A STUDY ON

MEGA THIMIRAM

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INTRODUCTION

Medicine, as everyone knows is not merely a science but an art as well. There are different systems of medicine in the world, according to their way of life with their geographical conditions.

The siddha system of medicine is one of the pillars of Indian system of medicine. It is dedicated bequest of siddhars.

The siddha system of medicine is the most holistic medical system in the world. It is the mother of all healing arts in our planet and it predates of all healing sciences.

Siddha system considers not merely body alone, but also the soul. Siddha is a Tamil word, that is derived from its root “Sidh” (சித்து) which means “Perfection in life” or “Heavenly bliss”. The Siddhars have blessed this world with ways and means for a healthy life and to reach the life’s goal i.e veeduperu or mukthi.

Siddha system is the first system to emphasize health as a perfect state of physical, psychological, social and spiritual component of a human being. This explanation is quoted in “Thirumanthiram” which is pioneer word by saint Thirumoolar as follows.
which translate as

one that cures physical ailment is medicine
one that cures psychological ailment is medicine
one that prevents ailment is medicine
one that bestows immortality is medicine

Thus, siddhars insisted everything without health is nothing and healthy body is the only tool through which one can attain “Eternal Bliss”. Siddhars had written their works on subjects namely, Asanams (yoga), Maruthuvam (Medicine), Rasavadham (Alchemy), Gnam (Philosophy) etc., It declares that human body is made up of 96 basic principles or thathuvas. These thathuvas are universally applicable to all human beings and it also exist in universe also,
Nature is man and man is nature and therefore both are essentially one. Man is said to be microcosm and the universe is macrocosm “what exists in the universe exists in man”. Man is a miniature of the universe because the composition in both is same as per siddha philosophy. According to siddha the five basic elements (panchabootham) are present in all living and non-living things of the universe in various proportions.

Siddhars in their attempt to elevate themselves to a perfected earthly immoral (attain siddhi) developed techniques, which included controlled breathing (Vaasi), concentration of mind, intense meditation (Dhyanam), besides dietary regimen and certain postures (Yoga) for psychosomatic harmony.

The paramount aim and object of siddhars is to attain enlightenment for which they needed a strong body, sound mind and longer lifespan. In pursuit of such endeavors they developed a science which encompassed medicine, yoga, rejuvenation techniques, alchemy, varma, tantrism etc. The prime aim was diluted in the later centuries and the practice was intended towards leading a very long life with some supernatural powers. This was largely reduced now a days that only the therapeutic and clinical aspects of the science is largely in practice.
The basic principles of the siddha system consist of panchabootham theory, Trihumoural pathology and 96 basic factors. In siddha system of medicine, the understanding of the trihumoural status is very essential. The humours vaatha, pitha and kabha exists in the ratio of 4:2:1 in normal physiological status in man. Any imbalance or deviation from this state leads to diseases or death will be the result.

The diagnosis in siddha system of medicine is made by eight fold examination called envagai thervugal which includes the examination of Naadi (pulse), Sparisam (touch) Naa (tongue), Niram (colour), Mozhi (speech), Vizhi (eyes), Malam (faeces), Moothiram (urine). Out of the eight, considerable importance is laid in the examination of naadi or pulse. Examination of pulse in siddha system of medicine is not just assessing the rate and rhythm. Pulse is considered as the “cosmic energy” (praana). A siddha physician by examining the naadi coupled with intuition distinguishes the changes in humours, the vitiated humour is brought to normal by administering appropriate drugs. The choice of drug is made by assessing the panchaboothic constituent of the drug. The panchaboothic constituent of the drug is assessed by the six tastes (Arusuvai), since each taste consist of different combination of the five elements.
Ancient Siddhars classified the diseases into 4448. A vivid explanation of each and every disease and the medicaments were found in various texts one among the diseases is “Mega thimiram” comes under the head “Thimiram”, which falls under “Karuvizhi noigal” according to text “Nagamuni nayana vidhi- 200”

The author has selected the disease “Mega thimiram” and has made a sincere attempt to review various literatures and a thorough study of the disease.
SIDDHA PHYSIOLOGY

Physiology is the science deals with bodily changes which explains the physical and chemical factors that are responsible for origin, development and progression of life.

The siddha criteria greatly explains above all changes of human body on the basis of ‘96’ Thathuvas.

These 96 basic principles are structural units of the body. Apart from this, the body rely on

7 physical constituents - Udal Katukkal
6 tastes - Suvaigal
14 reflexes - Vaegangal
3 Immunities - Udal vanmai
4 Body fires - Udal thee

96 THATHUVANGAL

Yugi quoted the principles of vaethantha thathuva kattalai and the 96 thathuvas as follows,

"ஒருநிலீவ்ப் புருநீதியிலிருந்து
இன்பகாட்டத்தின் வைக்குத் தொடர்வதிலிருந்து
குதிரையின் காரணிகளில் கிரிப்பார்வுதிலிருந்து
குழாய்த் தாக்காட்டில் கிரிப்பார்வுதிலிருந்து
ைத்தின் வைசுவையின் காரணிகளிலிருந்து
கிரிப்பார்வு ஆரவியார்வுதிலிருந்து......"
Taking Pancha Boothas as the main principle almost all the 96 physiological factors come under the five boothas.

<table>
<thead>
<tr>
<th>Boothas</th>
<th>Tamil</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 5 elements</td>
<td>சுவாகத்</td>
</tr>
<tr>
<td>The 5 sense of organs</td>
<td>சூமிலாகத்</td>
</tr>
<tr>
<td>The 5 object of senses</td>
<td>சூமுரங்</td>
</tr>
<tr>
<td>The 5 organs of action</td>
<td>கண்டிச்சுற்றிலிங்</td>
</tr>
<tr>
<td>The 5 organs of perception</td>
<td>கண்டிச்சுற்றிலிங்</td>
</tr>
<tr>
<td>The 4 intellectual faculties</td>
<td>ஆக்துக்காண்மான்</td>
</tr>
<tr>
<td>The 10 Nerves</td>
<td>திருவா நாள்</td>
</tr>
<tr>
<td>The 5 states of the soul</td>
<td>பூர்வத்துச் சாதனங்</td>
</tr>
<tr>
<td>The 3 principles of moral evil</td>
<td>பூணிதம்</td>
</tr>
<tr>
<td>The 3 cosmic qualities</td>
<td>பார்க்கணம்</td>
</tr>
<tr>
<td>The 1 wisdom</td>
<td>அதிலைந்</td>
</tr>
<tr>
<td>The 3 humours</td>
<td>பெப்பிலிச்</td>
</tr>
<tr>
<td>The 3 physical bindings</td>
<td>நல்லசன்</td>
</tr>
<tr>
<td>The 3 regions</td>
<td>பெப்பிலிச்சாதன்</td>
</tr>
<tr>
<td>The 8 predominant passions</td>
<td>சென்றிச்சாதனும்</td>
</tr>
<tr>
<td>The 6 stations of the soul</td>
<td>அக்காரும்</td>
</tr>
<tr>
<td>The 7 Physical constituent elements of the body</td>
<td>சுமோல்கத் கருந்</td>
</tr>
<tr>
<td>The 10 vital airs</td>
<td>குறுமன்</td>
</tr>
<tr>
<td>The 5 cases of sheath of the soul</td>
<td>புதுவிளகும்</td>
</tr>
</tbody>
</table>
I. Pancha Bootham (The five elements)

"சிவப்பு வெள்ளை பெரும் நீலம் வாணவாயில்
காரணமல்காரனா வாழகில்”

- சோந்தரங்கிசூ கோவில்

1. Vin (Ether)
2. Vali (Air)
3. Thee (Fire)
4. Neer (Water)
5. Mann (Earth)

The human anatomy and physiology, causative factors of the disease, the materials for treatment and cure of disease, the food for substances all fall within the five elemental categories.

II. Pori 5 (The five sense organ)

1. Mei (Skin)
2. Vaai (Tongue)
3. Kann (Eyes)
4. Mooku (Nose)
5. Saevi (Ears)

III. Pulan 5 (Five objects of sense)

1. Saptham (Sound)
2. Sparisam (Sensation)
3. Rubam (Vision)
4. Rasam (Taste)
5. Kandham (Smell)
IV. Kanmaenthiriyam – 5 (Five organs of action)

1. Karuvaai (Reproductive orifice)
2. Eruvaai (Anal orifice)
3. Kai (Upper limb)
4. Kaal (Lower limb)
5. Vaai (Mouth)

V. Gnanendhriyam – 5 (Five organs of perception)

1. Vasanam – Speech
2. Kamanam – Walk
3. Thaanam – Work (giving, taking)
4. Visarkkam – Sweating, motion, voiding
5. Aaanandham – Semen or ovum voiding

VI. Anthakaranam – 4 (Four intellectual faculties)

1. Manam – Mind (or) Thinking faculty
2. Puthi – Knowledge (or) Sense of proportion
3. Siddham – The deciding faculty
4. Agangaram – Achievement faculty

VII. Arivu – 1

Intellect (or) Wisdom

VIII. Naadi -10 (Ten pulse)

1. Edakalai – Runs from right big toe to left nostril
2. Pinkalai – Runs from left big toe to right nostril
3. Suzhumunai – Passes through both nostrils
4. Siguval – It helps in swallowing of food and water
5. Purudan – Present in the right eye
6. Kaanthari – Present in the left eye
7. Atthi – Present in the right ear
8. Alambudai – Present in the left ear
9. Sangini – Present in the reproductive organs

**IX. Vaayu - 10 (Ten vital force)**

1. Abanan
2. Pranan
3. Udhanan
4. Samanan
5. Vyanan
6. Nagan
7. Koorman
8. Kirugaran
9. Devadhatan
10. Dhananjayan

**X. Asayam – 5 (Five visceral cavities)**

1. Amarvasayam – It lodges the ingested food.
2. Pakirvasayam – It digests food, help in separation and absorption of saaram from the digested food.
3. Malavasayam – Responsible for the expulsion of ingested food part and flatus.

4. Salavasayam – Responsible for the formation and excretion of urine.

5. Sukkilavasayam – Place for the formation and growth of the Sperm and ovum.

**XI Kosam – 5 (Five vestures of the soul)**

1. Annamayakosam – Made up of seven udal kattugal.

2. Pranamayakosam – Conjunction of pranan and kanmenthiriyam.

3. Manomayakosam – Conjunction of manam and gnanenthiriyam.

4. Vingnanamayakosam – Conjunction of puthi and gnanenthiriyam.

5. Aanandhamayakosam – Conjunction of pranan and suzhuthi.

**XII. Aatharam -6 (Six stations of the soul)**

1. Moolatharam – It lies between anus and genitalia.

2. Swathistanam – It lies 2 inches above moolatharam.

3. Manipooragam – It lies 8 inches above swathistanam.

4. Anagatham – It lies 10 inches above manipooragam.

5. Vishuthi – It lies 10 inches above anagatham.

6. Aaginai – It lies in between two eyebrows.
XIII. Mandalangal – 3 (Three regions)

1. Agni – Fire.

XIV. Malam – 3 (Three moral evils)

1. Aanavam – Pride (or) Arrogance.
2. Kanmam – Selfishness and desire towards other’s things.
3. Maayai – Illusion or false interpretation to an external sensory stimulus.

XV. Dosham- 3 (Three humours)

The three humours are the fundamental principles and essential factors in the composition and constitution of the human body. The three humours are,

- Vaatham (Wind) - Vin + vali
- Pitham (Bile) - Thee
- Kabham (Phlegm) - Neer + Mann

**Vaatham** represents mind, dryness, pain, sensitiveness, lightness and also air. It is of 10 types.

**Pitham** represents gastric juice, bile, energy, heat, inflammation, anger and irritation. It is of 5 types.

**Kabham** represents feeling of cold, heaviness, running nose, passing of secretions and also saliva. It is of 5 types.
**Formation of three humours**

- Vaatham – Edakalai + Abanan
- Pitham – Pinkalai + Pranan
- Kabham – Suzhumunai + Samanan

"अंतः क्रत्वेण सुरयमिदं मानिष्या भविष्यति।
देति प्रसरितां कर्माणि - सर्वनाम
सत्नैसनीं निरूपितैं कालं कामं पिन्नत
रक्तमिनीं सदिशवाम नृत्त।"

"शर्कराय बहुतादुर
पिन्नं भद्रेचिनां भक्ति
तिष्ठति प्रेमचन्दन्ता दुर्गतिः।"

- Vaatham – Creation
- Pitham – Protection
- Kabham – Destruction

"देवपदार्य मानिषोगत्व
देति भविष्य निरूपितामृ
श्रद्धालोकं महत्व।"

- Vaatham – 1
- Pitham – $\frac{1}{2}$
- Kabham – $\frac{1}{4}$

The physiological functions of the body as mediated by 3 humours are made up of five basic elements. These three functional factors maintain the integrity of the human body.
XVI. Edanai - 3 (Three physical bindings)

1. Porul pattru - Material bindings
2. Puthalvar pattru - Offspring bindings
3. Ulaga pattru - Worldly bindings

XVII. Gunam - 3 (Three cosmic qualities)

1. Sathuva gunam - goodness or virtue
2. Rasatha gunam - manifestation of passion, pride, courage, zeal etc.
3. Thamatha gunam - qualities of darkness or ignorance manifested as lethargy, sleep, lust and anger etc.

XVIII. Ragam - 8 (Eight predominant passions)

1. Kaamam - desire
2. Krotham - hatredness
3. Lobam - stingy
4. Moham - lust
5. Matham - pride
6. Marcharyam - internal conflict
7. Idumbai - mockery
8. Agankaram - ego or self love
XIX. Avasthai - 5 (Five states of consciousness)

1. Nanavu - Awareness
2. Kanavu - Dream
3. Urakkam - Sleep
4. Perurakkam - Stupor
5. Uyirpadakkam - State of samathy

XX. Vinai - 2 (Two deeds)

1. Nal vinai - good deeds
2. Thee vinai - bad deeds

UDAL THATHUKKAL – 7 (Seven physical constituents)

"உடல் தாதுக்கல் தொன்மைகளின் பொருளாக
செய்யப்படும் பொழுதுபோல் பொருள்
பொழுதும் செய்யவேண்டும் பொருள்
உடல் தாதுக்கல் குறிப்பிட்டு பொருள்"

Above, udal thathukkal maintain the functions of different organs, systems and vital parts of the body. They play a very important role in development and nourishment of body.

