AN OPEN NON-RANDOMIZED CLINICAL TRIAL OF

KALLADAIPPU CHOORANAM

IN

VATHA KALLADAIPPU (UROLITHIASIS)

The dissertation submitted by

Dr. S.ARUL PRIYA (Reg. No.321511101)

Under the Guidance of

Prof. Dr. K. KANAKAVALLI, M.D(S)

Submitted to

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment of the requirements
For the award of the degree of

SIDDHA MARUTHUVA PERARIGNAR

DOCTOR OF MEDICINE (SIDDHA)

BRANCH I – MARUTHUVAM

POST GRADUATE DEPARTMENT OF MARUTHUVAM

THE GOVERNMENT SIDDHA MEDICAL COLLEGE

CHENNAI – 106

OCTOBER – 2018

CERTIFICATE

This is to certify that the dissertation entitled "**AN OPEN NON RANDOMIZED CLINICAL TRIAL OF KALLADAIPPU CHOORANAM IN VATHA KALLADAIPPU (UROLITHIASIS)"** is a bonafide work done by **Dr. S. ARUL PRIYA**, Government Siddha Medical College, Chennai – 600 106 in partial fulfilment of the University rules and regulations for award of **SIDDHA MARUTHUVA PERARIGNAR** under my guidance and supervision during the academic year 2015 – 2018.

Name & Signature of the Guide

Name & Signature of the HOD

Name & Signature of the Dean/ Principal

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INTRODUCTION

INTRODUCTION

The most ancient and primordial medicine system is Siddha. Siddha is an orthodox and traditional medicine system which is been followed from past 25000 years with paramount potential and capability of numerous Siddhars, on which the name Siddha Medicine has been initiated. Every Siddhar were possessed with ashta siddhi or eight supernatural powers. Father of Siddha Medicine is **Agasthiar**. There are 18 other Siddhars who has contributed their valuable knowledge and experiences in Siddha medicine.

According to Siddha system human body consists of five elements such as Earth (Munn), Fire (Thee), Water (Neer), Air (Vayu) and Space (Agayam). Siddha medicines were conceived and constructed with assorted research and analysis carried on animals, herbs and minerals by the Siddhars. The main aim of Siddha medicine is not only to provide treatment for disease but also to prevent from the disease.This medicine has been carried out and followed by generations and generation in various Gurukuls and now days in educational institutions.

Initially this medicine was invented and practiced by the Dravidian civilization and thereafter the medicine was developed in Tamil language.Vata, Pitta and Kapha are the main three Doshas in Siddha medicine. It is been found that any kind of disturbance occurs in these humors will cause disease. The diseased body can be recovered with the help of the siddha medicine. Siddha medicine system contains both internal and external medicine.

Siddhars had defined 4,448 types of disease. Vatha kalladaippu is one of them, this disease mostly affects male as compared to female[1]. **Yug**i in his**"YUGI VAIDHYA CHINTHAMANI 800"** explains about aetiology, pathology, classification, clinical features, and prognosis. Urinary system can be divided into two forms:

"நீரினை அருக்கல் நோய்
நீரினை பெருக்கல் நோய்"

Vatha kalladaippu comes under "*நீரினை அருக்கல் நோய்*" in which the output of urine level will be very low, which will dry the urine and form urinary calculi due to various aetiological factors.

Urolithiasis is also known as Nephrolithiasis, which has been derived from the Greek word Nephros means kidney and Lithos means stone, kidney stone.

Urolithiasis or Nephrolithias is is formation of urinary calculi at any level of the Urinary tract. It is characterized by acute loin pain radiating to groin, and it consists of aggregates of crystals containing small amount of proteins and glycoprotein. Though various kinds of stone have been identified, calcium stones are the most common in human as well as rats[2].

Urinary stone disease is a common disorder estimated to occur in approximately 12% of the world population, with a recurrence rate of 70-81% in males and 47-60% in females . The peak incidence is observed in 2nd and 3rd decades of life[3].

Stone disease is frequently a recurrent problem more than 50% of patients with the calculus will have formed a further stone or stones within ten years. Obesity, aging, dietary indiscretions, global warming are some of the elements which plays a vital role causing stone disease. The risk of recurrence increases if a metabolic or other abnormality predisposing to stone formation is present and is not modified by treatment [4]. According to Siddha system of medicine Vatha kalladaippu occurs due to increase of Pitha.

On the above theory, I selected Vatha kalladaippu as my dissertation topic because now days the prevalence is increasing due to change in the life style of people and environment, moreover people prefer Siddha medicines to remove stones instead of a surgery. In Siddha system there are many drugs available for Kalladaippu, but I chosen Kalladiappu Chooranam for my clinical study to prove the efficacy of my drugs, over the other drugs because each and every drug of has its diuretic activity as well as it is a combination of herbo mineral. Herbal medicine provides economically effective and time tested and the same is considered as safe when compared to Modern synthetic drugs.

Therefore I selected **Vatha kalladaippu (Urolithiasis)** as my dissertation topic to cure the disease without surgery. For which, I choose Kalladiappu Chooranam to study its effect on Vatha kalladaippu both pharmacologically as well as clinically.

My clinical study is to observe the various factors in the evolution of Vatha kalladaippu and with the help of Siddha medicine, Kalladiappu Chooranam.

AIM AND OBJECTIVES

AIM AND OBJECTIVES

AIM:

The aim of my dissertation is to evaluate the efficacy of siddha drug **Kalladaippu Chooranam** both clinically and experimentally in the treatment of **Vatha Kalladaippu (Urolithiasis)**.

OBJECTIVES:

- To collect the authorial measures and literature reviews of vatha kalladaippu noi in ancient siddha and modern literatures.
- To have an idea of the incidence of the disease with regard to age, sex, occupation , socio economic status, food, climatic conditions and precipitating factors etc.
- To expose the efficacy of siddhar's diagnostic principles.
- To utilize the possible moder methods to confirm the diagnosis and prognosis.
- To have clinical trial on patients with vatha kalladaippu noi with selected siddha medicine.
  - ✓ **KalladaippuChooranam**
- To evaluate
  - ✓ Toxicological screening
    - Acute
    - Sub acute
  - ✓ Pharmacological screening
    - Lithotriptic activity
- To find out the Physio chemical & Phyto chemical analysis
- To find out the statistical analysis of clinical study

REVIEW OF LITERATURE

SIDDHA ASPECT

SIDDHA ASPECT

The diseases of the urinary system are divided into two types. They are

"நீரினை அருக்கல் நோய்
நீரினை பெருக்கல் நோய்"[5]

The disease kalladaippu comes under the classification of "Neerinai Arukkal Noi". In siddha system of medicine, the disease kalladaippu is mentioned by Yugi Munivar in Yugi Vaidhya Chinthamani 800.

"நீரிரு வினைக்குணத்தை நீயறி விரித்துச் சொல்வாம்
நீரினை பெருக்கலொன்றே நீரினை யருக்க லொன்று
நீரிழிவுடனே கொல்லும் நீர்க்கட்டு வினைகளொன்று"[6]

KALLADAIPPU NOI

VERUPEYAR (SYNONYMS)

Achmari

IYAL (DEFINITION)

Sudden obstruction in the flow of urine, pain at the tip of the penis in males and clitoris in females, burning micturition, loin to groin pain, passing of small sand like stones along with urine are the cardinal features of this disease[7].

Dehydration occurs due to overheat of the body. It leads to solid or crystalline aggregation from the dietary minerals in the kidney. The formed stone cannot expelled by kidney leads to this diseased condition[8].

Large concentions of stone in the bladder or kidney are known as calculus or gravel. It is attended with difficulty in passing urine[9].

Sudden obstruction to the flow of urine, pain at the tip of the penis in males and clitoris in females, burning micturition, pain in loin to groin region[10].

விலகு சிலநேரம் விடுபட்டு நீரோடும்
ஒழுகிய வாயு மொதுகினால் நோகாது
வழுகிய மந்த்தால் வாயுவந்தே புகில்
கழுவி முதிர்ந்திடும் கல்லடைப்பாகும்[11].

தானான மூத்திரப்பை தன்னிலப்பா
தனியான கல்லிருந்தால் சொல்லக் கேளே
ஊனான மூத்திரந் தானடிக்கடியே தானும்
உள்ளபடி இறங்குமடா சொன்னேன் பாரு
தேனான கல்லப்பா தாரை மேலே
தொப்பெனவே விழுவதால் தாரையப்பா
மானாக விழுவதனாலே நின்று போகும்
மக்களுக்கு இதுதீர சலாகை போடே

"தானென்ற மூத்திரத்தால் நறநறவென்று
தங்கியதோர் பொடியேனும் மணல்தானப்பா
வானென்ற சிறியதொரு கல்லாவதப்பா
வளமாக வந்துவிழும் நோய்க்குத் தானே
ஏனென்று அச்மரீ ரோகமென்ற பேராம்
தாககல்லுகள் தான் விழுகும் போது
கோனென்று குண்டிக்காய் மூத்திரக் குழலப்பா
குணமான மூத்திரப்பை நீர்த்தாரைக் கேளே

கேளடா முங்குறியில் எரிச்சல் கண்டு
கொடியாக வேதனைகள் காட்டுமப்பா
வாளடா சிறியதொரு கற்கள் தானே
வளமான மூத்திரப்பை குழல்வழிப் படியாய்த்
தேளடா வரும்போது திரேகந்தன்னில்
தெரிப்பது போல யிருவேதனை செய்யும்பாரு
நாளடா கற்கள் தானிறங்கி விட்டால்
நலமான வேதனைகள் தீரும்பாரே[12]"

Agasthiyar says the definition of Kallaidaippu as sand likes crystals deposited in urine, followed by small size of stones which is excreted in urine .Stones are stagnated in kidney, ureter, urinary bladder and urethra. Pain with burning sensation starts in urethral orifice followed by agonizing pain during the stone moving in urethral tract from the bladder , when the stone removed pain also relieved.

NOI VARUM VAZHI (AETIOLOGY)

"தெளிந்ததோர் கல்லடைப்பு ற்பத்தி கேளாய்
சிறிது நாட்டுடங்கியே மேகந்தன்னால்
தளிந்ததோர் சலப்பையிலுதிரந் தோய்ந்து
சந்து சந்தாகவே பருத்துக் கொள்ளும்
வளிந்ததோர் வாதபித்தங் கோபித்தக்கால்
வந்து பெருங்கல்லாய் நீர்வழியடைத்து
நளிந்ததோர் நாலுவிதக் கல்லடைப்பு
நண்பான வரலாறு நாட்டக்கேளே"

கலங்கினதோர் தண்ணீர்தான் குடித்தபேர்க்கும்
கல்லெலும்பு மயிர் மண்தான் கலந்தன்னத்தில்
அலங்கினதோ ரன்னங் கலருந்தலாலும்
அழுகலோடு மூத்தபண்ட மருந்தலாலும்
மலங்கினதோர் மாப்பண்ட மருந்தலாலும்
மந்தத்தில் வாய்வான பதார்த்தந் தன்னை
துலங்கினதோ ருசிதன்னிற் சுவைத்தலாலும்
சுருக்காய் கல்லடைப்பு வந்து தோன்றுந்தேனே[13]."

The urine constituents will easily deposit on the urinary tract and form the stone. At that time by vitiation of vatham and pitham these small stone becomes larger in size and block the urinary passage. The semen will stagnate for a long time in the urinary tract, so it will obstruct the urine flow Urinary stone are also formed due to the drinking of contaminated hard water, taking of food mixed with sand and small stones consuming of contaminated food articles, food containing more carbohydrates, unhealthy food habits.

A urinary disease occasionally developed in the urinary bladder which is known as vesical calculus. It is said to be due to the deranged vayu encircling or prevailing in the region of the abdomen arising from any of the following causes.

1) Suppression of seminal discharge during sexual intercourse.

2) Retention of semen in the spermatic region in involuntary discharge during nocturnal emissions due to excessive heat in the body.

The calculus are stone which is formed in the bladder may vary in size from that of the particles of sand or mustard upto things as large as green gram or Bengal gram and sometimes attains the size of a hen's egg even and block the passage of urine. It is accompanied by pain and difficulty in passing urine[14].

"நீரினைத் தடுத்தல் செய்யின்
நீர்க்கட்டுத் துவாரம் புண்ணாம்
பாறிடு சந்து சந்தில்
பண்பற நோவதாகும்
நேரிலங் கயரும் காமியம்
நிச்சயம் நோதல் செய்யும்
பாரினி லபான வாயு
பண்புறச் சேருமன்றே[15]"

POTHU KURIGUNANGAL(Clinical features)

- Gradual or sudden obstruction of the urine flow.
- Unbearable pain in the penis
- Excruciating pain and swelling is experienced at the tip of penis if the calculus attempts to expel.
- Colicky pain radiating from loin to groin, lower abdomen and urethra if the calculus is irregular with sharp projection.
- Burning and scanty micturition and Haematuria[16].

CLASSIFICATION

Classification according to yugi mamunivar,

"தோன்றினதார் நாலினிட நாமங்கேளாய்
சுறுக்கான வாதத்தின் கல்லடைப்பு
பூன்றியதோர் பித்தத்தின் கல்லடைப்பு
புரண்டதோர் சேத்துமத்தின் கல்லடைப்பு
தீன்றியதோர் தொந்தமாங் கல்லடைப்பு
தேகத்திற் பற்றியே சிறிதுகாலம்
தான்றியே சலப்பையில் வந்திழிந்து
சருவியே லிங்கத்திற்றரிக்குந் தானே[17]"

According to Yugivaidhyachinthamani, kalladaippu is classified into four types.

1) Vatha kalladaippu
2) Piththa kalladaippu
3) Silethuma kalladaippu
4) Thondha kalladaippu

1) Vatha kalladaippu:

"தரித்து நாபிக்குங் கீழ்சுருக்காய் குற்றில்
சல மலந்தான் விழாமற் றம்பமாகி
வரித்துமே லிங்கத்தில் வலியுமாகி
மருவியதோர் பொத்தியெலாஞ் சுரந்துகட்டி
திரித்தியே கிடைக்கொடாப் பிரட்டலாகித்
தேம்பியே மூச்சுமாய் வயிறுமுப்பும்
உரித்தோர் சதைபோல உவர்ப்புமாகும்
ஓங்கியதோர் வாதக்கல்லடைப்பு தானே[18]."

Acute pricking pain in the lower abdomen, scanty Micturition, obstruction to the flow of urine, pain in the penis, abdominal discomfort, and albuminuria will be present with mucous discharge and black coloured stone will be expelled.

2) Piththa kalladaippu:

"அடைப்பாகிச் சலந்தானு மருவலாகி
அயங்காச்சி சொருகினாற்போலே காணும்
புடைப்பாகிப் பொற்றியெங்கும் புழுக்கமாகிப்
பூட்டுபோல் பிகுவாகிப் பிரட்டலாகும்
மடைப்பமாகி உதிரநிறமாய்க் கல்லாகி
வந்திழிந்து லிங்கத்தில் மாட்டிக்கொள்ளும்
குடைப்பாகிக் குற்றலாய்க் கூச்சலாகிக்
குதட்டுமே பித்தக்கல்லடைப்பு தானே[19]."

Obstruction of urine flow, pricking pain and burning sensation in external meatus, expulsion of blood coloured stones.

3) Silethuma kalladaippu:

"தானான தொப்புளிலே வில்லு போலச்
சலியாமற் சுரந்துமே சற்றே குற்றும்
ஏனான காலோடு கைகள் சந்து
இடுப்புதான் குடைசலா யிசிவு காணும்
வேனான லிங்கத்தின் வெண்மை தன்னில்
விறுவிறென்றே கடுப்பாகி வியற்வை யாகும்
தேனான வெளுப்புக்கல் சிறு கல்லாகச்
சிக்கலாய் வந்திறங்குச் சேட்பந்தானே[19]"

In this type of Kalladaippu the symptoms are, pricking pain in umbilicus, pain radiating towards thigh, pain in the joints of hands and legs, burning micturition excessive sweating, expulsion of white coloured stone in urine, excessive sweating.

4) Thondha Kalladaippu:

"வந்திறங்கும் நீர்தாரையடி யிற்றானும்
மாவருத்த முண்டாகி வலியுமாகி
நொந்திறங்கி நீர்தானு மருவிபாயும்
நொய்தான சிறுமணல் போல் நொறுங்கிக்கல்லான்
சந்திறங்கி நீர்வழியில் வந்து விழும்
தாக்கான சிறங்கைக்கல் தினமொன்றுக்கு
துந்திறங்கித் தினந்தின முமிழந்துகொல்லும்
தொந்தமாங் கல்லடைப்புச் சூட்டிட்டாயே[20]"

Severe pain in urethra, Dysuria, Oliguria, handful of small sand like stones will expel with severe pain.

According to Dhanvanthri,

"திருந்திய வாதபித்தச் சிலேற்பனம் பிரகோபித்தால்
வகுந்த கமரித்தா நான்கு வகைப்படும் கல்லரிப்பான்
பிரிந்திடுஞ் சிலேற்பனா கமரிபித்தாசுமரி பின்னு
மிருந்திடு சுக்கிலாசுமரி நான்கு மெய்துமென்றே[21]"

<u>Achmari is classified into four types;</u>

1. **Kallerippan**
2. **Silethumaachmari**
3. **Piththaachmari**
4. **Sukkilachmari**

1) Kallerippangunam:

"சுத்துநீர் நாலிந்தன்னிற் சுக்கிலந்தனிற் சிலேற்பம்
பித்துமீ துலர்த்தல் கல்லாய்ப்பீசகி நீரடைத்துக் கொள்ளுங்
கொத்துநீ ரிற்றுவிழுங் கொப்புளநோ குடம்புகாயுஞ்
சித்தமா யருசியுண்டாஞ் சேர்ந்த கல்லெரிப்பனாமே.[21]"

Increased iyyam and azhalkutram dries the urine and semen forming calculi. Formations of stones in the urinary tract, oliguria, pricking pain around the umbilicus, fever, anorexia are the symptoms of this type.

2) Silethumaachmarigunam:

நீர்வரு நாளந்தன்னில் நின்றுநீர் சிறுத்துக்கொண்டு
சோர்தரும் சிவப்புவெண்மை சுக்கிலம் போலவீழும்
பேர்பெற நாலாமெட்டுப் பின்னமாய்க் கல்லுவீழும்
ஏர்பெறு சிலேற்பனத்தில் அச்சமரி என்னலாமே[22]"

Calculus in the Ureter urethra causes hydronephrosis, oliguria, Reddish white in colour and falls out like semen and stones are expelled as 4 or 8 fragments.

3) Piththaachmarigunam:

"*பெய்யும் நீர்நாளந்தன்னில் பித்தத்தா லெரிப்பெழுந்து*
செய்யு வுஷ்ணத்தால் வெந்துசேங்கொட்டைபோற்கல்லுண்டாம்
நய்யவே தனைகள் செய்யும் நவில்குணம் பித்தந்தன்னில்
எய்தசுமரி யென்றேமுன் னியம்பினர றிவின்மிக்கோர்[22]."

Burning sensation in urethra due to Azhal Kutram, burning micturition and formation of stone that appear like semicarpusanacardium seed.

4) Sukkilachmarigunam:

"*சுக்கிலம் வருங்காலத்தில் தம்பித்தாற் சுக்கிலந்தான்*
மிக்ககல்லாகி வெம்பி விதனமாய் நீர்விடாமற்
சிக்கி நீர் விழாமலங்கே மணல்வீழும் வெளுக்குந்தேகம்
மிக்குண ஞ்சுக்கிலாசு மரிய சாத்தியமென்றோதே[23]"

Suppression of semen, develops on two stones and obstruction in the flow of urine, sand like gravels are expelled, pallor of the body and this is incurable.

SAATHIYAM, ASAATHIYAM (PROGNOSIS)

As per yugi, Vatha kalladaippu, piththa kalladaippu, silethuma kalladaippu are curable. Thondha kalladaippu is fatal.

"சூட்டிய சாத்தியத்தைச் சொல்லக் கேளாய்
சுளுக்காகும் வாதத்தின் கல்லடைப்பு
பூட்டிட்ட பித்தத்தின் கல்லடைப்பு
புகழான சேட்டுமத்தின் கல்லடைப்பு
மூட்டிட்ட இதுமூன்று மசாதியமாகி
முனையான மருந்துகளிற் செம்மையாகும்
தோட்டிட்ட தொந்தமாங் கல்லடைப்புத்
தொடுசுறவே கொல்லுமிது சூட்சந்தானே[24]."

MUKKUTRA VAERUPADUGAL (PATHOGENESIS):

Disease occurs due to the derangement in

- Uyirthathukkal
- Udalthathukkal
- Kallamarupadu (seasonal changes)
- Thinai (living lands) and
- Udalvanmai.

Mukkutraiyal:

The function of the three uyirthathus:

a) Vali – Kattru + Veli

b) Azhal – Thee

c) Iyyam – Neer + Mann

The alteration of three thathu in their reaction to extrinsic or intrinsic factors results in disharmony. This altered harmony and balance variation of the three thathus results in disease. Their natural ratio (1:1/2:1/4) to each other is discerned by the physician at the wrist and each nadi is individually assessed for its strength, speed and regularit.

VATHAM

The term vatham denotes vayu, dryness, pain and flatulence. Based on functions and locations it is classified into ten types. They are tabulated below.

S.No	Vatham	General Features	Changes in VathaKalladaippu
1	Piranan (Uyirkkaal)	Responsible for respiration and it is necessary for proper digestion.	Normal
2	Abanan (Keel nokkukkaal)	Responsible for all the downward forces such as voiding of urine, stools, semen, menstrual flow.	Affected (Scanty Micturition)
3	Viyanan (Paravukaal)	Dwells in the skin and is concerned with the sense of touch, extension and flexion of the parts of the body and distribution of the nutrients to various parts of the body.	Normal
4	Uthanan (Melnokkukaal)	Responsible for all kinds of upward motion such as nausea, vomiting etc.,	Affected (Nausea, vomiting)
5	Samanan (Nadukkaal)	Considered essential for proper digestion, assimilation and carries the digested nutrients to each and every organ.	Affected
6	Nagan	Helps in opening and closing of eyelids.	Normal
7	Koorman	Responsible for vision, lacrimation and yawning.	Normal
8	Kirugaran	Induces appetite, salivation, all secretions in the body including nasal secretion and sneezing.	Normal
9	Thevathaththan	Induces and stimulates a person to become alert, get anger, to quarrel, to sleep etc.,	Normal
10	Dhananjeyan	Resides in the cranium and produces bloating of the body after death. This leaves from the body after 3 days of death, forming a way through the skull[25]	Normal

PITHAM

It is the thermal life force of the body. It is sub divided into five types. They are

S.No	Pitham	General Features	Changes in VathaKalladaippu
1	Anarpitham	Peps up the appetite and aids in digestion.	Normal
2	Ranjagapitham	Responsible for the colour and contents of blood.	Normal
3	Saathagapitham	Controls the whole body and is held responsible for fulfilling a purpose.	Affected (Dysuria, Oliguria)
4	Pirasagapitham	Dwells in the skin and concerned with the shine, glow, texture and its complexion.	Normal
5	Alosagapitham	Responsible for the perception of vision[26].	Normal

KABHAM

It is responsible for the stream line functions of the body and maintains body's defence mechanism intact. It is again classified into 5 types.

S.No	KABHAM	GENERAL FEATURES	CHANGES IN VATHA KALLADAIPPU
1	Avalambagam	Lies in the respiratory organs, exercises authority over other kabhas and control the heart and circulatory system.	Normal
2	Kilethagam	Found in stomach as it seat, moistens the food, softens and helps to be digested.	Normal
3	Pothagam	Responsible for the perception of taste	Normal
4	Tharpagam	Presents in the head and is responsible for the coolness of the eyes, sometimes may be referred to as cerebrospinal fluid.	Normal
5	Santhigam	Necessary for the lubrication and the free movements of joints[27.]	Normal

PARUVAKALAM

S.No	Perum Pozhuthugal	Mukkutra Marupaadugal
1	Kaarkaalam (Aavani & Purattasi) Mid August to Mid October	VATHAM - Vaetrunilaivalarchi PITHAM – Thannilaivalarchi
2	Koothirkaalam (Iypasi & Karthigai) Mid October to Mid December	VATHAM – Thannilaiadaidhal PITHAM - Vaetrunilaivalarchi
3	Munpanikaalam (Margazhi & Thai) Mid December to Mid February	PITHAM – Thannilaiadaidhal
4	Pinpanikaalam (Masi & Panguni) Mid February to Mid June	KABHAM – Thannilaivalarchi
5	Elavenirkaalam (Chithirai & Vaikaasi) Mid April to Mid June	KABHAM – Vaetrunilaivalarchi
6	Mudhuvenirkaalam (Aani & Aadi) Mid June to Mid August	VATHAM – Thannilaivalarchi KABHAM – Thannilai adaidhal[28]

THINAI (LAND)

Siddhars classified the lands into five types. They are

1. Kurunji – Mountain range
2. Mullai – Pastoral area of the forest
3. Marudham – The fertile river bed
4. Neidhal – The coastal region
5. Paalai – Arid desert

Kabha diseases will occur in Kurinji land. Pitha diseases occur in Mullai land. Vatha diseases occur in Neidhal land. Staying in Paalai land is not good to health. Marudham land is the fertile area where no disease occurs. So, Marudham land is the best one to stay.The winter season gives good health to the man, early summer and later rainy gives moderate health. Whereas early rainy and later summer are more prone to diseases, that's why siddhars called it as AanagaKaalam[29].

RELATION BETWEEN MUKKUTRAM, KAALANGAL AND THINAIGAL

Mukkutram	Paruvakaalam (Seasons)			Thinai
	Thannilaivalarchi (Accumulation)	**Vaetrunilaivalarchi (Aggravation)**	**Thannilaiadaidhal (Alleviation)**	
VATHAM	Mudhuvenilkaalam	Kaarkaalam	KoothirKaalam	Vatha disease is more prevalent in Neidhal land.
PITHAM	Kaarkaalam	Koothirkaalam	MunpaniKaalam	Pitha disease is more prevalent in Mullai land.
KABHAM	Pinpanikaalam	Elavenilkaalam	Mudhuvenil Kaalam[30]	Kabha disease is more prevalent in Kurunji land[31].

UDAL VANMAI (IMMUNITY)

Siddhars classify udalvanmai into three types. They are

1. IyarkaiVanmai
2. Kala Vanmai
3. SeyarkaiVanmai

UDAL KATTUGAL

S.No	Udalkattugal	General Features	Changes in Kalladaippu
1	Saaram (Digestive essence)	Responsible for the growth and development. It keeps the individual in good temperament and it enriches the body.	Affected due to pain
2	Senneer (Blood)	Responsible for the color of the blood and for the intellect, nourishment, strength of the body.	Normal
3	Oon (Muscle)	Gives lookable contour to the body as needed for the physical activity. It feed the fat next day and gives a sort of plumpness to the body.	Normal
4	Kozhuppu (Fat)	Lubricates the organs to facilitate frictionless functions.	Normal
5	Enbu (Bones)	Supports and protects the vital organs, gives the definite structure of the body and responsible for the posture and movements of the body.	Normal
6	Moolai (Bone marrow)	Nourishes the bone marrow and brain which is the centre that controls other system of body.	Normal
7	Sukkilam/Suronitham	Responsible for reproduction[32].	Normal

PINIYARI MURAIMAI (DIAGNOSIS)

Four steps are followed in diagnosing the disease. They are

1. PoriyaalAridhal
2. PulanalAridhal
3. Vinaadhal
4. Envagaithervugal

PORIYAAL ARIDHAL PULANAL ARIDHAL:

In this, the physician should carefully observe the changes that occur in the five sensory organs (porigal) of the patient.PulanalAridhal are understanding by the sense objects. These are as follows:

1. Mei : Ooru (Somatic sense)
2. Vaai : Suvai (Taste)
3. Kan : Oli (Vision)
4. Mookku : Natram (Smell)
5. Sevi : Oosai (Sound)

VINAADHAL(INTERROGATION):

An effective history taking helps one to diagnosis properly. By Vinadhal the physician should interrogate about the patients name, age, occupation, socio-economic status, food habits, history of past illness, history of present illness, family history, marital status, menstrual history and frequency of pain.

ENVAGAI THERVUGAL:

“நாடிப்பரிசம் நாநிறம் மொழிவிழி

மலம் மூத்திரமிவை மருத்துவராயுதம்[33].”

Nowadays advanced diagnostic tools have been developed by modern bio medical scientists. But siddhars have given eight diagnostic methodological tools. They are called as Envagaithervu.

Eight fold system of clinical assessments:

Siddhars have given eight diagnostic methodological tools. They are

1. Naadi
2. Sparisam
3. Naa
4. Niram
5. Mozhi
6. Vizhi
7. Malam
8. Moothiram[34]

GENERAL FINDINGS:

NAADI:

The word pulse means the beating of artery felt with the tip of the fingers; its rate and character go to indicate a person’s condition of health. It is also understood as the beating,throbbing or rhythmical dilatation of arteries as the blood is propelled along them by the concentration of the heart in the living body. The term pulse in medical practice is usually applied to beat or throb felt in radial artery at the wrist;

through it may felt over the temporal, carotid, ulnar, brachial, femoral and other artery.

Normally the pulse is recorded in the radial artery in the right hand for the male and left hand for the female by keeping the index finger,the middle finger and the ring finger on it after gently scrubbing the area .It is one unit in vali as felt by index finger and a half unit in azhal as felt by the middle finger and one fourth units in iyyaas felt by the ring finger .

Three humoursVatham, Pitham, and Kabham are in the ratio 1:1/2:1/4 normally. Derangement in these ratio leads to various disease conditions.

Naadinadai in kalladaippu

When the vatham add with mandham it produces the kalladaippu disease.

"ஏவலாய் குழலாய் பித்தஞ் செய்குணம் விளம்பக்கேளாய்

கோலவேல் விழி சிவந்து குளிர்ந்திடிரிருக்கு மல்லால்

சீலவே நீர்கடுத்து நொந்து சுறுக்கெனச் சிவந்து வீழும்

ஞலமே கிறுகிறென்று நாவுலர்ந் திருக்குங் காண்[35]"

SPARISAM:

By sparisam, the temperature of skin (thatpam- cold or veppam – heat), smoothness, roughness, sweating, dryness, hard patches, swelling, abnormal growth of organs and tenderness can be felt.

InVathaKalladaippu, patient feels tenderness over the lower abdomen, renal angle and lumbar region. Also patient's temperature is increased in lower abdomen, sweating all over the body at the time of colic.

NAA:-

By the examination of the tongue its colour, size, shape, coatings, moisture, movement, ulcer, fissures, crust and conditions of teeth and gums can be examined. In kalladaippu, the naa is not affected.

NIRAM:

- The colour of the skin all over the body a local region of affection in conjunctiva, tongue, nail bed and hair etc.

  ValiUdal : Black colour

  AzhalUdal : Yelllow or Red Colour

  IyyaUdal : White or Yellow

- In VathaKalladaippu, the Niramof Udal depends upon the body constitution, pallor of the body is absorbed in sukkilaachmari.

MOZHI:

- By examining Mozhi (Speech), characters, hoarseness, slurring speech, various disorders of speech such as dysarthria can be noted.

- In VathaKalladaippu there is a low pitch voice due to agonizing pain in lower abdomen and burning sensation.

VIZHI:

Character of the eye is noted. Colour, warm, burning sensation, irritation, visual perception are generally noted.

- In kalladaippu, the vizhi may be affected. Redness due to renal colic pain.

MALAM:

The stools are examined for quantity, hardening (malakattu), loose motion (bedhi), colour and smell.

- In kalladaippu, the malam will be affected due to either constipation or diarrhoea.

MOOTHIRAM

a) NEERKURI (Urine examination)

Urine examination is good diagnostic method compare to naadi and other Envagaithervugal. Theraiyar mention it as.

"அருந்து மாறி ரதமும் அவிரோதமமாய்

அக்கல் அலர்தல் அகாலவூன் தவிர்தழற்

குற்றளவருந்தி உறங்கி வைகறை

ஆடிக்கலசத் தாவியே காதுபெய்

தொருமுகூர்த்தக் கலைக்குட்பட்டு நீரின்

நிறக்குறி நெய்குறி நிருமித்தல் கடனே[36]."

