

A Dissertation On

**“COMPARATIVE STUDY OF COBLATION
TONSILLECTOMY VS CONVENTIONAL TONSILLECTOMY”**

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For the Award of the degree

M.S. (OTORHINOLARYNGOLOGY)

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CERTIFICATE

This is to certify that the dissertation titled“-“**COMPARATIVE STUDY OF COBLATION TONSILLECTOMY VS CONVENTIONAL TONSILLECTOMY**”submitted by **Dr. MATHUMITHAA.S**, appearing for M.S. (Otorhinolaryngology) Branch IV degree examination in May 2020, is a bonafide record of work done by her under my guidance and supervision in partial fulfillment of requirements of The Tamilnadu Dr. M.G.R Medical University, Chennai. I forward this to The Tamilnadu Dr. M.G.R Medical University, Chennai.

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I, **Dr. MATHUMITHAA.S**, certainly declare that this dissertation titled, **“COMPARATIVE STUDY OF COBLATION TONSILLECTOMY VS CONVENTIONAL TONSILLECTOMY”** represent a genuine work of mine done at the Department of Otorhinolaryngology, Government Stanley Medical College, under the supervision of the **Prof. V.RAJARAJAN, M.S(ENT)., DNB., Professor, Department of Otorhinolaryngology, Government Stanley Medical College, Chennai – 600 001.**

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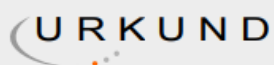
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https://www.researchgate.net/publication/233942307_Coblation_versus_traditional_tonsillectomy_A_double_blind_randomized_controlled_trial

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11

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| TABLE OF CONTENTS | | |
|--------------------------|-----------------------------------|----|
| 1. | INTRODUCTION | 1 |
| 2. | AIMS AND OBJECTIVES | 3 |
| 3. | HISTORY OF TONSILLECTOMY | 4 |
| 4. | ANATOMY OF TONSILS | 7 |
| 5 | PATHOPHYSIOLOGY OF TONSILS | 18 |
| 6 | TONSILLECTOMY | 33 |
| 7 | COBLATION TECHNIQUE | 46 |
| 8 | REVIEW OF LITERATURE | 50 |
| 9 | MATERIALS AND METHOD | 53 |
| 10 | RESULTS | 58 |
| 11 | DISCUSSION | 75 |
| 12 | CONCLUSION | 78 |
| 13 | LIMITATION | 79 |
| 14 | BIBLOGRAPHY | |

| | | |
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| 15 | ANNEXURES PROFOMA ETHICAL COMMENT APPROVAL LETTER URKUND PATIENT CONSENT FORM MASTER CHART | |
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INTRODUCTION

In otorhinolaryngological practice most patients present with the complaints of sore throat, difficulty in swallowing with tonsillar enlargement. Tonsillitis is the most common condition present in paediatric age group. Tonsillectomy is the most frequent procedure done in otorhinolaryngology.

Primary hemorrhage, postoperative pain and secondary hemorrhage are the most common complications of tonsillectomy.

The traditional methods of tonsillectomy are ‘cold steel’ techniques using metal instruments. Several other methods have been introduced with perceived advantages in terms of reduced bleeding, reduced pain, more rapid healing and ease of surgical technique.

Dissection method, bipolar method, cryosurgery, coblation, harmonic scalpel, radiofrequency, laser method are the various techniques. Dissection technique is routinely followed.

Coblation is a relatively newer technique in otorhinolaryngology. It is more popular and accepted due to patient's early recovery. This technology utilizes the radio-frequency bipolar electrical current.

In Coblation method (controlled ablation) two different techniques are used

I.total subcapsular tonsillectomy:(Removal of entire tonsil)

II.Subtotal intracapsular tonsillectomy(some tonsil tissue left behind)

In our study we have compared the operative time, intraoperative and postoperative complications of conventional tonsillectomy and coblation tonsillectomy (total subcapsular).

AIMS AND OBJECTIVES

To compare the following parameters in Coblation tonsillectomy patients and Conventional tonsillectomy patients.

1. Intraoperative blood loss
2. Operative duration
3. Intraoperative complications
4. Postoperative complications
5. Postoperative pain
6. Recovery time

HISTORY OF TONSILLECTOMY

In first Century Aulus Cornelius Celsus is the first person to do tonsillectomy in 1st Century AD, by finger dissection method .Vinegar is used as a medication for postoperative hemostasis².

Hook and knife method was introduced by Aetius of Amidain 6th Century AD.Philip Syng Physick was the first to develop the tonsillotome.

He was known as “Father of American surgery”²

Strangulation technique was championed by Ambroise Pare (1564) and modified by Scultetus (1655), which permitted the placement of a thread around the tonsil and cutting it off by means of strangulation.As tonsillectomy slowly grew in popularity, partial removal remained the procedure of choice.

Most modifications were in the instrumentation for grasping and/or excising the tonsil to make the procedure faster, given the surgical limitations created by bleeding and the lack of anesthesia.

The most important of these was a guillotine device described in 1828 by Philip Syng Physick.²The device had been modified for use on the tonsils from one designed for uvulectomy by a Norwegian peasant, Canute of Thorbern, and modified by Benjamin Bell of Edinburgh after

observing the execution apparatus developed by Dr. J.I. Guillotin in France.²

This instrument became the prototype for similar instruments developed by William Fahnestock (1832), Morrell Mackenzie (1880), Greenfield Sluder (1911), and Otto Oswald Popper (1929)² Snare (Pierce-Mueller, Middledorpf [with galvanocautery]) were also perfected and used for tonsillotomy.²

A unique hybrid device developed by Joseph C. Beck was a snare harboring a wire within a rigid ring.² By the end of the 19th century, several developments caused significant changes in the performance of tonsillectomy. First, otolaryngologists had developed superior techniques of illumination in the head and neck, and therefore, supplanted general surgeons as the primary practitioners of tonsil surgery. Second, postoperative hemostasis was improved with the use of ligatures (Cohen) and galvanocautery (Dillinger).²

While tonsillotomy could be performed in most cases under local anesthesia using agents such as cocaine, general anesthesia was usually necessary for complete tonsillectomy. The clinicians' experience with ether anesthesia since Morton's first description in 1846 had evolved considerably, allowing longer procedures to be performed more comfortably and precisely.