The udal thathus are also the part of biological protective mechanism and are nourished one by one and it takes seven days to attain its full nourishment.
1. Saaram (Chyle)
2. Seeneer (Blood)
3. Oon (Muscle)
4. Kozhuppu (Fat)
5. Enbu (Bone)
6. Moolai (Bone marrow)
7. Sukkilam (or) suronitham (sperm / ovum )

VEGANGAL 14 (The fourteen reflexes)

"பதிலானது நோயான் அணுகக் குழை
பார்க்கிற அம்மகுக தொட்டை
விதுற்றிய முயன் குளைய
பாதுகான தேர் தொட்டை
கறிப்பின் பந்தேண்டு
காரணவுதுவப் தின்மில்லு
பந்தேண்டு மதிப்பு கம்பறத்கிற
முதல் வதிப்பு வம்பத்தை।"

- மதுகர் தீன் பார்க்கக்

In our body there includes 14 urges and it should be
distributed as reflexes. The 14 reflexes are,

1. Vaatham (flatus)
2. Thummal (sneezing)
3. Siruneer (Urine)
4. Malam (Stool)
5. Kottavi (Yawning)
6. Pasi (Hunger)
7. Neervaetkai (Thirst)
8. Kasam (Erumal, cough)
9. Elaippu (Fatigue / Exhaustion)
10. Nithirai (Sleep)
11. Vanthi (Vomit)
12. Kanneer (Tear)
13. Sukkilam or suronitham (Genital secretion)
14. Suvasam (Respiration)

If the urges are suppressed they lead to some sort of ailments.

**SUVAIGAL - 6 (Six tastes)**

1. Inippu (Sweet) - Mann + Neer
2. Pulippu (Sour) - Mann + Thee
3. Uppu (Salt) - Neer + Thee
4. Kaippu (Bitter) - Vayu + Aakayam
5. Kaarppu (Pungent) - Vayu + Thee
6. Thuvarppu (Astringent) - Mann + Vayu
UDAL VANMAI - 3 (Three immune status)

1. Iyarkkai vanmai - It is inherited vitality
2. Kaala vanmai - Vitality that is generally found in different age and periods
3. Seyarkkai vanmai - Improvement of vitality obtained by good habits, physical exercise and proper diet.

Vanmai is mainly based on one’s healthy condition, and it differs from one another by nature, seasonal variation, drugs and diet.

Udal Thee - 4 (Four body fires)

The body fires are concerned with digestion

1. Samanakini - To maintain normal complete digestion
2. Manthakini - Delayed digestion
3. Theekshanakini - Quick fast digestion
4. Vishamakini - Incomplete digestion leading to toxicity
SIDDHA PATHOLOGY

Siddha pathology deals with the aetiology, pathogenesis and the clinical features of diseases. Siddha medicine accepts to trihumoural pathology and diseased conditions are attributed to imbalance in normal physiological status of humours.

“செய்யும் கடும் விளக்கம் விரைவில் புரிந்து
வெற்றியளவ அமங்கசெய்யும்”
- சிவகந்த வெங்கடாம்பு சந்திரன்

When the 1: ½ : ¼ normal proportion of the uyir thathus are disturbed. It leads to mukkutram (diseased condition)

Much importance is laid on humoural composition of the body and their normal functioning is influenced by a number of exogenous and endogenous factors. The most important factors among them are as follows.

→ Abnormal food habits

→ Inappropriate physical activities

→ Seasonal and environmental variations

→ Withholding natural reflexes

→ Alterations in 7 physical constituents
Abnormal food habits

According to Thiruvalluvar versus,

"மருவ தவம் அச்சல் மாங்குவதுலை
நூறு பாதுமெல்லை பாரியாத"

- சிக்ரமணம்

"நடுநார் உருந்து, உடுப்பிட் உச்சம"

This famous proverb has become almost the motto of siddha medicine. Immense importance is given to the diet. Siddha principles are formulated according to seasonal and environmental variation. A complete food containing Six taste (arusuvai) is to be taken by normal individual. A special diet regimen for each diseased condition is advocated according to the trihumoural variation of the disease and humoural composition of the individual patient. If they are followed strictly disease never arise.

The arusuvai constituent of food substances is important as any excess or decrease of them will cause disease. They are corrected by appropriate composition of food containing particular taste. The following poem explains how humours are altered by the taste.

"புளித்தவர் விளை பூக்கும் மாதம்
துருந்தங்கள் இறா பிரித்து சேறு - கிரியாந்தனின்
நட்டுத்தவர் விளைத்து அடல் விளைக்கே கங்கத்தை
சர்ப்புமால் வெய்முனை கூம்"
environmental variations

The place where the people are living is also responsible for disease (Thinai).

1. Kurinji – Kabham resides there further anemia, fever, abdominal mass may develop.
3. Marutham – All the thoshas will be maintained in balanced state.
4. Naeithal – Vaatha disease with increased body mass, liver enlargement and flatulence.
5. Paalai – All thoshas are disturbed and all sort of ailments may supervene.

seasonal variations

One year is classified into six seasons each one constituting 2 months. Alteration in characters of the three humour occurs due to seasonal variations.

In Kaarkaalam - (All the 3 humours are disturbed, pitham altered from its normal state, aggravated vaatha spread to other areas.
- In Koothirkaalam - (Altered pitham spreads to other areas, vaatham is in normal state).
- In Munpanikaalam - (Pitham is in normal state).
- In Pinpanikaalam - (Kabham is altered from its nature).
- In Elavaenilkaalam - (Altered kabham spread to other parts).
- In Muthuvaenilkaalam - (Kabham is in normal state, vaatha disease aggravates).

**Udal Thathukkal - 7(Physical constituents)**

When the three humours of the body are affected by various factors they immediately change the nature of the physical constituents.

1. **Saaram (Chyle)**

   If increased, shows symptoms of increased kabham like decreased appetite, excess salivation and excessive sleeping.

   If decreased, loss of weight, lassitude, dryness of skin, and the function of sense organs are diminished.

2. **Seneer (Blood)**

   If increased, blood pressure increases with redness of eye, haematuria, boils, tumours, spleenomegaly and jaundice.

   If decreased there will be tiredness, dryness, anemia and lassitude.
3. **Oohn (Muscle)**

   If increased, excess muscle mass around the cheek, face, abdomen, thigh, genitalia etc.,
   
   If decreased, muscle wasting with lethargic sense organs.

4. **Kozhuppu (Fat)**

   If increased, identical features of increased oohn like excess fatty tissue around the cheek, neck, face, abdomen, thigh and genitalia occurs.
   
   If decreased, loin pain, emaciation and spleenomegaly.

5. **Enbu (Bone)**

   If increased, ossification and dentition are quickened.
   
   If decreased joint pain along with easy falling of nail, hair and teeth.

6. **Moolai (Bone Marrow)**

   If increased, heaviness of body and eyes, swelling of interphalangeal joint, oliguria and non healing ulcers occur.
   
   If decreased, osteoporosis and blurred vision occurs.

7. **Veneer (Sperm / Ovum)**

   If increased, excess sexual activity with calculi formation.
   
   If decreased there will be pain in the genitalia and unable to reproduce.
14 Reflexes

The 14 urges should not be self suppressed. If suppressed they show the following symptoms.

1. Vaatham (Abanavayu – flatus)

   If abanavayu is suppressed it leads to Chest pain, Ulcer pain, Abdominal pain, Body pain, Constipation, Indigestion and Liver disorders predominate.

2. Thummal – Sneezing

   If thummal is arrested it leads to Headache, Facial pain, Low back ache, Neuritic pain in sense organs are felt.

3. Siruneer - Urine

   If controlled it leads to Urinary tract complications and joint pain.

4. Malam - Faeces

   If malam is suppressed it leads to Flatulence, Weakness, Headache, Knee joint pain may originate.

5. Kottavi - yawning

   If kottavi is controlled it may lead to Lethargic Face, Indigestion, Mega noi may occur.

6. Pasi - Hunger

   If pasi is ignored all organs get tired, Pricking pain all over the body, Schizophrenia, Emaciation may occur.
7. Neervaetkai - Thirst

Without water, all cells of the body will get tired and pain supervenes.

8. Kasam – Cough

If kasam is suppressed it may cause Chest pain and Heart diseases.

9. Elaippu – Relaxation

If there is no rest, Fainting and Mega diseases may occur.

10. Nithirai – Sleep

If nithirai is disturbed, it will lead to Headache, Pain in the eyes, Deafness and Speech disturbances.

11. Vanthi – Vomiting

If vomiting is suppressed, it will lead to Itching, Anemia and Eye diseases.

12. Kanneer – Tears

If controlled, it leads to Sinusitis, Headache, Eye disease and Chest pain.

13. Sukkilam – Semen

If sukkilam is suppressed, there will be Joint pain, Difficulty in urination, Fever and Chest pain.

14. Swasam – Breathing

If swasam is suppressed Cough, Abdominal discomfort and Anorexia may arise.
**Three humours (Tridhosam)**

The three physical elements of the external world that is air, heat and water for the three fundamental principles on which the constitution of human being has been based. The three elements as they enter the body, are called Tridhosam that is vaatham (wind) pitham (bile) kabham (phlegm). The three humours maintain the human body through their combined functioning. Any imbalance in them bring about diseases.

**1. Vaatham (Wind)**

**A. Features of exaggerated vaatham**

Body pain, joint pain, pricking pain, astringent taste, black stools and urine, difficulty in flexion and extension of limbs, generalized weakness, constipation and mental distress.

**B. Features of decreased vaatham**

Pain in the body, low pitch voice, difficulty in doing work, impairment of intelligence, giddiness, syncope and symptoms of increased kabham.

**2. Pitham (Fire)**

**A. Features of exaggerated pitham**

Yellowish discolouration of eyes, skin, motion and urine, increased appetite and thirst, burning sensation all over the body and decreased sleep.
B. Features of decreased pitham

Decreased appetite, cold, symptoms associated with defective growth of kabham

3. KABHAM (Phlegm)

A. Features of increased Kabham

The body fire is decreased, increased salivation, a fall in enthusiasm, feeling a sensation of body weight, pallor and cooling, dyspnoea, cough, abdominal distension and excessive sleep.

B. Features of decreased Kabham

Giddiness, dryness of joint, decreased kabham in lungs, having a feeling of absence of lung, increased sweating and palpitation.

Piniyari Muraimai (Diagnosis)

“Pini” means the disease which affects the body. Any interruption of the normal functions of any body part, organ or system.

“Ari” means identify

“Muraimai” means rules

“Piniyari muraimai” is the method of diagnosing the disease affecting the people. It is based upon the following aspects.

1. Poriyalarithal

2. Pulanalarithal
3. Vinaathal

4. Envagai thervugal

5. Naadi paritchai.

**Poriyalarithal and pulanalarithal**

Pori is considered as the five senses of perception namely Nose, Tongue, Eye, Skin and Ear while pulan are five objects of sense, they are Smell, Taste, Vision, Sensation and Sound. Physician’s pori and pulan are used as the tools for examine the pori, pulan of the patient.

**Vinaathal:**

It has a procedure for gathering information about the patients name, age, occupation, nativity, socio-economic status, family history, dietary habits, allergic factors, period of suffering from the complaints, history of previous episodes, relevant history of habits and treatment etc., from the patient or from his immediate relatives, if the patient is not in person to speak or if the patient is child.

The above principles correspond to the methodology of inspection, palpation and interrogation of modern medicine
ENVAGAI THERVUGAL

Eight different kinds of tests to be applied or attended by physician to arrive correct diagnosis. These are also called Attavitha paritchai or Attasthanna parikshai.

Envagai thervukal is considered as physician’s instruments.

"தாம் பாதியால் குறிப்பிட்டு தொலை விளக்கி
மூடும் வெள்கிலை தேவை மன்றப்பற்றி"

"அமைத்திருள் தருணத்தில் விளக்கிச் செவு காரணி"
- சுந்தரபந்த

Envagai thervugal are

1. Naadi (Pulse)
2. Sparisam (palpation)
3. Naa (Tongue)
4. Niram (Colour)
5. Mozhi (Speech)
6. Vizhi (Eye Examination)
7. Malam (Motion examination)
8. Moothiram (Urine examination)
**Naadi (Pulse)**

Naadi is the vital force. Any changes in the three dhoshas are best diagnosed by feeling the naadi. Naadi is an important observation for diagnosis and prognosis. Naadi is responsible for the existence of life and can be felt one inch below the wrist on the radial side by means of palpation with the tips of index, middle and ring finger corresponding to vaatham, pitham and kabham in the ratio of 1: ½ : ¼

For male – Right hand

For female – Left hand

**Procedure to see Naadi**

Site to feel Naadi and its procedure is well demonstrated by Agasthiar as follows

"குப்பத்தில் குண்டசம் மார்புக்கிரியை
நாதிசிந் தெற்பு பரங்கிய்கின்
புரேர்நாசாள் கொண்டியை
புத்துக்குள் வெள்ள வேண்டும்
குடியார் வேண்டும் வரும்
நாதிசுற்று வேண்டும் பிறுக்கு
காத்திக்கும் தேர்ந்தெடுக்கு
செய்கிறில் தொட்டும் தோண்டும்
செய்கிறில் தொட்டும் தோண்டும்
குறிக்கும் குறிக்கும்”

- அகாதிக்கிய விளை.
**Suitable place for reading Naadi.**

According to Thirumoolar, feeling the Naadi in various sites are mentioned as,

- கன்று பாறைகள் காத்துக்கொலி சந்தை
- குரு கரிமை திண்மையைய் பின்பு
- கார்தருபுராய் காண்பு கருப்பும்
- பார்த்துக்கொள் பாறை பின்புத்து

- கிருத்வாள் தவற்கள்

Even though naadi can be felt on the above mentioned peripheral arteries, commonly the radial artery at the wrist.

**Formation of Naadi:** is ideal for all people

\[(\text{Naadi}) + (\text{Vayu}) = (\text{Uyir thathu})\]

- Idakalai + Abanan = Vaatham
- Pinkalai + Pranan = Pitham
- Suzhumunai + Samanan = Kabham

The gait of the naadi is compared with the gait of reptiles and birds

- Vaatha Naadi - Movements of Swan & Hen
- Pitha Naadi - Movements of tortoise & Leech
- Kabha Naadi - Movements of frog & snake
2. **Sparisam (palpation)**

   The following criteria such as the temperature (Hot or cold) and changes in the skin (Smoothness, roughness, dryness, scaling, pigmentation, sweat, hard patches), swelling, tenderness, any abnormal growth, enlargement of viscera, ulcers, etc., are elicited by sparisam.