Siruneer should be collected in early morning; patient should be eating six tastes of food with regular time and well sleeping over night, urine should be examine within 3 hours.

SIRUNEERIN POTHU GUNAM:

"வந்த நீர்க்கரி எடை மணம் நுரை எஞ்சலென

றைந்தியலுளவை யறைகுது முறையே[36]."

The urine is examined for its Niram (colour), Eadai (Specific gravity), Nurai (Froth), Natram (Smell), Enjal (Deposits). Invathakalladaippu, the moothiram is affected due to scanty Micturition.

NIRAM (COLOUR)

"பீதம் செம்மைபைங் கருமை வெண்மையென்

றோதைங் கொழுமையை யொத்துகு நீரே[37]."

1. Yellow
2. Red
3. Green
4. Black
5. White

KALLADAIPPU NEERIN GUNAM (COLOUR INDICATING URINARY STONES)

The urine colour would look like flesh washing water; this is indicated in kidney diseases. This is mentioned as

"தீப்புலால் கழுநீர்ச் செயலெனிர் குண்டிக்

காய்த்துர்ப் பலத்தால் கதித்த நீராமத்

துர்ப்பலக் கபமும் சோரியும் கொதிப்புறகப்

பற்பகலாகப் பையப் பதிந்தே[38]."

EADAI (SPECIFIC GRAVITY)

Urine, not thick is considerably healthy. This is mentioned as

“மிகத் தடிப்பும் மிகத் தேறலும் இன்றெனில்
சுகத்தைத் தரும் மெய்ச் சுபாவ நீர்நன்றே[39].”

NURAI (FROTH)

Urine may be frothy in nature, if it is reduced in vali, azhal and ayyam are said to be deranged. This is mentioned as

“பந்த மெய்ப்பசை யிளகப்படும் பருவத்
தந்தர்ப் பூதமாய் அனில மூத்திரத்தில்
சம்பத்தப்படும் ததிநுரைப் புனலே[40].”

NAATRAM (SMELL)

Foul odour with pyuria is observed in patients with urinary lithiasis associated with urinary tract infection and ulcer. This is mentioned as

“ஓதமணத்தோ டவவோத மொத்தி றங்கும்
சீதளத்தாற் கம்மிய தேகிகளுக்கே
காணிதில சீழுற் கலந்திழி மணமுறின்
கருப்பநா பிகளுங் காமநாள த்துளும்
விரணமுண் டின்றேல் எய்து மாசுமரியல்
திருத்தலே திண்ண மெனமனத் துன்னே[39].”

ENJAL (DEPOSITS)

If urine excretion look like curd water white colour and sand like deposits in urine indicate stones in kidney. This is mentioned as

“நார்த்தி நீர்ப்பால் போல நனவுற்றங் கிழியு மானால்
மாரற்ப முற்ற நீரி லடி மண்டிக் கிடந்த தானால்
பாரிந்த மெழுகு மாங்காய் பற்றிய கல்வி னாலே
சீருற்ற செய்கை யென்று தெரிவுறச் செப்பலாமே[41].”

NEIKURI

The early morning urine of the patient is analyzed by dropping a drop of gingely oil on the surface of the urine sample. The accumulation, formations, changes, and dispersal under the sunlight without any external disturbances of the urine sample can be noted.

The urine kept on the kidney tray in sun light, on non wind condition, should be by dropping a drop of gin oil gently with rod. If oil spread like snake, it indicates valineer; a ring indicates azhalneer and float like a pearl indicates iyyaneer and sinks in urine indicates mukkutram.

"அரவென நீண்டினஃதே வாதம்
ஆழி போல் பரவின் அஃதே பித்தம்
முத்தொத்து நிற்கின் மொழிவதென் கபமே[42]".

- Vathaneer – The oil spreads like snake
- Pithaneer – The oil spreads like ring
- Kabhaneer – The oil spreads like pearl
- If the oil spreads gradually, it indicates good prognosis[43]
- If the oil spreads fast or gets mixed completely with urine or sinks in urine, it suggests bad prognosis.

Since kalladaippu is due to the derangement of vatham and pitham, the Neikuri will be vatha or pithaneer.

MARUTHUVAM (LINE OF TREATMENT)

The entire siddha system of medicine consists of three great subdivisions namely,

1) Noyillaneri (preventive) – Kaappu

2) Noineekuneri (curative methods) – Neekkam

3) Uramaakkumurai (strengthening methods) - Niraippu .

Noyillaneri is the special approach of the siddha system where regular dietary habits, early rising, physical and mental discipilinaries are all emphasized. Prevention can mostly save our body and soul, but modernization results in alteration of good health, leads to disease.

Siddha system is playing major role in treating and preventing many chronic diseases. Likewise, herbal medicines have several phyto chemicals which exert their beneficial effect on urolithiasis by multiple mechanisms like,

- Diuretic activity
- Crystallization inhibiting activity
- Anti-Litiatic activity
- Antimicrobial activity
- Analgesic and anti inflammatory activity
- Improving renal function
- Regulates oxalate, calcium mechanisms.

The main object of treatment is to bring down the deranged mukkutrams to natural equilibrium by giving purgatives, which cure derangement of vatham; this is one of the causes forVathakalladaippu.

In Siddha system, treatment is not only removable of disease but also the prevention and improving the body condition after removal of disease. This is said as kappu, neekkam and niraippu.

Fomentation:

An attack of renal colic may be aborted by the application of heat fomentation (hot water bottle or heater) to the lumbar region. Immediate treatment of loin pain or renal colic is bed rest.

PREVENTION:

1. For prophylactic purpose it is necessary to eliminate all hindrances to a free drainage of urine (constriction, adenoma of the prostrate etc) and to remove foci of infection from the teeth and tonsils.

2. To prevent the formation of urate calculi, a diet of milk and vegetables and mineral water is prescribed.

    - In the presence of oxalate calculi restrictions are imposed on foods rich in calcium (milk, raw eggs, potatoes) with total abstinence from chocolate, spinach gooseberries and carrots.

3. A patient with phosphorus, carbonate stones is kept on a meat diet and much water to drink.

ADVICE:

1. Patients should drink large amount of water (2 - 3 lit/day)

2. Patient should not suppress the excretion of urine and seminal fluid.

3. Preparation containing Vit. D must be avoided.

4. Regarding prevention Anubhavavaidhya deva ragasiyam states that one should not suppress the excretion of Moothiram (urine) and Sukkilam (Seminal fluid).

NOI KANIPPU VIVATHAM (DIFFERENTIAL DIAGNOSIS)

1) Neerkattu (Anuria)
2) Neerchurukku (Oliguria)
3) Chottuneer (Incontinence)

DO'S AND DONT'S:

DO'S:

1) Drink 2-3 litres of water per day.
2) Dring tender coconut, barley water, lemon juice, raddish juice.
3) The following vegetables can be taken in the diet

    Raddish

    Lady's finger

    Plantain pith

    Mint leaves

    Bottle guard

DONT'S:

1) Avoid cabbage, cauliflower, and tomato seeds, mushroom.
2) Avoid milk and its products.
3) Avoid chicken, fish and other sea foods

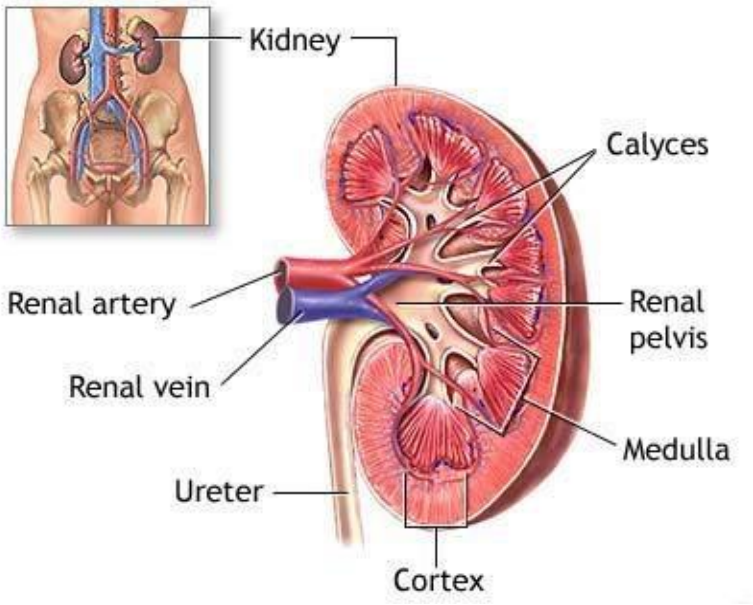
MODERN ASPECT

MODERN ASPECT

ANATOMY AND PHYSIOLOGY OF THE URINARY SYSTEM

KIDNEYS

The kidneys are a pair of excretory organs situated on the posterior abdominal wall, one on each side of the vertebral column, behind the peritoneum. They remove waste products of metabolism and excess of water and salts from the blood, and maintain its pH.



LOCATION

The kindney is occupying the epigastric, hypochondrium, lumbar and umbilical and Vertically they extends from the upper border of T 12 Vertebra to the centre of the body of L3 Vertebra.

The right kidney is slightly lower than the left kidney. And the left kidney is little nearer to the median plane than the right . The transpyloric planepassess through the upper part of the Hilum of right kidney and the lower part of the hilum of Left kidney.

SHAPE, SIZE, WEIGHT AND ORIENTATION

Each kidney is about 11cm long, 6 cm broad and 3 cm thick. The left kidney is a little longer and narrower than the right kidney. On an average the kidney weighs 150 g in males and 135 g in females. The kidneys are reddish brown in colour.

The long axis of the kidney is directed downwards and laterally, so that the upper poles are nearer to the median plane than the lower poles. The transverse axis is directed laterally and backwards.

EXTERNAL FEATURES

Each kidney is bean shaped. Each kidney has following features. It has

2 poles (upper and lower)

2 borders (medial and lateral)

2 surfaces (anterior and posterior)

TWO POLES OF THE KIDNEY

The upper pole is broad and is in close contact with the corresponding suprarenal gland.

The lower pole is pointed.

TWO SURFACES

The anterior surface is said to be irregular and the posterior surface flat, but it is often difficult to recognize the anterior and posterior aspects of the kidney by looking at the surfaces. The proper way to do this is to examine the structures present in the hilum as described below.

TWO BORDERS

The lateral border is convex. The medial border is concave. Its middle part shows a depression, the hilus or hilum.

HILUM

The following structures are seen in the hilum from anterior to posterior side: 1) The renal vein 2) the renal artery and 3) the renal pelvis, which is the expanded upper end of the ureter. Examination of these structures enables the anterior and posterior aspects of the kidney to be distinguished from each other. As the pelvis is continuous, inferiorly, with the ureter the superior and inferior poles of the kidney can also be distinguished by examine the hilum. So it is possible to determine the side to which a kidney belongs by examining the structures in the hilum. Commonly, one of the branches of the renal artery enters the hilum behind the renal pelvis, and a tributary of the renal vein may be found in the same plane.

CAPSULES OR COVERINGS OF KIDNEY

1. **The fibrous capsule**: This is a thin membrane which closely invests the kidney and lines the renal sinus.

2. **Perirenal or perinephric fat**: This is a layer of adipose tissue lying outside the fibrous capsule. It is thickest at the borders of the kidney and fills up the extra space in the renal sinus.

3. **Renal fascia:** This is a fibroareolar sheath which surrounds the kidney and the perirenal fat called as the fascia of Gerota. It consists of an anterior layer or fascia of Toldt and a posterior layer or fascia of Zuckerkandl.

4. **Pararenal or paranephric body (fat**): It consists of a variable amount of fat lying outside the renal fascia. It is more abundant posteriorly and towards the lower pole of the kidney. It fills up the paravertebral gutter and forms a cushion for the kidney.

Naked eye examination of a coronal section of the kidney shows: a) an outer, reddish brown cortex; b) an inner, pale medulla; c) a space, the renal sinus.

The renal medulla is made up of about 10 conical masses, called the renal pyramids. Their apices form the renal papillae which indent the minor calices.

The renal cortex is divisible into two parts: a) cortical arches or cortical lobules, which form caps over the bases of the pyramids; and b) renal columns, which dip in between the pyramids. Each pyramid along with the overlying cortical arch forms a lobe of the kidney.

The renal sinus is a space that extends into the kidney from the hilus. It contains a) branches of the renal artery; b) tributaries of the renal vein; and c) the renal pelvis. The pelvis divides into 2 to 3 major calices, and these in their turn divide into 7 to 13 minor calices. Each minor calyx ends in an expansion which is indented by one or three renal papillae.

Histologically, each kidney is composed of one to three million uriniferous tubules. Each tubule consists of two parts which are embryologically distinct from each other. These are as follows.

A) The **secretory part**, called the nephron, which elaborates urine. Nephron is the functional unit of kidney and comprises the renal corpuscle or Malphigian corpuscle and the renal tubule.

B) The **collecting tubule** begins as a junctional tubule from the distal convoluted tubule. Many tubules unite together to form the ducts of Bellini which open into minor calices through the renal papillae.

C) **Juxtaglomerular apparatus** is formed at the vascular pole of glomerulus which is intimately related to its own ascending limb of the Henle’s loop near the distal convoluted tubule.

BLOOD SUPPLY

Usually there is one renal artery on each side, arising from the abdominal aorta. Accessory renal arteries are present in 30% of individuals; they arise commonly from the aorta, run parallel to the renal artery, and enter the kidney either at the hilus or at one of its poles.

At or near the hilus the renal artery divides into anterior and posterior divisions. Further branching of these divisions gives rise to segmental arteries each of which supplies one vascular segment. Five such segments are described. These are apical, upper, middle, lower and posterior. The segmental arteries are end arteries, so that the vascular segments are independent units.

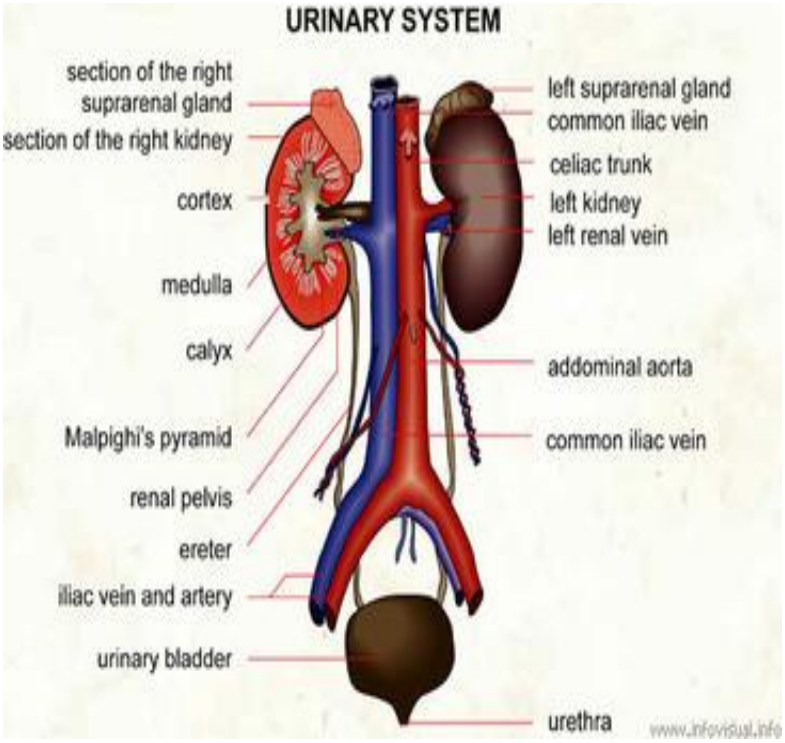
VENOUS DRAINAGE

The venous end of the peritubular capillary plexus gives rise to interlobular veins which run along the corresponding arteries. The interlobular veins drain into the arcuate veins, which in their turn open into the interlobar veins. These emerge at the renal sinus and join to form the renal vein which drains into the inferior vena cava.

The venous end of the capillary plexus along the vasa recta gives rise to veins which drain into the arcuate veins.

LYMPHATIC DRAINAGE

The lymphatics of the kidney drain into the lateral aortic nodes located at the level of origin of the renal arteries.



NERVE SUPPLY

The kidney is supplied by the renal plexus, an offshoot of the celiac plexus. It contains sympathetic (T10 – L1) fibres which are chiefly vasomotor. The afferent nerves of the kidney belong to segments T10 to T12.

FUNCTIONS OF KIDNEYS

Kidneys perform vital functions. By excreting urine, kidneys play principal role in the maintenance of internal environment. In addition, kidneys perform many other functions as described below.

1. ROLE OF HOMEOSTASIS

The primary function of kidneys is homeostasis. It is accomplished by the formation of urine. Kidneys are not only the excretory organs, but are also the regulatory organs because their major role is in homeostasis. During the formation of urine, kidneys regulate various activities in the body, which are concerned with homeostasis.

Excretion of waste products: Removal of wastes help in homeostasis. Kidneys excrete the unwanted waste products which are formed during metabolic activities.

a. Urea – end product of amino acid metabolism
b. Uric acid – end product of nucleic acid metabolism
c. Creatinine – end product of metabolism in muscles
d. Bilirubin – end product of hemoglobin degradation
e. Products of metabolism of other substances.

Kidneys also excrete harmful foreign chemical substances like:

a. Toxins
b. Drugs
c. Heavy metals
d. Pesticides etc.,

Maintenance of water balance: Kidneys maintain the water balance in the body by conserving water when it is decreased and excreting water when it is excess in the body. This is a very important process for homeostasis.

Maintenance of electrolyte balance: Maintenance of electrolyte balance, especially sodium is in relation to water balance. Kidneys retain sodium if the

osmolarity of body water decreases and eliminate sodium when osmolarity increases.

Maintenance of acid base balance: The pH of the blood and body fluids should be maintained within narrow range for healthy living. It is achieved by role of kidneys. Body is under constant threat to develop acidosis, because of production of lot of acids during metabolic activities. However, it is prevented by kidneys, lungs and blood buffers, which eliminate these acids. Among these organs, kidneys play major role in preventing acidosis. In fact, kidneys are the only organs, which are capable of eliminating certain metabolic acids like sulfuric and phosphoric acids.

2. HEMOPOIETIC FUNCTION

Kidneys stimulate the production of erythrocytes by secreting erythropoietin. Erythropoietin is the important stimulating factor for erythropoiesis. Kidney also secretes another factor called thrombopoietin, which stimulates the production of thrombocytes.

3. **ENDOCRINE FUNCTION**

Kidneys secrete many hormonal substances in addition to erythropoietin and thrombopoietin. The hormones secreted by kidneys are:

a. Erythropoietin

b. Thrombopoietin

c. Renin

d. 1, 25 – Dihydroxycholecalciferol

e. Prostaglandins

4. REGULATION OF BLOOD PRESSURE

Kidneys play an important role in the regulation of arterial blood pressure. Kidneys regulate arterial blood pressure by two ways:

1. By regulating the volume of extracellular fluid
2. Through renin – angiotensin mechanism

5. REGULATION OF BLOOD CALCIUM LEVEL

Kidneys play a role in the regulation of blood calcium level by activating 1, 25 – dihydroxycholecalciferol into vitamin D. Vitamin D is necessary for the absorption of calcium from intestine[44].

MECHANISM OF URINE FORMATION

The process involve in urine formation are,

1. Glomerular filtration
2. Tubular reabsorption
3. Tubular secretion

GLOMERULAR FILTRATION

Glomerular filtrate is protein free plasma. Glomerular filtration is depends upon hydrostatic pressure of the afferent arterioles, glomerular capillary pressure and colloidal osmotic pressure. The glomerular filter contains all the substance present in the plasma except colloids.

About 170 litres of glomerular filtrates enters the renal tubule per day and about 168.5 litres of urine reabsorbed in the renal tubule.

Normal amount of urine excreted per day is about 1.5 litres. The glomerular filtrate is alkaline. It contains water, small quantities of urea, glucose, potassium, calcium, bicarbonates and uric acid.

TUBULAR REABSORPTION

When the glomerular filtrate flows through the tubular portion of nephron, both quantitive and qualitative changes occur. Large quantity of water (more than 99%), electrolytes and other substances are reabsorbed by the tubular epithelial cells. The reabsorbed substances move into the interstitial fluid of renal medulla. And, from here, the substances move into the blood in peritubular capillaries.

Since the substances are taken back into the blood from the glomerular filtrate, the entire process is called tubular reabsorption.

TUBULAR SECRETION

In addition to reabsorption from renal tubules, some substances are also secreted into the lumen from the peritubular capillaries through the tubular epithelial cells. It is known as tubular secretion or tubular excretion. Drug mercurial diuretics, ammonium , potassium, hydrogen ion etc. are excreted by tubular secretion.

Thus, urine is formed in the nephron by the processes of glomerular filtration, selective reabsorption and tubular secretion[45].

URETERS

The ureters are a pair of narrow, thick-walled muscular tubes which convey urine from the kidneys to the urinary bladder.

They lie deep to the peritoneum, closely applied to the posterior abdominal wall in the upper part, and to the lateral pelvic wall in the lower part.

DIMENSIONS

Each ureter is about 25 cm (10 in.) long, of which the upper half (5 in.) lies in the abdomen, and the lower half (5 in.) in the pelvis. It measures about 3mm in diameter, but it is slightly constricted at three places.

COURSE

The ureter begins within the renal sinus as a funnel shaped dilatation, called the renal pelvis. The pelvis issues from the hilus of the kidney, descends along its median margin, or partly behind it. Gradually it narrows till at the lower end of the kidney it becomes the ureter proper.

The ureter passes downwards and slightly medially on the psoas major muscle, and enters the pelvis by crossing in front of the termination of the common iliac artery. In the lesser or true pelvis the ureter at first runs downwards, and slightly backwards and laterally, following the anterior margin of the greater sciatic notch. Opposite the ischial spine it turns forwards and medially to reach the base of the urinary bladder. The ureter enters the bladder wall obliquely to open into it at the lateral angle of its trigone.

CONSTRICTIONS

The ureter is slightly constricted at three places:

1) The first at the pelvic ureteric junction about 5.5 cm below the hilum of the kidney;

2) Second at brim of the lesser pelvis where the ureter crosses in front of the common iliac artery;

3)Third is just before it enters the bladder .The renal stones tend to get arrested at these places.

BLOOD SUPPLY

Upper part receives branches from renal artery, gonadal or colic vessels, middle part receives branches from aorta, the gonadal or iliac vessels, and pelvic part is supplied by branches from the vesical, middle rectal or uterine vessels.

NERVE SUPPLY

The ureter is supplied by sympathetic from T10 – L1 segments and parasympathetic from S2 – S4 nerves. They reach the ureter though the renal, aortic and hypogastric plexuses. All the nerves appear to be sensory in function[46].

URINARY BLADDER

The urinary bladder is a muscular reservoir of urine, which lies in the anterior part of the pelvic cavity. The detrusor muscle of urinary bladder is arranged in whorls and spirals and is adapted for mass contraction rather than peristalsis.

SIZE, SHAPE AND POSITION

The bladder varies in its size, shape and position according to the amount of urine it contains. When empty it lies entirely within the pelvis; but as it fills it expands and extends upwards into the abdominal cavity, reaching up to the umbilicus or even higher.

EXTERNAL FEATURES

An empty bladder is tetrahedral in shape and has:

- An apex, directed forwards;
- A base or fundus, directed backwards;
- A neck, which is the lowest and most fixed part of the bladder;
- Three surfaces, superior and right and left inferolateral; and
- Four borders, two lateral, one anterior and one posterior.

A full bladder is ovoid in shape and has:

- An apex, directed upwards towards the umbilicus;
- a neck, directed downwards, and
- two surfaces, anterior and posterior.

INTERNAL SPHINCTER OF THE BLADDER

The bladder wall is made up of longitudinal and circular layers of smooth muscles and they are called detrusor muscle. In the trigone in addition to detrusor muscle, there is trigonal muscle of bell. There is no definite circular muscle fibre at the neck of the bladder stop at the level of neck. Longitudinal fibres from the posterior wall diverge to pass around the urethra on both sides.

CAPACITY OF THE BLADDER

The mean capacity of the bladder in an adult male is 220 ml, varying from 120 to 320 ml. filling beyond 220 ml causes a desire to micturate, and the bladder is usually emptied when filled to about 250 – 300 ml. filling upto 500 ml may be tolerated, but beyond this it becomes painful. Referred pain is felt in the lower part of the anterior abdominal wall, perineum and penis (T11 to L2; S2 – S4).

BLOOD SUPPLY

Superior vesicle arteries and inferior vesicle arteries supplies the bladder. In addition branches from obturator and inferior gluteal artery are supplied to the bladder.

NERVE SUPPLY

Sympathetic fibers arise from T11 – L2 segment. Parasympathetic fibres branches from S2 – S4. Somatic pudental nerve supplies the sphincter urethrae which is voluntary.

URETHRA

Urethra is a tubular passage extending from the neck of the bladder to the external urethral orifice.

The male urethra extends from the internal urethral orifice at the neck of urinary bladder to the external urethral orifice at the tip of the penis. It is about 20 cm long in flaccid state of the penis; the long axis of urethra shows 2 curvatures and is therefore S shaped. In the erect state it becomes J shaped.

It is divided into 3 parts

1) **Prostatic part** : Passes through prostate (3 cm long)
2) **Membraneous part** : Surrounded by sphincter (2 cm long)
3) **Spongy part (Penile part)** : Passes through the bulb and carpus spongiosum (15 cm long)[47]

SPHINCTER OF THE URETHRA

There are 2 sphincters, in relation with urethra internal and external. The internal sphincter made up of smooth muscle fibre and situated at the neck of the bladder is supplied by sympathetic nerves from lower thoracic segments and upper lumbar segments.

The external sphincter made of light striated muscle fibre surrounds the membraneous part of urethra; it is supplied by prineal branch of the pudental nerve (S2 to S4).

BLOOD SUPPLY

Branches of internal pudental artery supplies urethra[48].

THE FEMALE URETHRA

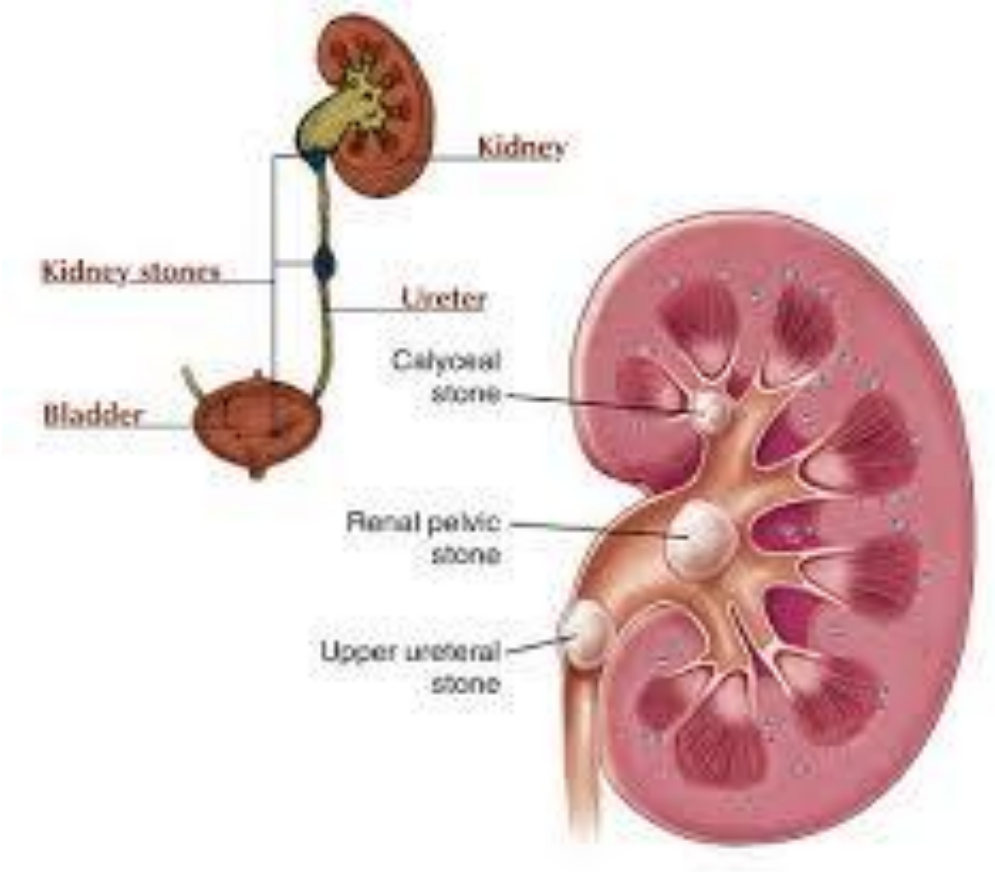
The female urethra is only 4 cm long and 6 mm in diameter. Developmentally, it corresponds to the upper part of the prostatic urethra of the male.

It begins at the internal urethral orifices roughly 5 cm behind the middle of the pubic symphysis. It runs downwards and forwards embedded in the anterior wall of the vagina, traverse the urogenital diaphragm and ends at the lateral urethral orifices in the vestibule.

The mucosa of the urethra is much folded and contains numerous mucous glands and lacunae which open into the urethra. The collections of mucous glands one on each side of the upper part of the urethra is called the paraurethral glands of skene.

The female urethra is dilatable[48].

RENAL CALCULI (UROLITHIASIS)



It refers to calculus formation at any level in the urinary tract but most arise in the kidney.calculi are common in the renal pelvis, calyces and collecting ducts of people in industrialized countries, and is the third most common disorder of the urinary tract[49].

Urolithiasis is a frequent clinical problem, affecting 5 to 10% of Americans in their lifetime. Males are affected more often than females and the peak age at onset is between20 and 30 years. Familial hereditary predisposition to stone formation has long been known. Many of the inborn errors of metabolism, such as gout cystinuria, and primaryhyperoxaluria, provide good examples of hereditary disease characterized by excessiveproduction and excretion of stone -forming substances[50].

In underdeveloped countries nephrolithiasis is rare. In Britain and USA the incidence of renal calculi has become at least 10 times higher in the past 90 years.

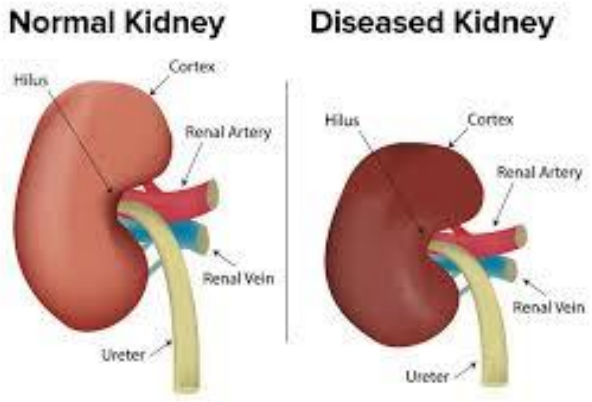
This increase may be related to changes in diet e.g. increase in protein diet. Current annual incidence in Britain and the USA ranges from 6.87 to 20.8 per 10,000 of the population. A familial tendency toward stone formation has long been recognized.

If stones grow to sufficient size (usually at least 3 millimeters (0.12 in)) they can cause obstruction of the ureter. Ureteral obstruction causes postrenal azotemia and hydronephrosis (distention and dilation of the renal pelvis and calyces), as well as spasm of the ureter. This leads to pain, most commonly felt in the flank (the area between the ribs and hip), lower abdomen, and groin (a condition called renal colic). Renal colic can be associated with nausea, vomiting, fever, blood in the urine, pus in the urine, and painful urination. Renal colic typically comes in waves lasting 20 to 60 minutes, beginning in the flank or lower back and often radiating to the groin or genitals. The diagnosis of kidney stones is made on the basis of information obtained from the history, physical examination, urinalysis and radiographic studies. Ultrasound examination and blood tests may also aid in the diagnosis.[51]

Renal calculi are formed when the urine is supersaturated with salt and minerals such as calcium oxalate, struvite (ammonium magnesium phosphate), uric acid and cystine.60-80% of stones contain calcium[52]. They vary considerably in size from small 'gravel-like' stones, to large staghorn calculi. The calculi may stay in the position in which they are formed, or migrate down the urinary tract, producing symptoms along the way. Studies suggest that the initial factor involved in the formation of a stone may be the presence of nanobacteria that form a calcium phosphate shell[53,54.].