William Lincoln Ballenger was the one who did complete removal of tonsil with the intact capsule in 1906.

George Ernest Waugh was the first to describe complete tonsillectomy in 1909.

During 1911-1917 Crowe did 1000 tonsillectomies using using Crowe Davis Mouth gag by Sharp dissection method.

ANATOMY

EMBRYOLOGY

The primitive respiratory and alimentary tract are encircled by ring of lymphoid tissue called the Waldeyer ring, during the fifth month of gestation.

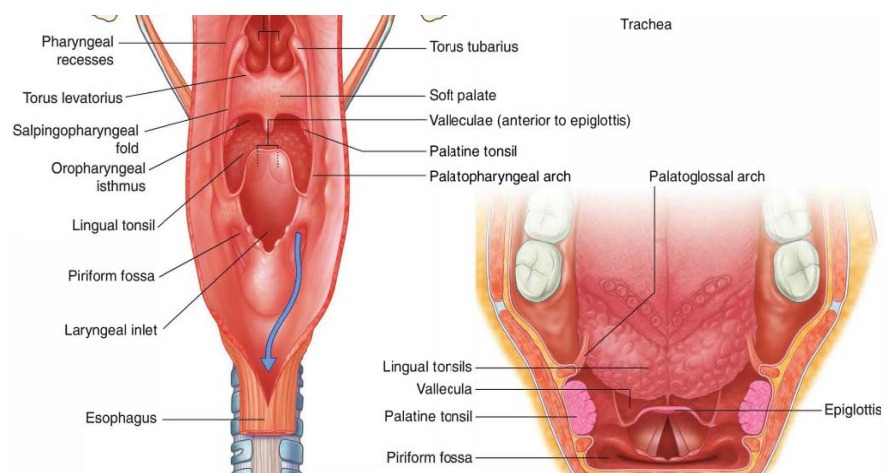
The ring consists of (from superior to inferior):

Adenoids and tubal tonsils (superiorly in the nasopharynx).

Palatine tonsils (laterally in the oropharynx).

Lingual tonsils (inferiorly in the hypopharynx and posterior one-third of tongue).

In addition, it includes lateral pharyngeal bands and scattered lymphoid follicles throughout the pharynx.



The lymphoid structures is a result of interaction among epithelial, mesenchymal, and lymphoid cell populations.²

When the endodermal epithelial cells form a wedge of epithelial cells in surrounding mesoderm forms the tonsillar crypt.¹

Crypt is formed by a lumen due to centrally programmed cell death.

Epithelial crypts develop into the epithelial connective tissue and are infiltrated by lymphoid cells during the fourth fetal month.

The first primary follicles are seen during the fifth month.

The fully formed pharyngeal (adenoid) tissue is seen at seventh month.

During the third month the ventral portion of the second pharyngeal pouch develops into the palatine tonsils.^{1,2}

Solid epithelial (endodermal) buds within the mesenchyme around the pharyngeal wall, and canalization occurs via programmed cell death during the fourth month,¹

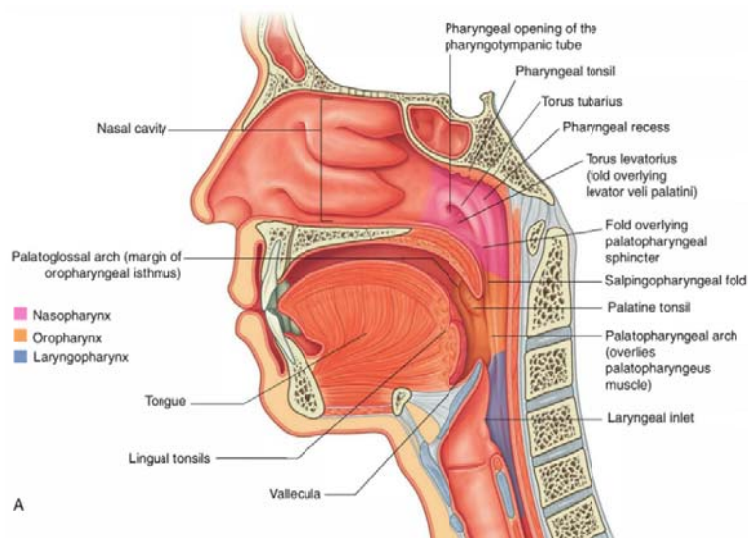
Organized lymph follicles are noted during third trimester. Growth continues after birth.

A persistent depression at the superior pole of the tonsil is present. This depression is believed to be the only remnant of the second pouch. This is called as supratonsillar fossa.⁷⁶

The first pharyngeal pouch develops into the tubal tonsils.

The lingual tonsils are noted to develop in association with the posterior two-thirds of the tongue.⁷⁶

PALATINE TONSILS ANATOMY



The two oval palatine tonsils can be found in the tonsillar fossa in between the anterior (palatoglossal) and posterior (palatopharyngeal) tonsillar pillars.

At birth, the palatine tonsils are approximately 5 mm in anteroposterior diameter and 3.5 mm in vertical diameter and weigh about 0.75 g.³⁴

During childhood, the palatine tonsils descend within their fossae, as their vertical diameter grows faster than their anteroposterior diameter. In contrast to other oronasal lymphoid tissues, the palatine tonsils are covered with a pharyngobasilar capsule fascia.

The capsule is separated from the underlying musculature by loose connective tissue. Pus can collect here and cause a peritonsillar abscess.¹⁴

The glossopharyngeal nerve and styloid process descend almost vertically on the lateral surface of this musculature.