3. **Naa (Tongue)**

   The tongue has been regarded as an invaluable clinical indicatory of health and disease. The examination of tongue includes colour, coating, wetness or it’s dryness, deviation, movements, fissures, ulceration, variation in taste, microglassia, macroglassia any abnormal growth etc.,

4. **Niram (Colour)**

   Reveals that any change in the colour of the skin, nails, hairs, conjunctiva, teeth, mucous membrane etc., cyanosis, pallor, yellowish discoloration of the body, redness of the skin are also noted.

5. **Mozhi (Speech)**

   In the examination of mozhi, the pitch of voice (low or high), loudness of voice, nature of voice, slurring speech, speech in hallucination, Aphasia should be noted.
6. **Vizhi (Eye examination)**

Both sensory and motor disturbances are noted. By the examination of vizhi, redness, yellowishness, pallor, dryness, lacrimation, sharpness of vision, response of pupil, condition of hair in the eye lashes, inflammation, and ulceration of eye should be noted.

7. **Malam (Motion examination)**

In the examination of malam, niram (colour), nurai (froth), erugal (solid), elagal (semisolid or liquid), quantity (increased or decreased), smell and other examination like presence of blood, mucus, undigested matter in the stools can also be considered.

8. **Moothiram (Urine Examination)**

In the examination of urine, colour, odour, quantity, presence of froth, deposits, blood, pus, inorganic sediments, abnormal constituents such as sugar, protein etc., the frequency of micturations are to be noted.

The diagnostic value is usually arrived by methods of urine examinations called.

1. Neerkuri
2. Neikuri
**Collection of urine:**

“அதுடன் பிற்குச் அவிட்டு காதல்
அல்லும் அவிட்டு அகற்றும் காதல்
குறுக்கு பல்லட்டி துறவில் காவலு
அதற்கு காதல் காவில் காதல்
பராட்டு புகார் காவில் காதல்
மிகல்கி பசொத்தாக குற்றக்கு கால்”

- நர்த்திரிக்கி தம்மை

Prior to the day of urine examination, the patient should be advised to take a balanced diet and should have good rest. The first voided urine of the patient is collected in a glass container. The colour volume, frothy, smell, specific gravity and sedimentation is noted. A drop of gingelly oil is added into the container without any disturbance and the tendency to spread is examined within 1 ½ hrs.

**i) Neerkuri**

சள்ளா குரி கபி சோலம் மார்ந்து எளிய குரி
சாமர்கள் சுல்பாளம் முதலாம் புகழ்பாடு

- நர்த்திரிக்கி தம்மை

In neerkuri Niram, Edai, Manam, Nurai and Enjal of the voided urine is noted. This has been already mentioned in Envagai thervugal

"அதுடன் பிற்குச் காதல் குற்றக்"
Though the urine should be examined only according to the rules and regulations at time of emergency, they can be relaxed.

**Niram** : It indicates the colour of urine voided.

**Edai** : It indicates the specific gravity of urine.

(Increased or decreased quantity).

**Manam** : It indicates the smell of urine voided.

**Nurai** : It indicates the frothy nature of urine voided.

**Enjal** : It indicates the quantity of urine.

**Neikuri**

A drop of gingelly oil is dropped into a wide vessel containing the urine and is kept in sun light in a calm place without shaking and the dearrangement of three thathus is studied by nature of a oil spread on the surface of urine.

“அரோக்மாள திருத்தவுண்டு அயோர்கோ வாக்சம்
அடுத்திரா பரிதை ஆற்றி விகாரம்
பொதுவுக்கு நிக்கிள் வைத்தின்னைக் குறியை”

- வரோயா விகாரி, ஆம்பேறி

**Vaatham** - The drop of oil lengthens like a snake.

**Pitham** - The drop of oil spreads like a ring.

**Kabham** - The drop of oil resembles a pearl.

Oil spreading like above indicates thontham.

The siddhars followed up this method for prognosis of the disease and classify the disease as curable and incurable.
Treatment in siddha medicine is aimed at keeping the three dhoshas in equilibrium and maintenance of seven thathus. So proper diet, medicine, an adjuant and a regimen of the life are advised for a healthy living and to restore equilibrium of doshas in increased or decreased condition.

In diseased condition, body shows many signs and symptoms. To diagnose the disease and choose the correct medicine the physician must have the knowledge of pathology of the disease, which is essential for proper treatment. For this purpose in this dissertation work, I have selected the disease “Mega thimiram” one among the 96 eye diseases.
AIMS AND OBJECTIVES

The recent advancement in the field of medicine has opened a window in the field of siddha medicine to study in detail the basic concept of siddha pathology and redefined its application according to the present scenario.

“Mega thimiram”, a complication of diabetes is now considered to be important because of its pandemic spread. Nearly 177 million people i.e two thirds of population of developing countries are suffered from diabetes. The major populations of the diabetics are unaware of their diabetic status while the awarded persons do not realize the importance of consistent follow ups. Most of the physicians treating are not also trained to detect and refer sight threatening diabetic retinopathy for a timely treatment.

So, an effort is made to derive the basic concepts of “Mega thimiram” in a scientific way to the modern world for their view.

- The main aim of this study is to collect the ancient siddha literatures about mega disease in general and mega thimiram in particular.
- To study the clinical course of the disease with keen observation on aetiology, pathology, clinical features and diagnosis.
To evaluate the Siddha basic physiology and pathology

To make a note inorder to analyse the clinical symptoms and pathology of “Mega thimiram” and also about climate, sex, habitat, occupation etc.,

To support my study using envagai thervugal, mentioned both in siddha literatures with modern parameters.

To study the diagnostic methods and compare with modern investigations techniques like slit lamp, direct and indirect ophthalmoscopy with respect to mega thimiram.

To discuss the complications of “Mega thimiram”

How to prevent and control early blindness.

To have a plan for further studies and research on this disease.
INTRODUCTION ABOUT DISSERTATION TOPIC

The author has selected the eye disease “Mega thimiram” for the present study. The topic of dissertation is taken from “NAGAMUNI NAYANA VIDHI – 200”

The word megam literally means clouds. As the cloud in the sky, denotes rain fall, the mega diseases in man also indicates pathology to so many diseases. The clouds fall as rain, the patient with the mega disease have increased frequent passage of urine.

The term megam popularly called as Neerizhivu is characterized by increased frequent passage of urine, having sweety odour. In our system of medicine it is one among 4448 diseases and it is separately dealt by Yugi in Yugi Vaidhya Sindhamani 800. The disease pramiyam or pramegam should not be confused with the megam, because megam is strictly a disease of metabolic disorder, since the excretory organ kidney has only a limited ways of responding to a multitude of pathogenic stimuli, urinary symptoms like frequent passage of urine is chiefly taken into consideration for the megam disease. Megam or Madhumegam, Yugi has given more importance to variation in colour, consistency and constituents of urine as the gradual diminution of the physical constituent saaram is mainly excreted are urine.

As for lay man, any discharge from the urethra, for example leucorrhoea, spermatorrhoea, purulent discharge etc, are called as
passing of megam in urine. This is a misnomer and the physician should carefully evaluate the exact disease.

Pramiyam or pramegam is of 21 types according to Agasthiyar Gunavagadam, which matches with Yugi’s classification of pramiyam. Premegam usually comprises diseases of genito urinary tract which includes urinary tract infections, genital tract infections, renal diseases and sexually transmitted diseases etc..

Megam is correlated with that of “Diabetes” in modern medicine. Yugi classified it into 20 types, which are all deal with different types and complication of Mega Noi. So that here it is concluded that in ‘Megathimiram’ is a disease of eye due to complication of Mega Noi (Diabetes).

**Megam** represents Madhumegam caused by diminution of seven physical constituents.

**Thimiram** refers to an eye disease which is a blindness caused by the constriction of retinal blood vessels, retinal hemorrhage and exudates formation.

As the dissertation topic Mega thimiram is among 96 eye disease, let us have a study about the eye in detail.
THE NORMAL EYE:

"அப்பாற்றில் சிற்று ராணி நிலையைவை பாது பீடர்ந்து
நூற்றாண்டு வரலாறு பாதுறில் முதல்பாது
நூற்றாண்டிருந்து வந்து வந்து நிறுத்து சுந்தரால் இவராளின்
நன்று பூம் படுவும் வசந்தமாக சிற்று லிங்க லிங்க”
- அகஸ்தியார் புலச விளை.

The conjunctiva, white of the eye occupying 5/6 of eyeball, is clear, white without redness like a crystal. The cornea, black of the eye occupying 1/6 of eyeball is black, opaque and resembles like a prism with good refracting power. 1/7 of the black portion is occupied by ‘Jothi’ or ‘Thaarai’ which constitute the pupil (Paavai).

Dimensions of the eye:

"அப்பாற்றில் மீளியும் சூடும் பக்துக்கு பக்து கதவாரை
புந்தக்கு பானூர் சிற்று பெண் பெணியின் காலக்கு
அப்பாற்றில் பூம் படுவும் வசந்தமாக பாது
உருக்குவிட்டு மீளியும் சூடுக்குப்பாதுக்கு சிறுக்கு குரியதென”
- அகஸ்தியார் புலச விளை.

According to Agasthiyar’s lines,

Length of the eye is 2 inches,

Breadth of the eye is ½ inch

Depth of the eye is 1 inch.
History of eye diseases:

According to Agasthiyar kanma kandam, the eye diseases are caused due to

1. Sexual indulgence
2. Hereditary
3. Non-belief on almighty
4. Telling lies
5. Congenital
6. Due to evil deeds.

**Aetiology for eye diseases.**

According to Agasthiyar Nayana Vidhi.

"ஆத்மாவளின் ருதாவளி வேறு கிளைன் ருதாவளி பலகும்
கூடிய பெறும் மாதறு கல்கள் பக் கிளைன் ருதாவளி பலகும்
வியாமா கனிகை சுற்று வேறு பக்கியடமும்
வுழந்து கிளைன் கல்களின் வியாமா சுற்று தர்க்க"

- Worm infestation during foetal growth
- Hunger
- Anxiety
- Excessive intake of sour tasted fruits by pregnant mother
  causes eye disease to the child.

**According the Nagamani’s version:**

Eye disease are also caused by

- Pox virus.
- Pitha diseases.
- Polluted water bathings.
According to Thiurmoolar textual works,

"பாற்று பெருந்தை புறையீர்ளை தோரம்
மாற்று வீரமைவாளன் பாரச விரைத்திலே
காறியுமைந்து காண்ணாள் அல்லார்குற்று
சிவறவ பாரசம் கலஞ்சாக கற்றீர்ளை என"

"கவண்டித்தூண்சர் காறியுமை பல்கரம்பிக்கொண்ட
பல்கரம் முக்கேவில் மாற்றன்
கவண்டித்தூண்சர் முக்கேவில் காண்ணாள் கற்றடன்
பல்கரம் பிள்ளாவியின் பாரசன் கற்றீர்ளை"

"கரங்க குறுக்குண்ட் கனேற குறுக்குண்ட
குறுக்குண்ட் கரங்கிண் கரையில் மாற்று
பல்கரம் பிள்ளாயில் பல்கொல் கவண்டித்தூண்
சிவறவு காண்ணாள் கீழக்கு மூச்சிலை" - குறுக்குண்ட்

The aetiological factors for eye diseases are,

- Barefooted walking on sunny weather.
- Excessive sexual indulgence.
- Common in welders & cobblers due to flame exposures.
- Intake of organic compounds.
- **Mega diseases like diabetes.**
- Genito urinary diseases like Gonorrhoea.
- Constipation.
- Oliguria.
- Application of mercurial preparation on wounds.
- Excessive or chronic intake of mercurial compounds and salts.
- Inhalation of mercurial smoke.
- Chronic diarrhoea.

According to:

"The eye diseases may also due to,

- Eating stone particles and hair mixed food.
- Chronic constipation.
- Betal chewing habituals.

**Visual acuity regarding with age:**

According to:

"The eye diseases may also be caused by old age."
up to 35 years  – vision normal
after 35 to 45 years  – there is variation in diopter of lens causing presbyopia.
after 45 to 57 years  – vision slightly diminished and immature cataract develops
after 57 years  – mature and hypemature cataract develops leading to blindness by 100th year.

Administration of eye applicants according to Paruvakalangal.

"பிள்ளை அணுவை கருவி பாலறை பிள்ளை நாள்லாஸ்க"

அரகோதி திருவனித்தா வாழ்க கடையாம ஒப்பினை ஒட்டம்
துக்காம வகும் இரும்பு பேராக்க கிராமம் போல

பட்டர் தலைக்காண்டல் குருக்களின் புதியவற்றும் அய்வாக்கும்"

At the month of

Aani, Aipasi, Karthigai  – morning time
Margazhi, Thai, Maasi, Panguni  – day time
Chitirai, Vaigaasi, Aadi,

\{
Aavani, Puratasi
\} - nazhigai is recommended

( Note: Nazhigai = 24 minutes)
Time for External Treatment:

Surgical procedures like

- Narambu kuthal, Karuviadal - in morning time.
- Kombu vaithal, Kurudhi vaangal - in afternoon.
- Leech therapy - in evening time.

Contraindications for applying eye drops:

Eye medicines and therapy are best avoided

- During rainy or cloudy days
- After taking oil bath
- During menstrual times
- Stress and strain periods
**Hygienic measures to prevent eye diseases:**

1. **Anjanam Idal:**

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   ""

   From the above lines for good health,
   
   Vomiting done for 6 months once
   
   Purgation for 4 months once
   
   Nasal drops for 45 days once
   
   to bring the mukkutram to normal.
   
   The eye applications known as ‘Anjanam’ done once for 3 days
   
   to improve visual power.

2. **Brushing habits:**

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   To prevent eye diseases use the sticks of

   Ficus, Calotrophis, Arjuna and Poola for brushing."
3. Dietary habits:

"திங்களால் பச்சையால் வெளியால் பாறக்கற்ற கயல்கள் தயாரிக்கவும்
பச்சையால் காக்கிக் கவிதையேயால் பச்சை பாறட்டு பொழுத்தையால்
பச்சையால் பாறையும் கல்லைப்போர்வையால் பாறையழுக்கு கயாளையால் - பனையும்
கயாளையால் இருப்பு கைவூரைத்து பாறட்டு வெளியால் கைவூரைத்தப்படும்"

❖ Regular intake of spinach varieties

❖ Intake of milk products like ghee, milk atleast twice a day.

❖ Brush regularly

❖ Avoid day time sleeping.