The other factor that leads to stone production is the formation of Randall's plaques. Calcium oxalate precipitates form in the basement membrane of the thin loops of Henle; these eventually accumulate in the subepithelial space of the renal papillae, leading to a Randall's plaque and eventually a calculus.[55]

Pathophysiology



Urinary calculi are consist of aggregates of crystals, usually containing calcium or phosphate in combination with small amounts of proteins and glycoproteins. In developed countries, however, most calculi occur in healthy young men, in whom investigations reveal no clear predisposing cause. Renal stones vary greatly in size. There may be particles like sand anywhere in the urinary tract, or large round stones in the bladder.

In developing countries bladder stones are common, particularly in children. In developed countries, the incidence of childhood bladder stones is low; renal stones in adults are more common. Staghorn calculi fill the whole renal pelvis and branch into the calyces; they are usually associated with infection and composed largely of struvite.

Deposits of calcium may be present throughout the renal parenchyma, giving rise to fine calcification within it (nephrocalcinosis), especially in patients with renal tubular acidosis, hyperparathyroidism, vitamin D intoxication and healed renal tuberculosis. Cortical nephrocalcinosis may occur in areas of cortical necrosis, typically after AKI in pregnancy or other severe AKI.

PREVALENCE

Renal stone disease is common , affecting individuals of all countries and ethnic groups. In the UK, the prevalence is about 1.2%, with a lifetime risk of developing a renal stone at age 60-70% of about 7% in men. In some regions the risk is higher, most notably in countries like Saudi Arabia, where the lifetime risk of developing a renal stone in men aged 60-70 is just over 20%.[56]

EPIDEMIOLOGY

- Renal stones are common, being present at some time in one in ten of the population, although a significant proportion will remain asymptomatic.
- The annual incidence is about 1-2 cases of acute renal colic per 1,000 people and the average lifetime risk around 5-10%.
- Men are more commonly affected than women, with a male to female ratio of 3:1. The difference between the sexes is gradually being eroded. This is thought to be due to lifestyle-associated factors, such as obesity and a Western diet.
- The peak age for developing stones is between 30 and 50 and recurrence is common[52].

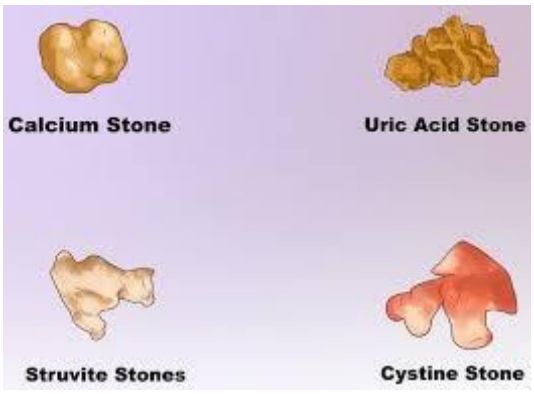
ETIOLOGY AND PATHOGENESIS

The crystals in the stone in the kidney are commonly mixed, although there is usually a preponderance of crystals from one particular solute. 70-75% of renal stones are composed almost entirely of calcium oxalate, mixed with calcium phosphate. 15% of calculi consist predominantly of magnesium ammonium phosphate (struvite). Uric acid stones and cysteine stones together account for about 10% of calculi. Very rarely stones are made up of almost pure xanthine, silica or some chemical foreign to the body.

Uric acid crystals are commoner in some parts of the Middle East, India and North Africa than in Europe and the USA.

The formation of stones within the kidney is not a specific disease; it is potential complication of many different disorders. The cause is obscure. The most important is almost certainly an increased urine concentration of the some constiuents[57].

TYPES OF RENAL CALCULI



There are 4 main tyoes of renal calculi- calcium containing, mixed(struvite), uric acid and cysteine stones, a few rare types.

1) CALCIUM STONES

Calcium stones are the most common comprising about 75% of all urinary calculi. They may be pure stones of calcium oxalate (50%), or calcium phosphate (5%), or mixture of calcium oxalate and calcium phosphate (45%).

Etiology

Etiology of calcium stones are variable.

About 50% of patients with calcium stones have *idiopathic hypercalciuria without hypercalcaemia.*

Approximately 10 % cases are associated with *hypercalcaemia and hypercalciuria*, the most commonly due to hyperparathyroidism, or a defect in the bowel (i.e. absorptive hypercalciuria), or in the kidney (i.e. renal hypercalciuria).

About 15% of patients with calcium stones have *hyperuricosuria with a normal blood uric acid level* and without any abnormality of calcium metabolism.

In about 25% of patients with clcium stones, the cause is known as there is no abnormality in urinary excretion of calcium, uric acid or oxalate and is referred to as *idiopathic calcium stone disease*.

Pathogenesis

The mechanism of calcium stone formation is explained on the basis of imbalance between the degree of supersaturation of the ions forming the stone and the concentration of inhibitors in the urine. Most likely site where the crystals of calcium oxalate and / or calcium phosphate are precipitated is the tubular lining or around some fragment of debris in the tubule acting as nidus of the stone. The predisposing factors contributing to formation of calcium stones are alkaline pH, decreased urinary volume and increased excretion of oxalate and uric acid

Morphology

Calcium stones are usually small (less than a centimeter), ovaid, hard, with granular rough surface. They are dark brown due to old blood pigment deposited in them as a result of repeated trauma caused to the urinary tract by these sharp – edged stones.

2.MIXED STONES

About 15% of urinary calculi are made of magnesium-ammonium-calcium phosphate, often called struvite; hence mixed stones are also called as *struvite stones* or triple phosphate stones.

Etiology

Struvite stones are formed as a result of infection of the urinary tract with urea- splitting organisms that produce urease such as by specious of Proteus, and occasionally klebsiella, pseudomonas, and Enterobacter. these are, therefore, also known as infection – induced stones. However, E.coli does not form urease.

Morphology

Struvite stones are yellow- white or grey. They tend to be soft and irregular in shape. Staghorn stone which is large, solitary stone that takes the shape of the renal pelvis where it is often formed is an example of struvite stone[57]

3).URIC ACID STONES

Approximately 6% of urinary calculi are made of uric acid. Uric acid calculi are *radiolucent*unlike radio- opaque calcium stones.

Etiology

Uric acid stones are frequently formed in cases with hyperuricaemia and hyperuricosuria such as due to primary gout or secondary gout due to myeloproliferative disorders (e.g. in leukaemias), especially those on chemotherapy, and administration of uricosuric drugs (e.g. salicylates, probenacid). Other factors contributing to their formation are acidic urinary pH (below 6) and low urine volume.

Pathogenesis

The solubility of uric acid at pH of 7 is 200 mg/ dl while at pH of 5 is 15 mg /dl. Thus as the urine becomes more acidic, the solubility of uric acid in urine decreases and precipitation of uric acid crystals increases favoring the formation of uric acid stones. Hyperuricosuria is the most important factor in the production of uric acid stones, while hyperuricaemia is found in about half the cases.

Morphology

Uric acid stones are smooth, yellowish- brown, hard and often multiple. On cut section, they show laminated structure.

4).CYSTINE STONE

Cysteine stones comprise less than 2% of urinary calculi.

Etiology

Cysteine are associated with cystinuria due to a genitically- determined defect in the transport of cysteine and other amino acids across the cell membrane of the renal tubules and the small intestinal mucosa.

Pathogenesis

The resultant excessive excretion of cysteine which is least soluble of the naturally- occurring amino acids leads to formation of crystals and eventually cysteine calculi.

Morphology

cysteine stones are small, rounded, smooth and multiple. They are yellowish and waxy.

5.OTHER CALCULI

Less than 2% of urinary calculi consist of other rare types such as due to inherited abnormality of enzyme metabolism e.g. hereditary xanthinuria developing xanthine stones[58].

CLINICAL COURSE

Stones are of importance when they obstruct urinary flow or produce ulceration and bleeding. They may be present without producing any symptoms or significant renal damage. In general, smaller stones are most hazardous, as they may pass into the ureters, producing pain referred to as colic (one of the most intense forms of pain) as well as ureteral obstruction. Larger stones cannot enter the ureters and are more likely to remain silent within the renal pelvis. Commonly, these larger stones first manifest themselves by hematuria. Stones also predispose to superimposed infection, both by their obstructive nature and by the trauma they produce[59]**.**

MORPHOLOGY OF KIDNEY

In 80% of patients, stones are unilateral. Common sites are renal pelvis, calyces and the bladder. Calcium oxalate crystals are mostly unilateral and solitary. They are usually either yellow-brown or dark from altered blood, and hard. Predominantly oxalate calculi may be nodular with smaller blunt spikes; mixed oxalate and phosphate stones may be fairly smooth. If small they are triangular in section. The nodular form may be called mulberry type in Britain or the jackstone type in the USA. Occasionally progressive accretion of salts leads to the development of branching structures known as staghorn calculi, which create a cast of the renal pelvic and calyceal system. These massive stones are usually composed of magnesium ammonium phosphates[57].

CLINICAL FEATURES

The clinical presentation is highly variable. Most patients with renal stone disease are asymptomatic, whereas others present with pain, hematuria, UTI, or urinary tract infection.

A common presentation is with acute loin pain radiating to the anterior abdominal wall, together with hematuria; a symptom complex termed renal or ureteric calculi. This most commonly caused by a calculus but the same symptoms can occur in association with a sloughed renal papilla, tumour or blood clot.

The patient is suddenly aware of pain in the loin, which radiates round the flank to the groin and often into the testis or labium, in the sensory distribution of the first lumbar nerve. The pain steadily increase in intensity to reach a peak in a few minutes.

The patient is restless and generally tries unsuccessfully to obtain relief by changing position or packing the room. There is pallor, sweating, and often vomiting. Frequency, dysuria, and hematuria may occur. The intense pain usually subsides within 2 hours but may continue unabated for hours or days[56].

PRESENTATION

- Many stones are asymptomatic and discovered during investigations for other conditions.
- The classical features of renal colic (or ureteric colic) are sudden severe pain. It is usually caused by stones in the kidney, renal pelvis or ureter, causing dilatation, stretching and spasm of the ureter. In most cases no cause is found:
- Pain starts in the loin about the level of the costovertebral angle (but sometimes lower) and moves to the groin, with tenderness of the loin or renal angle, sometimes with haematuria.
- If the stone is high and distends the renal capsule then pain will be in the flank but as it moves down pain will move anteriorly and down towards the groin.

- A stone that is moving is often more painful than a stone that is static.
- The pain radiates down to the testis, scrotum, labia or anterior thigh.
- Whereas the pain of biliary or intestinal colic is intermittent, the pain of renal colic is more constant but there are often periods of relief or just a dull ache before it returns. The pain may change as the stone moves. The patient is often able to point to the place of maximal pain and this has a good correlation with the current site of the stone.

Other symptoms which may be present include:

- ❖ Rigors and fever.
- ❖ Dysuria.
- ❖ Haematuria.
- ❖ Urinary retention.
- ❖ Nausea and vomiting[52].

PREDISPOSING FACTORS FOR KIDNEY STONES

Environmental and dietary:

- Low urine volumes, high ambient temperatures, low fluid intake
- Diet: high protein intake, high sodium, low calcium
- High sodium excretion
- High urate excretion
- High oxalate excretion
- Low citrate excretion

Acquired causes:

- Hypercalcemia of any cause
- Ileal disease or resection (leads to increased oxalate absorption and urinary excretion)
- Renal tubular acidosis type I

Congenital and inherited causes:

- Familial hypercalciuria
- Renal tubular acidosis type I (distal)
- Medullary sponge kidney
- Cystinuria
- Primary hyperoxaluria

The majority of stones pass spontaneously within 48 hours. However, some stones may not. There are several factors which influence the ability to pass a stone. These include the size of the person, prior stone passage, prostate enlargement, pregnancy, and the size of the stone. A 4 mm stone has an 80% chance of passage while a 5 mm stone has a 20% chance. If a stone does not pass, certain procedures (usually by a urology specialist doctor) may be needed[60].

RISK FACTORS

Several risk factors are recognised to increase the potential of a susceptible individual to develop stones. These include:

- Anatomical anomalies in the kidneys and/or urinary tract - eg, horseshoe kidney, ureteral stricture.
- Family history of renal stones.
- Hypertension.
- Gout.

- Hyperparathyroidism.
- Immobilisation.
- Relative dehydration.
- Metabolic disorders which increase excretion of solutes - eg, chronic metabolic acidosis, hypercalciuria, hyperuricosuria.
- Deficiency of citrate in the urine.
- Cystinuria (an autosomal-recessive aminoaciduria).
- Drugs - eg, diuretics such as triamterene and calcium/vitamin D supplements.
- More common occurrence in hot climates.
- Increased risk of stones in higher socio-economic groups.
- Contamination - as demonstrated by a spate of melamine-contaminated infant milk formula[61].

EXAMINATION

- The patient with colic of any sort writhes around in agony. This is in contrast to the patient with peritoneal irritation who lies still.
- The patient is apyrexial in uncomplicated renal colic (pyrexia suggests infection and the body temperature is usually very high with pyelonephritis).
- Examination of the abdomen can sometimes reveal tenderness over the affected loin. Bowel sounds may be reduced. This is common with any severe pain.
- There may be severe pain in the testis but the testis should not be tender.
- Blood pressure may be low.

- Full and thorough abdominal examination is essential to check for other possible diagnoses - eg, acute appendicitis, ectopic pregnancy, aortic aneurysm[52.]

DIFFERENTIAL DIAGNOSIS

This depends upon the position of the pain and the presence or absence of pyrexia and includes:

- Biliary colic.
- Pyelonephritis: very high temperature. Pain is unlikely to radiate to the groin.
- Acute pancreatitis
- Acute appendicitis
- Perforated peptic ulcer.
- Epididymo – orchitis or torsion of the testis: very tender testis.
- Sinister causes of back pain: usually tender over vertebrae.
- Dissection of an aortic aneurysm: the patient who presents with features of renal colic for the first time over the age of 60. This may be dissection of aortic aneurysm leading to ruptured aortic aneurysm.
- Drug addiction: there are reports of people with fictitious stories of renal colic, designed to obtain an injection of pethidine. These patients tend to be abusive when offered anything other than pethidine[62.]

INVESTIGATIONS

Basic analysis should include:

- Blood for FBC, CRP, renal function, electrolytes, calcium, phosphate and urate, creatinine.

- Midstream specimen of urine for microscopy (pyuria suggests infection), culture and sensitivities.
- Prothrombin time and international normalised ratio if intervention is planned.
- Stick testing of urine for red cells (suggestive of urolithiasis), white cells and nitrites (both suggestive of infection) and pH (pH above 7 suggests urea-splitting organisms such as *Proteus* spp. whilst a pH below 5 suggests uric acid stones).
- Intravenous pyelogram (IVP)[63].
- Computed tomography (CT)
- Ultrasound scanning may be helpful to differentiate radio-opaque from radiolucent stones and in detecting evidence of obstruction.
- Plain X-rays of the kidney, ureter and bladder (KUB) are useful in watching the passage of radio-opaque stones (around 75% of stones are of calcium and so will be radio-opaque).
- The European Association of Urology's guidelines on urolithiasis recommend stone analysis for:
- All first-time stone formers.
- All patients with recurrent stones who are on pharmacological preventing therapy.
- Patients who have had early recurrence after complete stone clearance.
- Late recurrence after a long stone-free period (stone composition may change)[64].

COMPLICATIONS

The complications of calcium oxalate and hydroxyapatite renal calculi are acute and chronic pyelonephritis, hydronephrosis and obstructive nephropathy.

The stone fragments may obstruct the ureter. This occurs in 5-15% of cases. 8% of patients develop hypertension or exacerbation of pre- existing hypertension within 1 year. thirdly there is a risk of renal damage.

HYDRONEPHROSIS

In bilateral complete obstruction, patient present with anuria. When the obstruction is below the bladder the dominant symptoms are bladder distention. Unilateral hydronephrosis may remain completely silent for long periods of time. Enlargement of kidney is made out on physical examination. Sometimes the obstructing cause e.g. calculi can produce symptoms.

Early removal of the cause of obstruction can return the full function of the kidney. In long standing cases the changes become irreversible.

Two metabolic disorders need to be mentioned here which are associated with precipitation of the crystalline material causing obstruction to urine flow.

1.HYPERURICAEMIA

Uric acid stones are formed In 22% of patients with gout. The urate crystals get deposited in distal collecting tubules. Collecting ducts as well in the interstitium, forming gouty tophus. Uric acidcrystal deposition takes place also following chemotherapy to the patients of leukemia and lymphoma. this is due to the breaking down of nucleic acid.

2.HYPERCALCAEMIA

Hyperparathyroidism, end stage kidney disease, vit. D intoxication, excessive calcium intake, osteolytic disease of bones, milk- alkali syndrome are some of the conditions giving rise to hypercalcaemia. This induces deposition of calcium in renal

tubules called nephrocalcinosis. Sometimes, the deposition can also form renal stones[57].

Complete blockage of the urinary flow from a kidney decreases glomerular filtration rate (GFR) and, if it persists for more than 48 hours, may cause irreversible renal damage.

If ureteric stones cause symptoms after four weeks, there is a 20% risk of complications, including deterioration of renal function, sepsis and ureteric stricture.

Infection can be life-threatening.

Persisting obstruction predisposes to pyelonephritis[64].

PROGNOSIS

The prognosis will depend upon the underlying condition causing the renal stones. Calcium oxalate and hydroxyapatite stones per se rarely lead to renal failure. If at the time of diagnosis there is renal damage due to the calculi then this may cause renal dysfunction and hypertension. The main problem is recurrence unless the causative condition can be treated ; the recurrence rate is high, approaching 70% by 10 years after spontaneous passage or surgical removal of a calculus[65].

- Most symptomatic renal stones are small (less than 5 mm in diameter) and pass spontaneously.
- Stones less than 5 mm in diameter pass spontaneously in up to 80% of people.
- Stones between 5 mm and 10 mm in diameter pass spontaneously in about 50% of people.
- Stones larger than 1 cm in diameter usually require intervention (urgent intervention is required if complete obstruction or infection is present).
- Two thirds of stones that pass spontaneously will do so within four weeks of onset of symptoms.

- A stone that has not passed within 1-2 months is unlikely to pass spontaneously.
- The following features predispose to recurrent stone formation:
- First attack before 25 years of age.
- Single functioning kidney.
- A disease that predisposes to stone formation.
- Abnormalities of the renal tract.

PREVENTION

Recurrence of renal stones is common and therefore patients who have had a renal stone should be advised to adapt and adopt several lifestyle measures which will help to prevent or delay recurrence:

- Increase fluid intake to maintain urine output at 2-3 litres per day.
- Reduce salt intake.
- Reduce the amount of meat and animal protein eaten.
- Reduce oxalate intake (foods rich in oxalate include chocolate, rhubarb, nuts) and urate-rich foods (eg, certain fish).
- Drink regular cranberry juice: increases citrate excretion and reduces oxalate and phosphate excretion.

CALCIUM

- Maintain good calcium intake(calcium forms an insoluble salt with dietary oxalate, lowering oxalate absorption and excretion).
- Avoid calcium supplements separate from meals (increase calcium excretion without reducing oxalate excretion).

OXALATE

Depending on the composition of the stone, medication to prevent further stoneformation is sometimes given - eg, thiazide diuretics (for calcium stones),allopurinol (for uric acid stones) and calcium citrate (for oxalate stones).

DIET RESTRICTION;

Uric acid and urate calculus

- Red Meat
- Beef
- Chicken
- Fish
- Peanuts
- Liver which are rich in purine

Cystine calculi

- Sulphur containing proteins such as meat ,fish and eggs

Calcium oxalate stones

A high fluid intake is most important as it will increase urinary volume and decrease the concentration of calcium oxalate.

- Tea ,nuts and some green leafy vegetables are high in oxalates
- Restriction of salt and fat intake
- Dairy products
- Foods high in oxalates are –Tomato, strawberries, plumbs, spinach etc

FOOD AND DRINKS CONTAINING CALCIUM OXALATE;

A diet low in oxalates are more reasonable than a calcium restricted diet.

- Apples
- Asparagus
- Beer
- Beets
- Berries
- Black pepper
- Cheese
- Chocolate
- Cocoa
- Coffee
- Cola drinks
- Figs
- Grapes
- Ice cream
- Milk
- Oranges
- Peanut butter
- Pine apples
- Spinach
- Tea
- Turnips
- Vitamin C

These foods can be eaten in very limited amounts under the advice of the doctor.

TRIAL MEDICINE

TRIAL MEDICINE

கல்லடைப்பு சூரணம்

“சீனாக்காரம் பொரிகாரஞ் சேர்த்துப் புசவர்க் காரந்
தானத் தொடுத்தும் பொடியாக்கித் தனியாயுருவி பனங்கதிரும்
பானங்கதரித் தண்டுடனே ப்ரிவாய்ச் சுட்டுச் சரிசமனாய்த்
தேனிற்குழைத்து விழுங்கிடவேறி தெறிக்குஞ் சதைகல்லடைப்பாமே”

ஆதாரம் – அகத்தியர் ஆயுள்வேதம் 1200, பக்க எண் 125.

Ingredients

- Purified Padigaram
- Purified Venkaram
- Purified Induppu
- Purified Savukkaram
- Nayuruvi
- Panaingathir
- VaazhaiMattai

ACTIONS OF TRIAL MEDICINE

S.No.	Drugs	Botanical Name	Actions
1.	Purified Padigaram	Alumen Alum	Astringent Antiseptic Antispasmodic Styptic
2.	Purified Venkaram	Borax (Sodium Biborate)	Diuratic Lithontriptic Refrigerant
3.	Purified Induppu	Sodium Chloride (Rock Salt)	Carminative Diuretic Stomachic
4.	Purified Savukkaram	Sodium Carbonate	Antipitha
5.	Nayuruvi	Achyranthesaspera	Astringent Diuretic[66] Anti Periodic
6.	Panaingathir	Borassusflabellifermis	Astringent Diuretic[67]
7.	VazhaiMattai	Mucasapientum	Refrigerant Diuretic[68] Antipitha

1. படிகாரம் – Alumen Alum

பொதுக் குணம்

சீனமெனும் காரமதுசீறிவரும் பல்லரணை
ஆனைக்கால்கண்ணோய்அனிலமோடு – மாநிலத்தில்
துன்மாங்கிசம் வாயுதோலாதஉள்ளழலை
குன்மமிவைபோக்குமெனக் கூறு[69]

2. வெங்காரம் – Sodium Biborate

பொதுக் குணம்

“வெங்காரம் சர்ப்பவிடம் ஜலம் நீர்அடைப்பு
மங்காத கிராணிரத்தமாம் மூலம் – பஞ்சஞ்செய்
வாயுவுடன் கல்லடைப்பு வன்கிருமிஅஷ்டகுன்மம்
ஓயும் படி புரியும் ஓது” [70]

3. இந்துப்பு –Sodium Chloride Impura

பொதுக் குணம்

“அட்டகுன்மமந்தம் அசிர்க்கரஞ்சூர் சீதபித்தந்
துட்டவையம் நாடிப்ப்புண் டோடங்கள் – கெட்டமலக்
சுட்டுவிடவிந்தையக் காமியநோய்வன்கரப்பான்
விட்டுவிடவிந்துப்பைவிள்” [71]

4. சவுக்காரம் – Sodium Carbonate

பொதுக் குணம்

“கரப்பானைச் சீதத்தைகண்டிக்கும் பேதி
உரப்பாக்கும் வாயுவைவிட்டோட்டும் – தரைக்குள்
வழலைஎனப்பேர் வசித்தசவுக்காரம்
அழலைகுன்மம் போக்கும் அறி”[72]

5. நாயுருவி–Achyaranthesaspera

பொதுக் குணம்

“ஒதமுறுசோபையுயர்பாண்டுவைப்போக்குந்
தீதலுகாமாலைநோய் தீர்க்குமினர் – சூதகநீர்
பொய்ப்புறுகாலத்தனைப் பொங்குவிக்குங் காரமாடு
கைப்புறுசெந் நாயுருவி காண்”[73]

6. பனங்கதிர் – Borassusflabellifer

பொதுக் குணம்

“பனையிலுறுபூவதுதான் பங்கமுறாக் குன்ம
வினையகற்றும் நீர்கட்டை மீட்கும் – முனையான
பன்னோய்ஒழிக்கும் பழஞ்சுரத்தைப் போக்கிவிடும்
மின்னேஇதனைவிளம்பு” [74]

7. வாழை–Musa sapientum

பொதுக் குணம்

“தொந்கினுறு மின்னுஞ்சுகபோகமுமண்ணும்
அக்கினிமந்தமலபலமொடு – திக்கிடுகால்
பாழையிலைப்புமறும் பன்னுபித்தமுஞ்சமனாம்
வாழையிலைக் குணருவாய்” [75]

STANDARD OPERATIVE PROCEDURE:

Take equal amount of purified Padigaram, Venkaram, Induppu & Savukkaram make it into fine powder. Take respective ashes of Nayuruvi, Panangathir &VaazhaiMattai and mix it.Now take both the powder proportionally equal in amount and mix well and store in air tight container.

DOSAGE :

1gm bd after food

ADJUVANT

Honey

DURATION

1 mandalam (48 days)

INGREDIENTS OF THE TRIAL MEDICINE

PADIGARAM

VENKARAM

INDUPPU

SAVUKKARAM

NAYURUVI

VAAZHAI MATTAI

PANANGATHIR

TRIAL MEDICINE

KALLADAIPPU CHOORANAM

MATERIALS AND METHODS

MATERIALS AND METHODS

PROTOCOL

Study Design

An open pilot study on Vatha kalladaippu (Urolithiasis) was carried out in the post graduate department of maruthuvam in Govt.Siddha Medical College attached to Arignar Anna Hospital of Indian Medicine, Chennai – 106 during the period of 2016 – 2018.

The study was approved by **Instititional Ethics Committee (IEC)** and the approval number is **GSMC-CH-ME-5/001/2016**. It was registered in **Clinical Trials Registry – India (CTRI)** and the register number is **CTRI/2018/03/012767**.

Sample size

The study is conducted in 40 selected Vatha Kalladaippu patients of both genders between age groups of 18 to 60 years.

Selection Criteria

The patients having following parameters are selected for the study.

- Pain in the flank
- Burning Micturition
- Oliguria
- Dysuria
- Nausea
- Vomiting
- Fever
- History of Urolithiasis (with USG-Whole Abdomen reports)

Exclusion Criteria

- Age group less than 18
- Stag horn calculus
- Pyonephrosis
- Calculi associated with elevated serum creatinine level
- Calculi in pregnancy

Proforma

The case sheet proforma for Vatha kalladaippu was prepared based on Siddha diagnostic methodology with necessary modern techniques.

History taking

For better treatments and results a detailed clinical history was taken regarding present illness, past illness, family history, menstrual history, occupational history, socio economic status, residential area, etc.,

Investigation

All patients were screened by the following investigations. This was carried out regularly before and after treatment.

- **Blood for biochemical examination**

  The blood was tested for sugar, urea, serum creatinine to know the renal function and its excretion.

- **Urine Examination**

  Albumin, Sugar, Deposits.

Ultra sonogram

Ultra sonogram of complete abdomen including KUB was done in cases to know the location, size and number of calculi.

Drug and dose schedule

Kalladaippu Chooranam – 1 gm, bd after food with honey for 48 days.

RESULT
AND
OBSERVATION

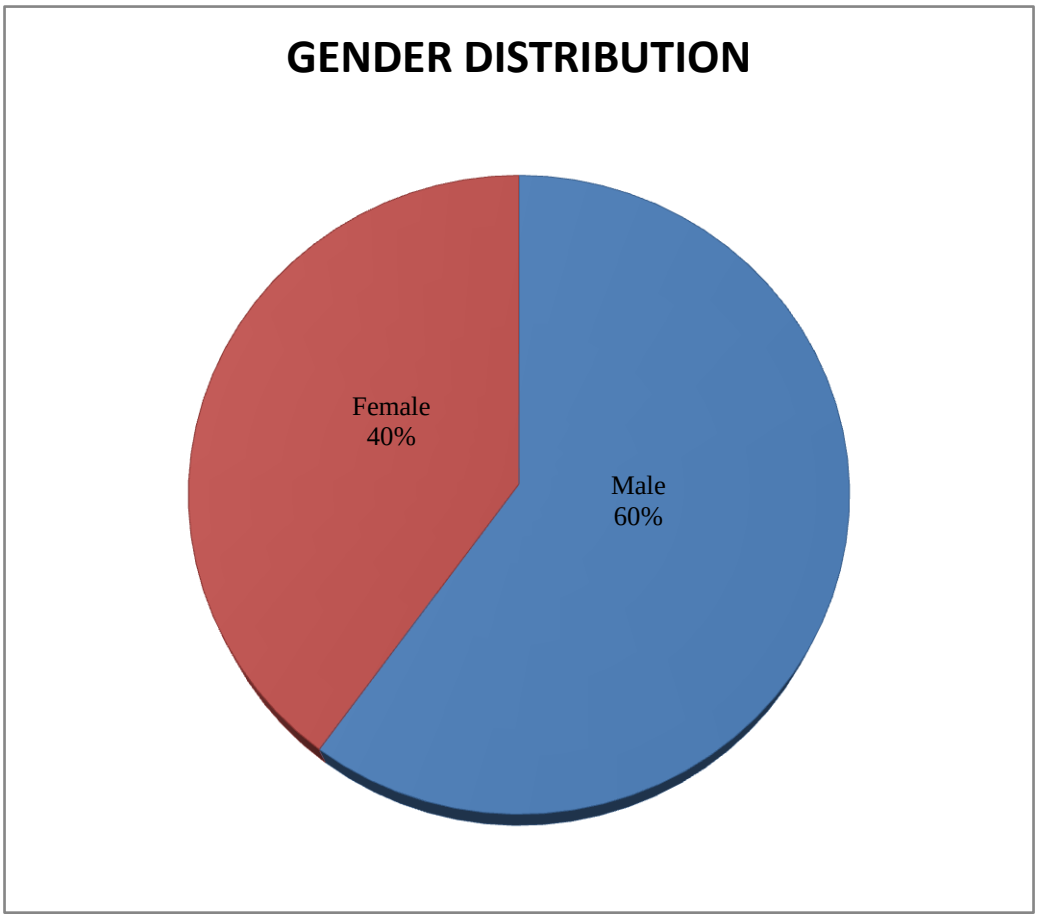
RESULTS AND OBSERVATION

40 cases having Vatha Kalladaippu were selected and treated in OPD of PG Maruthuvam department attached to AAGHIM, Chennai – 106 during the year 2016 – 2018. The resut and observation during that clinical study are as follows.

- Gender distribution
- Age distribution
- Occupation
- Socio- economic status
- Dietary habits
- Seasonal occurence
- Distribution of thinai
- Distribution of mukkutram – vatham
- Distribution of mukkutram – pitham
- Distribution of mukkutram – kabham
- Ezhu udal thathukkal
- En vagai thervugal
- Naadi
- Neikuri
- Clinical features
- Clinical prognosis
- Distribution of calculi based on location
- Grading of results.

1. GENDER DISTRIBUTION

S.No	GENDER	NUMBER OF CASES	PERCENTAGE (%)
1	Male	24	60%
2	Female	16	40%

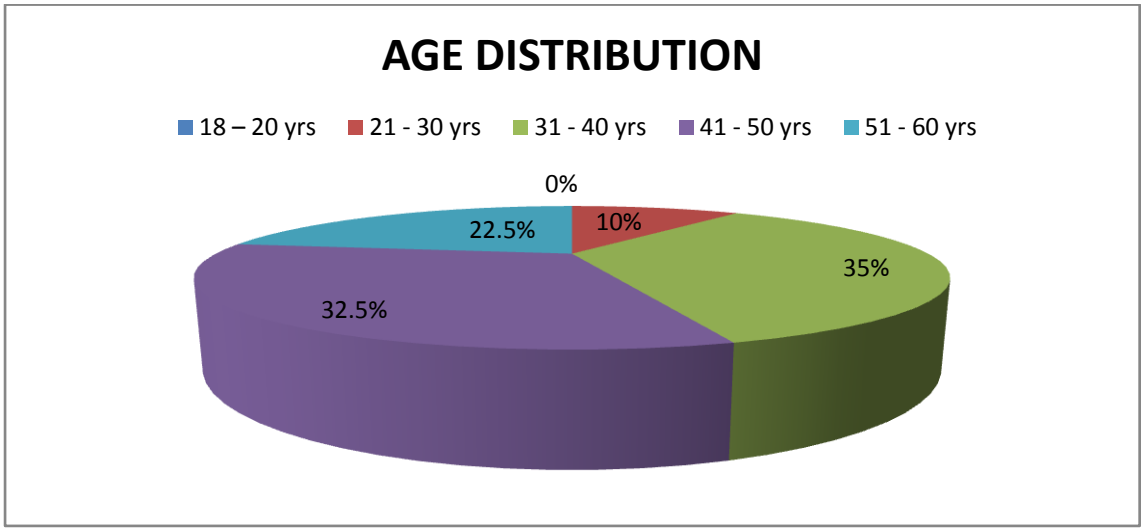


INFERENCE

About 60% were males and 40% were femalesAccording to literature males are more prone to renal calculi.