Surfaces and Poles

A tonsil has two surfaces medial and lateral .

Two poles upper and lower.

Surface epithelium of tonsil is continuous with the epithelium of oropharynx.

Tonsillar crypts are tube like invaginations from the surface epithelium.

MEDIAL SURFACE

Medial surface is covered by non keratinising stratified squamous epithelium. The epithelium dips into the substance of tonsil in the form of crypts. On medial surface of the tonsil crypt opening can be seen. The medial surface of the tonsil is free and faces towards cavity of oropharynx.

LATERAL SURFACE

The tonsil presents with a well defined fibrous capsule. Between the capsule and the bed of tonsil is the loose areolar tissue which makes it easy to dissect the tonsil in the plane during tonsillectomy. It is also the site for collection of pus in the peritonsillar abscess. Some fibres of palatoglossus and palatopharyngeus muscles are attached to the capsule of the tonsil.

Capsule has an intimate contact with deep surface of tonsil and extends into the parenchyma of tonsil which contribute connective tissue septa and conduct tonsil nerve supply and vessels.

Supratonsillar fossa:

The medial surface of tonsillar upper pole has a semi-lunar fold, which extends between anterior and posterior pillars. This fold encloses a potential space called supratonsillar fossa. .

The tonsillolingual sulcus, which separates the tonsil from tongue, is a common site for carcinoma.

Tonsillar Crypts

The nonkeratinizing stratified squamous epithelium on medial surface of tonsil dips into the tonsillar mass and forms crypts ⁽¹²⁻¹⁵⁾. Openings of crypts can be seen on the medial surface of the tonsil.

Secondary crypts:

They arise from the main crypts within the substance of tonsil.

Content:

Crypts may be filled with cheesy material, which consists of epithelial cells, bacteria and food debris and can be expressed out with pressure over the anterior tonsillar pillar.

Styloid process:

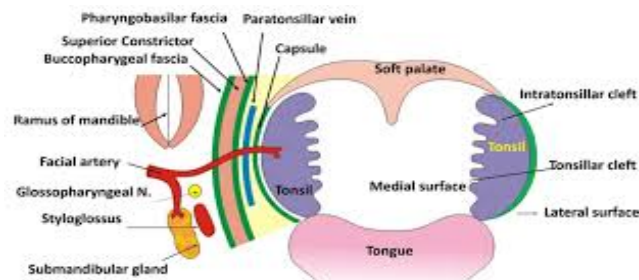
The styloid process when enlarged may be palpated intraorally in the lower part of tonsillar fossa. the glossopharyngeal nerve and styloid process can be approached through the tonsil bed after tonsillectomy.

The palatine tonsils vertical diameter grows faster than their anteroposterior diameter. So the palatine tonsils descend within their fossa, during childhood.

The palatine tonsils are covered with a pharyngobasilar capsule fascia, in contrast to other oronasal lymphoid tissues.

On the lateral surface of this musculature, the glossopharyngeal nerve and styloid process descend almost vertically.

TONSILLAR BED STRUCTURES



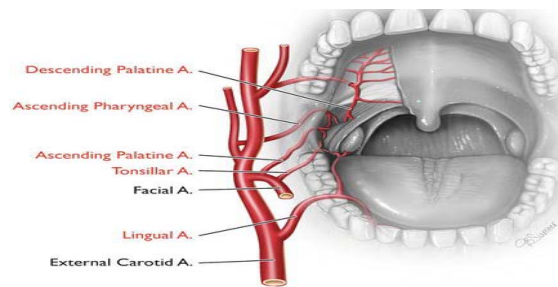
Following structures form the tonsillar bed.

Capsule, paratonsillar vein, pharyngobasilar fascia, superior constrictor muscle, buccopharyngeal fascia, glossopharyngeal nerve, facial artery, styloglossus muscle.

A penetrating oropharyngeal injury directed posterolaterally travels the tonsillar bed and the superior constrictor muscle enters the “parapharyngeal space.”

In this region, the structures that can be injured are internal jugular vein, internal carotid artery, nerves associated with carotid sheath at this point (CN X, XI, XII) and sympathetic trunk.

BLOOD SUPPLY



1.Facial artery

Tonsillar branch

Ascending palatine branch

2.Ascending pharyngeal artery

3.Dorsal lingual branch of the lingual artery, and

4.Internal maxillary artery branches descending palatine artery greater palatine artery

The ascending pharyngeal, facial, lingual and maxillary arteries are all branches of external carotid artery that may need to be ligated in cases of refractory bleeding after tonsillectomy.

An important anatomic relationship to note surgically is that the internal carotid artery is approximately 2.5 cm posterolateral to the tonsil.¹

Venous drainage

The tonsil drains into the tonsillar veins and subsequently into the external palatine, pharyngeal, and facial veins.

The External palatine veins are the most common cause of postoperative tonsillectomy bleeding.

Nerve supply:

The Sphenopalatine (pterygopalatine) ganglion through the lesser palatine nerves

The glossopharyngeal nerve. (IX th cranial nerve)

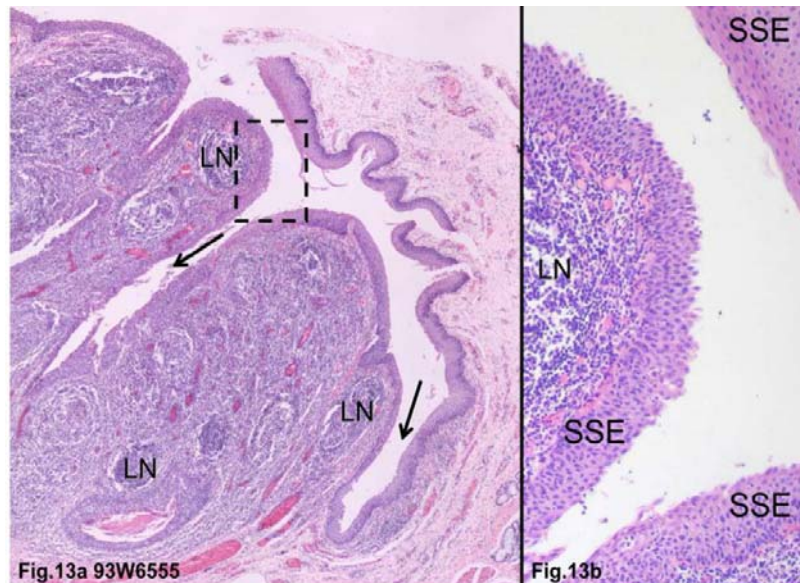
Referred otalgia occurs in pediatric patients after tonsillectomy. Because the glossopharyngeal nerve, which also supplies the middle-ear cavity, including the medial wall of the tympanic membrane.