EXERCISES:

4. Amirtha Yogam:

"சான்றால் கொள்பிரிய பிள்ளையார் சுமாரம் பாறட்டு கீழ்க்கை
பாறையும் கொள்பிரிய பாறையும் பொழுது பொழுதையால் கைவூரைத்து
சான்றால் கொள்பிரிய பாறையும் கைவூரைத்து
பாறையும் கைவூரைத்து பாறட்டு பொழுது பொழுதையால் ஆகிய பாற்றும்"

Drop few drops of pure water into the eye, and gently massage the eye and watch moon for one kadigai (22 minutes)

5. Nilavai Paarthal:

"காரையும் காரையால் மனையால் காரையால் காரையால் வெளியும்
குழுப்பால் கிருட்டி தொடார் பாறையும் குழுப்பால் பாறையும்
வெளியும் பாறையும் வெளியும் வெளியும் காரையால் மனையால்
குழுப்பால் மானார் அம்பித்து குழுப்பால் வெளியால் பொழுதையால் பொழுதையால்"
Arrange the fingers like palakani method and see the moon for few minutes. Then wash with pure water and gently massage. it will improves visual acuity.

6. Ghee Therapy:

"கணைக்கால வகைத் தருத்திய கதிர்கள் முளையும் வது என்றால்
கணைக்கால வகைத் தருத்திய நேர்வடை விளையாட்டு
கைத்திய கதிர் மறுமலர் கைகளின் காலன்களை
கணைக்கால வகைத் தருத்திய வது என்றால் வது என்றால்"

If there is any redness or inflammation to eye, apply ghee in the sole of foot, apply husk over it, and keep it all night, then wash it with water and apply paste of sandal.

Kan- noigal – 96

In our siddha medical system compiled by Siddhars, eye diseases due to various aetiologica factors are divided into 96 types, according to four regions of eye.

According to Agasthiyar Nayana Vidhi, Kan noigal are classified into 96 types

"அந்தரிக்கும் அகிலம் விருந்து
நான்கு வகைமுக கீழ்க்குறிக்கு
நான்கு வகைமுக தலைமுக கீழ்க்குறிக்கு
நான்கு வகை மேலுமுக கீழ்க்குறிக்கு
நான்கு வகை தலைமுக தலைமுக
நான்கு வகை மேலுமுக மேலுமுக
நான்கு வகை கீழ்க்குறிக்கு கீழ்க்குறிக்கு"
அண்மையில் காட்சி அமைந்துள்ளது கிைகள்
பானைனாள் போதுகளின் பானைனாள் ஓட்டுத்
சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
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சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
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சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
சோழன் நிற்கச் சுயல்கில் மாநிலமுள்ள
Nagamuni also clearly classified kan-noigal 96 based on four regions of the eye

"காற்றியிரு காலையிரு விருப்பைக் காய்மிதியம் கருப்புக்குத்தியம்

மூலம் நாமொடை காலையிரு காய்மிதியம் பிள்ளைத்தியம்

புல்லியம் பிள்ளைத்தியம் விளக்க விளக்க

புல்லியம் காலையிரு பிள்ளைத்தியம் விளக்கம்

- காற்றியிரு துவாரணீயம்
I. Diseases of Black portion of the eye - 45
(including Cornea, Choroids, Iris, Retina, Pupil, Lens and Vitreous humour)

They are

<table>
<thead>
<tr>
<th>Disease</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kasam</td>
<td>8</td>
</tr>
<tr>
<td>Padalam</td>
<td>7</td>
</tr>
<tr>
<td>Kumudam</td>
<td>3</td>
</tr>
<tr>
<td>Vizhiundal</td>
<td>3</td>
</tr>
<tr>
<td>Kundkam</td>
<td>3</td>
</tr>
<tr>
<td>Thimiram</td>
<td>7</td>
</tr>
<tr>
<td>Vari</td>
<td>3</td>
</tr>
<tr>
<td>Sukiran</td>
<td>5</td>
</tr>
<tr>
<td>Nerisal</td>
<td>3</td>
</tr>
<tr>
<td>Poo</td>
<td>3</td>
</tr>
</tbody>
</table>

45

Diseases of white portion of eye - 20
(including sclera)

They are

<table>
<thead>
<tr>
<th>Disease</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ezhuchi</td>
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</tr>
<tr>
<td>Padarthi</td>
<td>3</td>
</tr>
<tr>
<td>Nerisal</td>
<td>3</td>
</tr>
<tr>
<td>Putru</td>
<td>3</td>
</tr>
<tr>
<td>Kumulam</td>
<td>3</td>
</tr>
<tr>
<td>Vari</td>
<td>3</td>
</tr>
</tbody>
</table>

20
<table>
<thead>
<tr>
<th>Diseases of the eye lids</th>
<th>-</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillam</td>
<td>-</td>
<td>3</td>
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<tr>
<td>Imai thadippu</td>
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<tr>
<td>Mudamayir</td>
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<td>Ilichakan</td>
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</tr>
<tr>
<td>Parparogam</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Kazhalai</td>
<td>-</td>
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</tr>
<tr>
<td>Imaineer Paichal</td>
<td>-</td>
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<tr>
<td>Sutrukulaivu</td>
<td>-</td>
<td>1</td>
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<tr>
<td>Puzhukadi</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Imaiyunarchi</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diseases of corner of the eye (Angles)</th>
<th>-</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kannokaadu</td>
<td>-</td>
<td>1</td>
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<tr>
<td>Poochandiram</td>
<td>-</td>
<td>1</td>
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<tr>
<td>Neerpadarathi</td>
<td>-</td>
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<tr>
<td>Vizhivatham</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Viranaparu</td>
<td>-</td>
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</tr>
<tr>
<td>Vipurudhi</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Rathapadarthi</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Thasaipadarthi</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
Neerkulai - 1
Rathakulai - 1
Mangisakulai - 1
Imai kurudu - 1
Imai Kumizhl - 1
Naethiravayu - 1
Kannoii - 1
15

The author dissertation topic Mega thimiram falls under diseases of the black portion of the eye under thimiram.

Thimiram is of seven types, according to Nagamuni’s

"பித்தரகையதி சித்திரசு கர்மசுகரசு விலங்கு திலகம்
பனியும் பெரும் பாடை பாரதியை வேறு வேறு வேறு
பித்தரகையதி சித்திரசு கர்மசு விலங்கு திலகம்
பனியும் பெரும் பாடை பாரதியை வேறு வேறு வேறு"

They are

1. Velleluthu thimiram
2. Maalaikann thimiram
3. Mandhara thimiram
4. Varatchi thimiram
5. Neer thimiram
6. Vayu thimiram
7. Mega thimiram
The first three types are incurable, while other ones are curable.

Agasthiar mentioned about the features of thimiram as follows,

"உமதெளிமார் கல்பையம் காட்டுகள் பரம் மால்கள் சோழ வானையம் எதிர்குத்து கல்லம் குறிக்குத்து ரோஜாம் பிரித்தையும் பிற்றைப் பிரித்தையும் பார்வைம் பரம்மம் பாடல்ம் பிரித்தையும் செய்தாராரே சிலையும் மக்கும் வராம் தரையும்"

- ஆக்கிராம் துவார நீதி

❖ Burning pain & Irritating pain on eyes
❖ Sleepiness, Itching on face and head
❖ Excessive lacrimation
❖ Pallor of eyes.

Mega thimiram according to Nagamuni Nayana Vidhi 200, has following features,

"உமதெளிமார் தரந்தியம் அர்தாவம் பக்தம் தில்லிக்க
நிறைவிலும் பிரித்தையும் பார்வைம் பரம்மம் பாடல்ம்
சேற்றிலும் கருணையும் பிரித்தையும் பார்வைம் பரம்மம்
செய்தாராரே பார்வையும் இளையார் தொட்டு தராம்"

- மாராமி ரமகுரிசி 200

❖ Gradual diminution of 7 Udal Thathukkal
❖ Growing dullness of vision
❖ Inflammatory signs like heat and burning sensation of the eye and atrophy of retinal vessels and optic nerve
The author has taken the dissertation topic “Mega thimiram” from the literary work “NAGAMUNI NAYANA VIDHI - 200”

According to text work, Nagamuni has given a very excellent and perfect title as Mega thimiram. The title is more specific as it results as a complication followed by Mega noi.

“Megam”

Megam popularly known as “Neerizhivu” in those days is characterized by increased frequent passage of urine, having sweety odour. It is considered to be a single disease among the 4448 diseases.

“Thimiram”

Thimiram, one among the eye disease of karuvizhi is caused by the atrophy of optic nerve, retinal vessel, degeneration in the retinal Rods & Cones etc.
“Mega Thimiram”

The title refers to retinal complication of the eye due to Mega Noi

"அற்கைநிற்புற மாட்டும்"

The line refers about the gradual diminution of 7 udal thathukkal (Physical constituents) namely Saaram, Seneer, Oon, Kozhuppu, Enbu, Moolai and Sukkilam followed by Mega Noi.

"அற்கை நிற்புற மாட்டும்"

There exists gradual vascular constriction of arteries, atrophy of optic nerves and retinal vessels.

"அற்கைநிற்புற மிதிமுயற்சி நூற்றவனிக்க நூற்றாண்டுகளினுள்ளே"

There is gradual and progressive growing dullness of vision.

"அற்கைநிற்புற கதுங்கு விளக்குள்ள நூற்றாண்டுகளினைக்கு விளக்குள்ளே"

When there is an inflammation, there is naturally local edema, heat followed by burning sensation of the eye.

"அற்கைநிற்புற வாழ்வகுறிய கொழுங்கு விளக்குச் செய்யப்பட்டது தோண்டு" 

Above all are the characteristic findings of Mega thimiram.

Mega thimiram is one among the Karuvizhi noi. The clinical feature of Mega thimiram can be summarized as follows .

- Gradual diminuition of 7 Udal Thathukkal,
- Growing dullness of vision,
- Inflammatory signs like edema, heat and burning sensation of eye,
- Atrophy of optic nerve and retinal vessels.
DETAILED PATHOLOGICAL VIEW OF DISSERTATION TOPIC

MEGA THIMIRAM

MEGAM:

‘Megam’ is characterized by metabolic disorder and it is a long term complication involving eyes, kidney, nerves and blood vessels which shows some abnormal changes in urine excretion i.e. excessive urination with increased amount of nutrients which is most essential to body function.

Glucose is the major source of energy reserve to the body which provides energy to brain, kidney and other organs. In diabetes, blockage of insulin action stimulates glucagon release, activates glycogen breakdown and impair insulin action in target tissues, so that hepatic glucose production is increased and capacity to dispose excessive glucose is also impaired, leading to severe hyperglycemia and impaired utilization of glucose, which may cause many complications.

THIMIRAM:

The word ‘Thimiram’ refers to disease which comes in view of cornea, but the problem is not in cornea which goes inside deep to the lens, and it may lead to visual disturbances which are discussed under the heading of thimiram. Thimiram refers to diseases of posterior segment of the eye i.e. Retina, Rods and Cones, Optic nerve, Choroid and Vitreous humour.
In body, normal glucose homeostasis is tightly regulated by three interrelated processes.

- Glucose production in liver,
- Uptake and utilization of glucose by peripheral tissue (mostly muscles) and
- Insulin secretions.

Insulin is necessary for

- Transmembrane transport of glucose and amino acids.
- Glycogen formation in liver and skeletal muscle
- Conversion of glucose to triglycerides
- Nucleic acid and protein synthesis

**Pathological changes in 7 physical constituents.**

**Lymph, interstitial fluids:**

Obligatory water loss combined with the hyperosmolarity resulting from the increased levels of glucose in the blood tends to deplete intra cellular water, as for example in osmoreceptor of the thirst centres of brain.

**Blood:**

The blood glucose level is usually high. In diabetic atherosclerotic lesions appears earlier than in the general people. The cause for accelerated atherosclerotic process is not known but
possible contributory factors are hyperlipidamia, increased HDL, nonenzymitic glycosylation, and increased platelet adhesiveness. Microangiopathy of diabetes is characterized by basement membrane thickening of small blood vessels and capillaries of different organs and tissues such as skin, skeletal muscle, eyes and kidney.

Insulin deficiency causes excessive break down of adipose stores resulting in increased level of free fatty acids. Oxidations of these fatty acids produce ketone bodies, resulting in metabolic ketoacidosis leading to diabetic coma.

**Muscle:**

Atrophy and weakness of large muscles in the upper leg and pelvic girdle resembles primary muscle disease.

**Fat:**

Insulin deficiency leads to decreased triglyceride synthesis, fatty acid synthesis, Lipoprotein, lipase activity and adipose tissues. It increases lipolysis, ketogenesis, and fatty acid oxidation in liver.

**Bone:**

Chronic diabetes leads to uraemia. In chronic uraemia, there is osteodemyelination and demineralization of bones.

**CNS:**

Peripheral nerves, brain and spinal cord all may be damaged in long standing diabetes.
Sexual function in male / female:

Peripheral neuropathy is sometime accompanied by disturbance in neural innervation of pelvic organ. Autonomic neuropathy may lead to sexual impotence and retrograde ejaculation in addition.

A number of systemic complications may develop after 15-20 years after onset of diabetes. The early glycosylation products of collagen and other lived proteins in interstitial tissues and blood vessel walls rather than dissociating, undergo a slow series of chemical rearrangements to form irreversible Advanced Glycosylation End Products which accumulate over lifetime on vessel wall. In large vessels, they deposit as trapping low density lipoprotein (LDL) for example, retards its efflux from vessel wall and enhances the deposition of cholestrol in the intima thus accelerating atherosclerosis. Microangiopathy of diabetes is characterized by basement membrane thickening of small blood vessels and capillaries of different organs and tissues such as skin, skeletal muscle, eyes and kidney.

Hyperglycemia increases retinal blood flow and metabolism having direct effects on retinal endothelial cells and pericytes, loss of which impairs vascular autoregulation. The resulting
uncontrolled blood flow increases production of vasoactive substance and endothelial cell proliferation resulting in capillary closure. This causes chronic retinal hypoxia and stimulates production of growth Factor (VEGF). VEGF acts via protein kinase C to stimulate endothelial cell growth (causing new vessel formation) and increased vascular permeability (causing exudative damage). The hard exudates and edema of fovea are the most common causes of visual impairment in diabetic patients.

"தாய்ச்சைக்கு தெளிவு எனப்படும் வருகை"

Involvement of the fovea by edema and hard exudates or ischemia (diabetic maculopathy) is the most common cause of visual impairment.