2. AGE DISTRIBUTION

S.No	AGE IN YEARS	NUMBER OF CASES	PERCENTAGE (%)
1	18 – 20 yrs	0	0 %
2	21 - 30 yrs	4	10%
3	31 – 40 yrs	14	35%
4	41 - 50 yrs	13	32.5%
5	51 - 60 yrs	9	22.5%

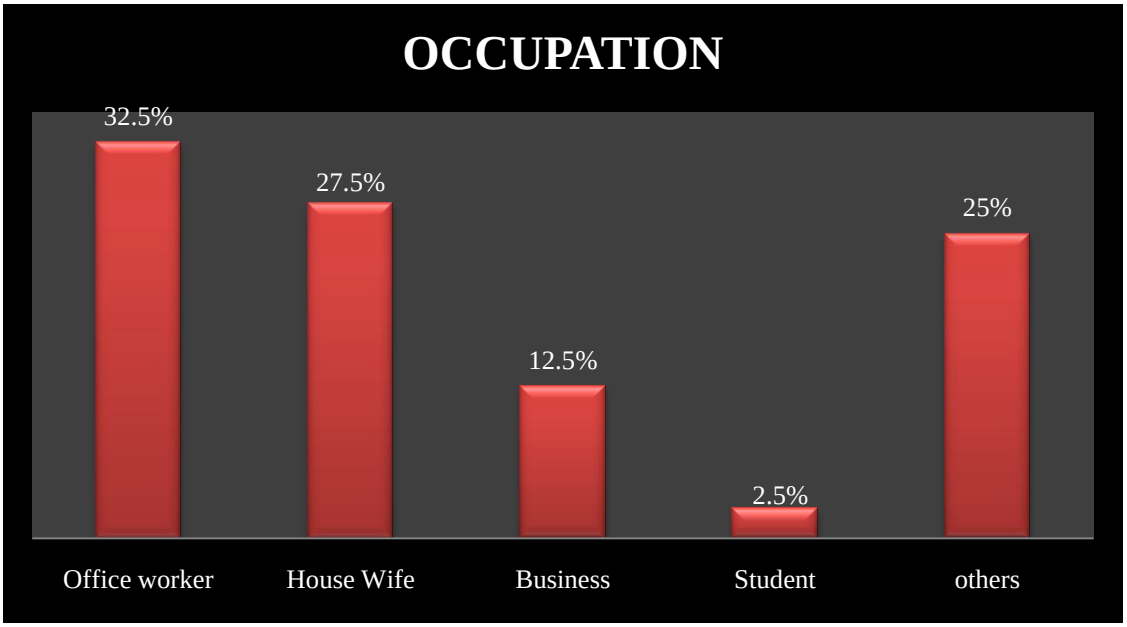


INFERENCE

Majority of the case that is 35% were in the age group between31-40 yrs, 32.5% were in the age group between 41-50 yrs, 22.5% were in the age group between 51-60 yrs, 10% were in the age group between 21-30 yrs. In this study the maximum of the disease were in the age group between 31-40 yrs due to tragedy of life, tension and anxiety.

3. OCCUPATION

S.No	OCCUPATION	NUMBER OF CASES	PERCENTAGE (%)
1	Office worker	13	32.5%
2	House Wife	11	27.5%
3	Business	5	12.5%
4	Student	1	2.5%
5	Others	10	25%

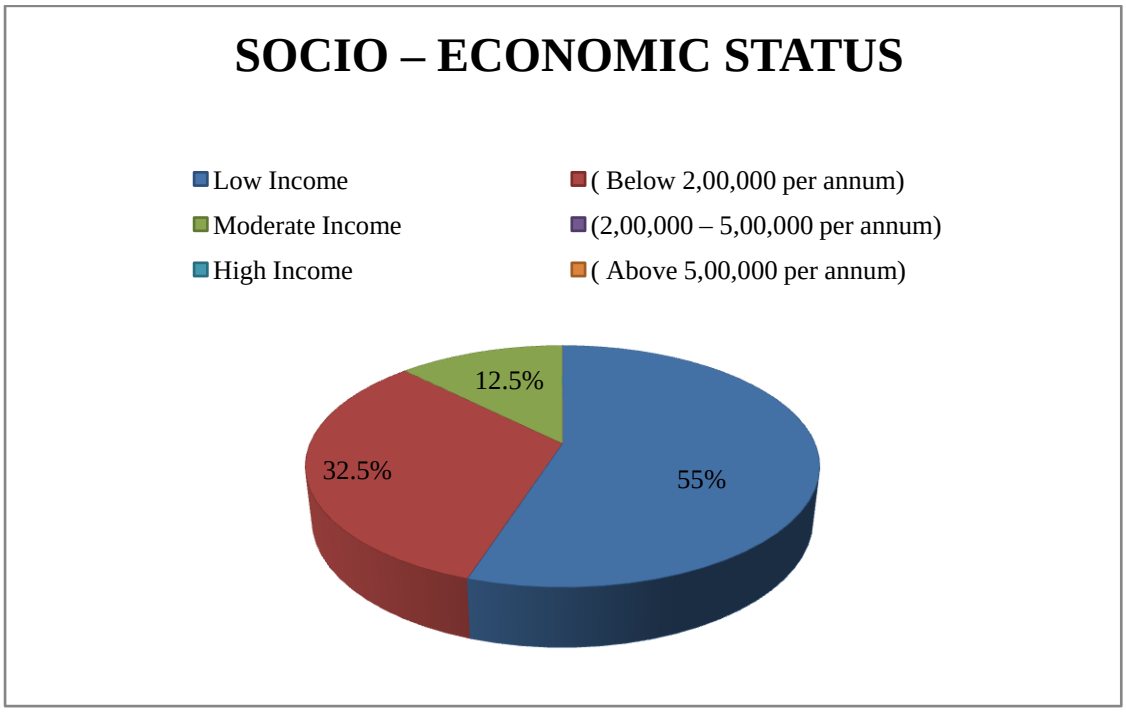


INFERENCE

0ut of 40 patients (100%), 32.5% were office worker, 27.5% were house wives 12.5% were business, 2.5% were student, and 25% were others.

4. SOCIO – ECONOMIC STATUS

S.No	SOCIO – ECONOMIC STATUS	NUMBER OF CASES	PERCENTAGE (%)
1	Low Income (below 2,00,000 per annum)	22	55%
2	Moderate Income (200,000 – 5,00,000 per annum)	13	32.5%
3	High Income (Above 5,00,000 per annum)	5	12.5%

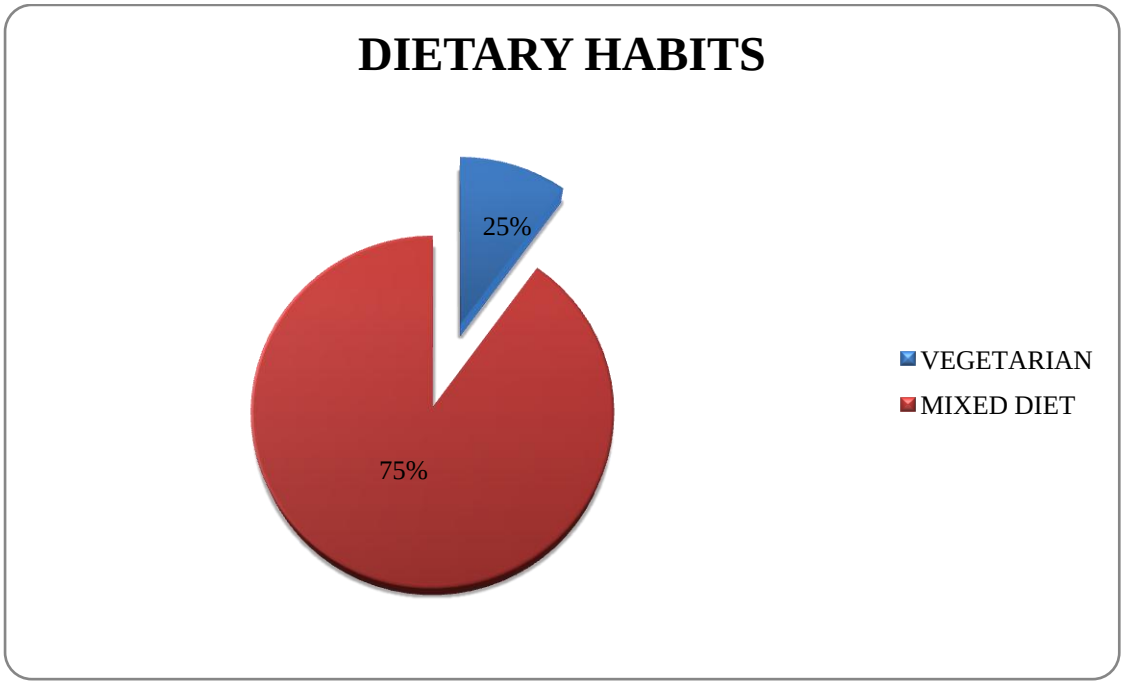


INFERENCE:

Among 40 cases 55% comes under low economic status, 32.5% of them under moderate status and12.5% of them under high income status.

5. DIETARY HABITS

S.No	DIET	NUMBER OF CASES	PERCENTAGE (%)
1	Vegetarian	10	25%
2	Mixed diet	30	75%

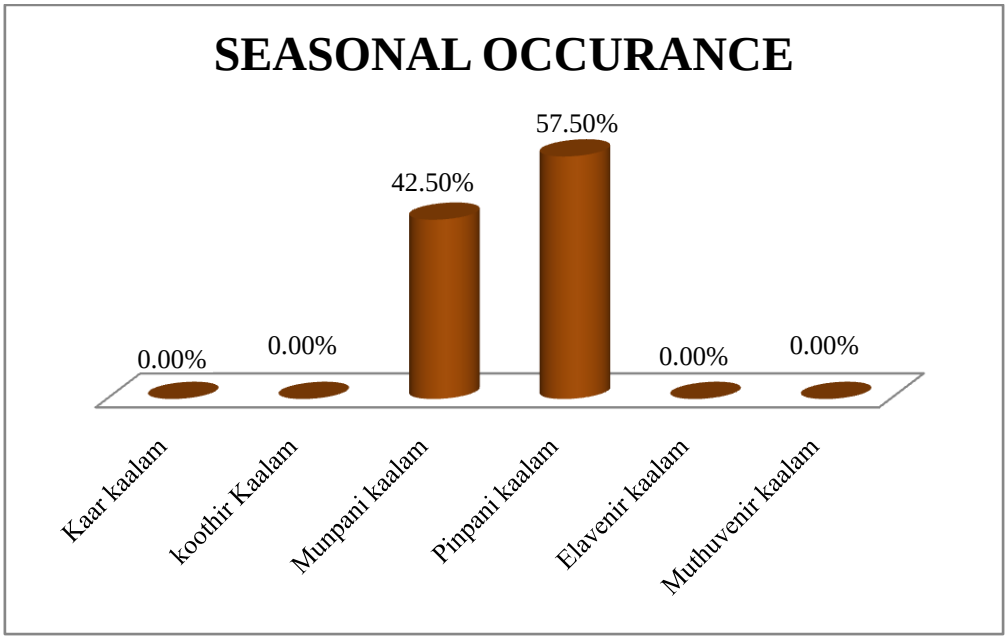


INFERENCE

Among 40 patients, 10 patients (25%) were taking vegetarian food and 30 patients (75%) were taking mixed diet.

6. SEASONAL OCCURENCE

S.No	KAALAM (Season)	NUMBER OF CASES	PERCENTAGE (%)
1	Kaar kaalam (Mid Aug-Mid Oct)	0	0%
2	koothir Kaalam (Mid Oct –Mid Dec)	0	0%
3	Munpani kaalam (Mid Dec-Mid Feb)	17	42.5%
4	Pinpani kaalam (Mid Feb-Mid Apr)	23	57.5%
5	Elavenir kaalam (Mid Apr –Mid Jun)	0	0%
6	Muthuvenir kaalam (Mid Jun –Mid Aug)	0	0%

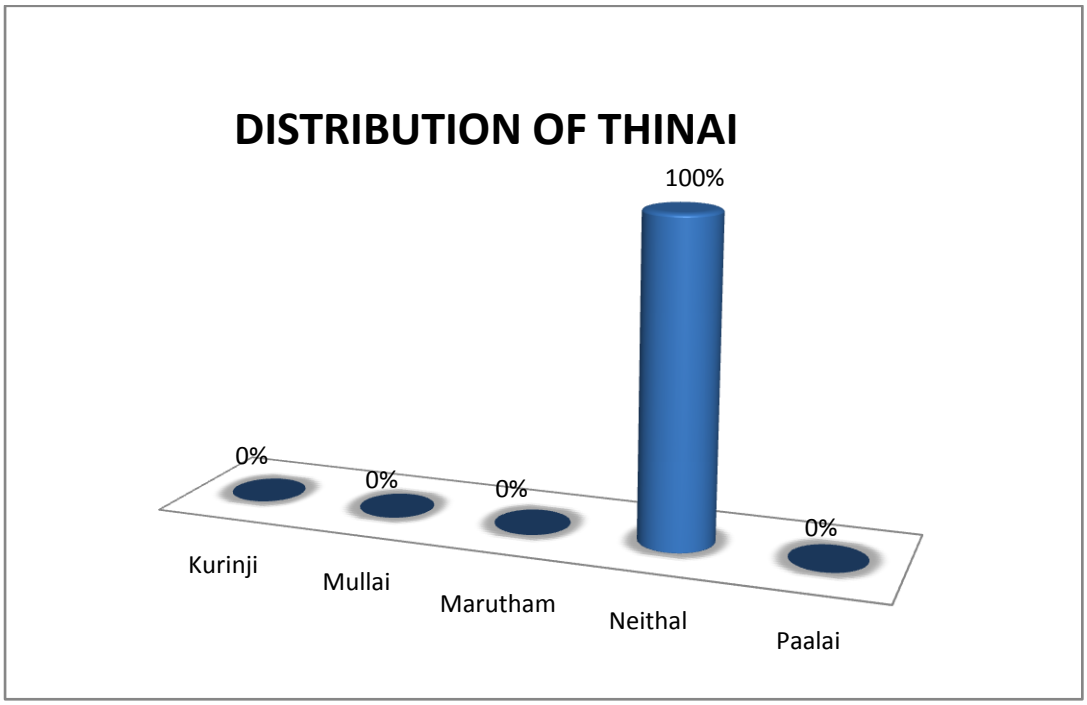


INFERENCE

According to paruvakaalam highest incident of 23 cases (57.5%) were noted in pinpani kaalam, 17 cases (42.5%) were noted in Munpani kaalam.

7. DISTRIBUTION OF THINAI

S.No	THINAI	NUMBER OF CASES	PERCENTAGE (%)
1	Kurinji	0	0%
2	Mullai	0	0%
3	Marutham	0	0%
4	Neithal	40	100%
5	Paalai	0	0%

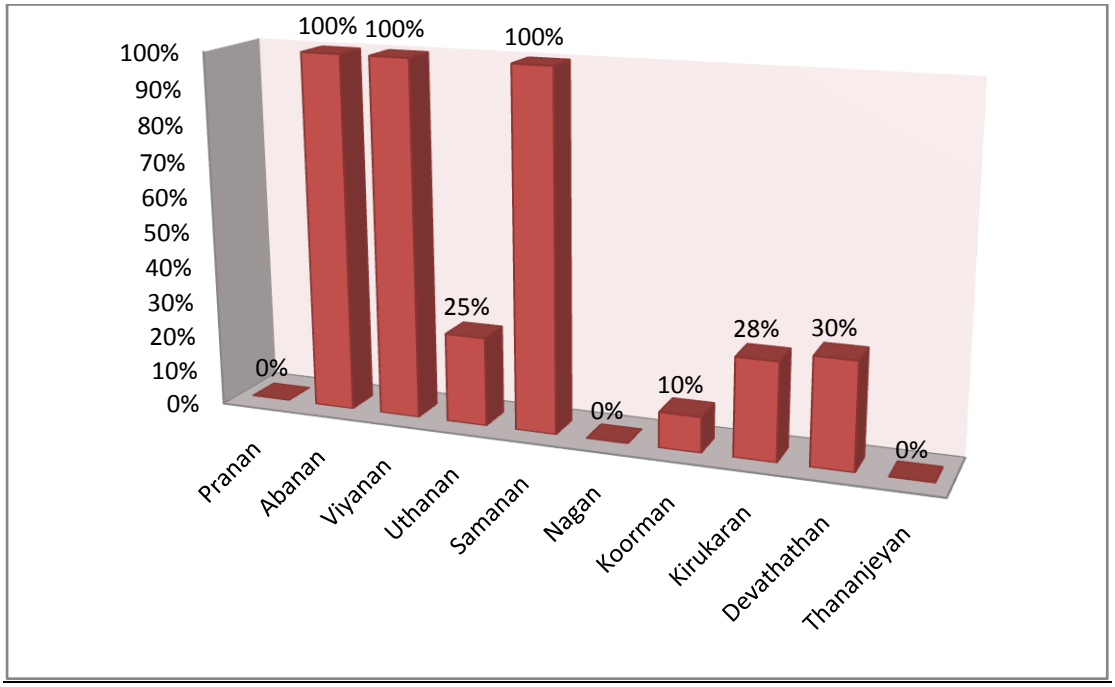


INFERENCE

According to thinai the highest distribution 100% was noted in neithal nilam.

8. DISTRIBUTION OF MUKKUTRAM – VATHAM

S.No	VATHAM	NUMBER OF CASES	PERCENTAGE (%)
1	Pranan	0	0%
2	Abanan	40	100%
3	Viyanan	40	100%
4	Uthanan	10	25%
5	Samanan	40	100%
6	Nagan	0	0%
7	Koorman	4	10%
8	Kirukaran	11	27.5%
9	Devathathan	12	30%
10	Thananjeyan	0	0%

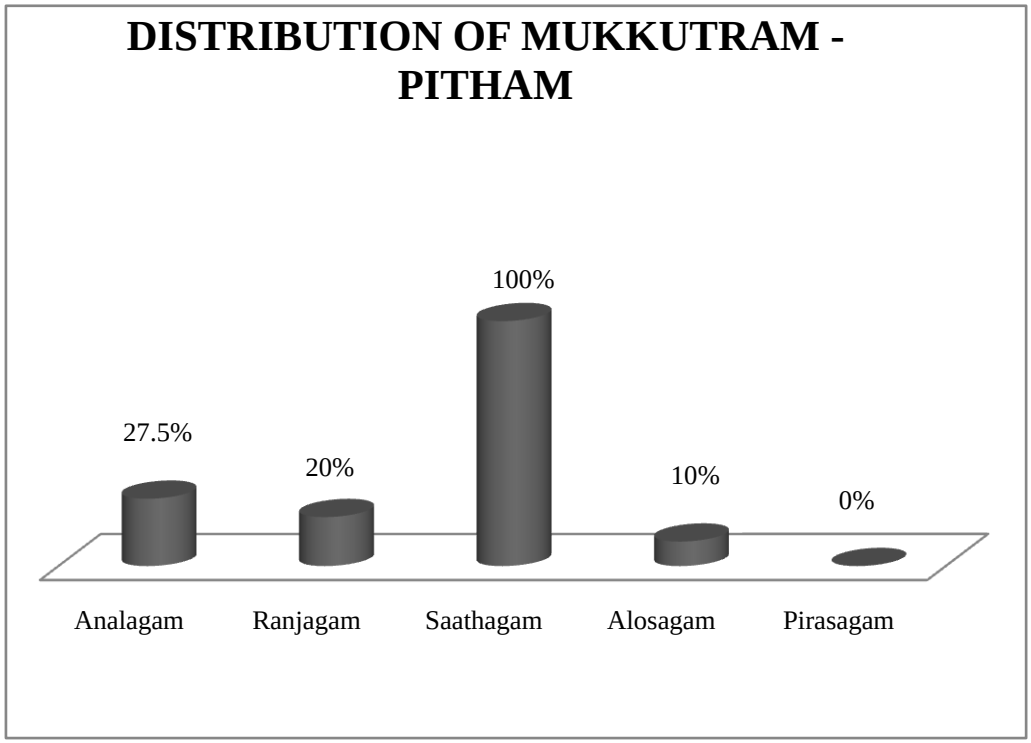


INFERENCE

Out of 40 patients Abanan was affected in 40 patients (100%), Viyanan was affected in 40 pateints (100%), Uthanan was affected in 10 patients (25%), Samanan was affected in 40 patients (100%) Koorman was affected in 4 patients (10%) and Kirukaran was affected in 11 patients (27.5**%)**and Devathathan was affected in 12 patients(30%).

9. DISTRIBUTION OF MUKKUTRAM – PITHAM

S.No	PITHAM	NUMBER OF CASES	PERCENTAGE (%)
1	Analagam	11	27.5%
2	Ranjagam	8	20%
3	Saathagam	40	100%
4	Alosagam	4	10%
5	Pirasagam	0	0%

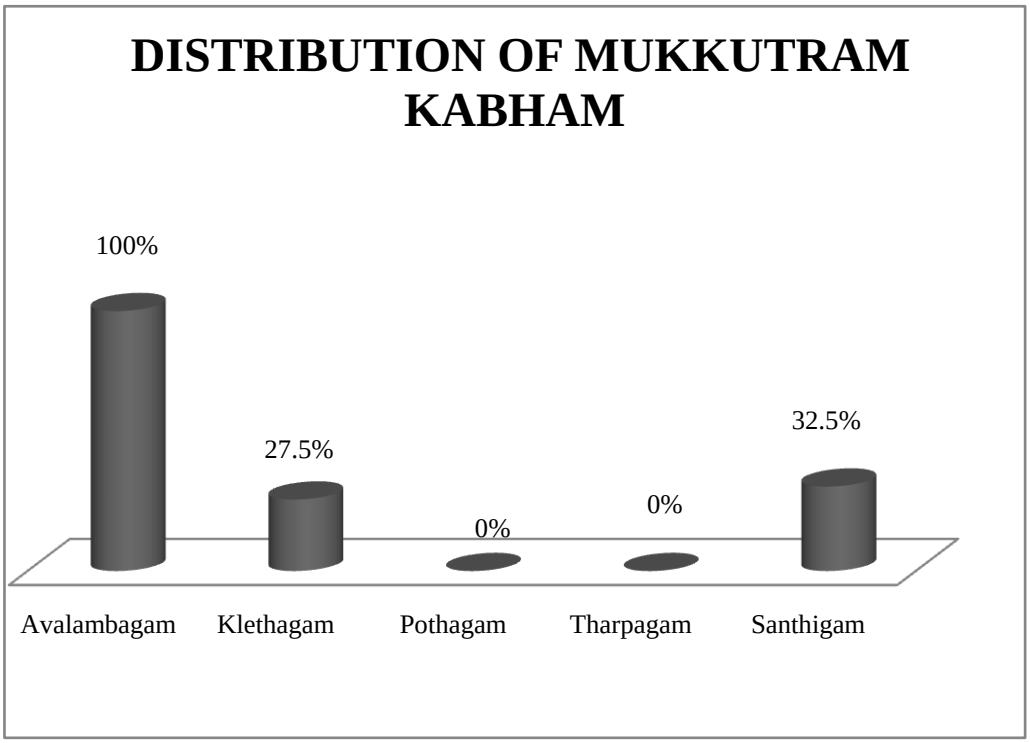


INFERENCE

Out of 40 patients Analagam was affected in 11 patients (27.5%), Ranjagam was affected in 8 patients (20%), Sathagam was affected in 40 patients (100%) and Alosagam was affected in 4 patients (10%).

10. DISTRIBUTION OF MUKKUTRAM – KABHAM

S.No	KABHAM	NUMBER OF CASES	PERCENTAGE (%)
1	Avalambagam	40	100%
2	Klethagam	11	27.5%
3	Pothagam	0	0%
4	Tharpagam	0	0%
5	Santhigam	13	32.5%

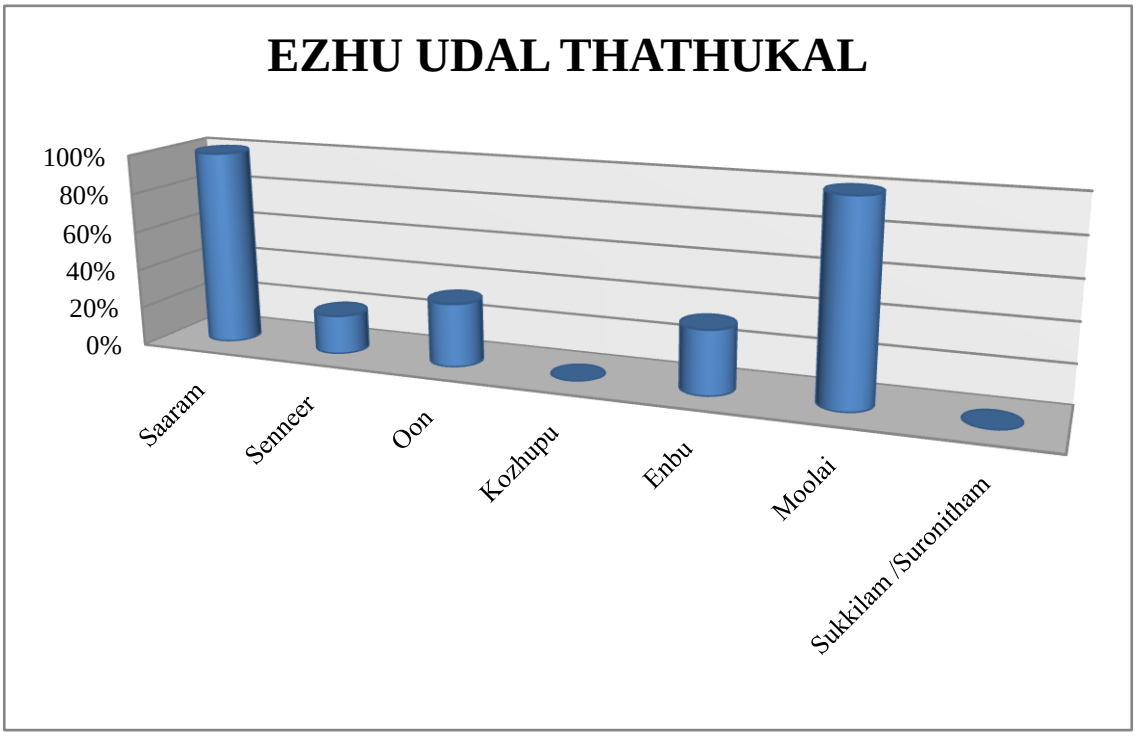


INFERENCE

Out of 40 patients, Avalambagam was affected in 40 patients (100%), Kiledhagam was affected in 11 patients (27.5%), Santhigam was affected in 13 patients (32.5%).

11. EZHU UDAL THATHUKAL

S.No	EZHU UDAL THATHUKAL	NUMBER OF CASES	PERCENTAGE (%)
1	Saaram	40	100%
2	Senneer	8	20%
3	Oon	13	32.5%
4	Kozhupu	0	0%
5	Enbu	13	32.5%
6	Moolai	12	30%
7	Sukkilam /Suronitham	0	0%

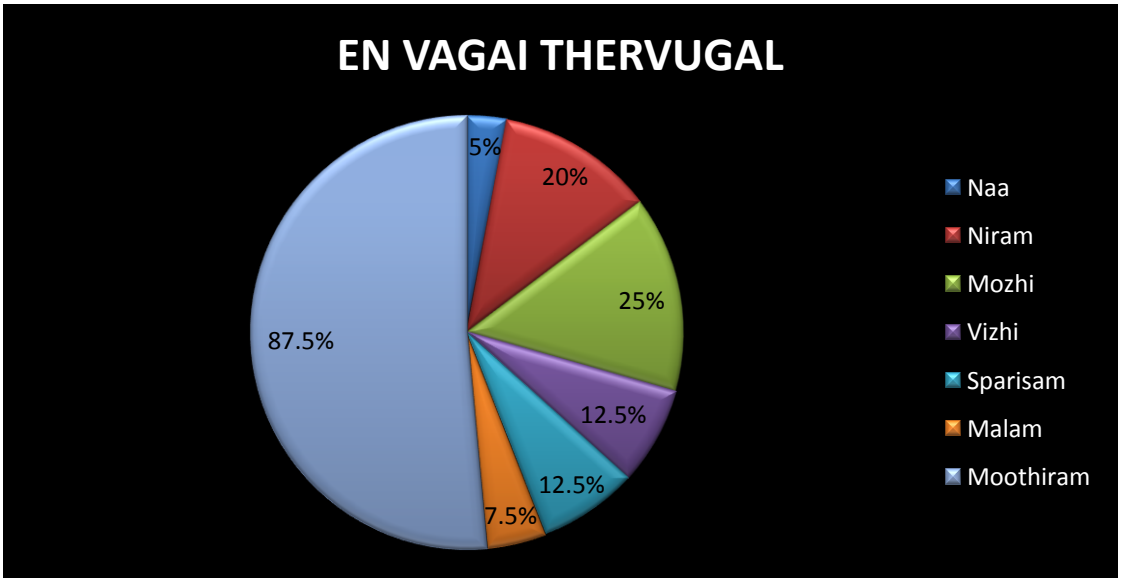


INFERENCE

Out of 40 patients, Saaram was affected in 40 patients (100%), Senneer was affected in 8 cases (20%), Oon was affected in 13 cases (32.5%), Enbu was affected in 13 cases (32.5%), Moolai was affected in 12 cases (30%).

12. EN VAGAI THERVUGAL

S.No	EN VAGAI THERVUGAL	NUMBER OF CASES	PERCENTAGE (%)
1	Naa	2	5%
2	Niram	8	20%
3	Mozhi	10	25%
4	Vizhi	5	12.5%
5	Sparisam	5	12.5%
6	Malam	3	7.5 %
7	Moothiram	35	87.5%

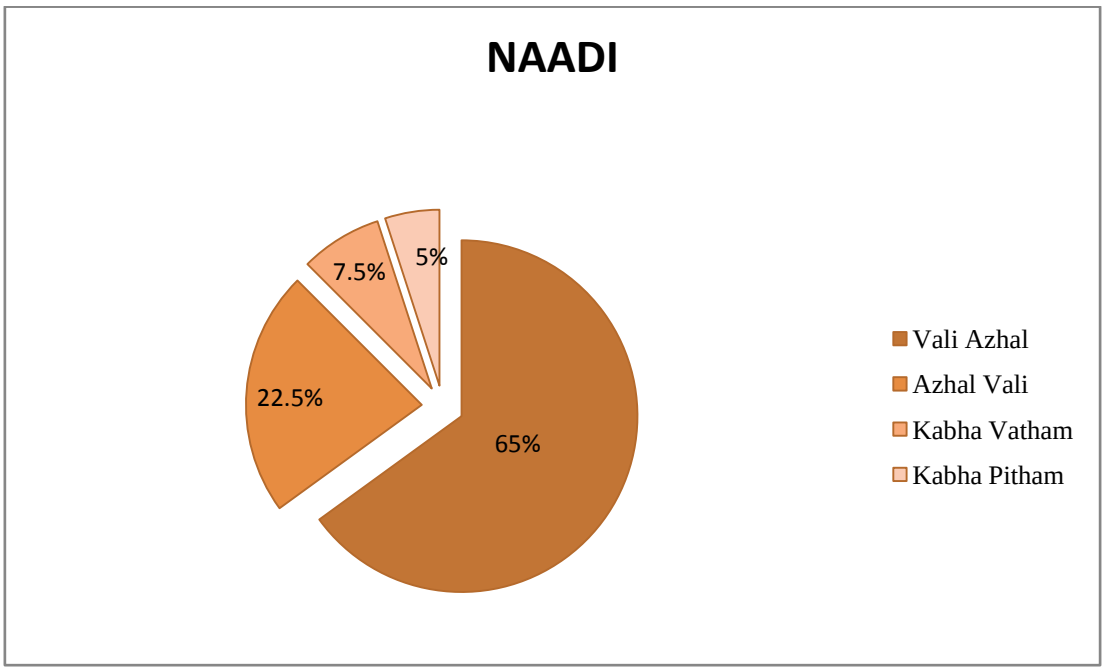


INFERENCE

In Envagai thervu,Naa was affected in 2 patients(5%),Niram was affected in 8 patients(20), Mozhi was affected in 10 patients(25%), Vizhi was affected in 5 patients (12.5%),Sparisam was affected in 5 patients (12.5), Malam was affected in 3 patients (7.5%) and Moothiram was affected in 35 patients (87.5%).