HISTOLOGY

The palatine tonsils are covered by non keratinised stratified squamous epithelium. This epithelium invaginates into the crypts and blends with the mesenchymal structures.

Each tonsil contains 10–20 crypts.

The crypts penetrate the surface to reach various depths



LN: Lymphatic nodule; arrows: Tonsillar crypt; SSE: Stratified squamous epithelium

It may penetrate the entire tonsil to reach the fibrous capsule.

After birth the palatine tonsils growth continues , and active until age 15 years.^{76,81}

Involution of tonsillar tissue occurs after puberty and more fibrosis appears .

At the base of the tongue,the lingual tonsils develop later than the other oronasal tonsils.The lingual tonsils persist well into adult life.

The epithelial covering of the palatine tonsils is stratified squamous epithelium, which invaginates into the crypts and blends with the mesenchymal structures.

FUNCTION

The tonsils are active in the synthesis of humoral immunoglobulins such as IgG, IgM, and IgA. They also produce lymphocytes in a complete sequence of lymphopoiesis and are related immunologically to the gut-associated lymphoid system in humans. The tonsils are the first lymphoid aggregates to encounter pathogens that enter the host via the upper respiratory and gastrointestinal tracts, and thus are believed to play a role in host immunity to pathogens.⁸⁰

Stimulation of the immune system begins shortly after birth. ,the tonsils also produce lymphocytes .In humans they are related immunologically to the gut-associated lymphoid system .Terminally differentiated plasma cells can be seen around two weeks of age. This results in the development of secondary follicles. The proliferation of these germinal centers is what accounts for the rapid tonsillar growth in pediatrics.

The tonsils continue to expand, as opposed to infiltrating neighboring tissue, leading to the common tonsillar hypertrophy.⁸⁰

PATHOPHYSIOLOGY OF TONSILS

Acute tonsillitis

Acute inflammatory condition of the tonsils which may involve the mucosa, crypts, follicles or tonsillar parenchyma

May occur primarily as infection of the tonsils themselves or may secondarily occur as a result of URTI following viral infection.

Organisms

Acute tonsil inflammation may be a localized episode, in association with an upper respiratory illness or as a part of generalized systemic infection such as infectious mononucleosis.

The causative organism usually is GABHS, although a range of other organisms including viruses and anaerobes may be implicated^{6,8}

Beta-haemolytic streptococcus

Staphylococcus

Haemophilus influenzae

Pneumococcus

Viral infections

Acute tonsillitis is diagnosed mainly on the basis of clinical assessment. There is a short history of sore throat with fever and pain on swallowing.

Examination generally reveals erythema of the tonsils and posterior pharyngeal wall, with obvious exudates on the tonsils occasionally. This is usually associated with tender jugulodigastric lymph node enlargement. Both bacteria and viruses play a part in acute inflammation of the tonsils, either separately or together. Also, there is no evidence to suggest that viral tonsillitis is more or less severe than bacterial tonsillitis.

In most of the cases both viral and bacterial tonsillitis tend to resolve quickly without treatment.⁴

Corticosteroids (oral or intramuscular), in addition to antibiotics, expedite the resolution of pain.^{10, 11} The management of acute tonsillitis is mainly symptomatic, i.e. using analgesia and hydration until the symptoms subside. Antibiotics will shorten the illness and may reduce the risk of sequelae.¹² In those patients in whom the illness shows no sign of improvement within 48–72 hours, antibiotics should be started, benzyl-penicillin being the drug of choice. If there is clinical concern about the severity of disease at the beginning, antibiotics should be started soon. Evidence suggests that corticosteroids provide symptomatic relief

of pain in sore throat, in addition to antibiotic therapy, especially in severe cases¹³

Acute Catarrhal/Superficial tonsillitis

When tonsils are inflamed as part of the generalised infection of the oropharyngeal mucosa it is called catarrhal tonsillitis.



Acute follicular tonsillitis

The process of inflammation

- hyperemia and oedema
- lymphoid follicles in to small abscesses which discharge into crypts. exudate collects in tonsillar crypts - □ multiple white spots on inflamed tonsillar surface
- follicular tonsillitis.



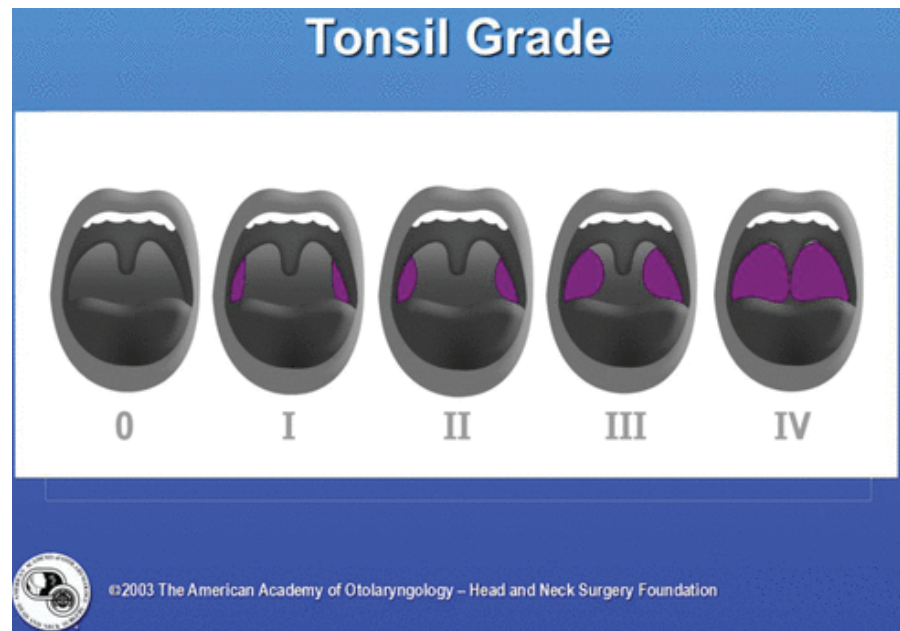
Acute Membranous tonsillitis.