As it is a chronic inflammatory disease there is naturally heat followed by burning sensation of the eye. It is due to interruption of axoplasmic transport with subsequent build-up of transported within the axons (axoplasmic statsis) in the nerve fiber layer.
MEGAM

Synonyms of Madhumegam

Neerizhivu, Vegumoothiram, Madhu prameham, Inippuneer, Meganeer, Thithippuneer.

Definition (Iyal)

Frequent passage of increasing urination more than the normal, resulting in deterioration and gradual diminution of seven thathus.

"தில்லிப்பர் தில்லிப்பர் தாண்டவம்
துள் தில்லிப்பர் மிள்ளாக்கச் பிள்ளிப்பர் தேர்வூக்கு மாடும்”
- என்று கூறு

Noi Varum Vali (Etiology)

a. The authentic etiological factors described by various siddhars are as follows.

"சக்தியுள்ள தலையாள பாலாலயம் பல்லுறுத் செய்யாமல் பார்க்கும் சிலம் பார்க்கும் குறுக்கு குற்றப்பட்டிருக்கும்
சாத்தமான தேவு சிறந்த காளியான பிரிவு காணவத்து
துவார் பிள்ளை ஓர் முன்னோர் முருக்கம் தேர்வூக்கு மாடும்”
- அக்கர்திரம் 1200

"உணவைக்கூறால் பால் பெரியம் குறுத்தாற் நகர்வதே
மகிழ்ச்சியுள்ள பாலாலயங்களுள் அவைக்குள்
பெரும்பைங்கு பலார்க்கூட்டாத மருந்து வழங்கவே
பெர்துகை செய்துப்பிள்ளை ஓர்பால் படித்து

64
Yugimuni in his text attributes this disease is due to injudicious diet containing rich fat, sweet and also obesity, too much of sedentary habits without exercise also leads to madhumegam. Undue fear, severe depression has also emphasized for the development of madhumegam.

**Hereditary Factors**

Statistics indicate that those with family history of diabetes have higher (25% - 35%) risk than those without such background. A number of genetic markers are now recognized.
Agasthiyar here tells that megam occurs due to ones kanma vinai and to his ill habitual deeds. These produce imbalanced vaatha, pitha, kabhaneer which in turn produce 20 types of mega disease.

"உடைய மகிழ்ந்த விசயநிலைத்தரை
அருகா நேயமந்த பராம்பனை
சாம்பன் விசயநிலை வியரிப்பனை
கக்காம்மகா வியரிபன் பார் கண்டைக்கானை
பார்ப்பா வைக்கு மறைக்கார்கள்

புவியியூப்பு மாத்தை வையூம்பார்கள
பார்ப்பா கால்பா வைக்கின்றோம் கேடே
தூண்ட்டன் வாக்காம்பிக்கு கோவேறியல்
மிச்சின் மீத்தெரியவில்லான் கால்பார்களே
சாத்திக் பேர்ரா வில்லியாங்கும் கோவேறியல்

- ஆக்கிரம் கர்த்தரங்கம் 300

"உள்ளிட்டு உள்ளிட்டுக்காதது உள்ளான வியரிப்பியல்களே
பார்ப்பா விஸ்யாக்கான் கால்பார்கள் கால்பார்கள் வையூம்பார்களே
கக்காம்மகா கால்பார்கள் 2 வில்லியாங்கும்
அதிருத் முட்டப்பு முட்டப்பு மாத்தை மாத்தை

- ஆக்கிரம் கர்த்தரங்கம்
Thirumoolar says in his Thirumandhiram about mega rogam.

"இவ்வோர் சிறுவர் திரும்பிப் பிள்ளை வேப்பாக்கி
அதும் குழுஞ்சி அல்லதுப்
நுழைவிட்டு கொண்டு போருமிமாக வந்தது
துறை சைப்பர் கோண்டு இருந்து வந்தது
தெரு புத்தசகோதராராயணா பற்றாத சிறுக்காணா
பெரும் பொழுதும் குழும்மான் மாறாக்கு வேப்பாம்”

- கிருஷ்ணன்

**Sexual Indulgence**

1) "சுருக்கிரேப்பார் தேவதிலிங்கா சுமாரங்கன்
சிறு மார் செய்து வந்தது காற்று சிரிக்
சாரியர் செய்து சாரியமா காற்று சிறிக்
சாரியர் பெரும் பொழுதும் சிறிக் வேப்பாம்”

- சேலார்

2) "சாலாதி மாற்றங்கள் காற்று வேப்பாம்”

- சேலார்

3) "சீர்குளி பொலைதருண நகர்க்குளில்லை சுருக்கி காணா
அதுக்கு சாரியமா பொழுதும் சாரியமா காற்று வேப்பாம்”

- சேலார் மாற்றங்கள் பொழுதும்

The direct inference from the above poem is that all Siddhars attribute Diabetes mainly due to excessive indulgence in sex which results in depletion of total strength of body as a whole, making the individual susceptible to this disease.
Noi Enn (Classification)

Twenty varieties of mega disorders have been discussed by Yugimuni, Agasthiar and by theraiyar.

The disease mega has twenty types.

"மைக்கி வாய்ப்பு விளக்கப்பட்டது

மாதறித்து பிள்ளை வண்டு வருகிறது

பிள்ளை பிள்ளை விளக்கம்

சுருங்க சுருங்க வடிவமைக்கு

ஞானசம் ஞானசம் விளக்கம்

சிற்றகண்ட சிற்றகண்ட விளக்கம்

திருநூறு திருநூறு விளக்கம்

சுருங்க முனைப்பும் சுத்தியலும்

சுருங்க சுருங்க முனைப்பும் சுத்தியலும்

- தொலைவியல் சிக்கலை".

The author Yugimuni classified mega disorder into 20 types.

Among this Vatha 4, Pitha 6 and Kabha 10 types

"மைக்கி வாய்ப்பு வருகிறது வண்டு விளக்கம்

மைக்கி வருகிறது பிள்ளை, சுருங்க சுருங்க விளக்கம்

மைக்கி வாய்ப்பு வருகிறது சுத்தியலும் சுற்றுநூறு விளக்கம்

- சோதந்தை வாய்ப்பு

In Siddha literatures like Thirumoolar Vaidyam 600, Prameham is also called as Prem eham Neerizhivu. The author who have dealt mega disorders have classified it under the three dhoshas and have given names according to his concept.
MATERIALS AND METHODS

The study on the Noi nadal aspects i.e pathological view of “Mega thimiram” was carried out in the Aravinth eye hospital, Tirunelveli both at outpatient department and Inpatient ward

Selection of cases

For the clinical study 30 cases suffering from Mega thimiram having signs and symptoms as said in the Nagamuni Nayana Vidhi- 200 are selected. Out of 30 cases 20 are selected for this dissertation under the guidance of professor and lecturers of Noi-Nadal Department, Chief Medical Officer, Fellows and postgraduates of Aravinth eye hospital, Tirunelveli.

Evaluation of clinical parameters:

The cases were subjected to careful scrutiny, which involved history taking and examination of clinical features.

A detailed history was taken from the patients

❖ Family history

❖ Personal history

❖ Occupational history

❖ Diet habits

❖ Seasonal variations were noted.

All the clinical signs and symptoms of Mega thimiram and its diagnosis is done by assessing the following criteria.
**Siddha Aspect**

1. Mukkutra nilai
2. Udal kattugal
3. Envagai thervugal
4. kaalam
5. Nilam
6. Neerkuri
7. Neikuri

**Modern aspect:**

**Lab studies**

**Haematological investigations**

1. Total WBC
2. Differential count
3. Erythrocyte sedimentation rate
4. Haemoglobin concentration
5. Blood sugar
6. Blood urea
7. Serum creatinine level

**Urine Analysis**

1. Albumin
2. Sugar
3. Deposits
**Eye Examination**

1. Vision - Snellen's chart
2. Ocular pressure
3. Refraction
4. Colour vision
5. Fundus Examination
   a. Slit lamp with 90D
   b. Direct Ophthalmoscopy
   c. Indirect Ophthalmoscopy

**Special investigations:**

1. Fundus flurosceince angiography
2. Optical coherent tomography
OBSERVATION AND RESULTS

Results were observed with respect to the following criteria

1. Age distribution
2. Sex reference
3. Kaalam
4. Seasonal variations
5. Thinai reference
6. Dietary changes
7. Socio–economic status
8. Onset of the disease
9. Mukkutram
10. Udal kattugal
11. Envagai thervugal
12. Neerkuri, Neikuri reference
13. Signs and symptoms
1. Age distribution

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Age</th>
<th>No.of.Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>upto 25</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>26 – 50</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>51 – 75</td>
<td>15</td>
</tr>
<tr>
<td>4.</td>
<td>76 above</td>
<td>-</td>
</tr>
</tbody>
</table>

2. Sex distribution

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Sex</th>
<th>No.of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male</td>
<td>13</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>7</td>
</tr>
</tbody>
</table>

3. Kaalam

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Kaalam</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vaatha kaalam</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Pitha kaalam</td>
<td>19</td>
</tr>
<tr>
<td>3.</td>
<td>Kabha kaalam</td>
<td>1</td>
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</tbody>
</table>

Most of the cases for this study belongs to pitha kaalam
4. Seasonal variations

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Paruvakaalam</th>
<th>No.of. cases</th>
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<tr>
<td>1.</td>
<td>Kaar kaalam</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Koothir kaalam</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>Munpani kaalam</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Pinpani kaalam</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>Ezhavenil kaalam</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>Muthuvenil kaalam</td>
<td>4</td>
</tr>
</tbody>
</table>

5. Thinai reference

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Thinai</th>
<th>No.of.cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kurinji</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Mullai</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Maruthuvam</td>
<td>15</td>
</tr>
<tr>
<td>4.</td>
<td>Neithal</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>Paalai</td>
<td>-</td>
</tr>
</tbody>
</table>

6. Dietary changes

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Dietary habits</th>
<th>No.of.cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vegetarian</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Mixed diet</td>
<td>16</td>
</tr>
</tbody>
</table>
7. Socio-economic status

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Socio-economic status</th>
<th>No.of.cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Poor</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>Middle class</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Upper class</td>
<td>4</td>
</tr>
</tbody>
</table>

8. Onset of disease

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Onset of disease</th>
<th>No.of.cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Acute</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Subacute</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Chronic</td>
<td>20</td>
</tr>
</tbody>
</table>

9. Mukkuttram

The derangement undergone by the various types of vaatham, pitham and kabham

a) Vaatham:

<table>
<thead>
<tr>
<th>Sl.No</th>
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b) Pitham:

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c) Kabham:

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10. Udal Kattugal :

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## 12. Neikuri Reference

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<td>Kaba neer</td>
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## 13. Signs and Symptoms

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ANATOMY AND PHYSIOLOGY OF RETINA

Retina, the innermost tunic layer of the eyeball is a thin delicate and transparent membrane. Most highly developed tissue of the eye i.e., photosensitive layer.

Retina extends from optic disc to ora serrata and has surface area of about 256mm². Retina is situated between hyloid membrane and vitreous body interiorly and choroid externally.

Dimensions

Thickness of posterior pole is 0.56mm
At equator is 0.18 – 0.2 mm
At ora serrata is 0.1mm

Colour

Purplish red in colour (due to visual purple of rods)
After death, it appears white opaque

On ophthalmoscopic examination, it can be divided into three distinct regions.

I. Optic Disc
II. Macula lutea
III. Peripheral Retina

I. Optic disc

It is a well defined circular area of about 1.5mm diameter

Colour: Uniformly pink
All retinal layers terminates except nerve fibres which pass through lamina cribrosa to run into optic nerve. It is insensitivity to light and it is known as blind spot.

II. Macula lutea

It is an yellow spot which is situated at the posterior pole of eyeball, temporal to optic disc.

The depression situated centrally is called fovea centralis. It is a transparent membrane. Optic disc is 3mm medial to macula lutea. It is concerned with photopic vision and colour vision. It corresponds to 15° of visual field.

Diameter : 1.85 mm
Thickness : 0.25 mm
Fovea centralis : It has three parts
Foveola : (0.35mm) forms central floor of fovea, situated 2 disc diameter from temporal edge.
Umbo : a tiny depression in centre corresponds to opthalmoscopically visible foveolar reflex. Loss of this is an early sign of damage.
Foveal avascular zone : Located inside the fovea but outside foveola with varying diameter.

Surrounding the fovea are parafoveal and perifoveal areas about 0.5mm and 1.5mm in diameter, respectively.
III. Peripheral retina

Peripheral retina can be divided into four regions

Near Periphery : It refers to a circumscribed region of about 1.5mm around area centralis.

Mid periphery : Occupies a 3mm wide zone around near periphery

Far periphery : Extends from optic disc, 9-10 mm on temporal side and 16mm on nasal side.

Ora serrata : Seratted peripheral margin where the retinal ends and ciliary body starts. It contains tooth-like extensions, to which vitreous and retinal pigment epithelium attached.

Microscopic structure of the retina

Retina consists of three types of cells and their synapses arranged are in the following layers.

1. Retinal pigment epithelium (RPE)

Outermost hexagonal shaped cell layer containing pigment cells with fine mottling due to unequal pigmentation of cells. The potential space between retinal pigment epithelium and sensory retina is called subretinal space. Separation of RPE from sensory retina is called retinal detachment.
Functions of RPE

1. Plays important role in photoreceptor renewal regarding with vit -A.
2. Forms outer blood-retinal barrier, actively pumping ions and water out of this space.
3. Phagocytic action.
4. Provide mechanical support to process photoreceptors.
5. RPE is involved with transport of nutrients and metabolites.

2. Layers of rods and cones : (Neuro epithelium)

There are about 120 million rod and 6.5 million cone cells which transform light energy to visual impulse. Rods are absent mainly in fovea and maximum in optic disc.

3. External limiting membrane

It is fenestrating membrane formed by junctions between cell membrane and muller’s cells. It extends from ora serrata to optic disc.

4. Outer nuclear layer

Formed by nuclei of rods and cones

The number of nuclei and thickness varies from region to region as follows.

Nasal to the disc - 8 to 9 layers of nuclei & 45 μm thickness

Temporal to the disc - 4 rows of nuclei & 22 μm thickness
Foveal region - 10 rows of nuclei & 50 μm thickness

Rest of retina except

ora serrata – one row of cone nuclei and 4 rows of rod nuclei with a thickness of 27 μm.

5. Outer plexiform layer

Contains synapses between rod spherules and cone pedicles with dendrites of bipolar cells. It is thickest at macula and contains oblique fibres known as Henle’s layer.