13. NAADI

S.No	NAADI	NUMBER OF CASES	PERCENTAGE (%)
1	Vali Azhal	26	65%
2	Azhal Vali	9	22.5%
3	Kabha Vatham	3	7.5%
4	Kabha Pitham	2	5%

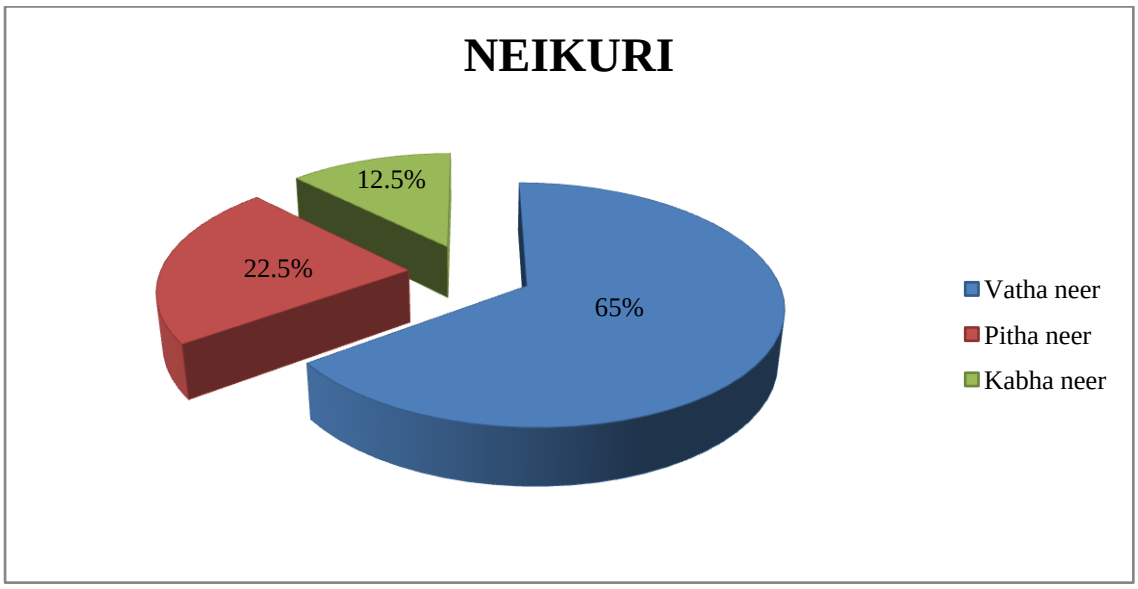


INFERENCE

26 patients (65%) had Vali azhal naadi, 9 patients (22.5%) had Azhal vali naadi, 3 patients (7.5%) had kabha vatham, and 2 patients (5%) had Kabha pitha naadi.

14. NEIKURI

S.No	THATHU	NEIKURI	NUMBER OF CASES	PERCENTAGE (%)
1	Vatha neer	Spread like snake	26	65%
2	Pitha neer	Spread like ring	9	22.5%
3	Kabha neer	Spread like pearl	5	12.5%

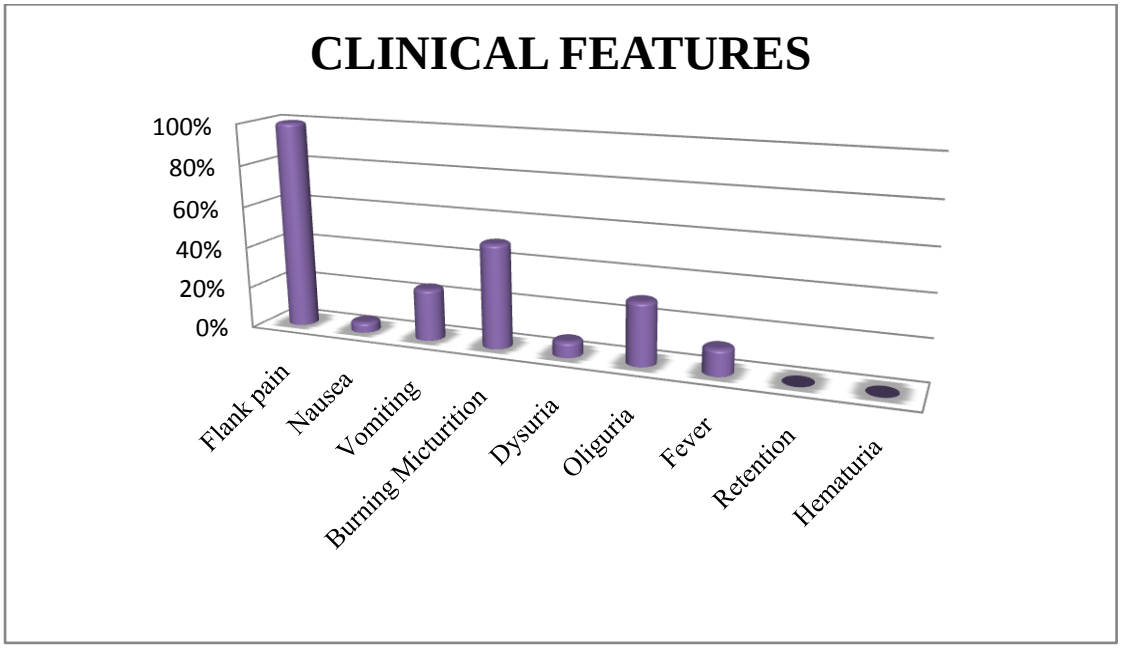


INFERENCE

26 patients (65%) had vatha neer, 9 patients (22.5%) had Pitha neer, and 5 patients (12.5%) had Kabha neer.

15. CLINICAL FEATURES

S.No	SIGNS & SYMPTOMS	NUMBER OF CASES	PERCENTAGE (%)
1	Flank pain	40	100%
2	Nausea	2	5%
3	Vomiting	10	25%
4	Burning Micturition	20	50%
5	Dysuria	3	7.5%
6	Oliguria	12	30%
7	Fever	5	12.5%
`8	Retention	0	0%
9	Hematuria	0	0%

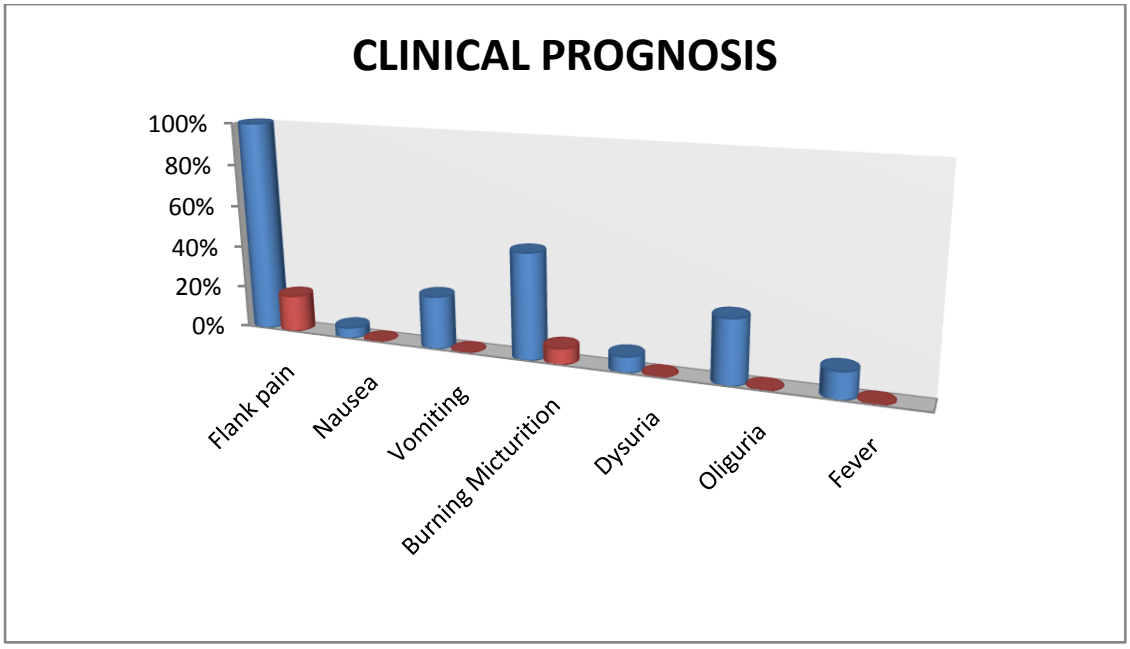


INFERENCE

Out of 40 patients, 40 patients (100%) had Flank pain, 2 patients (5%) had Nausea, 10 patient (25%) had vomiting, 20 patients (50%) had Burning Micturition, 3 patients (7.5) had Dysuria, 12 patients (30%) had oliguria, 5 patients (12.5%) had Fever.

16. CLINICAL PROGNOSIS

S.No	SIGNS& SYMPTOMS	BEFORE TREATMENT		AFTER TREATMENT	
		NO.OF CASES	PERCENTAGE (%)	NO.OF CASES	PERCENTAGE (%)
1.	Flank pain	40	100%	7	17.5%
2	Nausea	2	5%	0	0%
3	Vomiting	10	25%	0	0%
4	Burning Micturition	20	50%	3	7.5%
5	Dysuria	3	7.5%	0	0%
6	Oliguria	12	30%	0	0%
7	Fever	5	12.5%	0	0%

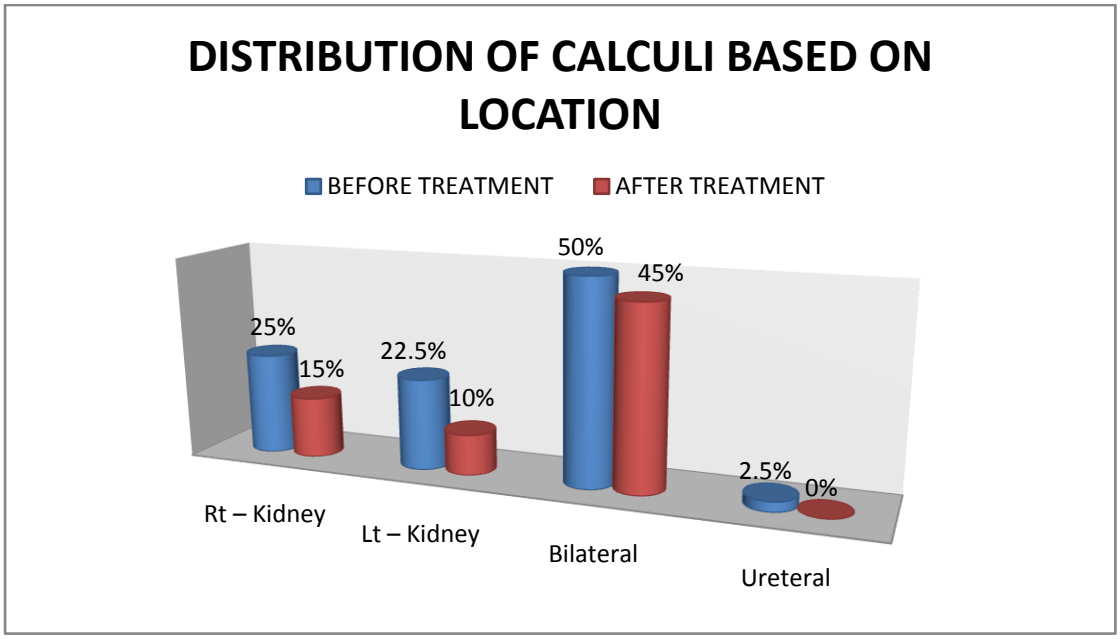


INFERENCE

After treatment Flank pain present in 7 patients (17.5%), Burning Micturition present in 3 patient (7.5%). no patient have experienced Nausea, Vomiting, Dysuria and Fever.

17. DISTRIBUTION OF CALCULI BASED ON LOCATION

SIDE	BEFORE TREATMENT		AFTER TREATMENT	
	NO.OF CASES	PERCENTAGE (%)	NO.OF CASES	PERCENTAGE (%)
Rt – Kidney	10	25%	6	15%
Lt – Kidney	9	22.5%	4	10%
Bilateral	20	50%	18	45%
Ureteral	1	2.5%	0	0%



INFERENCE

Before treatment:

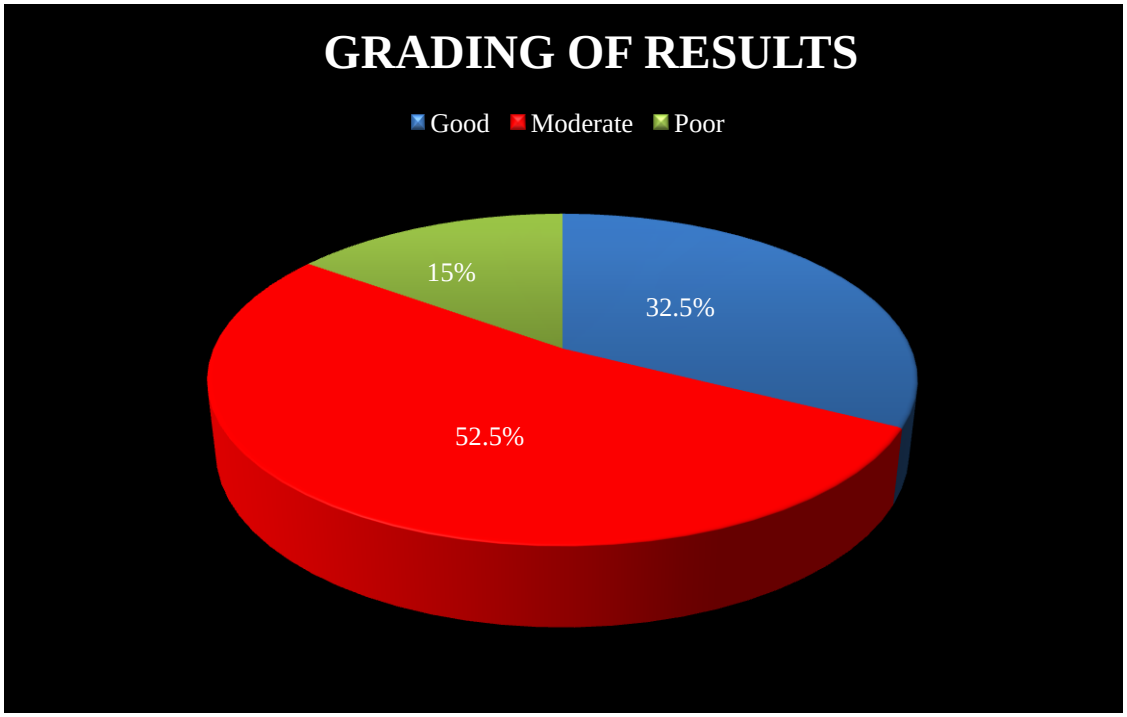
Out of 40 patients, 20 patients (50%) were having bilateral renal calculi, 10 patients (25%) were having right renal calculi, and 9 patients (22.5%) were having left renal calculi, 1 patient (2.5) had ureteric calculi.

After treatment:

Out of 40 patients, 18 patients (45%) were having bilateral renal calculi, 6 patients (15%) having right renal calculi and 4 patient (10%) having left renal calculi.

18. GRADING OF RESULTS

S.No	GRADING	NUMBER OF CASES	PERCENTAGE (%)
1	Good	13	32.5%
2	Moderate	21	52.5%
	Poor	6	15%



INFERENCE

Out of 40 patients, 13 cases (32.5%) shows good result, 21 cases (52.5%) shows moderate result, 6 cases (15%) shows poor result.

RESULTS OF PATIENTS BEFORE AND AFTER TREATMENT

GOVT.SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE, CHENNAI-106

S.No	Name of the patient	Age / Sex	OP.No	Date of Treatment Started	Duration of medicine taken	Size of stone BT	Prognosis	Remarks
1	Mrs.Srimathy	36/F	6431	03-01-18	7- Weeks	Bilateral RT 3 Stones (7.2 mm), LT 5 Stones (9.2 mm)	Bilateral RT 2 (5.2 mm), LT 4 (7 mm)	Symptoms relieved
2	Miss. Sathya	23/F	6827	10-01-18	7- Weeks	LT 6 mm	USG Normal	Completed
3	Mrs.Anusuya	50/F	7439	12-01-18	7- Weeks	Bilateral RT 2 (4mm), LT (3.5mm)	USG Normal	Completed
4	Mr.Dhanraj	25/M	4743	15-01-18	7- Weeks	RT (5 mm)	RT (4 mm)	Symptoms reduced
5	Mr.Vijay	36/M	1514	25-01-18	7- Weeks	RT 2 (5.2mm, 3.6mm)	USG Normal	Completed
6	Mrs.Mahalakshmi	40/F	1949	26-01-18	5- Weeks	RT 6mm	USG Normal	Completed
7	Miss.Nandhini	21/F	2913	28-01-18	7- Weeks	Bilateral RT 6.6mm, LT 5.4 mm	RT 5 mm, LT 5.4 mm	Symptoms relieved
8	Mr.Bennet	45/M	4219	30-01-18	7- Weeks	RT 2 (2.7 mm, 3.7 mm)	USG Normal	Completed
9	Mr.Ashokraj	52/M	8062	01-02-18	7- Weeks	Bilateral RT (6 mm), LT (6mm)	Bilateral 2 (5mm)	Symptoms reduced
10	Mr.Thamaraiselvan	42/M	4980	01-02-18	7- Weeks	RT 8mm	RT 8 mm	Poor prognosis
11	Mr. Sanjay gandhi	40/M	5243	02-02-18	7- Weeks	Bilateral 2 (8 mm)	RT 7.4mm, LT 7.8mm	Advice to continue medicine
12	Mr.Kumar	36/M	5651	03-02-18	7- Weeks	LT 7-8 mm	LT 4 mm	Symptoms relieved
13	Mrs.Thenkuzhali	32/F	5543	04-02-18	7- Weeks	Bilateral RT 4mm, LT 6mm	RT 4mm, LT 4mm	Symptoms Reduced

14	Mrs. Thamizhkodi	52/F	5853	08-02-18	7- Weeks	Bilateral RT 10mm, LT 5mm	RT 9.6 mm, LT 5 mm	Referred to Urologist
15	Mr.Abbas	57/M	7414	09-02-18	7- Weeks	Bilateral 3 - 4 (3 to 4 mm)	USG Normal	Completed
16	Mr.Jaabar	30/M	9245	15-02-18	7- Weeks	Bilateral RT 6.8 mm, LT 6.1 mm	RT 5.6 mm, LT 5 mm	Symptoms relieved
17	Mrs.Ponnammal	41/F	9272	15-02-18	7- Weeks	Bilateral RT 4mm, LT 2 (3.2 mm, 4.7 mm)	RT (3mm), LT 4mm	Symptoms reduced
18	Mr.Prabu	38/M	9420	15-02-18	7- Weeks	Bilateral RT 4.3 mm, LT 5.2mm	RT 3mm, LT 3.5mm	Symptoms relieved
19	Mrs.Rani	59/F	1458	21-02-18	7- Weeks	Bilateral 5.1 mm	USG Normal	Completed
20	Mr.Suresh	57/M	3714	27-02-18	7- Weeks	RT 5.7 mm	RT 3.9mm	Symptoms relieved
21	Mrs.Selvi	33/F	3716	28-02-18	7- Weeks	LT 5.4 mm	USG Normal	Completed
22	Mrs.Valli	42/F	3715	28-02-18	7- Weeks	Bilateral RT 9.1 mm, LT 6 mm	Bilateral RT 9.1 mm, LT 6 mm	Poor prognosis
23	Mr.Manimaran	45/M	4904	01-03-18	7- Weeks	LT 4.6 mm	USG Normal	Completed
24	Mrs. Krishna moorthy	45/M	4910	01-03-18	7- Weeks	LT 2 (17.8 mm, 8.3 mm)	LT 2 (17.8 mm, 8 mm)	Referred to Urologist
25	Mrs.Manimegalai	38/F	4012	01-03-18	7- Weeks	Bilateral RT 3 (3.5, 3mm), LT 2 (3mm)	RT 2 (3mm), LT 3mm	Symptoms relieved
26	Mr.Mariyappan	43/M	4011	01-03-18	7- Weeks	Bilateral RT 2 (4.5, 5mm), LT 8mm,	RT 2 (3.5mm,4mm), LT 3.5mm)	Symptoms reduced
27	Mrs.Sanaa	32/F	5292	05-03-18	7- Weeks	LT 5.2 mm	USG Normal	Completed
28	Mr.Immugan	34/M	5313	05-03-18	7- Weeks	Bilateral 3 (3.5mm)	RT 3 (3.5mm), LT 2 (3.5mm)	Symptoms reduced
29	Mrs.Kaaleeshwari	53/F	5516	06-03-18	7- Weeks	LT 5mm	USG Normal	Completed
30	Mr.Shanmugam	48/M	6333	08-03-18	7- Weeks	Bilateral RT 4 (5.5mm), LT 3 (5.2mm)	RT 4(3mm), LT 3 (4mm)	Symptoms reduced
31	Mr.Singaraj	48/M	6332	08-03-18	7- Weeks	RT 2 (8, 5mm)	RT 2 (5, 4mm)	Symptoms reduced

32	Mrs.Shanthi	52/F	7897	13-03-18	7- Weeks	Bilateral 2 (5.6 to 6.2 mm)	Bilateral 5 mm	Symptoms reduced
33	Mr. Sekar	49/M	8175	14-03-18	7- Weeks	RT 6 mm	USG Normal	Completed
34	Mr.Ravi	42/M	1921	14-03-18	7- Weeks	1.6x0.6x0.1 size Ureteric calculi	Stone expelled, USG Normal	Completed
35	Mr.Muralikumar	32/M	3214	15-03-18	7- Weeks	BilateralRT 4mm, LT 2 (4.2mm,4.7 mm)	RT 3mm, LT 2 (3 mm)	Symptoms reduced
36	Mr.Karthikeyan	40/M	6637	17-03-18	7- Weeks	RT 5.7 mm	RT 3 mm	Symptoms relieved
37	Mr. Vanagamudi	37/M	3912	22-03-18	7- Weeks	Bilateral RT 4.3mm, LT 5.2mm	Bilateral 3mm	Symptoms reduced
38	Mr. Madhan	35/M	1571	24-03-18	7- Weeks	RT 8mm	RT 6.8 mm	Advice to continue medicine
39	Mr. Manikandan	42/M	1570	24-03-18	7- Weeks	LT 6.7 mm	LT 5.6 mm	Symptoms reduced
40	Mrs. Usha	58/F	4913	30-03-18	7- Weeks	LT 7.2 mm	LT 5.6 mm	Symptoms relieved

LABORATORY INVESTIGATION REPORT

BEFORE TREATMENT

S.No	OP. No	Age/Sex	Haematological report							RFT		Urine Analysis		
			TC cells/ cu.mm	DC %			ESRmm		Hbgms%	Urea mg/dl	Creatinine mg/dl	Alb	Sug	Dep
				P	L	E	½ hr	1 hr						
1	6431	36/F	8600	57	41	2	12	26	10.6	32	0.8	Nil	Nil	Opc
2	6827	23/F	9200	64	33	3	15	35	10.8	28	1.0	Nil	Nil	Opc
3	7439	50/F	8700	63	33	4	2	5	13.6	26	0.7	Nil	Nil	Nil
4	4743	25/M	7300	49	46	5	16	35	14	29	0.8	Nil	Nil	Opc
5	1514	36/M	8900	59	36	5	7	16	10.6	26	0.6	+	Nil	Opc
6	1949	40/F	8600	62	36	2	20	42	10.6	32	0.8	Nil	Nil	Oec
7	2913	21/F	8200	49	51	0	5	12	11.8	28	0.4	Nil	Nil	Nil
8	4219	45/M	6600	58	39	3	4	10	11.2	22	0.7	Nil	Nil	Nil
9	8062	52/M	7900	62	30	8	6	14	9.4	21	0.3	Nil	Nil	Nil
10	4980	42/M	9900	50	49	1	11	30	14.8	24	0.4	Nil	Nil	Opc
11	5243	40/M	7500	61	35	4	12	26	12.5	30	0.7	Nil	Nil	Opc
12	5651	36/M	9600	60	39	1	4	10	13	28	1.0	Nil	Nil	Oec
13	5543	32/F	9500	49	48	3	7	17	10.8	32	0.6	+	Nil	Oec
14	5853	52/F	7500	63	33	4	5	12	9.6	23	0.7	Nil	Nil	Nil
15	7414	57/M	8800	59	36	5	21	40	12.2	23	0.9	Nil	Nil	Opc
16	9245	30/M	8900	61	37	2	6	10	13	21	0.7	Nil	Nil	Nil
17	9272	41/F	9200	67	30	3	15	32	14	24	0.3	Nil	Nil	Oec
18	9420	38/M	8100	61	34	5	8	17	11.2	26	0.8	Nil	Nil	Oec
19	1458	59/F	8700	70	28	2	10	22	13	34	1.1	+	Nil	Opc
20	3714	57/M	7400	63	33	4	5	11	14.6	32	1.0	Nil	Nil	Opc
21	3716	33/F	8300	55	44	1	3	7	11.4	26	0.6	Nil	Nil	Nil
22	3715	42/F	7400	68	28	4	6	12	12.4	27	0.7	Nil	Nil	Opc
23	4904	45/M	8900	62	35	3	3	7	12.6	31	1.0	Nil	Nil	Oec
24	4910	45/M	8300	59	35	6	31	72	14.8	32	0.8	Nil	Nil	Oec
25	4012	38/F	9100	67	28	5	5	13	12.6	34	0.8	Nil	Nil	Opc
26	4011	43/M	9800	54	38	8	17	39	15	40	2.0	+	Nil	Opc
27	5292	32/F	7700	56	42	2	5	12	9.6	34	1.2	Nil	Nil	Nil
28	5313	34/M	7200	63	31	6	14	32	13.3	26	0.8	Nil	Nil	Opc
29	5516	53/F	9500	64	35	1	5	11	10.6	31	0.7	Nil	Nil	Nil
30	6333	48/M	8900	63	31	6	4	10	14.6	30	1.1	+	Nil	Oec
31	6332	48/M	8200	61	36	3	10	15	14.6	36	1.0	Nil	Nil	Opc
32	7897	52/F	7700	61	35	4	5	13	12.8	21	0.8	Nil	Nil	Oec
33	8175	49/M	9900	54	42	4	2	6	10.4	36	0.9	Nil	Nil	Nil
34	1921	42/M	8600	66	32	2	6	18	13.8	29	0.6	Nil	Nil	Nil
35	3214	32/M	10000	68	29	3	4	10	14.2	28	0.4	Nil	Nil	Nil
36	6637	40/M	9600	71	29	0	2	5	13.4	22	0.7	+	Nil	Oec
37	3912	37/M	8400	59	38	3	12	28	14.2	29	0.6	Nil	Nil	Nil
38	1571	35/M	8400	55	41	4	2	6	12.5	28	0.9	Nil	Nil	Opc
39	1570	42/M	7600	59	36	5	4	12	13	34	0.6	Nil	+	Oec
40	4913	58/F	9600	67	28	5	16	40	12.5	28	0.5	Nil	Nil	Nil

TC – Total count, DC – Differential count, P – Polymorphs, L – Lymphocyte, E – Eosinophil, ESR – Erythrocyte Sedimentation Rate, Oec – Occasional epithelial cells, Opc – Occasional pus cells, Alb – Albumin, Sug – Sugar, Dep – Deposit

LABORATORY INVESTIGATION REPORT

AFTER TREATMENT

S.No	OP.No	Age/Sex	Haematological report							RFT		Urine Analysis		
			TC cells/ cu.mm	DC %			ESR		Hbgms%	Urea mg/ dl	Creatinine mg/dl	Alb	Sug	Dep
				P	L	E	½ hr	1 hr						
1	6431	36/F	9700	63	33	4	5	10	11.6	29	0.8	Nil	Nil	Nil
2	6827	23/F	8400	66	34	0	4	8	12.9	24	0.9	Nil	+	Opc
3	7439	50/F	8900	71	28	1	6	15	14.6	27	0.6	Nil	Nil	Nil
4	4743	25/M	8500	62	35	3	10	20	14	26	0.8	Nil	Nil	Nil
5	1514	36/M	9300	63	34	3	4	10	11.6	27	0.6	Nil	Nil	Nil
6	1949	40/F	9600	65	32	3	3	7	12.6	30	0.7	+	Nil	Oec
7	2913	21/F	8700	61	35	4	10	25	12.8	28	0.9	Nil	Nil	Nil
8	4219	45/M	8500	65	32	3	2	5	13.2	30	0.7	Nil	Nil	Nil
9	8062	52/M	8700	63	31	6	3	10	14.4	29	0.8	Nil	Nil	Nil
10	4980	42/M	9100	59	36	5	12	30	14.6	23	0.5	Nil	Nil	Nil
11	5243	40/M	8700	62	35	3	12	28	13.5	28	0.8	Nil	Nil	Opc
12	5651	36/M	9700	65	32	3	7	15	13	25	0.9	Nil	Nil	Nil
13	5543	32/F	9500	62	34	4	2	5	11.8	27	0.8	Nil	Nil	Nil
14	5853	52/F	8900	61	36	3	2	12	9.8	26	0.7	Nil	Nil	Nil
15	7414	57/M	9400	57	39	4	15	20	13.1	31	0.8	Nil	Nil	Nil
16	9245	30/M	8800	60	37	3	4	7	13.2	20	0.7	Nil	Nil	Nil
17	9272	41/F	9900	65	30	5	6	15	13	26	0.9	Nil	Nil	Oec
18	9420	38/M	8800	67	33	0	5	12	14.2	25	0.6	Nil	Nil	Nil
19	1458	59/F	8900	60	37	3	9	21	13.4	25	0.8	Nil	Nil	Opc
20	3714	57/M	9200	69	27	4	2	10	13	34	0.9	Nil	Nil	Nil
21	3716	33/F	9800	65	33	2	3	13	12.4	24	0.7	Nil	Nil	Nil
22	3715	42/F	8600	62	32	5	6	12	14	26	0.9	Nil	Nil	Nil
23	4904	45/M	8500	66	33	1	3	7	13.6	25	1.0	Nil	Nil	Nil
24	4910	45/M	8800	60	35	5	17	36	14.0	21	0.7	Nil	Nil	Nil
25	4012	38/F	9900	59	37	4	5	9	13.6	29	0.8	Nil	Nil	Nil
26	4011	43/M	9900	56	40	4	5	11	13.1	36	1.7	Nil	Nil	Nil
27	5292	32/F	9100	59	35	6	4	12	13.2	30	1.0	Nil	Nil	Nil
28	5313	34/M	7900	60	37	3	10	22	12	24	0.8	Nil	Nil	Opc
29	5516	53/F	8700	69	28	3	4	12	10.9	26	0.7	Nil	Nil	Nil
30	6333	48/M	8400	61	35	4	8	22	14.4	30	1.0	Nil	Nil	Nil
31	6332	48/M	8900	63	34	3	7	12	14.5	31	1.1	Nil	Nil	Opc

32	7897	52/F	8900	61	36	3	5	14	12.9	24	0.7	Nil	Nil	Nil
33	8175	49/M	9400	58	38	4	2	6	12.1	22	0.8	Nil	Nil	Nil
34	1921	42/M	8700	60	37	3	6	14	10.8	26	1.1	Nil	Nil	Nil
35	3214	32/M	10300	61	36	3	6	12	14.6	38	0.7	Nil	Nil	Nil
36	6637	40/M	8300	68	29	3	5	15	13.8	22	0.8	Nil	Nil	Nil
37	3912	37/M	8600	53	41	6	7	16	13.2	24	0.8	Nil	Nil	Nil
38	1571	35/M	9700	66	30	4	2	8	14.5	28	0.9	Nil	Nil	Nil
39	1570	42/M	8000	65	32	3	4	10	13.4	35	0.7	Nil	Nil	Nil
40	4913	58/F	9700	69	28	3	5	12	12	26	0.7	Nil	Nil	Nil

TC – Total count, DC – Differential count, P – Polymorphs, L – Lymphocyte, E – Eosinophil, ESR – Erythrocyte Sedimentation Rate, Oec – Occasional epithelial cells, Opc – Occasional pus cells, Alb – Albumin, Sug – Sugar, Dep – Deposits

Before Treatment

AARTHI SCANS & LABS™

NABL Accredited Lab & ISO 9001:2008 Organisation

Name	MRS.RANI.S	Patient ID	AS_VPL_US_043920
Accession No	01_043920_172277	Age/Gender	58Y / Female
Referred By	Dr.SENTHIL.S. MBBS.	Date	15-Oct-2017

USG ABDOMEN

Liver:
Is normal in size and increased echo texture. Intrahepatic biliary radicles and CBD appear normal. Portal and hepatic veins appear normal.