Some times exudation from crypts may coalesce to form a membrane over the surface of tonsil, giving rise to clinical picture of membranous tonsillitis.

GRADING OF TONSIL

(Brodsky and coworkers)

- GRADE 0 : Indicates that the do not impinge on the airway
- GRADE 1 : Indicates less than 25% airway obstruction;
- GRADE 2 : Indicates 25% to 50% airway obstruction;
- GRADE 3 : Indicates 50 to 75%airway obstruction:
- GRADE 4 : Indicates more than 75% airway



STREPTOCOCCAL TONSILLITIS

GABHS is a precursor of two serious conditions acute rheumatic fever and poststreptococcal glomerulonephritis. It is the most common cause of acute bacterial tonsillitis. Epidemic forms are seen in recruit camps and daycare facilities. GABHS are Gram-positive cocci that grow in chain.

Natural reservoir: Skin, nasopharynx and oropharynx.

Spread: Mostly through aerosolized microdroplets;

less commonly by direct contact, and rarely through ingestion of contaminated non-pasteurized milk or food.

Non-group A β -hemolytic streptococcal infection is clinically similar to GABHS. It is comparatively less common. The other bacteria may primarily infect the tonsil or may be secondary to a viral infection and mimic GABHS infection. They include staphylococci, pneumococci and *H. influenzae*.

Clinical features

The disease often affects school going children (peak 5–6 years), but may affect infants and individuals above 50 years of age.

Symptoms

Throat pain: Dry throat, fullness in throat or sore throat.

Dysphagia: Difficulty in swallowing or odynophagia.

Fever: Temperatures 38–40°C may be associated with chills and rigors. The child may present as a case of pyrexia of unknown origin.

Earache: It may be either referred, or due to acute otitis media.

Constitutional symptoms: Headache, limb and back pain, malaise and constipation.

Physical Findings

Tongue: Dry and coated tongue.

Breath: Fetid breath (halitosis).

Oropharynx:

Hyperemia of pillars, soft palate and uvula.

Tonsils red and swollen with yellowish spots of pus at the opening of crypts (acute follicular tonsillitis) is seen.

TONSILLOLITH

Tonsillolith (calculus of the tonsil) may be seen in chronic tonsillitis. The blocked tonsillar crypt causes retention of debris, which consists of inorganic salts of calcium and magnesium (formation of stone).

COMPLICATIONS

Acute tonsillitis can lead to septicaemia and local abscess formations. The non-infective complications of streptococcal tonsillitis include rheumatic fever and glomerulonephritis.

PERITONSILLAR ABSCESS (QUINSY)

A peritonsillar abscess is a collection of pus lateral to the tonsil. The clinical symptoms include severe usually unilateral sore throat, odynophagia, trismus and lymphadenopathy. The treatment includes antibiotics, needle aspiration of pus or incision and drainage.¹⁴

The antibiotics usually given are intravenous high-dose penicillin or a cephalosporin.¹⁵

Indication for interval tonsillectomy should take into account any background history of tonsillitis or more than one episode of quinsy on the same side. Tonsillectomy during the acute attack is not a very popular treatment option,¹⁶ as the release of pus into the oral cavity either spontaneously or therapeutically carries with it the risk of aspiration in severely ill patients. Using local anaesthetic before incision also increases this risk. The initial management of choice is aspiration of the abscess using a wide-bore needle along with intravenous antibiotics, usually high-dose penicillin or cephalosporin.

RETROPHARYNGEAL ABSCESS

This is a rare but serious complication of acute tonsillitis, seen mainly in infants and children less than 5 years of age. It presents as the infection tracks into the lymphoid tissue between the posterior pharyngeal wall and the prevertebral fascia. The child is usually systemically unwell and there may be evidence of airway compromise or an associated neck abscess. The diagnosis can be confirmed by CT scanning. Treatment is initially high-dose intravenous antibiotics.¹⁷ If pus collection is suspected, urgent incision and drainage is done under a general anaesthetic by an experienced anaesthetist.¹⁸ The drainage is usually done perorally but occasionally external drainage via neck may be appropriate. Very rarely, tracheostomy is necessary. Retropharyngeal abscess due to tuberculosis requires specific antibiotic treatment.

PARAPHARYNGEAL ABSCESS

Occasionally, peritonsillar and retropharyngeal abscess may be complicated by spread of infection to the parapharyngeal space. Pus collection in this space presents with severe trismus and possibly airway compromise in a systemically unwell patient. The diagnosis is confirmed by ultrasound or CT scanning, which also helps in treatment planning. Treatment includes high-dose broad-spectrum intravenous antibiotics and drainage of the abscess. Deep neck space sepsis may be complicated by progression to life-threatening infections including mediastinitis or retroperitoneal sepsis. It is essential to be proactive in managing these conditions.¹⁹

LEMIERRE'S SYNDROME

Lemierre's syndrome is a rare but potentially fatal complication of oropharyngeal infection. It is characterized by septic thrombophlebitis of the internal jugular vein, at times associated with metastatic abscesses. The causative organism is usually fusiform bacillus. This condition should be suspected when there is severe neck pain and septicaemia in a patient with infection in the upper aerodigestive tract.²⁰

Treatment is with antibiotics for 6 weeks, usually penicillin with metronidazole or Co-amoxiclav.²¹

IMMUNE COMPLEX DISORDERS

Acute tonsillitis caused by GABHS can occasionally lead to diseases related to immune complex formation, generated as a response to the infection. The two important diseases resulting from this phenomenon are acute rheumatic fever and acute glomerulonephritis.