6. Inner nuclear layer

Resemble outer nuclear layer but it is very thin. This layer disappears at fovea and in rest of retina consists of the following

- Bipolar Cells
- Horizontal Cells
- Amacrine Cells
- The soma of muller’s Cells
- Capillaries of central retinal vessels

7. Inner plexiform layer

Essentially consists of synapses between axons of bipolar cells (first order neurons) and dendrites of ganglion cells (second order neurons). This layer is absent at foveola.
8. **Ganglion cell layer**

The cell bodies and nuclei of ganglion cell lie in this layer. It is composed of single row of cells except in macular region. Multilayered.

9. **Nerve fibre layer (stratum opticum)**

Essentially consists of unmyelinated ganglion cells which converge at optic nerve head, pass through lamina cribrosa. Centrifugal nerve fibres are thicker. Microglia and macroglia are neuroglial cells present in nerve fibre layer. Retinal vessels lie in nerve fibre layer but as a rule do not project on surface of retina.

10. **Internal limiting membrane**

Consists of four elements

1. Collagen fibrils
2. Proteoglycans
3. Basement membrane
4. Plasma membrane of muller’s cells

**Blood supply of retina**

Central retinal artery, a branch of internal carotid artery and choriocapillaries.

**Central Retinal Artery**

Arises from ophthalmic artery near optic foramina and courses with 5-6 right angle bends as follows.
Outside the optic nerve

It runs as a wavy course below optic nerve, adherant to dural sheath and pierce dura and arachanoid membrane.

In subarachanoid space

Bends forwards and after a short course it again bends upwards nearly right angle and invaginate pia to reach centre of nerve, surrounded by sympathetic nerve plexus.

In the centre of optic nerve

The artery bends forwards and then in company with vein. It pierces Lamina cribrosa to appear inside the eye.

In the retina

Four terminal branches namely superior nasal, superior temporal, inferior nasal and inferior temporal divide dichotomously as they proceed towards ora serrata, when they end with out anastomosis.

Blood retinal barrier

The endothelial cells of a normal retinal capillary are closely bound together about lumen by intercellular junction of zonula occludens type. These junctions normally prohibit a free flow of fluid and solutes from vascular lumen, into retinal interstitium, thus forms a blood retinal barrier. Presence of this barrier is confirmed by absence of fluorescein leakage from these capillaries.
The endothelial cells of retinal capillaries are encircled by basement membrane around which present a layer of pericytes, surrounded by a layer of basement membrane. Normally the endothelial cells and pericytes are present in a one to one ratio, in young individual. In certain diseases such as diabetes mellitus, there occurs a relative decrease in number of pericytes.

**Functions of retina**

Visual functions are classified under the light sense, form sense and colour vision.

Retinal functions are tested by the following tests

i. Visual acuity

ii. Visual fields

iii. Colour vision

iv. Dark adaptation

v. Electroretinogram (ERG) and Electrooculogram

The visual impulses reach occipital cortex after 124 m/sec following retinal stimulation.

i. The central part of retina (macula lutea) consists mainly of cones which are responsible for vision in day light and for colour vision.

ii. The peripheral part of the retina consists mainly of rods which are responsible for vision at night
Physiology of vision

Introduction

Physiology of vision is a complex phenomenon. Main mechanisms concerned with vision are.

Initiation of vision (Transduction)

Transmission of visual sensation and

Visual perception

Initiation & transmission of visual sensations

The rods and cones serve as sensory nerve endings for visual sensations.

Physiologically, stimuli can be divided into 2 types

Inadequate stimuli

It produces glowing sensations called phosphenes. Mechanical stimulation by pressure of the sclera is an example of inadequate stimulus which produces pressure phosphene.

Ex: Rapid eye movements in dark passage of weak electric current through retina produce electron phosphene and passage of X-rays or other ionizing radiations through the retina. (Produces radiation phosphenes)

Adequate stimuli

True visions are formed by visible portion of electromagnetic radiation spectrum. It lies between UV & IR portions form 400nm at violet end of spectrum to 750nm at red end. The white light
consists of seven colours denoted by “VIBGYOR” Light ray is the term used to describe radius of concentric wave forms.

Light falling upon retina is absorbed by the photo sensitive pigments present in rod and cones. The photochemical changes trigger a sequence of events that initiate visual sensations. The retinal receptors are active processors of information. Thus the electrical potential changes produced and actively processed in retina are transmitted through the ganglion cells and along fibres of optic nerve.

**Visual perceptions**

Visual perceptions are functional elements of vision which result from stimulation of retina with light.

These are of 4 kinds namely

1. Light sense
2. Form sense
3. Sense of contrast
4. Colour sense

**The light sense**

It refers to appreciation of light in all gradations of intensity. The minimum brightness required to evoke a sensation of light is called light minimum. Measured during dark adaptation for at least 20-30 minutes. Rods are much more sensitive to low illumination. It forms the basis of the Duplicity theory of vision.
The form sense

It is the ability to discriminate between the shapes of the objects. Cones play a major role in this faculty. Form sense is most acute at fovea.

Sense of contrast

It is the ability of eye to perceive slight changes in luminance between regions which are not separated by definite border.

The colour sense

It is the ability of eye to discriminate between colours excited by light of different wave-lengths. Function of cones is thus better appreciated in photopic vision. It performs this function by different types of pigments which absorb red, green, blue wavelength of light.

Neurology of vision

The visual pathway has some unique features which are explained by comparing with afferent tract.

The visual pathway consists of

1. The optic nerves
2. The optic chiasma
3. The optic tract
4. The lateral geniculate body
5. The optic radiations
6. The occipital cortex
The optic nerves

The fibres arise from retina divided into temporal and nasal halves at the level of fovea centralis. The optic nerves join the optic chiasma at anterolateral angles.

The optic chiasma

It is a flat, band like structure lying above pituitary fossa. In the optic chiasma there is semi decussation of nerve fibres.

i. The nerve fibres from nasal side of each retina cross over to opposite side

ii. The nerve fibres from the temporal side do not cross but pass into optic tracts of the same side.

The optic tract

The optic tract originates from posterolateral angle of optic chiasma. They are cylindrical bands running outwards and backwards to end in lateral geniculate bodies. They consist of temporal fibres of same side and nasal fibres of opposite side.

The lateral geniculate bodies

Oval structures situated at the posterior end of the optic tracts. The fibres of optic tracts end in lateral geniculate bodies and new fibres of optic radiations originate from them.

The optic radiations

The nerve fibres processed backwards and medially as optic radiations to terminate in visual centres situated in occipital lobes.
The occipital cortex

It is situated above and below the calcarine fissure extending up to occipital pole.

The visual nerve pathway can be divided into three parts.

1. The neuron of the first order is the bipolar cell in the retina. The rods and cones are the sensory end organs.

2. The neuron of the second order is the ganglion cell in the retina, the process of which pass along optic nerve, optic chiasma and optic tract to the lateral geniculate body

3. The neuron of the third order takes up the impulses via optic radiations to occipital lobe (visual centre).
PATHOLOGY

Introduction Of Diabetic Retinopathy

Diabetic retinopathy refers to retinal changes that occur in patients with diabetes mellitus. Over the past few decades, the global burden of diabetes has grown to such a level that the disease is now considered as pandemic. According to world health organization, around 177 million people world wide suffer from diabetes and two-third of them live in the developing countries. It's expected that by the year 2030, the number of people with diabetes is doubled to 370 million.

India currently has world’s largest diabetic population, with an estimation of 35 million people. Most of these people have type 2 diabetes mellitus, which is predominantly a lifestyle disease, related to obesity, dietary habits and lack of exercise. Majority of diabetics are unaware of their diabetic status while aware person do not realize the importance of consistent follow ups with physician, most of the physicians are not trained to detect and refer sight-threatening diabetic retinopathy for a timely treatment. The data regarding alarms most diabetics develop some retinopathy in course of their life time. It is estimated that 15% Indians currently showing an abnormal glucose tolerance from which the future enormity of problem can be easily anticipated like the barrel of a
smoldering canon, which can explode in our face any time. DR is the most common cause of legal blindness between the age of 20 and 65 yrs.

The current research focuses more on disease mechanism, the risk factors, clinical features and standard treatment protocols and future strategies to counter the diabetic retinopathy are discussed.

**Risk factors affecting diabetic retinopathy**

1. Epidemiological factors
2. Systemic parameters of diabetics
3. Genetic factors
4. Other diseases
5. Physiological factors
6. Socio economic factors
7. Local factors

1. **Epidemiological factors**
   
   **a. Age**: In type I, prevalence and severity of retinopathy increase with increasing age. It is rare before the age of 13 years. In type II diabetes, the severity of retinopathy is not related to age.

   **b. Sex**: No significant correlation

   **c. Race**: Indians have a higher risk of developing proliferative diabetic retinopathy compared to Americans.
2. **Systemic Diabetes**

**a. Type of DM**: Type 1 diabetics typically have a faster progression of diabetic retinopathy and more commonly lose vision due to proliferative diabetic retinopathy, while type 2 lose vision more commonly due to diabetic macular edema.

**b. Duration of DM**: After 20 years of diabetes, 99% type 1 and 60% type 2 diabetic have retinopathy and 53% type 1 and 5% type 2 patients have proliferative diabetic retinopathy.

**c. Control of diabetes mellitus**: It is less important than duration. Tight control of diabetes at earliest after detection of diabetes reduces both the incidence and progression of diabetic retinopathy.

3. **Genetic factors**

   The genetic transmission is low only 3-6% siblings and 8% offspring of diabetic patients are prone to become diabetes.

   Type 2 diabetes mellitus has a stronger genetic predisposition 30% of offspring and 40% siblings are affected.

4. **Other systemic diseases**

   Hypertension is extremely common in diabetes. If poorly controlled is associated with worsening of DR and the development of PDR in both type 1 and type 2 diabetes.

   Nephropathy worsens diabetic retinopathy through rheological, platelet and lipid abnormalities by increasing risk of both macular edema and proliferative diabetic retinopathy.
Increased serum cholesterol causes increase in hard exudates at macula with subsequent visual compromise. This is due to increased risk of atherosclerosis and ischemic heart disease in diabetics.

Anemia aggravates retinal hypoxia by decreased oxygen carrying capacity of blood and it is an independent risk factor for high risk proliferative diabetic retinopathy and severe visual loss. When hemoglobin falls below 12 gms% the risk or retinopathy has increased to 2 fold.

5. Physical factors

a. Puberty: The most important determinant of retinopathy is duration of diabetes after onset of puberty. The risk of disease is same in two adults whom developed diabetes at age 6 and the other at age 12.

b. Pregnancy: Diabetic retinopathy accelerates during pregnancy increases the risk of retinopathy twice, and also a risk factor for congenital anomalies in the newborn.

6. Socio economic factors

Increasing incidence of diabetes has been linked to life style changes and urbanization. Diabetes is common in all status neither hyperglycemia nor diabetic retinopathy has been found to be associated with socio economic status.
7. Local factors

While cataract occurs early in diabetic eyes, its removal poses an increased risk of anterior and posterior segment complications like a uveitis, posterior capsular opacification and cystoid macular edema. The severity of diabetic retinopathy is increased after cataract surgery, particularly if posterior capsule is torn during surgery.

Various degenerative and atrophic diseases of retina like glaucoma, myopia, optic atrophy, retinitis pigmentosa reduce metabolic demand of retina and decrease the stimulus for new vessel formation.

BASIC BIOCHEMICAL MECHANISMS

Sorbital pathway

Excess glucose in a diabetic’s blood stream is channelled through alternative metabolic pathway, one of which is sorbital pathway. The enzyme aldose reductase converts excess glucose into an intermediate product sorbitol, intracellularly. The stabilization of sorbital as fructose sugar is a slow reaction and it occurs extracellularly. Since sorbital cannot be transported out of cell rapidly and it is osmotically active. If water accumulates inside cell, this is main mechanism for pericyte loss and adversely effect photoreceptor function, retinal blood flow and vasodilation. Cataract, diabetic neuropathy also may results from this pathway.
**Non-enzymatic glycation of proteins**

This is the mechanism of browning of meat when incubated with glucose. In diabetic eyes, there is a similar adhesion of glucose with proteins, which results in continued cross linking and formation of Advanced Glycosylation End Products (AGEP). Since it is a slow process, it only affects tissues with a slow protein turnover, like basement membrane. Quick turn over proteins like haemoglobin is not affected. Therefore HbA1C a glycosylated protein only indicates the diabetic control without affecting the function of haemoglobin.

**Protein Kinase C Pathway**

Incomplete metabolism of excess glucose leads to accumulation of intermediates like advanced glycosylation end proteins and diacyl glycerol (DAG). Elevated levels of Diacyl glycerol result in increased activity of ubiquitous enzyme Protein Kinase C (PKC) which decreases retinal blood flow. PKC is also activated by vascular endothelial growth factor and mediate its function, mainly by blood retinal barrier breakdown and neovascular proliferation.
**Angiogenic factors**

The angiogenic factors isolated namely X was released by hypoxic retina and it causes neovascularization of retina and iris. Of various angiogenic factors isolated, it is secreted and soluble in aqueous and vitreous, upregulated by hypoxia and is potently angiogenic. VEGF is a peptide produced mainly by extravascular tissue, glia, retinal pigment epithelium, macrophages and T-Cells. It is the major catalyst for both inner break down and new vessel formation. It is also released in response to trauma and inflammation. Other growth factors like fibroblast growth factor and insulin like growth factor have only a synergistic, supportive or permissive role adjuvant to Vascular Endothelial Growth Factor (VEGF).

**Pathogenesis**

Diabetic retinopathy has traditionally been considered a vascular disease, primarily a capillaropathy. It is presumed to be inner retinal disease, whose pathological changes are tissue hypoxia and edema, caused by micro vascular occlusion and leakage.

**Clinically, DR may be:**

(a) Background (non-proliferative) in which the pathology remains intraretinal,
(b) Proliferative in which the pathology extends onto or beyond the retinal surface and
(c) Pre-proliferative, which has features of imminent proliferative disease.

**Microvascular occlusion**

1. **Pathogenesis**

   a) **Capillary** changes consist of loss of pericytes, thickening of the basement membrane and damage and proliferation of endothelial cells.

   b) **Haematological** changes consist of deformation and increased rouleaux formation of red blood cells and increased platelet stickiness and aggregation, leading to decreased oxygen transport.