Gall Bladder:
Is adequately distended. No calculus or internal echoes are seen.
Wall thickness is normal.

Pancreas:
Appears normal in size and it shows uniform echo texture.

Spleen:
Is normal in size (7.8 cm) and shows uniform echogenicity.

Kidneys:
The kidneys are normal in size and position.
Few tiny microliths noted in both kidneys.
RT. Kidney measures 9.2 x 4.1 cms.
Few tiny microliths noted, largest measuring 5.1 mm is noted in the lower pole of the right kidney.
LT. Kidney measures 9.1 x 4.9 cms.
Cortico medullary differentiation is maintained on both sides.
Pelvicalyceal system on both sides appears normal.

Bladder:
Is normal contour. No intra luminal echoes are seen.

VADAPALANI : # 60, 100 Feet Road, Chennai - 26 Ph: 2472 2420.Mob: 99401 10502
KILPAUK : # 766, P.H. Road, Chennai - 10. Ph: 2661 1255. Mob: 99401 10501
ALWARPET : # 17, C.V. Raman Road, Chennai -18. Ph: 2499 5636. Mob: 99400 22558
TONDIARPET : # 623, T.H. Road, Chennai -81. Ph: 2597 1717. Mob: 99401 10505
PERAMBUR : # 49/50, Paper Mills Road, Chennai - 11. Ph: 2670 6622. Mob: 95000 76590
PORUR : # 4/10, Arcot Road, Lakshmi Nagar, Chennai - 116. Ph: 2476 2421.Mob: 98400 95032
TAMBARAM : # 116, Ezhumalai Street, Mudichur Road, Chennai - 45. Ph: 2226 1944. Mob: 99400 22337
VELACHERY : # 17, Ist Main Road, Vijay Nagar, Chennai - 42. Ph: 2259 4143. Mob: 97899 38544
ANNA NAGAR : Plot No.2107, "L" Block, 13th Main Road, Chennai -40. Mob: 90030 81185
AARTHI DIAGNOSTICS : Plot No.2107, "L" Block, 13th Main Road, Chennai -40. Ph; 044 - 2620 8166

Note : This imaging modality is having its own limitations. Hence this report should be correlated with clinical features and other parameters.

AARTHI SCANS & LABS™

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Name	MRS.RANI.S	Patient ID	AS_VPL_US_043920
Accession No	01_043920_172277	Age/Gender	58Y / Female
Referred By	Dr.SENTHIL.S. MBBS.	Date	15-Oct-2017

USG ABDOMEN

Uterus:
Measures 5.6 x 3.3 x 2.8 cms. Anteverted.
Myometrium shows normal echogenicity. No focal lesion is seen.
Endometrium is regular.

Both ovaries are atrophic.

IMPRESSION:

- **Fatty liver.**
- **Bilateral renal calculi.**

Sonologist/ Radiologist.

VADAPALANI : # 60, 100 Feet Road, Chennai - 26 Ph: 2472 2420.Mob: 99401 10502
KILPAUK : # 766, P.H. Road, Chennai - 10. Ph: 2661 1255. Mob: 99401 10501
ALWARPET : # 17, C.V. Raman Road, Chennai -18. Ph: 2499 5636. Mob: 99400 22558
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TAMBARAM : # 116, Ezhumalai Street, Mudichur Road, Chennai - 45. Ph: 2226 1944. Mob: 99400 22337
VELACHERY : # 17, Ist Main Road, Vijay Nagar, Chennai - 42. Ph: 2259 4143. Mob: 97899 38544
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Note : This imaging modality is having its own limitations. Hence this report should be correlated with clinical features and other parameters.

AFTER TREATMENT

SWAMI VIVEKANANDA DIAGNOSTIC CENTRE

Clinical lab - ECG - Digital X-ray - Ultrasound Scan - Colour Doppler - ECHO - Digital ELG - EMG - Dexa Scan - Spiral C.T. Scan - 1.5T MRI Scan

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Patient Name	Mrs. Rani . S	Age/Sex	58 Years/Female
Patient ID	02_05_2018_11_02_46	Visit No	5
Referred By	Dr. S Arul Priya	Visit Date	02/05/2018

Abdomen and KUB Scan Report

Real time B-mode Ultrasonograohy of Abdomen and KUB done

Abdomen

Liver filled with homogenous parenchymal echoes. No abscess or mass lesion in the liver.

Gall bladder appeared normal. No calculi seen in gall bladder.

Commonduct appeared normal. No calculi seen in commonduct

Pancreas appeared normal

Spleen measured 10.4cms and appeared normal

Aorta appeared normal. No para aortic nodes seen

Peritoneal cavity appeared normal

KUB

Right Kidney measured 9.4 X 5.1 cm

Cortex and collecting system of the Right Kidney appeared normal. No Caculi seen

Left Kidney measured 10.5 X 5.3 cm

Cortex and collecting system of the Left Kidney appeared normal. No Caculi seen

Bladder appeared normal

Impression

Normal Study

Dr.R. KANAGASABAI,MD,DMRD
CONSULTANT RADIOLOGIST

"Results to be correlated with patient's age, clinical symptoms, timing of food and drug intake"
Report Collecting Time: 5.45 pm to 6.45 pm – Feed back and requests regarding values will be addressed within 24 hrs.

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BEFORE TREATMENT

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Pat Name	MR SEKAR	Age & Sex	49 Years : Male
Study date	13-03-2018	Study Name	Abdomen
Ref Dr	DR.S.BALA MURUGAN MBBS MHSc FRHS.,	Pat ID	137337

Thanks for your referral.

USG COMPLETE ABDOMEN

Real time B-mode Transabdominal Ultrasonography of Abdomen & Pelvis

LIVER: Normal in size and shows normal parenchymal echoes. No focal lesions in the liver.

Portal vein, IHBR, CBD, hepatic veins and perihapatic regions appear normal.

GALL BLADDER: Well distended and shows normal wall thickness / contents. No calculus.

PANCREAS: Pancreas appears normal. MPD is not dilated.

SPLEEN: Enlarged in size (13.6 cm) and normal in echogenicity.

KIDNEYS: Both kidneys appear normal in size/echoes. Cortico-medullary differentiation is normal.

6 mm sized calculus seen in right middle calyx. No hydronephrosis / Hydroureter.

Rt.Kidney:10.4 X 5.2 cm in size. Lt.Kidney: 10.5 X 6.1 cm in size.

Aorta appears normal. No Para aortic nodes seen. No free fluid seen in the peritoneal cavity.

BLADDER: Well distended. Shows normal wall thickness and contents.

PROSTATE: Shows normal in size & echoes. Measures 3.1 X 2.6 cm in size.

Detailed High Frequency scans of both iliac fossa shows no obvious pathology / probe tenderness.

IMPRESSION:

*** SPLENOMEGALY.**

*** RIGHT RENAL CALCULUS.**

*** NORMAL STUDY OF LIVER, GB, PANCREAS, LEFT KIDNEY, BLADDER AND PROSTATE.**

Dr.R.P.BABU MD RD.,
Consultant Radiologist.
MOB :9884423408

THIS IMAGING MODALITY HAS ITS OWN LIMITATIONS. PLEASE CORRELATE WITH CLINICAL FINDINGS AND OTHER INVESTIGATION

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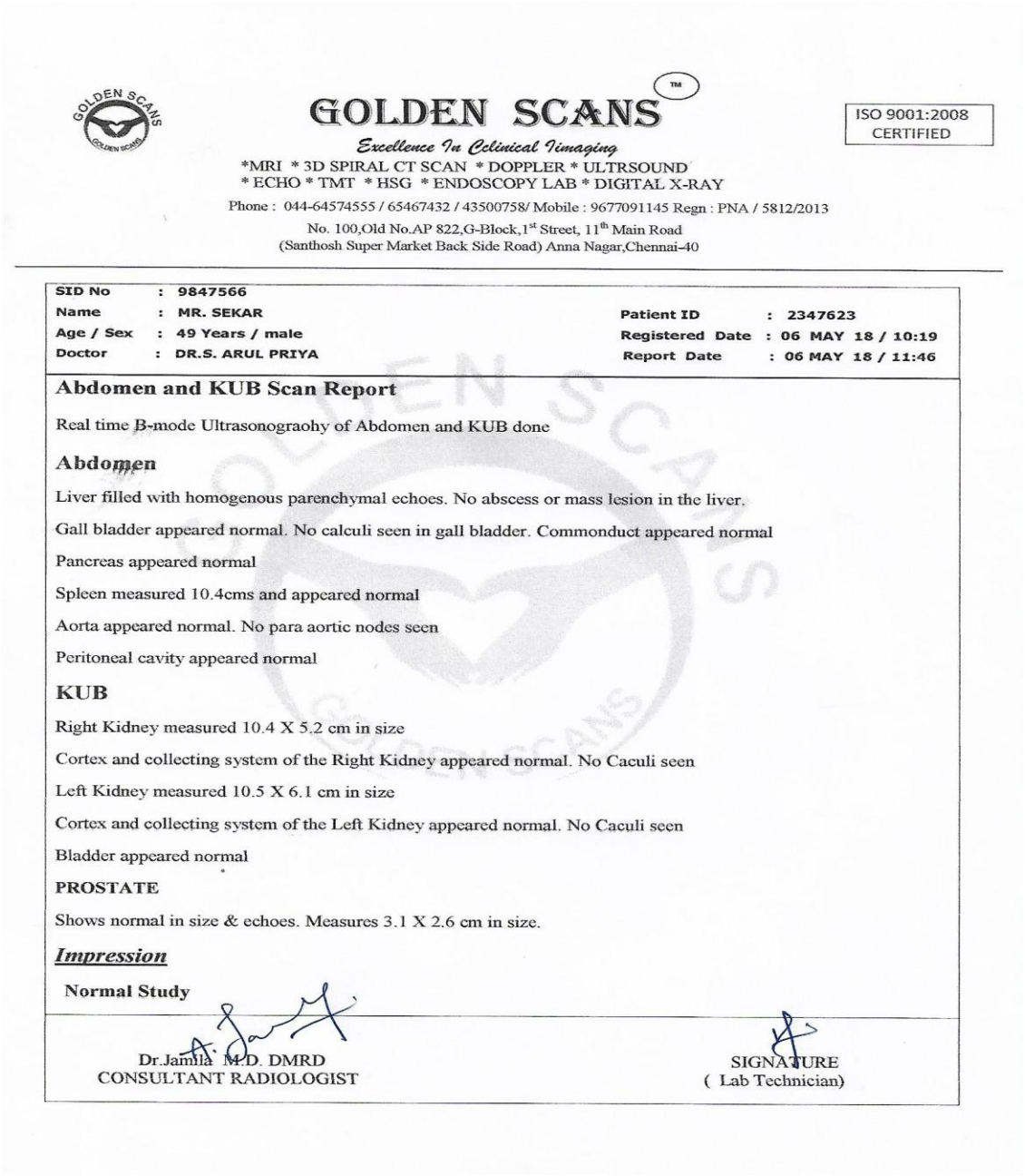
AFTER TREATMENT



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(Santhosh Super Market Back Side Road) Anna Nagar,Chennai-40

SID No	: 9847566		
Name	: MR. SEKAR	Patient ID	: 2347623
Age / Sex	: 49 Years / male	Registered Date	: 06 MAY 18 / 10:19
Doctor	: DR.S. ARUL PRIYA	Report Date	: 06 MAY 18 / 11:46

Abdomen and KUB Scan Report

Real time B-mode Ultrasonograohy of Abdomen and KUB done

Abdomen

Liver filled with homogenous parenchymal echoes. No abscess or mass lesion in the liver.

Gall bladder appeared normal. No calculi seen in gall bladder. Commonduct appeared normal

Pancreas appeared normal

Spleen measured 10.4cms and appeared normal

Aorta appeared normal. No para aortic nodes seen

Peritoneal cavity appeared normal

KUB

Right Kidney measured 10.4 X 5.2 cm in size

Cortex and collecting system of the Right Kidney appeared normal. No Caculi seen

Left Kidney measured 10.5 X 6.1 cm in size

Cortex and collecting system of the Left Kidney appeared normal. No Caculi seen

Bladder appeared normal

PROSTATE

Shows normal in size & echoes. Measures 3.1 X 2.6 cm in size.

Impression

Normal Study

Dr.Jamila M.D. DMRD
CONSULTANT RADIOLOGIST

SIGNATURE
(Lab Technician)

DISCUSSION

DISCUSSION

Urinary calculi are known to mankind since antiquity. The earliest recorded example being bladder and kidney stones detected in Egyptian Mummies dated to 4800 B.C. Kalladaippu is a common disease pertaining to the kidney. Large populations are suffering from this disease. In spite of new approach in diagnosis and management, it still continues to cause significant morbidity, with a high tendency of recurrences. Hence with the help of trial medicine from Siddha system, results and observations are noted for this study.

The patients were examined base on Siddha and as well as modern aspects. All the necessary investigations were made during the study. The results obtained from their studies were discussed below for better conclusion.

Trial medicine administered was Kalladaippu Chooranam – 1gm 2 times a day with honey after food for 48 days.

40 cases were selected in the outpatient ward of Aringar Anna Government Hospital of Indian Medicine attached to Government Siddha Medical College, Arumbakkam ,Chennai -106 during the period of 2015-2018.All necessary investigations were carried out to all patients and trail medicine were given.

IEC, CTRI:

Study Design

The study was approved by Institutional Ethics Committee (IEC) and the approval number is **GSMC-CH-ME-5/2016/001**.It was registered in **Clinical TrialsRegistry – India (CTRI)** and the reference number is **CTRI/2018/03/012767**.

Population and sample:

The population consists of all patients satisfying the inclusion and exclusion criteria mentioned below. Sample consists of VATHA KALLADAIPPU patients who were attending the OPD of Arignar Anna Hospital, Arumbakkam, Chennai – 106.

Sample Size:

The trial size will be 40 patients.

DRUG AUTHETICATION:

I have got a drug authentication of minerals like padikaram, venkaram, Savukaaram, Induppu from Department of chemistry and freshly specimens of herbals like Musa paradisiacal, Borassusfiabellifer , Achyranthesaspera were collected from their nativity and authentication from the Department of Pharmacognosy Siddha Central Research Institute, Arumbakkam Chennai-106.

IAEC:

IAEC/NO: LI/16/CLBMCP/2017

TOXICITY STUDY:

ACUTE TOXICITY:

Acute and sub acute toxicity studies were conducted on experimental rats at C.L .Baid Metha College of Pharmacy, Chennai, Tamilnadu.Acute toxicity study of the drug KalladaippuChooranam with Honey was carried out as the OECD guideline - 423 (Organisation to Econamic Co-operation and Development).The acute toxicity study of my trial medicine was studied and the drug was proved safer for long term administration, as it did not exhibit any significant toxicity at 2000 mg / kg body weight.

SUB ACUTE TOXICITY:

Sub acute toxicity study as per the guideline of – 407. Under the dosage of trial medicine 200mg / kg (Low dose), 400mg / kg (High dose) it did not exhibit any significant.

PHARMACOLOGICAL ACTIVITY:

The pharmacology studies of trial medicine Kalladaippu Chooranam showed significant Lithotriptic action in wistarrats.The Lithotriptic activity of Kalladaippu Chooranam was carried out in wistar rats through Ethylene Glycol-induced urolithiasis method. Then trial medicine was administrated shows a potent Lithotriptic activity during the studies.The result of preclinical screening, the result of chemical analysis, Toxicological studies, Pharmacological studies were shown in annexure.

PRE CLINICAL SCREENINGS:

PHSIOCHEMICAL ANALYSIS:

Loss on Drying (at 105^0C) was 8.3%.

The total ashvalue 73.53%,

Acid insoluble ash 17.96%

Water soluble ash 50.55%

Water soluble extraction 72.15%

Alcohol soluble extraction 2.96%

BIOCHEMICAL ANALYSIS:

Kalladaippu Chooranam contains -Chlorides, Phosphate, Sulphate, and Iron.

CLINICAL STUDY:

All the necessary investigations were carried out to all patients and trial medicine were given. Weekly once follow up were done. Total duration of treatment ranges from 48 days. All the patients were strictly advised to follow diet restriction and peaceful life style to normalize the immune mechanism.

GENDER DISTRIBUTION:

From selected 40 cases of 60% were males and 40% were females Urolithiasis is most commonly affected in male.

AGE DISTRIBUTION:

Out of 40 cases 14 patients (35%) were between 31 – 40 years, 13 patients (32.5%) were between 41 – 50 years, 9 patients (22.5%) were between 51 – 60 years and 4 patients (10%) were between 21-30 years.High incidences of cases were noted in age ranging of 31 – 40 years during the studies. The disease is more common in 3^{rd} and 4^{th} decade.

SEASONAL INCIDENCE:

According to Paruvakaalam highest incidences of 57.5% were noted in Pinpanikaalam and 42.5% cases were noted in Munpanikaalam. When clinical trials of 40 cases were enquired about the seasonal link, most of the cases were in PinpaniKaalam due to seasonal variation.

OCCUPATIONAL STATUS:

From selected 40 cases, 13 patients (32.5%) were house Officer worker, 11 patients (27.5%) were housewives, 5 patients (12.5%) were businessman,1 patients(2.5%) was Student 10 patients (25%) were others.Mixedcatagories of people are affected from Office workers, housewife.

SOCIO ECONOMIC STATUS:

Recording Socio Economic Status 22 patients (55%) were low income and 13 cases (32.5%) from middle income and 5 cases (12.5%) from high income. The people living in poor Socio Economic Status were more affected because of life style and environmental factors.

DIET REFERENCE:

Out of 40 cases, most of the cases 30 (75%) were taken mixed diet and 10 cases (25%) had vegetarian diet only.

THINAI DISTRIBUTION:

According to the study, 40 cases (100%) were from Neithal thinai. Thinai in which the patients live in one of the major extrinsic factor responsible for urinary lithiasis. Siddha Maruthuvanga Churukkam explains that in Neithalnilam, Vali Azhal in its power.

CLINICAL MANIFESTATION:

In respect of the patients with Kalladaippu, the clinical manifestation of Flank Pain were present in 40 cases (100%), Burning micturation had present in 20 cases (50%), Oliguria were present in 12 cases (30%), Nausea were present in 2 cases (5%), Fever in 5 patients (12.5%) and Vomitting were present in10 cases (25%), Dysuria in 3 cases (7.5%) and Oliguria in 12 cases (30%).

MUKKUTRAM:

DISTRIBUTION OF VATHAM:

According to classification of Vatham, derangement of Abanan, Viyanan, Uthhanan, Samanan, Kirukaran and Devathathan. 40 patients (100%) was affected with Abanan, 40 patients (100%) was affected with Viyanan,and 40 patients was affected with Samanan,10 patients (25%) was affected with Uthanan,Koorman was affected with 4 patients (10%) , 11 patients (27.5%) was affected with Kirukaran,12 patients (15%) was affected with Devathathan and none affected with Pranan, Naagan ,korman and Thananjeyan.

- Affected Abanan produced Burning micturition , constipation dysuria and oliguria
- Affected Viyanan produced (pain) tenderness from loin to groin.
- Affected Uthanan produced nausea and vomiting.
- Affected samanan due to other factor.

- Affected Koorman due to dullness of vision.
- Affected kirukaran produced loss of appetite
- Affected Devathathan produced insomnia.

DISTRIBUTION OF PITHAM:

According to Pitham 40 cases (100%) were affected Saathagam, 11 cases (27.5%) was affected with Analagam, 8 cases (20%) was affected with Ranjagam,Alosagam was affected with 4 patients(10%).

- Affected Analagam produced loss of appetite.
- Affected Ranjagam produced pallor of skin, eye and reduced haemoglobin.
- Affected Saathagam due to unable to perform desired work.
- Affected Alosagam due to dullness of vision.

DISTTRIBUTION OF KABAM:

According to the study, 40 cases (100%) affected by Avalambagam, 11 cases (27.5%) affected by Kelathagam, 13 cases (32.5%) affected by Santhigam.

- Affected Avalambagam due to other factors.
- Affected Kelathagam due to loss of appetite and indigestion.
- Santhigamiyam gives stability, lubrication and movements of joints.
- Affected Santhigam produced low back pain.

EZHU UDAL KATTUGAL:

From the above chart, we observe that Saaram, were affected in all the patients (100%), Senneer was affected in 8 cases (20%), Oon was affected in 13 cases (32.5%), Enbu was affected in 13 cases (32.5%),Moolai was affected in 12 cases (30%), None affected with Kozhupu and Sukkilam / Suronitham.

ENVAGAI THERVUGAL:

According to Envagaithervugal, Naa was affected in 2 cases (5%), Niram was affected in 8 patients (20%), Mozhi was affected in 10 cases (25%),Vizhi was affected in 5 patients (12.5%), Sparisam was affected in 5 patients (12.5%), Malam was affected in 3 patients (7.5%), Moothiram was affected in for all the 35 patients (87.5%).

- Naa was affected due to anaemia.
- Niram was affected due to anaemia (pale colour).
- Vizhi was affected had dullness of vision.
- Mozhi was affected low pitched sound.
- Sparisam was affected due to Fever, tenderness pain.
- Malam was affected due to constipation.
- Moothiram was affected due Burning micturation, Oliguria and Dysuria.

NAADI:

Out of 40 patients, 26 patients (65%) had VathaAzhal, 9 patients (22.5%) had AzhalVali, 3 patients (7.5%) had KabhaVatham, 2 patients (5%) had KabhaPitham

NEIKURI:

Out of 40 patients (65%) had VathaNeer, 9 patients (22.5%) had PithaNeer and 5 patients (12.5%) had KabhaNeer.

CLINICAL PROGNOSIS:

The clinical signs and symptoms were improved after treatment, `showing only 7 cases (17.5%) had Flank pain, 3 cases (7.5%) had Burning micturation.

INVESTICATION:

In Blood tests, TC, DC, ESR, Hb% serum creatinine, blood urea were investigated.

URINE:

Albumin, Sugar, Deposits were investigated.

SPECIAL INVESTICATION:

USG- abdomen and pelvis is advised for all the patients to confirm the diagnosis.After confirming the diagnosis, the patients were given the trial medicine and instructed to follow the diet and other restrictions based on Siddha system.

BIO STATISTICAL STUDY:

Since the p value C.I: 95%, *P<0.05; **P<0.01 is significant in all clinical manifestations. So there is significant reducing of clinical manifestations among the patients for the treatment of Vatha Kalladaippu. Hence it is concluded that the treatment was effective and **significant.**

DISTRIBUTION OF CALCULI BASED ON LOCATION:

Since the p value C.I: 95%, *P<0.05; **P<0.01 is significant in all sides. So there is a significant changes grade of pain among the patients for the treatment of Vatha Kalladaippu. Hence it is concluded that the treatment was effective and **significant.**

OVER ALL RESULT:

Out of 40 patients, 13 cases (32.5%) shows good result, 21 cases (52.5%) shows moderate result, 6 cases (15%) shows poor result.

SUMMARY

SUMMARY:

The clinical study on **VATHA KALLADAIPPU** was carried out in post graduate department of pothumaruthuvam, Govt. Siddha Medical College, Aringar Anna Hospital, Chennai 106. During the period of 2015-2018.A total of 40 patients was treated in the out patient department. The clinical and pathological assessment was carried out on the basis of Siddha and Modern aspects.All the patients were treated with **KALLADAIPPU CHOORANAM** with Honey 1g b.d, daily after food for duration of 48 days.

- I like to summarize this study with the following highlights.
- Males are more prone to get kalladaippu than females according to my studies, males were affected with 60%.
- In age distribution, age groups between 31-40 yrs of people are more affected which is 35%.
- Office workers (32.5%) and House wives (27.5%) occupy the first two places in occupational classification.
- Most of the patient had mixed diet (75%).
- Higher incidences of cases were noted in Pinpanikalam (Mid Feb – Mid Apr) which is 57.5%.
- Most of the patients were from Neithalthinai (100%).
- In Vali, Abanan (100%), Viyanan (100%), Uthanan (25%), Samanan (100%), Koorman (10%), Kirukaran (27.5%), Devathathan (30%) was affected.
- In Azhal, Analagam (27.5%), Ranjagam (20%), Saathagam (100%), Alosagam (10%) was affected.
- In Iyyam, Avalambagam (100%), Kelathagam (27.5%), Santhigam (32.5%) was affected.

- In the disturbance of Ezhu udal thathukkal, 100% saaram, 20% senneer, 32.5% Oon, 32.5% enbu and Moolai 25% were affected.
- In Envagaithervu, 5% Naa, 20% Niram, 25% Mozhi, 12.5% Vizhi, 12.5% Sparisam, 7.5% Malam, 87.5% Moothiram were affected.
- In Naadi, most of the patients having vali azhal naadi (65%).
- In Neikuri examination 65% were having vatha neer.
- Among the patients, 100% had flank pain, 50% had burning Micturition, 5% had nausea, 12.5% had fever, Vomiting 25%, Oliguria 30% and 5% had Dysuria.
- Most of the patients had stone in both sides of the kidney (45%).
- The Toxicological studies of the trial medicine reveal no toxicity.
- The pharmacological studies reveal that, the TRIAL MEDICINE has **LITHOTRIPTIC ACTIVITY.**
- Bio-statistical analysis of the clinical trial reveals significant p value <0.05, <0.01 and concludes that the treatment is effective and significant.
- After treatment with this trial medicine, most of the symptoms like loin pain, burning Micturition and Dysuria are relieved. The trial medicine shows 32.5% good result and 52.5% moderate result.

CONCLUSION

CONCLUSION

Kalladaippu is a common disorder due to dearrangement of pitha kutram. The dearranged pitham is settled down by the trial medicine by its thuvarpu suvai, on Oppurai Maruthuvam.

- Most of the cases noted in Pinpanikalam and munpanikalam in my clinical trial. So, people should take all preventive measures during this period and take enough water.
- The Kalladaippu chooranam no toxicity in the preclinical studies and hence proved to be safe for human administration.
- Pharmacological study reveals that the trial medicines possess lithotriptic activity.
- During clinical trial, no adverse reactions or complications were observed.
- The cast of the TRIAL MEDICINE is less also the palatability is alsoacceptable for consume by the patients.
- The trial medicine Kalladaippu chooranam showed good results with relieving symptoms in almost 85% patients.
- Once again Siddha medicine proves itself as a great boon to mankind.

ANNEXURES

The Tamil Nadu Dr. M.G.R. Medical University

69, Anna Salai, Guindy, Chennai - 600 032.

This Certificate is awarded to Dr/Mr/Mrs.....S.ARUL PRIYA.....

For participating as ~~Resource Person~~ / Delegate in the Twentieth Workshop on

"RESEARCH METHODOLOGY & BIOSTATISTICS"

For ***AYUSH Post Graduates & Researchers***

Organized by the Department of Siddha

The Tamil Nadu Dr. M.G.R. Medical University From 07th to 11th March 2016.

Dr.N.KABILAN, M.D.(S)
PROF & HEAD
DEPT.OF SIDDHA

Prof.**Dr.P.ARUMUGAM,** M.D.,
REGISTRAR i/c

Prof. **Dr.S.GEETHALAKSHMI,** M.D., Ph.D.,
VICE CHANCELLOR

सिद्ध केंद्रीय अनुसन्धान संस्थान
(सी.सी.आर.एस., चेन्नई, आयुष मंत्रालय, भारत सरकार)
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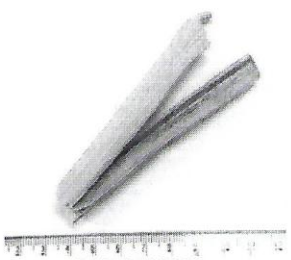
06.06.2017

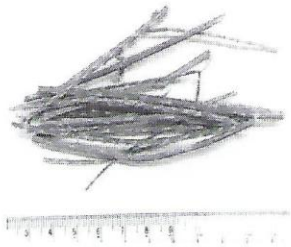
AUTHENTICATION CERTIFICATE FOR 17051801-03

Certified that the drugs submitted by Dr. S. Arulpriya, MD (S) II Year, Dept of Maruthuvam, Govt. Siddha Medical College, Arumbakkam, Chennai-106 are identified as:

SN	Botanical Name	Tamil Name	Part	Code
1.	*Musa* × *paradisiaca* L.	Vazhaimattai	Sheathing leaf base	M17051801P
2.	*Borassus flabellifer* L.	Panangathir	Inflorescence	B17051802F
3.	*Achyranthes aspera* L.	Nayuruvi	Whole plant	A17051203A


M17051801P


B17051802F


A17051203C

Dr. K.N. Sunil Kumar 6/6/17
Dr. K.N. Sunil Kumar
R.O. and HOD Pharmacognosy

Dr. P. Sathiya Rajeswaran
Assistant Director (Siddha)
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and In Charge

சித்த மருத்துவ மைய ஆராய்ச்சி நிலையம், சென்னை - 600 106
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Phone: 044-2621 4925, Fax: 044-2621 4809

23.5.2017

CERTIFICATE

Certified that the sample submitted by Dr. S. Arul Priya, II year MD Student, Department of Maruthuvam, Government of Siddha Medical College, Chennai-600106 is identified as Indhuppu – Sodium Chloride, Padikaram – Aluminium Potassium Silicate, Vengaram - Borax and Savukkaram – Sodium Carbonate.

(R. Shakila)
Research Officer (Chemistry) & Head,
Department of Chemistry

(Dr. P. Sathiyarajeswaran)
Assistant Director (Siddha) I/c

C.L.BAID METHA COLLEGE OF PHARMACY

(An ISO 9001-2000 certified institute)

Jyothi Nagar, Old Mahabalipuram Road

Thoraipakkam, Chennai – 600 097

CERTIFICATE

This is to certify that the project entitled, Pharmacological and Toxicological screening of Kalladaippu Chooranam submitted in partial fulfilment for the degree of M.D. (siddha) was carried out at C.L. Baid Metha college of Pharmacy, Chennai-97, in the Department of Pharmacology during the academic year of 2017-2018. It has been approved by the IAEC No: LI/16/CLBMCP/2017

C.L. Baid Metha College of Pharmacy CHENNAI-97 Thoraipakkam

Dr.P. MURALIDHARAN

IAEC MEMBER SECERATARY

ACUTE ORAL TOXICITY STUDY OF KALLADAIPPU CHOORANAM

(OECD GUIDELINE – 423)

Introduction:

- The acute toxic class method is a stepwise procedure with the use of 3 animals of a single sex per step.
- Depending on the mortality and/or the moribund status of the animals, on average 2-4 steps may be necessary to allow judgement on the acute toxicity of the test substance.
- This procedure is reproducible, uses very few animals and is able to rank substances in a similar manner to the other acute toxicity testing methods.
- The acute toxic class method is based on biometric evaluations with fixed doses, adequately separated to enable a substance to be ranked for classification purposes and hazard assessment.
- In principle, the method is not intended to allow the calculation of a precise LD50, but does allow for the determination of defined exposure ranges where lethality is expected since death of a proportion of the animals is still the major endpoint of this test.
- The method allows for the determination of an LD50 value only when at least two doses result in mortality higher than 0% and lower than 100%.
- The use of a selection of pre-defined doses, regardless of test substance, with classification explicitly tied to number of animals observed in different states improves the opportunity for laboratory to laboratory reporting consistency and repeatability.