TONSILLITIS AND PSORIASIS

There is possibly some association between GABHS tonsillitis and exacerbations of psoriasis, as a result of an immune phenomenon. Some dermatologists and otolaryngologists advocate tonsillectomy, but there is no good evidence to suggest that this relieves the condition²²

RECURRENT TONSILLITIS

Significant numbers of patients suffer from recurring episodes of acute tonsillitis. These episodes may gradually settle or may continue for several years. The infections need to be treated depending on the severity of the individual episode. There is no evidence of benefit of longterm antibiotics for this condition.

CHRONIC TONSILLITIS

Some patients get chronic throat discomfort associated with production of smelly white debris from tonsillar crypts. Occasionally, these debris may become inspissated, calcify and form a tonsillolith.

There is no evidence to show a relationship to identifiable tonsillar pathology in these patients.

NON INFLAMMATORY DISEASES

Tonsillar asymmetry

Asymmetry of the tonsils is not an absolute indication for tonsillectomy, but in children, as adults, the clinicians need to be aware of the possibility of neoplasia (lymphoma). One study to measure actual size in cases of apparent asymmetry in children did not show any significant difference in size.²⁶ In general, the apparent size of the tonsils is not well correlated with disease within them. There is a wide variation in the degree to which the tonsils are buried within the tonsillar pillars, which can give a false impression of the actual size of the tonsil. In general, the tonsils tend to involute during late childhood, but this rate of involution is variable between individuals and can vary between the two tonsils, which can at times give an asymmetrical appearance.

Spontaneous tonsillar bleeding

Spontaneous bleeding can happen from inflamed tonsils occasionally. Bleeding can also be secondary to minor trauma. This usually will respond to topical cautery under local anaesthetic. If it persists, tonsillectomy is an option.

Neoplasia

Asymmetrical tonsils arouse suspicion of neoplasia especially if the surface of one of the tonsils is irregular or ulcerated. Difference in size is not always an indication for biopsy in children, but any unusual appearances need to be investigated. Lymphoma can occur within the tonsils in adults as well as children. In adults, squamous cell carcinoma is the most common malignancy encountered.

DIFFERENTIAL DIAGNOSIS OF MEMBRANE OVER TONSIL

- 1.Membranous tonsillitis
- 2.Diphtheria
- 3.Vincent's angina
- 4.Infectious mononucleosis
- 5.Agranulocytosis
- 6.Leukemia
- 7.Apthous ulcers
- 8.malignancy
- 9.Traumatic ulcer

FAUCIAL DIPHTHERIA

The increasing coverage of child population by diphtheria immunization [combined (DPT, DT, dT) and single vaccines] has significantly reduced the incidence of diphtheria. The disease was quite common and feared of. It is now fortunately seen uncommonly.

Causative organisms:

Gram-positive bacilli, *Corynebacterium diphtheriae*.

Spread:

It spreads by droplet infection. Diphtheria carriers harbor organisms in their throat,

Incubation period: 2–6 days.

Clinical features Children are affected more.

Diphtheria has slow onset of local discomfort.

Fever seldom rises above 38°C.

The dirty gray tenacious membrane extends beyond the tonsils on to the soft palate and posterior pharyngeal wall and after removal, leaves a raw bleeding surface. Larynx and nasal cavity can also be affected.

Cervical lymph nodes (jugulodigastric) get enlarged and tender, and may present as “bull-neck” appearance. The child looks ill and toxemic.

Treatment

Antidiphtheric serum: Antidiphtheric serum (ADS) is started immediately on clinical suspicion to neutralize the free diphtheria exotoxin. Dose depends on the site, duration and severity of disease. 20,000 to 40,000 units: History of less than 48 hours, or membrane is limited to tonsils only. 80,000 to 120,000 units: History of more than 48 hours, or membrane extends beyond tonsils. Mode of administration: Intravenous infusion in saline in about 60 minutes. Sensitivity test: Horse serum is tested by conjunctival or intracutaneous test with diluted antitoxin. Adrenaline must be handy for any hypersensitivity reaction. Desensitization: Desensitization is required if patient is hypersensitive to ADS. Antibiotics: Benzyl penicillin 600 mg 6 hourly for 7 days. Erythromycin 500 mg 6 hourly orally in penicillin sensitive individuals.

VINCENT'S ANGINA

Causative organism: Fusiform bacilli and spirochetes.

Clinical Features: It has insidious onset with mild fever and discomfort in throat. It presents with membrane, which usually involves one tonsil. This pseudomembrane can be easily removed, and reveal an irregular ulcer. Diagnosis: Throat swab shows the causative organisms.

AGRANULOCYTOSIS:

Ulcerative necrotic lesions in the oropharynx.

Patient looks very ill.

Diagnosis: – Total leukocyte count: 50–2000/cumm. –

Polymorph neutrophil 5% or less.

INFECTIOUS MONONUCLEOSIS

Infectious mononucleosis is caused by Epstein-Barr virus.

Often affects older children and young adults

Clinical features : Fever, sore throat, exudative pharyngitis

Both tonsils are enlarged, congested and covered with membrane

Marked local discomfort. Lymphadenopathy: Lymph nodes enlarged in the posterior triangle of neck&Hepatosplenomegaly.

Characteristic feature: Petechiae at the junction of hard and soft palate. CBC: Fifty percent lymphocytes, of which 10% are atypical.