2. **The consequence** of retinal capillary non-perfusion is retinal ischaemia, which initially develops in the mid-retinal periphery. The two main effects of retinal hypoxia are the following

   a) **Arteriovenous shunts** associated with significant capillary occlusion ('drop-out') run from arterioles to venules. As it is unclear whether these lesions represent new vessels or opening of pre-existing vascular channels, they are often referred to as ‘intraretinal micro-vascular abnormalities’ (IRMA).

   b) **Neovascularization** is thought to be caused by 'vasoformative substances' (growth factors) elaborated by hypoxic retinal tissue in an attempt to revascularize hypoxic retina. These substances
promote neovascularization on the retina and optic nerve head (PDR) and occasionally on the iris (rubeosis iridis). Many growth factors have been identified; vascular endothelial growth factor (VEGF) appears to be of particular importance.

**Microvascular leakage**

1. **Pathogenesis.** Breakdown of the inner blood-retinal barrier leads to leakage of plasma constituents into the retina. Physical weakening of the capillary walls results in localized saccular outpouchings of the vessel wall, termed microaneurysms, which may leak or become thrombosed.

2. **Consequences** of increased vascular permeability include the development of intraretinal haemorrhages and oedema which may be diffuse or localized.

a) **Diffuse retinal oedema** is caused by extensive capillary dilatation and leakage.

b) **Localized retinal oedema** is caused by focal leakage from microaneurysms and dilated capillary segments. Chronic localized retinal oedema leads to the deposition of 'hard exudates' at the junction of normal and oedematous retina. These exudates composed of lipoprotein and lipid-filled macrophages. When leakage ceases, they absorb spontaneously over a period of months or years, either into the healthy surrounding capillaries or by
phagocytosis of their lipid content. Chronic leakage leads to enlargement of the exudates and the deposition of cholesterol.

**Classification and Clinical Features**

**Background diabetic retinopathy**

**Clinical features**

1. **Microaneurysms** Microneurysym are the clinical hall mark and earliest change in diabetic retinopathy. As the disease progresses, they increase in number and are accompanied by other features like soft and hard exudates, dot and blot hemorrhages, venous caliber changes and intraretinal microvascular abnormalities. Microneurysym are located in the inner nuclear layer and are the earliest clinically detectable lesions.

   **Signs.** Tiny, round, red dots, initially appearing temporal to the fovea. When coated with blood they may be indistinguishable from dot haemorrhages.

2. **Hard exudates** lie within the outer plexiform layer

   **Signs.** Waxy, yellow lesions with relatively distinct margins often arranged in clumps and / or rings at the posterior pole. A ring of hard exudates (circinate exudate) often exhibits microaneurysms at its centre. With time, number and size tend to increase, and the fovea may be threatened or involved.
3. **Retinal oedema** is initially located between the outer plexiform and inner nuclear layers. Later it may also involve the inner plexiform and nerve fibre layers, until eventually the entire thickness of the retina becomes oedematous. With further accumulation of fluid the fovea assumes a cystoid appearance (cystoid macular oedema).

**Signs.** Retinal thickening is best detected by slit-lamp biomicroscopy with a Goldmann lens.

4. **Haemorrhages**

a. **Intraretinal haemorrhages** arise from the venous end of capillaries, and are located in the compact middle layers of the retina with a resultant red 'dot-blot' configuration.

b. **Retinal nerve fibre layer haemorrhages** arise from the larger superficial pre-capillary arterioles and are therefore flame-shaped.

**Preproliferative diabetic retinopathy**

Background Diabetic Retinopathy (BDR) that exhibits signs of imminent proliferative disease is termed preproliferative diabetic retinopathy (PPDR). The clinical signs of PPDR indicate progressive retinal ischaemia. The risk of progression to proliferative disease appears proportional to the number of lesions.
Clinical features

1. **Cotton wool spots** represent focal infarcts of the retinal nerve fibre layer, due to occlusion of pre-capillary arterioles. Interruption of axoplasmic transport with subsequent build-up of transported material within the axons (axoplasmic stasis) is responsible for the white appearance of the lesions.

**Signs** Small, whitish, fluffy superficial lesions which obscure underlying blood vessels and are clinically evident only in the post equatorial retina, where the nerve fibre layer is of sufficient thickness to render them visible.

2. **Intraretinal microvascular abnormalities** (IRMA) represents shunts that run from retinal arterioles to venules. Thus by-passing the capillary bed, and are therefore often seen adjacent to areas of capillary closure.

**Signs** Fine red lines that run from arterioles to venules. Thus resembling focal areas of flat retinal new vessels. The main distinguishing features of IRMA are their intra retinal location, their failure to cross major retinal blood vessels.

3. **Venous Changes:**

Veins are dilated, tortuous, reduplicated, looped or beaded in diabetic retinopathy, venous beading is important indicator of retinal hypoxia and diabetic retinopathy progression. This appearance is called also ‘**Sausage-like**’ Segmentation.
4. Arterial Changes

Consisting of narrowing, silver-wiring and obliteration resembling a branch retinal artery occlusion.

5. Dark blot haemorrhages represent haemorrhagic retinal infarcts and are located within the middle retinal layers.

Diabetic maculopathy

It is the most frequent cause of visual impairment. It may occur at any stage of diabetic retinopathy. But is more common in advanced stages when edema occurs close to or at the centre of macula, it is called Clinically Significant Macular Edema (CSME). Involvement of the fovea by oedema and hard exudates or ischaemia (diabetic maculopathy) is the most common cause of visual impairment in diabetic patients, particularly those with type 2 diabetes.

Classification

1. Focal exudative

Signs Well-circumscribed retinal thickening associated with complete or incomplete rings of perifoveal hard exudates.

2. Diffuse exudative

Signs Diffuse retinal thickening, which may be associated with cystoid changes. Obliteration of landmarks by severe oedema may render localization of the fovea impossible.
3. Ischaemic

**Signs**  Reduced visual acuity in association with a relatively normal appearance of the fovea. Associated PPDR is frequent. Dark blot haemorrhages may be seen.

**4. Mixed** is characterized by features of both ischaemia and exudation.

**CLINICALLY SIGNIFICANT MACULAR EDEMA (CSME)**

**Definition**

Clinically Significant Macular Edema (CSME) has the following characteristics.

- Retinal edema within 500 μm of the centre of the fovea.
- Hard exudates within 500 μm of the centre of the fovea, if associated with adjacent retinal thickening (which may be outside the 500 μm limit).
- Retinal edema one disc area (1500 μm) or larger, any part of which is within one disc diameter of the centre of the fovea.

**Proliferative diabetic retinopathy**

PDR affects 5-10% of the diabetic population. Type-1 diabetics are at particular risk with an incidence of about 60% after 30 years.
CLINICAL FEATURES

**Signs** Neovascularization is the hallmark of PDR. New vessels may proliferate on or within one disc diameter of the optic nerve head (NVD = new vessels at disc), or along the course of the major vessels (NVE = new vessels elsewhere), or both. It has been estimated that over one-quarter of the retina has to be non-perfused before NVD develop. The absence of the Internal Limiting Membrane (ILM) at the optic nerve head may partially explain the predilection for neovascularization at this site. New vessels start as endothelial proliferations, arising most frequently from veins, they then pass through defects in the ILM to lie in the potential plane between the retina and posterior vitreous cortex, using the latter as a 'scaffold' for their growth.

**Clinical assessment**

1. **Severity** of PDR is determined by the area covered with new vessels in comparison with the area of the disc. The severity of PDR is described as follows:

   a) **NVD**
   - Mild when less than one-third disc area in extent
   - Severe when more than one-third disc area in extent

   b) **NVE**
   - Mild if less than half disc area in extent.
   - Severe if half disc area or more in extent.
2. **Elevated** new vessels are less responsive to laser therapy than flat new vessels.

3. **Fibrosis** associated with neovascularization is important, since significant fibrous proliferation, although less likely to bleed, carries an increased risk of tractional retinal detachment.

4. **Haemorrhage** which may be preretinal (subhyaloid) and/or intragel vitreous is an important risk factor for visual loss.

5. **High risk characteristics.** The following signify a high risk of severe visual loss within 2 years, if left untreated.

   - Mild NVD with haemorrhage carries a 26% risk of visual loss,
   - Severe NVD without haemorrhage carries a 26% risk of visual loss.
   - Severe NVD with haemorrhage carries a 37% risk of visual loss,
   - Severe NVE-with haemorrhage carries a 30% risk of visual loss.

**Histopathologic changes**

**Capillary basement membrane thickening**

Glycation of capillary basement membrane collagen results in its thickening directly and by decreased proteoglycan levels. There is vacuolization of basement membrane resulting in increased platelet adhesion reduced diffusion of nutrients and decreased binding of growth factors which are released in blood stream free to induce angiogenesis.
**Loss of Micro vascular intramural pericytes**

Sorbital accumulation along with free radicals destroys pericytes which are muscles of capillaries and maintain their tone, pericytes loss results in formation of microaneurysm by focal dilatation of weakened capillaries and thickening of it’s membrane.

**Endothelial cell damage**

Accumulation of sorbital, advanced glycosylation end products and glucose itself is toxic to capillary endothelium. The damage is exacerbated by accelerated blood flow, which results in leakage from the inner BRB, acellularity of capillaries and adhesion of leukocyte to capillary wall.

**Hematological alterations**

RBC and WBC become less deformable, platelets aggregate more easily, Formation of thrombus in capillaries, consequent capillary occlusion is prolonged by a defective fibrinolytic mechanism, resulting in retinal ischaemia.

**Diabetic retinopathy, an inflammatory disease**

Diabetic retinopathy has only two macroscopic signs of inflammation

i.  Swelling

ii.  Loss of function
**Microscopic attributes of inflammation**

Vasodilation

Altered blood flow

Fluid and protein exudation

Leucocytosis

Leucocytes clog capillaries more efficiently than RBC because of large size and less pliability.

Vascular endothelial growth factor, released by capillary shut down and hypoxia is also released during inflammation. From this it is evidence that diabetic retinopathy may be a chronic low grade inflammation.
DISCUSSION

For the present study, the disease ‘Mega thimiram’ is selected based on clinical features given by Nagamuni in his treaties ‘Nagamuni Nayana Vidhi-200’. Nagamuni has clearly explained about pathology of the disease and given the opt title mega thimiram, as it is a complication of mega diseases.

The aetiology and pathogenesis of mega disease and as well as mega thimiram both were demonstrated in siddha literatures and it is very important because the aetiogeneis and correct diagnosis of a disease is an essential prerequisite for evolving correct treatment regimen.

The prime aim of this dissertation is to arrive at a correct diagnosis of Mega thimiram through Envagai thervugal, Mukkutra verupadugal, Changes in Udal kattugal, Kaalam along with Modern diagnostic parameters. Apart from the major criteria, Age distribution, Dietary changes, Socio-economic changes, Occupational status, Thinai, Onset of disease etc., were also taken in to account in arriving at the diagnosis.

‘Mega thimiram’, one among the seven types of thimiram as mentioned earlier is a complication of mega noi, with the symptoms of diminution of seven physical constituents, gradual vascular
constriction, gradual diminution of vision, moderate burning sensation of the eye.

Humoural changes and hereditary changes are important pathogenic factors which cause changes in the seven physical constituents in bringing out the diseases. These changes in physical constituents are diagnosed through the eight fold physical examination (Envagai thervugal).

Twenty patients were selected for this study and they were properly enrolled in the outpatient department.

**DIAGNOSIS OF MEGA THIMIRAM**

**Age distribution**

Out of 20 patients, majority of 15 patients falls under the age of 51-75 years and 5 patients at 26-50 years. Majority of the patient falls under fifth decade.

**Sex distribution**

Among 20 patients, 13 were males and 7 were females. so mega thimiram can affect both sex. Males and females are affected more or less equally.

**Kaalam:**

Among the 20 patients, 19 patients belong to pitha kaalam, and only one patient to kabha kaalam.
**Thinai:**

Among the 20 patients, majority of 15 patients belong to marutham.

**Dietary changes:**

Both vegetarian and mixed diet groups were affected.

**Socio economic status:**

Among 20 patients, 8 patients belong to poor class, 8 patients belong to middle class and 4 patients to upper class. So it is common in all static groups of people.

**Onset:**

Chronic onset.

**Humoural variations (Mukkutra verupadugal)**

Vaatham, pitham and kabham are three vital forces which form the functional units of human body. The following changes are noted in this disease.

**(i) Vaatham :**

- Abanan  –  Affected -20 patients-(Polyurea)
- Viyanan  –  Affected -20 patients-(Decreased peripheral Utilization of glucose)
- Uthanan  –  Affected-20 patients-(Increased appetite, affected distribution)
- Samanan  –  Affected-20 patients-(As above all are affected samanan is also affected)
Koorman – Affected-20 patients-(Diminished vision)
Kirugaran – Affected -12 patients-(Polyphagia , Polydipsia)

**Pitham :**

Ranjaga pitham - Affected-5 patients-(reduced haemoglobin level)
Prasaga pitham - Affected -10 patients-(Reduced skin complexion)
Aalosaga pitham - Affected -20 patients-(Diminished vision)
Sathaga pitham - Affected -20 patients- (Inability to perform regular activities due to diminution of seven physical constituents)

**Kabham:**

Avalambagam – Affected-20 patients-(As the below, four kabhass are affected avalambagam is also affected )
Tharpagam – Affected -5 patients-(Burning sensation of the eye)
Santhigam – Affected-20 patients-( Joint pain. Degeneration of cartilage)
UDAL KATTUGAL:

Saaram – Affected-20 patients- (Increased appetite and thirst)

Seener – Affected -20 patients-(Decreased body weight, Lassitude, Anemia, function of vision is diminished, Increased blood sugar level)

Oon – Affected-20 patients-(Atrophy and weakness of large muscles, lethargy of eyes)

Kozhuppu – Affected-20 patients-(Joint pain, Emaciation.)

Enbu – Affected-20 patients-(Joint pain, In chronic stage demineralization of bones)

Moolai – Affected -20 patients-(Blurred vision)

Sukkilam /

Suronitham – Affected-20 patients-(Sexual desire, sexual impotence, erectile dysfunction, retrograde ejaculation)

Interpretation of Envagai Thervugal:

Naadi

Kabhavaatham - 6 patients

kabhapitham - 6 patients

pithavaatham - 3 patients

pithakabham - 5 patients
Most of the patients had Kabhavaatham, kabhapitham and pithakabham Nadi.