Principle of the Test:

It is the principle of the test that based on a stepwise procedure with the use of a minimum number of animals per step, sufficient information is obtained on the acute toxicity of the test substance to enable its classification. The substance is administered orally to a group of experimental animals at one of the defined doses. The substance is tested using a stepwise procedure, each step using three animals of a single sex. Absence or presence of compound-related mortality of the animals dosed at one step will determine the next step, i.e.

− no further testing is needed

− dosing of three additional animals, with the same dose

− dosing of three additional animals at the next higher or the next lower dose level. The method will enable a judgment with respect to classifying the test substance to one of a series of toxicity classes.

Methodology:

Selection of Animal Species

The preferred rodent species is the wistar albino rat, although other rodent species may be used. Healthy young adult animals are commonly used laboratory strains should be employed. Females should be nulliparous and non-pregnant. Each animal, at the commencement of its dosing, should be between 6 to 8 weeks old and the weight (150-200gm) should fall in an interval within±20 % of the mean weight of any previously dosed animals.

Housing and Feeding Conditions

The temperature in the experimental animal room should be 22ºC ± 3ºC. Although the relative humidity should be at least 30% and preferably not exceed 70% other than during room cleaning the aim should be 50-60%. Lighting should be artificial, the sequence being 12 hours light, 12 hours dark. For feeding, conventional laboratory diets may be used with an unlimited supply of drinking water. Animals may be group-caged by dose, but the number of animals per cage must not interfere with

clear observations of each animal.

Preparation of animals:

The animals are randomly selected, marked to permit individual identification, and kept in their cages for at least 7 days prior to dosing to allow for acclimatization to the laboratory conditions

Test Animals and Test Conditions:

Sexually mature Female Wistar albino rats (150-200gm) were obtained fromkings institute, Chennai.All the animals were kept under standard environmental condition (22±3°C). The animals had free access to water and standard pellet diet (Sai meera foods, Bangalore).

Preparation of animals: The animals are randomly selected, marked to permit individual identification, and kept in their cages for at least 7 days prior to dosing to allow for acclimatization to the laboratory conditions

Preparation for Acute Toxicity Studies

Rats were deprived of food overnight (but not water 16-18 h) prior to administration of the, **KALLADAIPPU CHOORANAM**

The principles of laboratory animal care were followed and the Institutional Animal Ethical Committee approved the use of the animals and the study design

IAEC No: XLVIII/01/CLBMCP/2016

Test Substance : **KALLADAIPPU CHOORANAM**

Animal Source : Kings institute, Chennai.

Animals : Wister Albino Rats (Female-3+3)

Age **:** >6 weeks

Body Weight on Day 0 **:**180-300 gm.

Acclimatization **:** Seven days prior to dosing.

Veterinary examination **:** Prior and at the end of the acclimatization period.

Identification of animals **:** By cage number, animal number and individual marking by using Picric acid.

Numberofanimals : 3 Female/group,

Routeofadministration : Oral

Diet **:** Pellet feed supplied by Sai meera foods Pvt Ltd, Bangalore

Water **:** Aqua guard portable water in polypropylene bottles.

Housing & Environment **:** The animals were housed in Polypropylene cages provided with bedding of husk.

Housing temperature **:** between 22ºC + 3ºC.

Relative humidity **:** between 30% and 70%,

Air changes **:** 10 to 15 per hour and

Dark and light cycle **:** 12**:**12 hours.

Duration of the study **:** 14 Days

Administration of Doses:

KALLADAIPPU CHOORANAM was suspended in water and administered to the groups of wistar albino rats in a single oral dose by gavage using a feeding needle. The control group received an equal volume of the vehicle. Animals were fasted 12 hours prior to dosing. Following the period of fasting, the animals were weighed and then the test substance was administered. Three Female animals are used for each group. The dose level of 5, 50,250 and 500 mg/kg body weight was administered stepwise. After the substance has been administered, food was withheld for a further 3-4 hours. The principle of laboratory animal care was followed. Observations were made and recorded systematically and continuously as per the guideline after substance

administration. The visual observations included skin changes, mobility, aggressively, sensitivity to sound and pain, as well as respiratory movements.Finally, the number of

survivors was noted after 24 hrs and these animals were then monitered for a further 14 days and observations made daily. The toxicological effect was assessed on the basis of mortality.

Observations:

Animals are observed individually after dosing at least once during the first 30 minutes, periodically during the first 24 hours, with special attention given during the first 4 hours, and daily thereafter, for a total of 14 days, except where they need to be removed from the study and humanely killed for animal welfare reasons or are found dead. It should be determined by the toxic reactions, time of onset and length of recovery period, and may thus be extended when considered necessary. The times at which signs of toxicity appear and disappear are important, especially if there is a tendency for toxic signs to be delayed. All observations are systematically recorded with individual records being maintained for each animal.

Observations include changes in skin and fur, eyes and mucous membranes, and also respiratory, circulatory, autonomic and central nervous systems, and somatomotor activity and behavior pattern. Attention was directed to observations of tremors, convulsions, salivation, diarrhoea, lethargy, sleep and coma. The principles and criteria summarized in the Humane Endpoints Guidance Document taken into consideration. Animals found in a moribund condition and animals showing severe pain or enduring signs of severe distress was humanly killed. When animals are killed for humanreasons or found dead, the time of death was recorded.

Acute oral toxicity study of KALLADAIPPU CHOORANAM

Table 1: Dose finding experiment and its behavioral Signs of acute oral Toxicity

Observation done:

SL	Group CONTROL	Observation	SL	Group TEST GROUP	Observation
1	Body weight	Normal	1	Body weight	Normally increased
2	Assessments of posture	Normal	2	Assessments of posture	Normal
3	Signs of Convulsion Limb paralysis	Normal	3	Signs of Convulsion Limb paralysis	Absence of sign (-)
4	Body tone	Normal	4	Body tone	Normal
5	Lacrimation	Normal	5	Lacrimation	Absence
6	Salivation	Normal	6	Salivation	Absence
7	Change in skin color	No significant color change	7	Change in skin color	No significant color change
8	Piloerection	Normal	8	Piloerection	Normal
9	Defecation	Normal	9	Defecation	Normal
10	Sensitivity response	Normal	10	Sensitivity response	Normal
11	Locomotion	Normal	11	Locomotion	Normal
12	Muscle gripness	Normal	12	Muscle gripness	Normal
13	Rearing	Mild	13	Rearing	Mild
14	Urination	Normal	14	Urination	Normal

Behaviour:

The animals will be observed closely for behaviour in the first four hours which includes abnormal gait, aggressiveness, exophthalmos, ptosis, akinesia, catalepsy, convolusion, excitation, head twitches, lacrimation, loss of corneal reflex, loss of traction, piloerection reactivity of touch, salivation, scratching, sedation, chewing,

head movements, sniffing, straub, tremor and writhes, diarrhea, leathery, sleep and coma.

Body Weight:

Individual weight of animals was determined before the test substance was administered and weights will be recorded at day 1, 7, and 14 of the study. Weight changes were calculated and recorded. At the end of the test, surviving animals were weighed and humanly killed.

Food and water Consumption:

Food and water consumed per animal was calculated for control and the treated dose groups.

Mortality:

Animals were observed for mortality throughout the entire period.

Results:

All data were summarized in tabular form, (Table-1-4) showing for each test group the number of animals used, the number of animals displaying signs of toxicity, the number of animals found dead during the test ,description of toxic symptoms,, weight changes, food and water intake.

No of animals in each group:3

Table 2 (Observational study Results)

No	Dose mg/kg	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	Control	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	500 mg/kg	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1..Alertness 2. Aggressiveness 3. Pile erection 4. Grooming 5. Gripping 6. Touch Response 7. Decreased Motor Activity 8.Tremors 9.Convulsions 10. Muscle Spasm 11. Catatonia 12. Muscle relaxant 13. Hypnosis 14.Analgesia 15.Lacrimation 16.Exophthalmos 17.Diarrhea 18. Writhing

19. Respiration 20. Mortality.

(+ Present, - Absent)

Table 3 (Body Weight Observation)

DOSE	DAYS		
	1	7	14
CONTROL	186.6± 2.75	189.2± 3.87	194.2 ± 7.62
500 mg/kg	182.5± 4.08	184.2± 2.16	187.4 ± 2.67
P value (p)*	NS	NS	NS

Table 4 Water intake (ml/day) of Wistar albino rats group exposed to (KALLADAIPPU CHOORANAM*):*

DOSE	DAYS		
	1	6	14
CONTROL	28.5 ± 2.74	30.0± 9.13	32.4± 3.13
500 mg/kg	30.4±2.33	36.6±1.11	38.9± 2.19
P value (p)*	NS	NS	NS

N.S- Not Significant,**($p > 0.01$), *($p > 0.05$), n = 10 values are mean ± S.D

(One way ANOVA followed by Dunnett's test)

Table 5: Food intake (gm/day) of Wistar albino rats group exposed to *KALLADAIPPU CHOORANAM*

DOSE	DAYS		
	1	7	14
CONTROL	23.56±3.36	28.60±2.42	31.61±5.46
500 mg/kg	22.42±1.64	29.31±1.22	32.22±3.24
P value (p)*	NS	NS	NS

REPEATED DOSE 28-DAY ORAL TOXICITY STUDY OF KALLADAIPPU CHOORANAM

Test Substance : **KALLADAIPPU CHOORANAM**

Animal Source : Kings institute, Chennai.

Animals : Wister Albino Rats (Male -24, and Female-24)

Age **:** >6 weeks

Body Weight **:** 180-300 gm.

Acclimatization **:** Seven days prior to dose.

Veterinary examination **:** Prior and at the end of the acclimatization period.

Identification of animals **:** By cage number, animal number and individual marking by using Picric acid

Diet **:** Pellet feed supplied by Sai meera foods Pvt Ltd, Bangalore

Water **:** Aqua guard portable water in polypropylene bottles.

Housing & Environment **:** The animals were housed in Polypropylene cages

provided with bedding of husk.

Housing temperature **:** between 22ºC ±3ºC.

Relative humidity **:** Between 30% and 70%,

Air changes **:** 10 to 15 per hour

Dark and light cycle **:** 12**:**12 hours.

Duration of the study **: 28 Days.**

Table 5

Groups	**No of Rats**
Group I Vehicle control	12(6male,6 female)
Group II KALLADAIPPU CHOORANAM 50 mg/kg	12 (6male,6 female)
Group III KALLADAIPPU CHOORANAM 250 mg/kg	12 (6male,6female)
Group IV KALLADAIPPU CHOORANAM 500 mg/kg	12(6male,6female)

Methodology

Randomization, Numbering and Grouping of Animals:

48 Wistar Albino Rats (24M + 24F) were selected and divided into 4 groups. Each group consist of 12 animals (Male -6, and Female-6). First group treated as a control and other three group were treated with test drug (low, mid, high) for 28 days. Animals were allowed acclimatization period of 7 days to laboratory conditions prior to the initiation of treatment. Each animal was marked with picric acid. The females were nulliparous and non-pregnant.

Justification for Dose Selection:

As per OECD guideline three dose levels were selected for the study. They are low dose (50 mg/kg), mid dose dose (250 mg/kg), high dose (500 mg/kg). X is calculated by multiplying the therapeutic dose of human (3000mg/kg) and the body surface area of the rat (0.018). i.e X dose is 50 mg/kg/animal, 5X mid dose is 250 mg/kg, 10 X high dose is 500 mg/kg.

Preparation and Administration of Dose:

KALLADAIPPU CHOORANAM suspended in with water, It was administered to animals at the dose levels of 50, 250 and 500 mg/kg. The test substance suspensions were freshly prepared every two days once for 28 days. The control animals were administered vehicle only. The drug was administered orally by using oral gavage oncedaily for 28 consecutive days.

Observations:

Experimental animals were kept under observation throughout the course of study for the following:

Body Weight:

Weight of each rat was recorded on day 0, at weekly intervals throughout the course of study.

Food and water Consumption:

Food and water consumed per animal was calculated for control and the treated dose groups.

Clinical signs:

All animals were observed daily for clinical signs. The time of onset, intensity and duration of these symptoms, if any, were recorded.

Mortality:

All animals were observed twice daily for mortality during entire course of study.

Necropsy:

All the animals were sacrificed by excessive anesthesia on day 29. Necropsy of all animals was carried out.

Laboratory Investigations:

Following laboratory investigations were carried out on day 29 in animals fasted over-night. Blood samples were collected from orbital sinus using sodium heparin (200IU/ml) for Bio chemistry and potassium EDTA (1.5 mg/ml) for Hematology as anticoagulant. Blood samples were centrifuged at 3000 r.p.m. for 10 minutes.

Hematological Investigations:

Hematological parameters were determined using Haematologyanalyzer.

Biochemical Investigations:

Biochemical parameters were determined using auto-analyzer.

Histopathology:

Control and highest dose group animals will be initially subjected to histopathological investigations. If any abnormality found in the highest dose group than the low, then the mid dose group will also be examined. Organs will be collected from all animals and preserved in 10% buffered neutral formalin for 24 h and washed in running water for 24 h. The organ sliced 5 or 6µm sections and were dehydrated in an auto technicon and then cleared in benzene to remove absolute alcohol. Embedding was done by passing the cleared samples through three cups containing molten paraffin at 50°C and then in a cubical block of paraffin made by the "L" moulds. It was followed by microtome and the slides were stained withHaematoxylin-eosin red.

Statistical analysis:

Findings such as body weight changes, water and food consumption, hematology and blood chemistry were subjected to One-way ANOVA followed by dunnett test using a computer software programme – Graph pad version 5.0 .All data were summarized in tabular form, (Table-6 to 12)

RESULTS

Repeated Dose 28- day oral toxic study ofKALLADAIPPU CHOORANAM

Table 6: Body weight of wistar albino rats group exposed to KALLADAIPPU CHOORANAM

DOSE	DAYS				
	1	7	14	21	28
CONTROL	165.6± 2.76	166.4 ± 3.42	167.7 ± 3.26	169.2 ± 3.73	170.7 ± 1.31
LOW DOSE	160.2 ± 2.12	162.7 ± 3.64	164.4± 1.51	165.2 ± 1.66	166.42± 2.76
MID DOSE	166.6± 1.64	167.3 ± 2.74	159.4 ± 8.12	162.1 ± 3.36	163.7 ± 3.11
HIGH DOSE	167.4± 6.74	169.6 ± 3.72	162.6 ± 2.46	167 ± 6.81	161.92 ± 2.49
P value (p)*	NS	NS	NS	NS	NS

NS- Not Significant, **(p > 0.01),*(p >0.05), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

Table 7: Water intake (ml/day) of Wistar albino rats group exposed to KALLADAIPPU CHOORANAM

DOSE	DAYS				
	1	6	14	21	28

CONTROL	31.5 ± 8.95	32.0 ±6.23	28.5±6.23	29.12±8.19	31.5±3.96
LOW DOSE	21.5±3.28	21.4±3.22	21.7±3.02	21.2±3.29	24.9±3.11
MID DOSE	26.7±4.33	26.3±2.11	27.1±2.43	28.4±2.11	32.4±2.34
HIGH DOSE	20.1±1.32	20.2±2.13	22.7±2.13	25.2±1.73	28.4±2.65
P value (p)*	NS	NS	NS	NS	NS

N.S- Not Significant, **(p > 0.01), *(p >0.05), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

Table 8: Food intake (gm/day) of Wistar albino rats group exposed to KALLADAIPPU CHOORANAM

DOSE	**DAYS**				
	2	7	23	22	28
CONTROL	37.12 ±5.37	38.5±3.22	39.5±3.37	38.5±3.37	37.12±3.12
LOW DOSE	43.7±2.68	44.3±1.12	44.1±1.18	44.4±2.12	44.6±2.42
MID DOSE	46.2±3.75	45.2±3.60	45.2±4.25	45.4±2.68	47.2±2.44
HIGH DOSE	47.2±2.34	47.2±2.64	48.6±2.66	49.2±3.20	49.0±3.62
P value (p)*	NS	NS	NS	NS	NS

N.S- Not Significant, **(p > 0.01), *(p >0.05), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test).

Table 9: Haematological parameters of Wistar albino rats group exposed to KALLADAIPPU CHOORANAM

Category	Control	Low dose	Mid dose	High dose	P value (p)*
Haemoglobin(g/dl)	14.8±1.88	13.88±1.66	14.94±0.66	15.28±0.96	N.S
Total WBC ($\times 10^3$ l)	10.91±2.59	11.25±3.73	11.48±3.91	12.20±3.17	N.S
Neutrophils(%)	32.65±1.06	33.23±2.14	35.61±1.36	35.40±2.20	N.S
lymphocyte (%)	69.34±2.48	72.12±3.12	72.48±2.66	73.10±3.16	N.S
Monocyte (%)	0.78±0.17	0.79±0.09	0.82±0.03	0.84±0.06	N.S
Eosinohil(%)	0.64±0.09	0.68±0.02	0.70±0.06	0.72±0.04	N.S
Platelets cells10^3/µl	687.17±8.76	702.71±8.16	725.18±9.0	726.16±9.74	N.S
Total RBC 10^6/µl	7.99±0.12	7.82±0.57	8.82±0.59	8.38±0.72	N.S
PCV%	37.79±0.6	43.35±1.13	45.2±1.68	46.82±2.54	N.S
MCHC g/dL	33.6±2.23	35.09±1.29	35.98±1.22	36.03±1.24	N.S
MCV fL(µm^3)	49.17±3.64	50.20±1.22	52.28±1.24	53.24±1.44	N.S

N.S- Not Significant, **($p > 0.01$), *($p > 0.05$), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

Table 10: Biochemical Parameters of Wistar albino rats group exposed to KALLADAIPPU CHOORANAM

BIOCHEMICAL PARAMETERS	CONTROL	LOW DOSE	MID DOSE	HIGH DOSE	P Value (p)*
GLUCOSE (R) (mg/dl)	75.45±13.4	78.16±8.44	78.26±11.20	78.42±11.6	N.S
T.CHOLOSTEROL(mg/dl)	115.26± 1.83	115.45±1.83	116.42±1.78	116.22±1.73	N.S
TRIGLY(mg/dl)	45.35±1.48	46.32±1.48	44.58±1.30	45.66±1.33*	N.S
LDL	73.81±2.13	71.24±2.14	72.8±2.14	71.64±4.32	NS
VLDL	14.2±2.44	15.42±4.64	15.44±6.64	15.64±4.36	NS
HDL	25.66±6.88	26.86±2.24	26.68±4.66	31.78±2.22	NS
Ratio 1(T.CHO/HDL)	3.42±2.44	4.16±3.14	4.34±8.44	4.46±2.22	NS
Ratio 2(LDL/HDL)	3.83±4.22	2.84±2.22	2.86±2.20	2.96±6.02	NS
Albumin(g/dL)	2.63±0.17	3.43±0.12	3.14±2.02	3.24±6.86	NS

NS- Not Significant,**($p > 0.01$), * ($p > 0.05$), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

Table 11: Renal function test of ofWistar albino rats group exposed to KALLADAIPPU CHOORANAM

PARAMETERS	CONTROL	LOW DOSE	MID DOSE	HIGH DOSE	P Value (p)*
UREA (mg/dl)	13.35±0.99	14.31±0.16	13.06±1.08	13.48±1.12	N.S
CREATININE(mg/dl)	0.28±0.08	0.36±0.06	0.52±0.04	0.66±0.02	N.S
BUN(mg/dL)	15.02±0.10	16.10±0.60	16.22±0.44	18.10±2.12	NS
URIC ACID(mg/dl)	5.17±0.35	5.31±0.43	5.72±1.25*	5.58±0.23	S

NS- Not Significant, **(p > 0.01), * (p >0.05) , n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

Table 12: Liver Function Test of ofWistar albino rats group exposed to KALLADAIPPU CHOORANAM

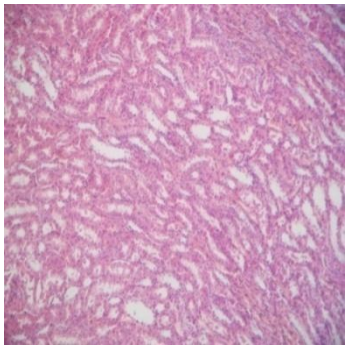
PARAMETERS	CONTROL	LOW DOSE	MID DOSE	HIGH DOSE	P Value (p)*
T BILIRUBIN(mg/dl).	0.45±0.07	0.53±0.06	0.51±0.08	0.48±0.05	N.S
SGOT/AST(U/L)	78.95±1.39	78.35±0.51	76.01±1.53	81.55±1.03	N.S
SGPT/ALT(U/L)	30.23±1.28	30.91±1.59	28.34±1.48	34.32±0.68	N.S
ALP(U/L)	142.25±8.70	142±16.17	147.16±24.07*	149.33±14.65*	S
T.PROTEIN(g/dL)	5.31±0.38	6.48±0.34	7.01±0.23	7.53±0.46	N.S

NS- Not Significant, **(p > 0.01), * (p >0.05), n = 10 values are mean ± S.D (One way ANOVA followed by Dunnett's test)

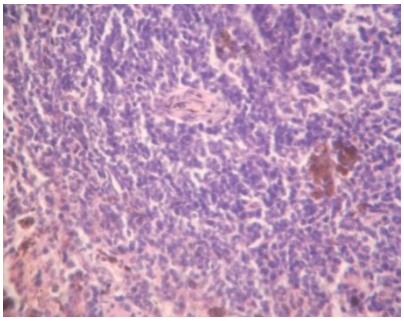
HISTO PATHOLOGY

CONTROL GROUP

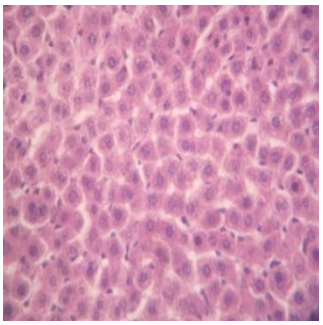
Kidney



Liver

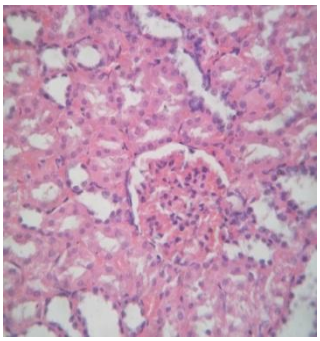


Spleen

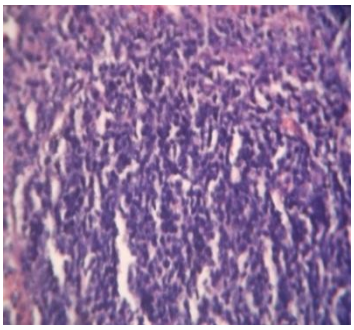


TEST GROUP (HIGH DOSE)

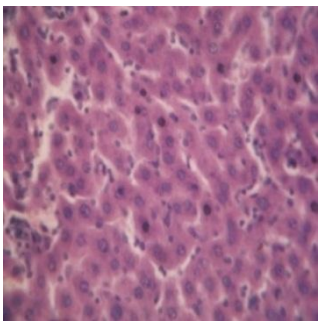
Kidney



Liver



Spleen



AN EVALUATION OF THE SIDDHA DRUG KALLADAIPPU CHOORANAM (KC) FOR ITS LITHOTRIPTIC ACTIVITY IN WISTAR ALBINO RATS.

ANIMAL STUDIES

Experimental Animals:

Adult Female Wistar rats weighing 200-250gms were used for this study. The inbredanimals were procured from the animal house of King institute, Guindy, Chennai. Theywere housed six per cage under standard laboratory conditions at a room temperatureat 22±20C with 12 hr light/dark cycle. The animals were provided with pellet chow andwater. Animals were acclimatized to laboratory conditions one week prior to initiationof experiments. Ethical committee clearance was obtained from IAEC (Institutional Animal Ethics Committee) of CPCSEA (Committee for the Purpose of Control andSupervision of Experiments on Animals).

IAEC Reference no:

IAEC/LI/16/CLBMCP/2017

EXPERIMENTAL DESIGN

Ethylene glycol induced hyperoxaluria method was used to assess the anti-urolithiatic activity in albino wistar male rats.

Animals were divided into 5 groups of 6 animals each. All the experimental animals except normal control received ethylene glycol (0.75%) in drinking water for a period of 28 days and a single dose of sodium oxalate injection (35 mg/kg, i.p) on 14th day for induction of urolithiasis. Rat belongs to treatment group co-administered with **SP** at the dose of 10 and 200 mg/kg b.wt, p.o from 1st to 28st day, Animals belonging to standard group received cystone 500 mg/kg, p.o

GROUPING OF ANIMALS

Group I: Control group rats received normal saline

Group II: Administered with ethylene glycol (0.75%) + Sodium oxalate injection (35mg/kg ,i.p)

Group III: Administered with ethylene glycol and treated with KC at 100 mg/kg, p.o

Group IV: Administered with ethylene glycol and treated with KC at 200 mg/kg, p.o

Group V: Administered with ethylene glycol and treated with cystone 500 mg/kg, p.o

24 hour urine samples will be collected on 14th and 24thday by housing rats at individual metabolic cages using sodium azide as preservative. Parameters such as volume, will be noted immediately after urine sample collection and stored at -8^{o} C, for further electrolyte estimation.

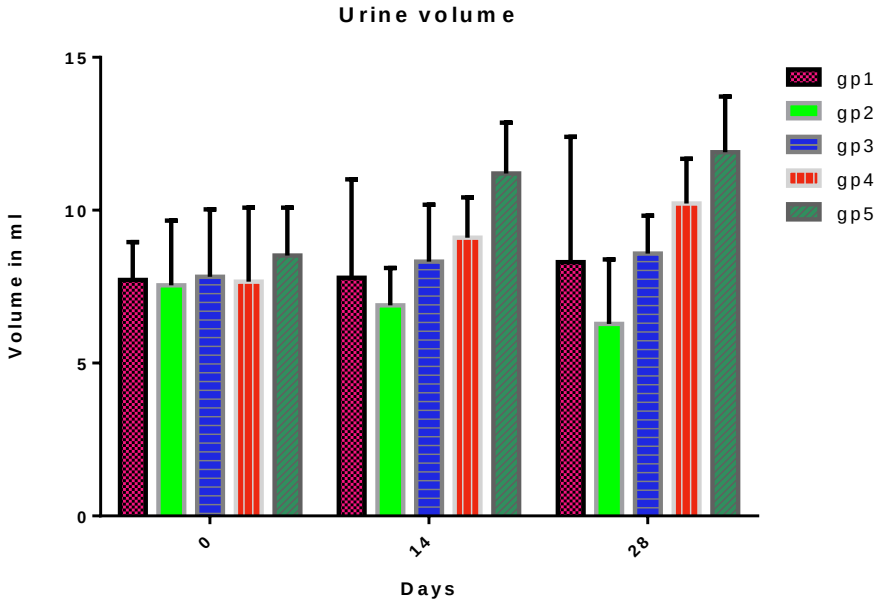
Collection and analysis of urine

All animals were kept in individual metabolic cages and 24 hr urine samples were collected on 14th, and 28th day of calculi induction treatment. The volume and calcium content of urine were measured. Estimation done usingauto analyzer. Urine was analyzed for oxalate, magnesium, Calcium, phosphate, uric acid,and creatinine.