White cell count normal in first week and rises in second week.

Serological tests: Monospot and Paul Bunnell or Ox-cell hemolysis test shows high titers of heterophil antibody.

Treatment

Antibiotics: No role except in secondary bacterial infection

TONSILLECTOMY

The Scottish tonsillectomy audit was a large-scale audit to look at patient satisfaction after tonsillectomy in more than 5000 patients. This audit reported 97% satisfaction rate 1 year after tonsillectomy.³⁵

For a long time, the only trial of value was that done by Paradise³² published in 1984.

The Paradise group randomized children with sore throats into surgical and non-surgical groups and their inclusion criteria are widely known and still used:

- 1.seven sore throat episodes in a year,
- 2.five a year for the last 2 years or
- 3.three a year for the last 3 years.

The “Paradise criteria” for Tonsillectomy in Recurrent Tonsillitis²

| CRITERIA | DEFINITION |
|---|---|
| Frequency of sore throat events | 7 or more episodes in the preceding year, or 5 or more episodes in each of the preceding 2 years, or 3 or more episodes in each of the preceding 3 years |
| Clinical features (one required in addition to sore throat) | Temperature > 38.3°C, or Cervical lymphadenopathy (tender lymph nodes or > 2 cm), or Tonsillar exudate, or Positive culture for GABHS |
| Treatment | Antibiotics are administered at appropriate dose for proven or suspected episodes of GABHS |
| Documentation | Each episode and its qualifying characteristics are synchronously documented in the medical record, or In cases of insufficient documentation, two subsequent episodes of throat infection are observed by the clinician with frequency and clinical features consistent with the initial history |

Tonsillectomy has been considered for treating pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS)

PREOPERATIVE SCREENING

The need for routine preoperative laboratory studies in children scheduled to undergo elective adenotonsillar surgery remains controversial. Coagulation parameters should be assessed if the patient's history reveals a potential bleeding disorder. In such cases, coagulation tests should include an activated partial thromboplastin time (aPTT) and a platelet count. These assays are performed to screen for disorders associated with substantial hemorrhage. Tests of prothrombin time (PT) and bleeding time or PFA 100 help in screening for all inherited or acquired coagulation disorders, such as hemophilia A and B, von Willebrand disease, thrombocytopenia, and other deficiencies.

American academy of otolaryngology head& neck surgery recently updated its 2011 guideline on the care and management of paediatric patients who may be candidates for tonsillectomy.

1. Clinicians should recommend watchful waiting for recurrent throat infection if

.seven sore throat episodes in a year, five a year for the last 2 years or.three a year for the last 3 years

2. Clinicians should administer a single intraoperative dose of intravenous dexamethasone to children undergoing tonsillectomy.

3. Clinicians should recommend ibuprofen, acetaminophen, or both for pain control after tonsillectomy.

The guideline update group strongly recommend

1. Don't administer or prescribe perioperative antibiotics to child undergoing tonsillectomy.

2. Clinician's must not administer or prescribe codeine, or any medication containing codeine, after tonsillectomy in children younger than 12 yrs.

AS PART OF OTHER SURGERIES

1. Palatopharyngoplasty which is done for sleep apnoea syndrome⁴⁰.

2. Glossopharyngeal neurectomy. Tonsil is removed first and then IX nerve is severed in the bed of tonsil.

3. Removal of styloid process.

4. Branchial fistula

5. Parapharyngeal tumour excision

CONTRAINDICATIONS

1. Haemoglobin level less than 10 g%

2. Acute infection in upper respiratory tract, acute tonsillitis.

Bleeding is more in the presence of acute infection.

3. Children under 3 years of age.

4. Bleeding disorders , e.g. leukaemia, purpura, aplastic anaemia, haemophilia.

5. At the time of epidemic of polio.

6. Uncontrolled systemic disease, e.g. diabetes, cardiac disease, hypertension or asthma.

7. Tonsillectomy is avoided during the period of menses.

DISSECTION METHOD

ANAESTHESIA

General anaesthesia via orotracheal intubation

SURGERY

STEPS OF SURGERY

1.ROSE'S POSITION

The patient is placed supine, with the head slightly extended. Excessive extension is avoided. Boyle-Davis mouth gag is introduced and opened. It is important to see that the lips are not caught in the gag. It is held in place by Draffin's bipods.



2.THE INCISION

Tonsil is grasped with tonsil-holding forceps and pulled medially. Thus exposing an area of mucosa medial to free edge of the

anterior faucial pillar. The incision is started halfway between the upper and lower poles of the tonsil. Taking care to preserve as much as mucosa possible, the surgeon carries the incision downwards to the base of the tongue and upwards to the upper pole.

3. BEGINNING OF BLUNT DISSECTION

When the capsule has been identified, using Mollison's pillar dissector is used to separate the tonsil and its capsule from the surrounding peritonsillar tissues.

4. MOBILIZATION OF THE UPPER POLE

The upper pole must first be mobilized, care being taken to keep the dissector as close as possible to the capsule throughout the dissection. 'Digging' into the fossa causes more bleeding and more postoperative scarring.

5. CONTINUING THE DISSECTION

Gripping the tonsil by its upper pole, the surgeon continues to draw the tonsil towards the midline, and extends the dissection by separating the peritonsillar tissues from the capsule, until the lower pole is approached.

6. MOBILIZATION OF THE LOWER POLE

Towards the lower pole of the tonsil there is a firm fibrous triangular fold which tends to hold up the dissection at this point. The triangular fold should be cut with scissors and the dissection carried on to the base of tongue.

7. REMOVAL OF TONSIL

There is nearly always a flat tongue of lymphoid tissue which passes from the lower pole of the tonsil proper. Snare is threaded over the tonsil, which is finally removed by closing the snare.

8. CONTROL OF HEMORRHAGE

Most of the primary bleeding from tonsillectomy is venous, either from paratonsillar vein of Dennis Brown or from small tributaries. Minor bleeding is controlled naturally by the contraction and retraction of the smaller vessels.