Naa – Affected -16 patients-(coated, dry and crack)
Niram – Affected -10 patients (Reduced skin Complexion)
Vizhi – Affected 20 patients (Dullness of vision)
Sparisam – Affected -10 patients (Hypothermia, cold clammy skin)
Malam - Affected – 5 patients (Constipation)
Moothiram – Affected 20 patients (polyurea, glucosuria)

Neerkuri –
  Niram - Yellow colour – 3 patients
  Straw colour – 1 patient
  Deep yellow – 1 patient
  Water like – 2 patients

Manam - Sweety odour – 5 patients

Enjal - Present - 9 patients

Neikuri –
  Oil lengthens like snake – 2 patients
  Oil spreads like a ring – 15 patients
  Oil resembles like a pearl – 3 patients

Most of the Neikuri report as Pitha Neer.
INTERPRETATION OF ALLIED PARAMETERS:

Lab investigation:

Blood sugar level : Patients with uncontrol diabetes may prone to the stage of retinopathy early, and good glycemic control delay the complication.

Urine sugar : Mild to severe are found in all patients. Both Blood sugar and Urine sugar give a evidence of hyperglycemia.

Blood urea, serum creatinne : Out of 20 patients 2 have increased blood urea and serum creatinne.


Blood Pressure:-

Out of 20 patients 2 patient have hypertension.

Eye Examination:-

Vision - affected 20 patients – diminished vision.
Lens - shows mature cataract and PCIOL.
Tension - 3 patients had incresed tension.
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<td>High risk PDR</td>
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</table>
HIGHLIGHTS OF DISSERTATION

- According to dietary changes, seasonal variations and Thinai, kabham gets deranged along with abanan, followed by diminution of seven physical constituents one by one and finally the udal thee.

- As a result of derangement of kabham, vaatham and pitham also gets deranged causing many pathological diseases.

  "தாமையுடன் வாதம் மற்றும் பின்னம் குதிரைக் கும்பத்தேரிக்கு தாமை வாதம் பின்னம் குதிரைக் கும்பத்தேரிக்கு தாமை வாதம் பின்னம் குதிரைக் கும்பத்தேரிக்கு தாமை வாதம் பின்னம் குதிரைக்

- From the above line, Mega disease cause diminuition of seven physical constituents.

Dwelling places of kabham

"காற்சிரங்கள் கிளையைப்போன்று செய்ய வாயா

குச்சையிலிருந்து கிளையைப்போன்று புதுக்கு விசையிருக்கின்ற

மீனின் கிளையைக் கிளையைப்போன்று செய்யக்

தாமையுடன் வாதம் மற்றும் பின்னம் குதிரைக் கும்பத்தேரிக்கு தாமை

மீனில் கிளையைப்போன்று புதுக்கு விசையிருக்கின்ற

பெம்பஞ்சில் பெம்பஞ்சில் பெம்பஞ்சில் கூறுகேண்டதில்

மீனில் கிளையைப்போன்று புதுக்கு விசையிருக்கின்ற

கூறுகேண்டதில் பெம்பஞ்சில் பெம்பஞ்சில் கூறுகேண்டதில்

மீனில் கிளையைப்போன்று புதுக்கு விசையிருக்கின்ற கூறுகேண்டதில்

என்று கூறுகேண்டதில் பெம்பஞ்சில் கூறுகேண்டதில்

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என்று கூறுகேண்டதில் பெம்பஞ்சில் கூறுகேண்டதில்

என்று கூறுகேண்டதில்

Samanan, aakinai in head, vindhu, moolai, tongue, tonsil, fat, bone, bone marrow, blood, nerve, large intestine and eye.
**Properties of kabham**

It gives stability, lubrication, holding together of the joints, power endurance for hunger, thirst and sorrow, disturbed mind and heart.

**Types of kabham 5**

1. **Avalambagam:**
   
   It is present in the lungs and is responsible for the basic functions of the heart and other four types of kabham.

2. **Kilethagam:**
   
   It is present in the stomach. It makes the food wet and helps for digestion.

3. **Pothagam:**
   
   It is present in the tongue and is responsible for sense of taste.

4. **Tharpagam:**
   
   It is located in the head and keeps the eye cool.

5. **Santhigam:**
   
   Located in the joints and responsible for free movements of the joints.

- The deranged humour (Kabha) affects the physical constituents such as fat, blood, bone, bone marrow, nerve, vindu and sense organ eye. Thus the derange kabha affects eye directly and
affected all the physical constituents with other altered humours (Vatham and Pitham).

As the result of Mega Noi there is growing dullness of vision occurs.

**Naadi Nadai**

“உயிரியின் விமர்சனம் விகிதம் காறு

பெருமளவு முரண் விளக்கம்

நெமத்து வரும் வெளியல் தன்னில்

நெமத்து வரும் வெளியல் தன்னில்”

- திகுதியன் செசு

❖ The above stanza describes that excessive elimination of urine containing sugar is primarily due to combined vitiation of vatha and pitha functional factors in the body.

❖ The pitha and vatha vitiation is indicated clinically by excessive hunger, thirst, over-eating, emaciation and passing of large quantities of urine.

“பார்த்தியில் உன்னை பிற்று எப்பெரும் தன்னில்

அருணை வெளி முனிவரால் வாய்வு பெற்றிரும்”

- திருநாம் செசு

❖ The above lines indicate that when there is any functional alteration of the Vaatha, pitha and kabha all the full clinical pictures of meganeer appears.
The above poem indicates that initially vaatha and kabha get deranged leading to vitiation of pitha thathu also finally.

When the aggravated vatha naadi combines with aggravated kaba naadi, there is genesis of mega disease in the body.

In the above lines, it is said that all the three naadis are feeble and weak in extensive madhumegam.

By the above line it is clearly stated that aggravation of pitha naadi results in increased udal kaangai. Eventually this leads to emaciation of seven udal thathu resulting in meganeer.
CONCLUSION

The identification of disease and its pathogenesis are a prerequisite to best medical practice and correct treatment regimen. A detailed history – taking, clinical examination, envagai thervugal as per our siddha guidelines is necessary to arrive at a precise diagnosis.

The study on ‘Mega Thimiram’ concludes that it is a disease of complication of megam, which has a gross relevance to modern clinical entity Diabetic retinopathy.

Clinical examination by modern methods helps much in diagnosing the disease. As early diagnosis of diabetes, diabetic retinopathy and proper treatment are essential prerequisite to save total blindness.

The vitiation of Mukkutra verupadugal and seven physical constituents are major criteria in the pathogenesis of the disease.

The opt diagnosis can be arrived by detailed history taking, clinical examination by modern methods, Envagai thervugal and assessing the changes of physical constituents and three humours.
1. Nagamuni Nayana Vidhi – 200
2. Agasthiar Nayana Vidhi
3. Kan Maruthuvam – by International Institute of Tamil studies, Chennai
4. Kan Maruthuvam – by Dr. Iqbhal
5. Mega Vagada Thirattu – by Saraswathi Mahal Noolagam, Thanjavur
6. Neerizhivu Maruthuvam – by Hukim Abdullah Sayub
7. Noi nadal – Part – I
8. Siddha Maruthuvanga Surrukkam
9. Siddha Maruthuvam – by Dr. Kuppusamy Mudhaliyar H.P.I.M
10. Aruvai Maruthuvam – by Dr. C.S. Uthamarayan
11. Yugi Vaidhiya Chinthamani – 800
12. Thirumoolar Karukadaai Vaidyam-600
13. Theraiyar Neerkuri, Neikuri
14. Thirukkural
15. T.V. Sambasivam Pillai – Tamil – English Dictionary
16. Sathaaga Naadi
17. Heritage of Tamil Siddha Medicine
18. History of Siddha Medicine
19. Noi Illa Neri – by Dr. K. Durairajan H.P.I.M
21. Gray’s Anatomy
22. Essentials of Human Anatomy – by A.K Dutta
23. Fundamentals of Human Anatomy – by A.S. Moni
24. Human Anatomy – by Chaurasia
25. Atlas of Human Anatomy
26. Anatomy and Physiology of the Eye – by Dr. Khaurana
27. An Atlas of disease of the Eye – by E.S. Perkins and Peter Hansell
28. Human Physiology – by Guyton
29. Text book of Pathology – by Harsh Mohan
30. Robbin’s Pathologic basis of disease
32. Davidson’s Principles and practices of medicine
33. Harrison’s – Principles of Internal medicine
34. Parson’s diseases of the eye
35. Basic ophthalmology – by Renu Jogi
38. Preventive and social medicine – Park.
## EYE EXAMINATION

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RE - Right Eye, LE - Left Eye, N - Normal, ND - Normal Depth, NCP - Normal Colouring Pigment, PCIOL - Posterior Chamber Intra Occular Lens, IM - Immature Catract, PDR - Proliferative Diabetic Retinopathy, NPDR - Non Proliferative Diabetic Retinopathy, CSME - Clinical Significant Macular Edema
# Annexure – 1

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<td>Sex</td>
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<td>Occupation</td>
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<td>H/O Previous illness</td>
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<td>Personal History</td>
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<td>Family History</td>
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Clinical Examination – Siddha aspect

**General Examination**

Yakkai : 
Gunam : 
Irukkai nilai : 
Padukkai nilai : 
Suvasa enn : 
Kuruthi azhutham :

**Special Examination**

**Pori / Pulan**

Mei - Sensation :
Vaai - Taste :
Kan - Sight :
Mooku - Smell :
Sevi - Hearing :

**Kanmendriyam / Vidayam**

Vaai - Vasanam :
Kai - Dhanam :
Kaal - Kamanam :
Eruvai - Visarkam :
Karuvai - Anantham :
Paruvakalam

Karkalam :
Koothirkalam :
Munpanikalam :
Pinpanikalam :
Elavernirkalam :
Mudhuvenirkalam :

Utkayam / Athakayam

Puyam - Foreran :
Sayam - Arm :
Kaal - Leg :
Paatham - Feet :

Uyir thathukkal

1)Vatham

Pranan :
Abanan :
Viyanan :
Uthanam :
Samanan :
Nagan :
Koorman :
Kiruharan :
Deathathan :
Dhananjayan :
### 2) Pitham

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<td>Aalosagam</td>
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### 3) Kabham

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<td>Kilethagam</td>
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<td>Pothagam</td>
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### Ezhu Udal Thathukkal

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</tr>
<tr>
<td>Enbu</td>
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<tr>
<td>Majjai</td>
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<tr>
<td>Sukkilam / Suronitham</td>
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MEI KURI (SPARISM)

Examination of the Skin

Inspection

   Colour of the Skin
   Eruptions
   Haemorrhages
   Ulcers, excoriations, fissures etc.
   Boils, carbuncles, scars, trophic changes etc.

Eruption

Types of rashes

  Macular
  Roseolar
  Erythematous
  Papular
  Pustular
  Lenticular
  Nodular
  Vesicular
  Bullous
  Wheals
  Burrows
  Blackheads
  Plaques
  Scales
**Ulcers**

- Duration
- Mode of onset
- Associated pain
- Size and pain
- Nature of the floor
- Character of the edge
- Discharge
- Tenderness
- Surrounding skin
- Lymphnodes

**Pruritis**

- Infestation
- Skin diseases
- Metabolic & endocrine
- Hepatic disorders
- Renal diseases
- Blood diseases

**Examination of the hair**

- Falling of the hair
- Patchy loss of hair
- Loss of hair in temporal region
- Characteristic features of the hair

**Sweat**

- Physiological / Pathological
Lymphglands

Site
Shape
Size
Consistency
Mobility
Tenderness

Examination of the nails

Examination of the Head, neck, Face

*Skull*

Size
Shape

*Face*

Eyebrows
Eye lids & Eye lashes
Nose
Lips
Ears

*Neck*
Examination of the Chest

Shape and Size
Movements
Rate of respiration
Breath Sounds : Normal / Abnormal
Heart Rate & Sounds

Examination of the Breast

Examination of the Abdomen

Shape
Size

Examination of the Genital Organs

Examination of the Extermitis

Upper & Lower Limb : General Examinations
Special Examinations
Tests for Tone, Power & reflex

NIRAM

Colour of the skin, Hair, Nail, Teeth, Tongue, Gums
Sputum – Normal / Abnormal

MOZHI

Larynx

Congenital
Acquired
Traumatic
**Tongue**

Congential Abnormalities

**Ear** : Deafness

**Palate** : Cleft palate

**VIZHI**

**Examination of Eye**

- Visual acuity
- Visual field
- Colour sense

**Pupil**

- Size
- Equality
- Regularity
- Reaction of light accommodation

**NAA**

- Colour
- Size
- Shape
IRU MALAM

Malam

I. Macroscopic Examination
   - Amount
   - Colour
   - Odour
   - Consistency
   - Abnormal Constituents

II. Microscopic Examination

III. Chemical Examination

Siruneer
   - Quantity
   - Colour & Transparency
   - Specific Gravity
   - Deposit

NAADI
   - The state of vatha, pitha and kabha naadi.

Examination of Pulse & its Indication
   - Rate
   - Rhythm
   - Volume
   - Force &
   - Character

Noi kanippu
MODERN ASPECTS

ANNEXURE – II

General Examination

Consciousness : General Appearance :
State : Nourishment :
Weight : Facies :
Height : Jaundice :
Skin Changes : Engorged venis :
Anaemia : Clubbing :
Cyanosis : JVP :
Pedal Odema : Koilonychia :
Abdominal distension : Brittle Nail :
Congential anomally :
Lymphadenopathy :

Pluse Rate Rhythm Volume Character
(Rt) (Lt)
Blood Presure : mm/Hg Upper limb ------- -------
Lower limb ------- -------

Respiratory Rate:

Systematic Examination

Cardiovascular System :
Respiratory System :
Gastro intestinal System :
Central nervous System :
Laboratory Investigations

**Blood**

TC : MCV :
DC: P, L, E, B, M : MCH :
Hb% : MCHC :
ESR : Serum Protein :
   1/2hr : Serum Cholestrol :
   1hr : Blood Urea :
RBC Count : Serum Iron :
Platelet Count : Serum Ferritin :
Reticulocyte Count : Serum TIBC :
PCV : Peripheral Blood Smear :

**Motion**

Ova : 
Cyst :
Occult blood :

**Urine**

Albumin :
Sugar :
Deposits :
Bile Salt :
Bile Pigment :
**Special Investigation**

- Barium meal and endoscopy
- Bone marrow examination
- Skiagram
- Sputum for AFB
- Radiological investigation
- Ophthalmoscopic examination
- E.C.G.

**Etc.**

**Case Summary**

**Fate of the Disease**

**Line of treatment**