Effect of KALLADAIPPU CHOORANAM on Urine volume in ml output on Day 0, 14 and 28th Day

Days	Group I	Group II	Group III	Group IV	Group V
0	7.72±1.24	7.54±2.12	7.82±2.21	7.66±2.42	8.52±1.56
14	7.79±3.22	6.89±1.22	8.32±1.86	9.10±1.32	11.20±1.66
28	8.30±4.10	6.28±2.11	8.58±1.24	10.22±1.46	11.90±1.82

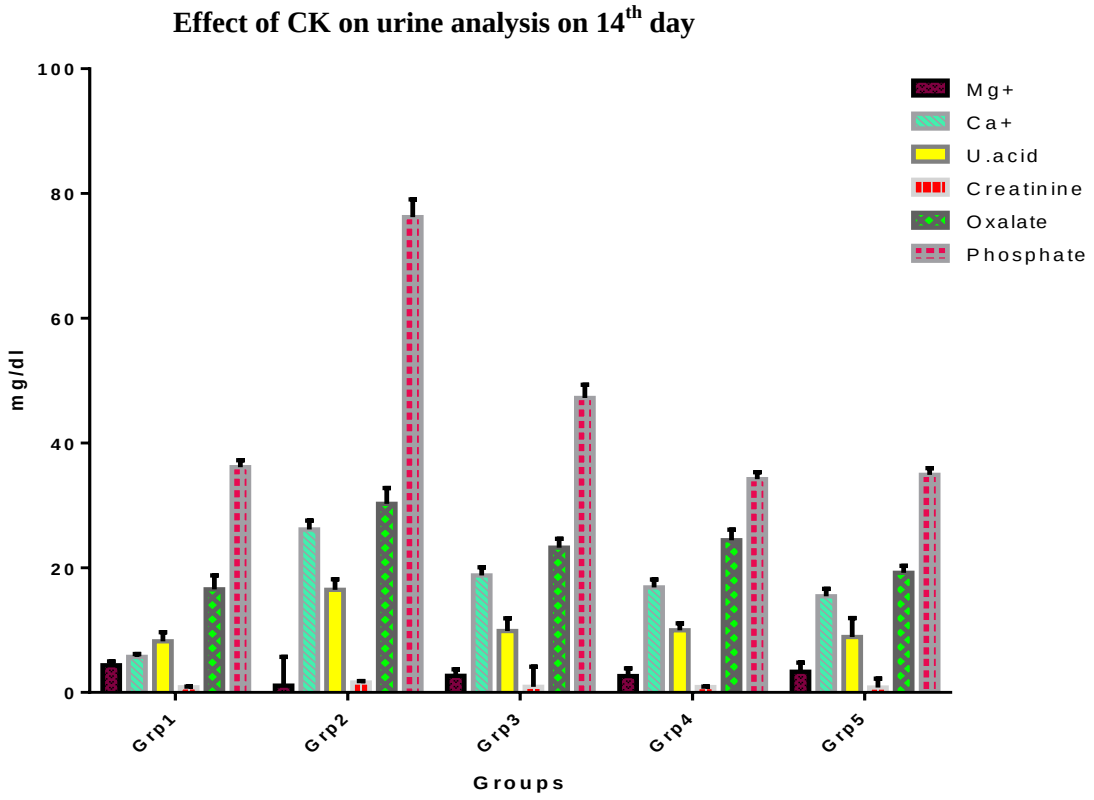
Values are expressed as mean ± SEM, Values were calculated by using One Way Anova



Effect of KALLADAIPPU CHOORANAM on urine analysis on 14th day

Group	Mg+ (mg/dl)	Ca+ (mg/dl)	Uric acid (mg/dl)	Creatinine (mg/dl)	Oxalate (mg/dl)	Phosphate (mg/dl)
Group I	4.35±.64	5.69±0.46	8.19±1.45	0.82±0.12	16.54±2.22	36.10±1.12
Group II	1.10±4.62	26.12±1.42	16.44±1.72	1.61±0.22	30.24±2.54	76.2±2.84
Group III	2.65±1.04	18.76±1.32	9.86±2.04	0.89±3.24	23.21±1.42	47.20±2.12
Group IV	2.62±1.24	16.85±1.24	9.96±1.10	0.86±0.09	24.40±1.68	34.20±1.12
Group V	3.32±1.46	15.42±1.20	8.89±3.04	0.79±1.42	19.18±1.10	34.89±1.08

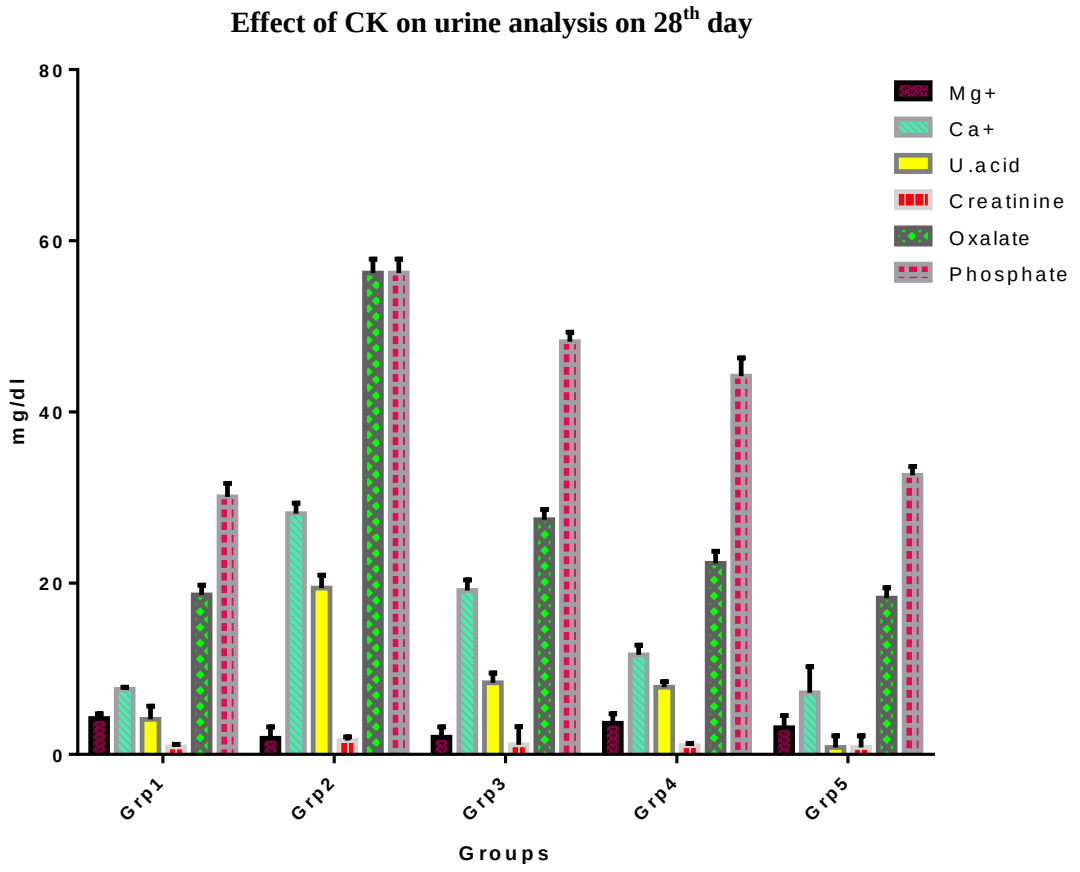
Values are expressed as mean ± SEM, Values were calculated by using One Way Anova



Effect of KALLADAIPPU CHOORANAM on urine analysis on 28th day

Group	Mg+ (mg/dl)	Ca+ (mg/dl)	Uric acid (mg/dl)	Creatinine (mg/dl)	Oxalate (mg/dl)	Phosphate (mg/dl)
Group I	4.20±0.56	7.6±0.24	4.1±1.54	0.87±0.32	18.64±1.12	30.10±1.56
Group II	1.88±1.32	28.14±1.22	19.42±1.52	1.61±0.42	56.24±1.64	84.2±1.62
Group III	2.02±1.20	19.16±1.22	8.36±1.14	1.13±2.12	27.42±1.20	48.22±1.10
Group IV	3.65±1.10	11.64±1.14	7.86±0.64	1.02±0.24	22.32±1.42	44.20±2.10
Group V	3.12±1.41	09.12±1.08	7.19±3.04	0.80±1.36	18.26±1.21	32.60±1.04

Values are expressed as mean ± SEM, Values were calculated by using One Way Anova



Effect of KALLADAIPPU CHOORANAM on serum analysis on 28th day

Group	Mg+ (mg/dl)	Ca+ (mg/dl)	Uric acid (mg/dl)	Creatinine (mg/dl)	Oxalate (mg/dl)	Phosphate (mg/dl)
Group I	4.96±1.14	10.62±1.18	3.24±1.15	0.48±0.21	6.54±1.62	13.10±1.28
Group II	2.01±1.22	19.12±2.44	09.24±1.12	1.31±0.20	13.64±1.44	31.2±1.48
Group III	3.98±1.04	13.76±1.02	4.86±1.24	0.79±1.14	09.21±1.32	27.20±1.20
Group IV	3.86±0.24	12.85±1.40	3.86±1.24	0.56±0.12	09.40±1.72	20.10±1.10
Group V	4.52±1.48	09.12±0.20	3.09±1.02	0.49±1.04	7.08±1.08	14.89±1.28

Values are expressed as mean ± SEM, Values were calculated by using One Way Anova

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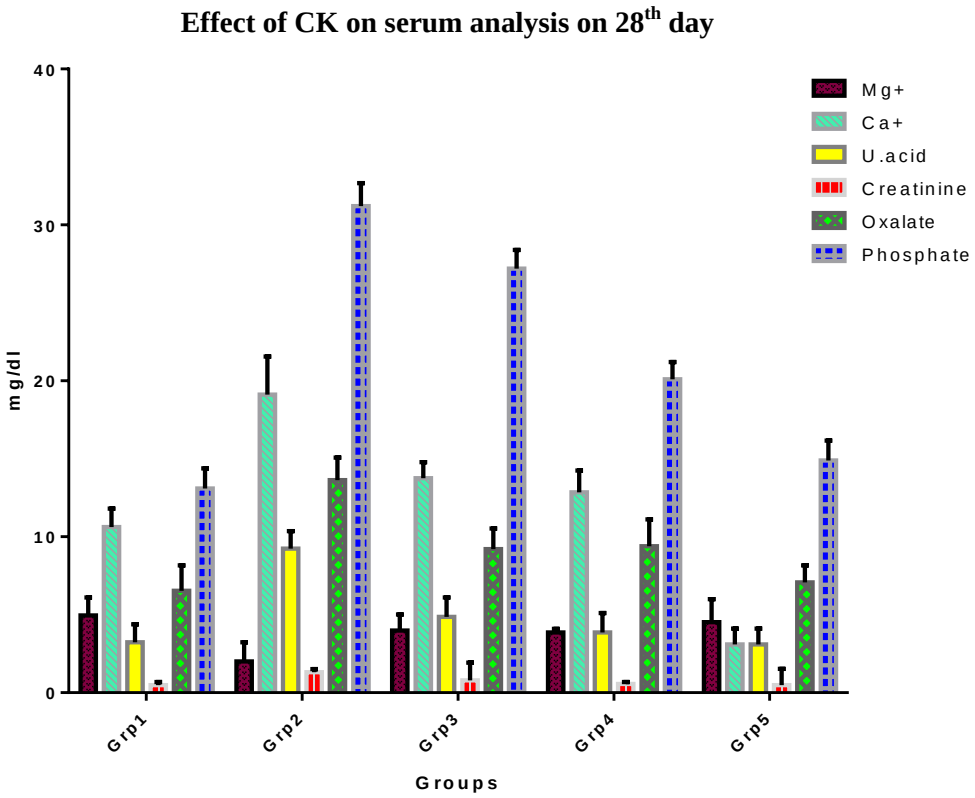

CONCLUSION;

In conclusion, the results indicated that the administration of Kalladaippu Chooranam to rats with ethylene glycol-induced urolithiasis reduced the growth of the urinary stone and hastened the process of dissolving the formed stones. These effects could conclude the lithotriptic activity of Kalladaippu Chooranam was less the effect of standard drug.

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PHYSIOCHEMICAL ANALYSIS OF –KALLADAIPU CHOORANAM

1. **Loss On Drying:**

An accurately weighed 2g of ***Kalladaipu Chooranam*** formulation was taken in a tarred glass bottle. The crude drug was heated at 105^0C for 6 hours in an oven till a constant weight. The Percentage moisture content of the sample was calculated with reference to the shade dried material.

2. **Determination of total ash:**

Weighed accurately 2g of ***Kalladaipu Chooranam*** formulation was added in crucible at a temperature 600^0C in a muffle furnace till carbon free ash was obtained. It was calculated with reference to the air dried drug.

3. **Determination of acid insoluble ash:**

Ash above obtained, was boiled for 5min with 25ml of 1M Hydrochloric acid and filtered using an ash less filter paper. Insoluble matter retained on filter paper was washed with hot water and filter paper was burnt to a constant weight in a muffle furnace. The percentage of acid insoluble as was calculated with reference to the air dried drug.

4. **Determination of water soluble ash:**

Total ash 1g was boiled for 5min with 25ml water and insoluble matter collected on an ash less filter paper was washed with hot water and ignited for 15 min at a temperature not exceeding 450^0C in a muffle furnace. The amount of soluble ash is determined by drying the filtrate.

5. **Determination of water soluble Extractive:**

5gm of air dried drug, coarsely powered ***Kalladaipu Chooranam*** was macerated with 100ml of distilled water in a closed flask for twenty-four hours, shaking frequently. The Solution was filtered and 25 ml of filtrated was evaporated in a tarred flat bottom

shallow dish, further dried at 100^0 C and weighted. The percentage of water soluble extractive was calculated with reference to the air dried drugs.

6. **Determination of alcohol soluble extractive:**

2.5gm. of air dried drugs, coarsely powdered ***Kalladaipu Chooranam*** was macerated with 50 ml. alcohol in closed flask for 24 hrs. With frequent shaking, it was filtered rapidly taking precaution against loss of alcohol. 10ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 100^0C and weighted. The percentage of alcohol soluble extractive was calculated with reference to air dried drug.

S.no	Parameters	Percentage
1	Loss on drying	8.3%
2	Total ash value	73.53%
3	Acid insoluble ash	17.96%
4	Water soluble ash	50.55%
5	Water soluble extraction	72.15%
6	Alcohol soluble extraction	2.96%

The above stated physiochemical properties of the given sample certified to be present.

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PRELIMINARY PHYTOCHEMICAL SCREENING- KALLADAIPU CHOORANAM

The preliminary phytochemical screening test was carried out for each extracts of ***Kalladaipu Chooranam*** as per the standard procedure.

1. Detection of alkaloids:

Extracts were dissolved individually in dilute Hydrochloric acid and filtered.

a) Mayer's Test: Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow colored precipitate indicates the presence of alkaloids.

b) Wagner's Test: Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown / reddish precipitate indicates the presence of alkaloids.

c) Dragendroff's Test: Filtrates were treated with Dragendroff's reagent (solution of Potassium Bismuth Iodide). Formation of red precipitate indicates the presence of alkaloids.

d) Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of yellow colored precipitate.

2. Detection of carbohydrates:

Extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

a) Molisch's Test:

To 2 ml of plant sample extract, two drops of alcoholic solution of α- naphthol are added. The mixture is shaken well and few drops of concentrated sulphuric acid is added slowly along the sides of test tube. A violet ring indicates the presence of carbohydrates.

b) Benedict's Test:

Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

3. Detection of glycosides:

Extracts were hydrolyzed with dil. HCl, and then subjected to test for glycosides.

a) Modified Borntrager's Test: Extracts were treated with Ferric Chloride solution and immersed in boiling water for about 5 minutes. The mixture was cooled and extracted with equal volumes of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose-pink color in the ammonical layer indicates the presence of anthranol glycosides.

b) Cardiac glycoside (Keller-Killiani test): Extract was shaken with distilled water (5 mL). To this, glacial acetic acid (2 mL) containing a few drops of ferric chloride was added, followed byH2SO4 (1 mL) along the side of the test tube. The formation of brown ring at the interface gives positive indication for cardiac glycoside and a violet ring may appear below the brown ring

4. Detection of saponins

a) Froth Test: Extracts were diluted with distilled water to 20ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicates the presence of saponins.

b) Foam Test: 0.5 gm of extract was shaken with 2 ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

5. Detection of phytosterols

a) Salkowski's Test: Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow color indicates the presence of triterpenes.

6. Detection of phenols Ferric Chloride Test:

Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black color indicates the presence of phenols.

7. Detection of tannins Gelatin Test:

The extract is dissolved in 5 ml of distilled water and 2 ml of 1% solution of Gelatin containing 10% NaCl is added to it. White precipitate indicates the presence of phenolic compounds.

8. Detection of Flavonoids

a) Alkaline Reagent Test: Extracts were treated with few drops of sodium hydroxide solution. Formation of intense yellow color, which becomes colorless on addition of dilute acid, indicates the presence of flavonoids.

b) Lead acetate Test: Extracts were treated with a few drops of lead acetate solution. Formation of a yellow color precipitate indicates the presence of flavonoids.

9. Detection of proteins and aminoacids

a) Xanthoproteic Test: The extracts were treated with a few drops of conc. Nitric acid. Formation of yellow color indicates the presence of proteins.

b) Ninhydrin Test: To the extract, 0.25% w/v ninhydrin reagent was added and boiled for a few minutes. Formation of blue color indicates the presence of amino acid.

10. Detection of diterpenes Copper Acetate Test:

Extracts were dissolved in water and treated with 3-4 drops of copper acetate solution. Formation of emerald green color indicates the presence of diterpenes

11. Gum and Mucilage:

To 1ml of extract add 2.5ml of absolute alcohol and stirring constantly. Then the precipitate was dried in air and examine for its swelling properties. Swelling was observed that will indicate presence of gum and mucilage.

12. Test for Fixed oils and Fats

a. Spot test : A small quantity of extract is pressed between two filter papers. Oil stain on the paper indicates the presence of fixed oils.

13. Test for Quinones

Extract was treated with sodium hydroxide blue or red precipitate indicates the presence of Quinones.

The Preliminary phytochemical studies of aqueous extract of ***Kalladaipu Chooranam*** were done using standard procedures. The results were presented in tables. The present study reveals that the bioactive compounds were present in all the extracts of ***Kalladaipu Chooranam***.

S.no	Phytochemicals	Test Name	H2O Extract
1.	Alkaloids	Mayer's Test	-ve
		Wagner's Test	-ve
		Dragendroff's Test	-ve

2.	Carbohydrates	Molisch's Test:	+ve
		Benedict's Test:	-ve
3..	Glycoside	Modified Borntrager's Test	+ve
		Keller Killiani	-ve
4.	Saponin	Froth Test	ve
		Foam Test	+ve
5.	Phytosterol	Salkowski's Test	-ve
6.	Phenols	Ferric Chloride Test	+ve
7.	Tannins	Gelatin Test	+ve
8.	Flavonoids	Alkaline Reagent Test	-ve
		Lead acetate Test	+ve
9.	Proteins and amino acids	Xanthoproteic Test	-ve
10.	Diterpenes	Copper Acetate Test	-ve
11.	Gum & Mucilage	Extract + Alcohol	+ve
12.	Fat & Fixed Oil	Spot Test	-ve
13.	Quinones	NAOH + Extract	-ve

+ve/-ve present or absent if component tested

The above stated physiochemical properties for the given sample certified to be present.

Professor & Head
Dept. of Chemistry
The T.N. Dr. M.G.R. Medical University,
Guindy, Chennai-600 032.

BIO-CHEMICAL ANALYSIS OF TRIAL MEDICINE

Preparation of Sodium Carbonate extract:

2 gm of the sample drug is mixed 5 gm of Sodium carbonate and taken in a 100 ml beaker and 20 ml of distilled water is added. The solution is boiled for 10 minutes, cooled and then filtered. The filtrate is called sodium carbonate extract.

S.No	EXPERIMENT	OBSERVATION	INFERENCE
I	**TEST FOR ACID RADICALS**		
1a	**Test for Sulphate** 2 ml of the above prepared extract is taken in a test tube. To this add 2ml of 4% Ammonium oxalate solution.	Absence of White Precipitate	Absent
b	2ml of extract is added with 2ml of dilute hydrochloric acid until the effervescence ceases off. Then 2ml barium chloride solution is added.	Absence of White Precipitate	Absent
2	**Test for Chloride:** 2ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2ml of silver nitrate solution is added.	white precipitate obtained	Present
3	**Test for Phosphate** 2ml of the extract is treated with 2 ml of Ammonium molybdate solution and 2ml of concentrated nitric acid.	Yellow precipitate obtained	Present.
4	**Test for Carbonate:** 2ml of the extract is treated with 2ml of magnesium sulphate solution.	Absence of white precipitate	Absent
5	**Test for Sulphide:** 1 gm of the substance is treated with 2ml of concentrated Hcl.	Absence of Rotten egg smelling	Present

6	**Test for Nitrate:** 1gm of the substance is heated with copper turnings and concentrated sulphuric acid and viewed the test tube vertically down.	Absence of reddish brown gas.	Absent
7a	**Test for Fluoride and oxalate** 2ml of the extract is added with 2ml of dilute acetic acid and 2ml of calcium chloride solution and heated.	Absence of white precipitate	Absent
b	5 drops of clear solution is added with 2ml of diluted sulphuric acid and slightly warmed to this, 1 ml of dilute potassium permanganate solution is added.	KMNO4 solution Discolourisation obtained	Absent
8	**Test for Nitrite** 3 drops of the extract is placed on a filter paper. On that, 2 drops of Acetic Acid and 2 drops of Benzidine solution is placed.	Absence of yellowish red colour	Absent
9	**Test for Borate** 2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame.	Absence of Green tinged flame	Absent
II	**TEST FOR BASIC RADICALS**		
10	**Test for lead** 2 ml of the extract is added with 2 ml of Potassium iodide solution.	Absence of Yellow precipitate	Absent
11a	**Test for Copper** One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the non luminous part of the flame.	Absence of Bluish green coloured flame.	Absent

b	2ml of the extract is added with excess of Ammonia solution	Absence of deep blue	Absent
12	**Test for Aluminium** To the 2 ml of extract. Sodium Hydroxide solution is added in drops to excess	Absence of White Precipitate.	Absent
13a	**Test for Iron** To the 2 ml of extract, 2 ml of Ammonium Thiocyanate Solution is added.	Absence of Blood red colour	Absent
b	To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution and 2 ml of concentrated Nitric Acid is added.	Blood red colour obtained	Present
14	**Test for Zinc** To the 2 ml of extract Sodium Hydroxide solution is added in drops to excess.	Absence of White precipitate.	Absent
15	**Test for Calcium** 2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate solution.	Absence of White precipitate.	Absent
16	**Test for Magnesium** 2ml of extract, Sodium Hydroxide solution is added in drops to excess.	Absence of White precipitate.	Absent
17	**Test for Ammonium** 2 ml of extract few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added.	Absence of Reddish brown Precipitate	Absent
18	**Test for Potassium** A pinch of substance is treated with 2 ml of Sodium Nitrite solution and then treated with 2 ml of Cobal Nitrate in 30% glacial Acetic acid.	Absence of Yellow precipitate	Absent

19	**Test for Sodium** 2 pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame.	Absence of Yellow colour flame	Absent
20	**Test for Mercury** 2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution.	Absence of yellow precipitate	Absent
21	**Test for Arsenic** 2 ml of extract is treated with 2 ml of silver Nitrate solution.	Absence of Yellow precipitate	Absent
22	**Test for Starch** 2ml of extract is treated with weak iodine solution	Absence of Blue colour	Absent
23	**Test of reducing Sugar** 5ml of Benedicts qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 10 drops of the extract and again boiled for 2 minutes. The colour changes are noted.	Absence of Green colour	Absent
24	**Test of the alkaloids** 2ml of the extract is treated with 2ml of potassium lodide solution.	Absence of Red colour	Absent
25	**Test of the proteins** 2ml of the extract is treated with 2ml of 5% NaOH, mix well and add 2 drops of copper sulphate solution.	Absence of Violet colour	Absent

RESULTS:

The given sample (KalladaippuChooranam) contains

Acid Radicals: Chloride, Phosphate, Sulphide

Basic Radical: Iron.

GOVERNMENT SIDDHA MEDICAL COLLEGE
Arumbakkam, Chennai-106

Communication Of The Decision Of Institutional Ethics Committee (IEC)

IEC No: GSMC-CH-ME-5/001/2016

Protocol title: AN OPEN NON-RANDOMIZED CLINICAL TRIAL OF KALLADAIPPU CHOORANAM IN VATHA KALLADAIPPU (UROLITHIASIS).
Principal Investigator: Dr. S. ARULPRIYA
Name & Address of Institution: Government Siddha Medical College, Arumbakkam, Chennai-106
☑ New Review ☐ Revised Review ☐ Expedited Review
Date of review (DD/MM/YY): 05-04-2016 Date of Previous Review, If Revised Application:
Decision of the IEC ☑ Recommended ☐ Recommended with suggestions ☐ Revision ☐ Rejected
Suggestions / Reasons / Remarks: i) Outcome -20%. reduction of stone size. ii) Investigation : Uric acid should be included. iii) Mearkuri : Paadal should be added.
Recommended for a period of 1 year from date of completion of preclinical studies :

Please Note:

- Inform IEC immediately in case of any adverse events/serious drug reaction.
- Seek IEC approval in case of any change in the study procedure, site and investigator
- This approval is valid only for period mentioned above
- IEC member have the right to review the trial with prior intimation.

5/4/16

Dr.P.Jeyaprakashnarayanan, M.D(s)
Chairman

Dr.K.Kanakavalli, M.D(s)
Member Secretary

INSTITUTIONAL ETHICS COMMITTEE

Date : 05/04/2016.
Sub : IEC review of research proposals.
Ref : Your letter dated

MEMBERS	PARTICIPATION	SIGNATURE
Dr.P.JEYAPRAKASH NARAYANAN, M.D(S)., Chairman	✓	
Dr.K.KANAKAVALLI, M.D(S)., Member secretary	✓	
Dr.P.SATHYA RAJESWARAN, M.D(S)., Clinician – Siddha	✓	
Dr.N.KABILAN, M.D(S)., Clinician – Siddha	✓	
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Mr.B.PADMANABHA PILLAI Philosopher	✓	
Mrs. PREETHA SARAVANAN Public person	✓	05/04/16

Dr. P. Jeyaprakashnarayanan, M.D(s)
Chairman

Dr.K. Kanakavalli, M.D(s)
Member secretary

BIO STATISTICAL ANALYSIS

CLINICAL PROGNOSIS

Treatment for Vadha Kalladaippu:

The most popular non parametric statistical tool, namely, McNemar Test analysis has been employed to analyses the effectiveness with the help of a hypothesis.

S. No	Signs&Symptoms	Before Treatment	After Treatment
		n%	n%
1.	Flank pain	40(100)	7(17.5)**
2.	Nausea	2(5)	0(0)*
3.	Vomiting	10(25)	0(0)**
4.	Burning Micturition	20(50)	3(7.5)**
5.	Dysuria	3(7.5)	0(0)*
6.	Oliguria	12(30)	0(0)**
7.	Fever	5(12.5)	0(0)*

McNemar test, C.I: 95%, *P<0.05; **P<0.01

Software: spss17 version

Number of cases: 40

Inference:

Since the p value is significant in all symptoms.So there is significant reducing of symptoms among the patients for the treatment ofVadhaKalladaippu.Hence it is concluded that the treatment was effectiveand **significant.**

Treatment for VadhaKalladaippu:

The most popular non parametric statistical tool, namely, McNemar Test analysis has been employed to analyses the effectiveness with the help of a hypothesis.

DISTRIBUTION OF CALCULI BASED ON LOCATION

S. No	Side	Before Treatment	After Treatment
		n%	n%
1.	Rt – Kidney	10(25)	6(15)*
2.	Lt - Kidney	9(22.5)	4(10)*
3.	Bilateral	20(50)	18(45)*
4.	Ureteral	1(2.5)	0(0)*

McNemar test, C.I: 95%, *P<0.05; **P<0.01

Software: spss17 version

Number of cases: 40

Inference:

Since the p value is significant in sides.So there is a significant changes indistribution of calculi based on location except ureteral.Hence it is concluded that the treatment was effectiveand **significant.**

CONSENT FORM

GOVERNMENT SIDDHA MEDICAL COLLEGE

ARIGNAR ANNA GOVERNMENT HOSPITAL OF INDIAN MEDICINE

CHENNAI – 600 106

CLINICAL STUDY ON **"KALLADAIPPU CHOORANAM"** IN THE TREATMENT OF

"VATHA KALLADAIPPU" (UROLITHIASIS)

INFORMED CONSENT FORM

"I have read the foregoing information. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction.

I consent voluntarily to participate in this study and understand that I have the right to withdraw from the study at any time without in any way it affecting my further medical care".

"I have received a copy of the information sheet/consent form".

Date:

Station:

Signature of participant:

Signature of the Guide: Signature of the Investigator:

அரசு சித்த மருத்துவக் கல்லூரி, சென்னை – 106
அறிஞர் அண்ணா மருத்துவமனை, சென்னை
வாத கல்லடைப்பு நோய்க்கான சித்த மருந்தின் (கல்லடைப்புசூரணம்)
பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கான தகவல் படிவம்.

ஒப்புதல் படிவம்

ஆய்வாளரால் சான்றளிக்கப்பட்டது

நான் இந்த ஆய்வை குறித்த அனைத்து விபரங்களையும் நோயாளிக்கு புரியும் வகையில் எடுத்துரைத்தேன் என உறுதியளுக்கிறேன்.

தேதி: கையொப்பம்:

இடம்: பெயர்:

நோயாளியின் ஒப்புதல்

என்னிடம் இந்த மருத்துவ ஆய்வின் காரணத்தையும், மருந்தின் தன்மை மற்றும் மருத்துவ வழிமுறை பற்றியும், தொடர்ந்து எனது உடல் இயக்கத்தை கண்காணிக்கவும், அதனை பாதுகாக்கவும் பயன்படும் மருத்துவ ஆய்வுக்கூட பரிசோதனைகள் பற்றி திருப்தி அளிக்கும் வகையில் ஆய்வு மருத்துவரால் விளக்கிக் கூறப்பட்டது.

நான் இந்த மருத்துவ ஆய்வின் போது, காரணம் எதுவும் கூறாமல், எப்பொழுது வேண்டுமானலும் இந்த ஆய்விலிருந்து என்னை விடுவித்து கொள்ளும் உரிமையை தெரிந்திருக்கிறேன். நான் என்னுடைய சுதந்திரமாக தேர்வு செய்யும் உரிமையைக் கொண்டு வாத கல்லடைப்பு நோய்க்கான கல்லடைப்பு சூரணம் மருந்தின் பரிகரிப்புத் திறனைக் கண்டறியும் மருத்துவ ஆய்விற்கு என்னை உட்படுத்த ஒப்புதல் அளிக்கிறேன்.

கையொப்பம்:
தேதி: பெயர்:
இடம்:

சாட்சிக்காரர்

கையொப்பம்:
தேதி: பெயர்:
இடம்:
உறவுமுறை:

துறைத்தலைவர் கையொப்பம்: ஆராய்ச்சியாளர்
கையொப்பம்:

CASE SHEET PROFORMA FOR VATHA KALLADAIPPU

GOVT.SIDDHA MEDICAL COLLEGE&HOSPITAL, CHENNAI-106

POST GRADUATE DEPARTMENT BRANCH –I MARUTHUVAM

Duration: 2015-2018

OP No / IP No	:	Occupation	:
Ward No	:	Income	:
Bed No	:	Nationality	:
Name	:	Religion	:
Age	:	D.O.A	:
Sex	:	D.O.D	:
Address	:	Diagnosis	:

1. Complaints and duration :

2. History of present illness :

3. History of past illness :

4. Personal history :

5. Occupational history :

6. Menstrual history :

7. Personal Habits : Veg/non veg/smoker/Alcoholic/Tobacco chewer

8. Family History :

GENERAL EXAMINATION

Patient consciousness :

Body Built :

Nourishment :

Anemia :

Jaundice :

Cyanosis :

Clubbing :

JVP :

Tracheal deviation :

Pedal oedema :

Lymph adenopathy :

VITAL SIGNS

Body Temp :

Pulse :

Respiratory rate :

Blood Pressure :

Weight :

SIDDHA ASPECT

NILAM

Kurinji :

Mullai :

Marutham :

Neithal :

Palai :

PARUVA KALAM

Kaar :

Koothir :

Munpani :

Pinpani :

Elavenil :

Muduenil :

YAAKKAI (Udal)

Vatham :

Pitham :

Kabham :

Kalappu :

GUNAM

Saththuvam :

Rajotham :

Thamasam :

PORI/PULANGAL

(SENSORY ORGANS)

Mei –Sensation :

Vaai – Taste :

Kan – Vision :

Mooku - Smell :

Sevi – Hearing :

KANMENTHRIYAM/KANNMA VIDAYAM [MOTOR ORGANS]

Kai- Dhaanam :

Kaal-Kamanam :

Vaai-Vasanam :

Eruvaai- Visarkkam :

Karuvaai-Aanantham :

UTHKAAYA ATHAKAAYAM

Puyam[forearm] :

Sayam[arm] :

Kaal[leg] :

Paaatham[feet] :

UYIR THATHUKKAL

A.VATHAM

Piranan :

Abanan :

Viyanan :

Udanan :

Samanan :

Nagan :

Koorman :

Kirukaran :

Devathathan :

Thananjeyan :

B.PITHAM

Anarpitham :

Ranjagapitham :

Saathagapitham :

Pirrasagapitham :

Alosagapitham :

C.KAPAM

Avalambagam :

Kilethagam :

Pothagam :

Tharpagam :

Santhigam :

UDALTHAATHUKKAL

Saaram :

Senner :

Oon :

Kozhuppu :

Enbu :

Moolai :

Sukkilam/Suronitham :

ENVAGAI THERVUGAL

1.Naa :

2.Niram :

3.Mozhi :

4.Vizhi :

5.Sparisam :

6.Malam :

7.Moothiram

a)NeerKuri :

b)NeiKuri :

8.Naadi :

MALAM

Niram :

Edai :

Erugal :

Elagal :

MOOTHIRAM

1.Neerkuri

Niram :

Manam :

Edai :

Nurai :

Enjal :

2.Neikuri

MODERN ASPECT

Sytemic Examination

Inspection :

Palpation :

Renal angle :

Tenderness : Present/Absent

Radiation :

Percussion :

Auscultation :

Others Systems

Cardio Vascular System :

Respiratory system :

Central nervous system :

CLINICAL SIGN AND SYMPTOMS OF VATHAKALLADAIPPU

S.No	Symptoms	Before Treatment	After Treatment			
			10th day	20th day	30th day	40th day
1	Pain ✓ Site ✓ Radiation ✓ Character					
2	Nausea					
3	Vomiting					
4	Burning Micturition					
5	Dysuria					
6	Oliguria					
7	Haematuria					
8	Retention					
9	Fever					
10	Frequency of Micturition					

INVESTIGATION

1. BLOOD

TC, DC, ESR

Bleeding time, Clotting time

Blood sugar

Blood urea

Serum cholesterol

Serum calcium

VDRL

2. URINE

Colour

Turbidity

Albumin

Sugar

Deposits

- Epithelial cells
- RBC's
- Pus cells

Casts

Specific gravity

Urine culture and sensitivity

3. USG Abdomen and Pelvis

CASE SUMMARY

DIAGNOSIS

VATHA KALLADAIPPU (UROLITHIASIS)

TRIAL MEDICINE:

KALLADAIPPUCHOORANAM

Dose: 1 Gram

Adjuvant : Honey

Duration of Treatment: 48 days

DO'S :

1. Drink 4-5 ltrs of water per day.
2. Drinking tender coconut/ barley water lemon juice, raddish juice.
3. The following vegetables can be taken in the diet :
    i. Raddish
    ii. Lady's finger
    iii. Plantain pith
    iv. Mint leaves
    v. Bottle guard.

DON'T'S:

1. Avoid cabbage, cauliflower, tomato seeds, mushroom.
2. Avoid milk and its products.
3. Avoid chicken, fish and other sea foods
4. Avoid drinking fluoride containing water.

Prognosis

Medical Officer Signature: **HOD**

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