A gauze sponge is placed in the fossa and pressure applied for a few minutes.

Bleeding points are tied with silk.

TONSILLECTOMY INSTRUMENTS



COMPLICATIONS

1. Primary haemorrhage. Occurs at the time of operation. It can be controlled by pressure, ligation or electrocoagulation of the bleeding vessels.

2. Reactionary haemorrhage. Occurs within a period of 24 hours and can be controlled by simple measures such as removal of the clot, application of pressure or vasoconstrictor, by using electrocautery..

3. Injury to tonsillar pillars, uvula, soft palate, tongue or superior constrictor muscle due to bad surgical technique.

4. Secondary hemorrhage

Secondary hemorrhage occurs after 24 hrs upto 7 days post operatively due to infection. It can be controlled by parenteral antibiotics & electrocautery.

5. Tonsillar remnants. Tonsil tags or tissue, left due to inadequate surgery, may get repeatedly infected.

6. Hypertrophy of lingual tonsil. This is a late complication and is compensatory to loss of palatine tonsil

Pain Significant morbidity is associated with tonsillectomy.⁴⁶ Post-tonsillectomy sore throat is normal for at least 1 week and on an average return to school or work can take 1–2 weeks.⁷⁸

Antibiotics

Peri-operative antibiotics and steroids has been discussed as well. For many years, the common practice was to administer both steroids and antibiotics intra-operatively, but recent studies suggest that peri-op antibiotics are not needed, and the work group strongly recommended against this practice. The work group however does strongly recommend a single dose IV steroid in the operating room at time of surgery to minimize nausea and vomiting.

DIATHERMY TONSILLECTOMY

Bipolar dissection tonsillectomy is an alternative method to traditional cold steel tonsillectomy. In a Cochrane review of dissection versus diathermy, it was demonstrated that diathermy reduced intra-operative bleeding but increased pain in the diathermy group with no difference in secondary haemorrhage rate⁷⁶. In the NPTA, postoperative bleeding was more frequent with diathermy than with cold steel alone, and particularly worse with monopolar diathermy. Monopolar dissection is known to be associated with more post-operative pain than other techniques and has little to recommend it

ULTRASONIC DISSECTION

Ultrasonic dissection uses an oscillating blade, which acts as both a cutting and a coagulating device. Some studies claim reduced pain with this technique but evidence of benefits is lacking.

HARMONIC SCALPEL

The harmonic scalpel has also been used for tonsillectomy. In this procedure, ultrasonic technology is used to cut and coagulate tissue ⁴⁴ at temperatures lower than those associated with electrocautery and lasers. This scalpel has been used for other techniques in otolaryngology and other fields of surgery. In contrast to electrocautery or laser dissection, cutting and coagulation occur at temperatures typically three to four times lower than the temperatures that occur in the traditional electro cautery technique. The decreased thermal damage is thought to lead to decreased postoperative pain. There are limited studies with the harmonic scalpel. Several studies indicate decreased postoperative pain, although some studies showed an increase in the postoperative pain rate. Other studies found no difference between traditional electro cautery and the harmonic scalpel technique in terms of intra operative blood loss or postoperative hemorrhage. Use of the harmonic scalpel for tonsillectomy may be a promising technique

LASER TONSILLECTOMY

Using a laser as a tool to dissect out the tonsils has been claimed to have advantages in terms of reduced bleeding and post-operative pain, but studies have failed to confirm this. There is evidence that the rate of secondary bleeding⁷⁷ and pain is greater with laser.⁴². Various type of laser wavelength had been studied of their usage in tonsillectomy including argon plasma coagulation (APC), potassium titanyl phosphate (KTP) crystal, neodymium: Yttrium aluminium garnet (Nd: Yag) and carbon dioxide (CO₂)laser

RADIO FREQUENCY ABLATION

The radiofrequency technique, which is somewhat similar to the coblation technique, has also been listed in the literature as a method for performing tonsillectomy. There is also mention of using the radiofrequency technique to perform partial tonsillar ablation or tonsil reduction in children with tonsil hypertrophy⁵¹. The temperature-controlled radiofrequency technique operates by heating the target tissue through an electrode placed submucosally. The radiofrequency generator regulates energy flow to form a precise lesion. This lesion is then gradually reabsorbed by the body, shrinking tissue volume while leaving the overlying mucous membrane intact. An electrode is available for tonsil reduction. There is an apparent decrease in postoperative morbidity when compared with the traditional tonsillectomy technique in patients undergoing tonsillotomy or ablation rather than complete removal.

COBLATION TECHNOLOGY

The Coblation process is a controlled, non-heat driven process. With Coblation technology, radiofrequency (RF) energy is applied to a conductive medium (usually saline solution), causing a highly focused plasma field to form around the energized electrodes. The plasma field is comprised of highly ionized particles. These ionized particles have sufficient energy (4-5 eV) to break organic molecular bonds within tissue. The byproducts of this non-heat driven process are elementary molecules and low molecular weight inert gases. Instead of exploding tissue, Coblation causes a low temperature molecular disintegration. The result is volumetric removal of target tissue with minimal necrosis of collateral tissue (, nerve fibers) .

. The energy of plasma particles depends on several factors:

I.the number of electrodes;

II.their size,

III. geometry, and the surface area;

IV.the roughness of the electrode surface,

V. the electrode material,

VI.the voltage and powerapplied to the electrodes,

VII.the type of the induction coil,

VIII conductivity of the contact liquid,

Because current does not pass directly through tissue during the Coblation process, tissue heating is minimal. Most of the current is consumed in the plasma layer, or, in other words, by the ionization process. These ions then bombard tissue in their path, causing molecular bonds to simply break apart.

Coblation byproducts are inert and can be quickly flushed out during irrigation of the surgical site. Let us compare the characteristics of the Coblation technology with those of conventional electrosurgery:

1.Characteristics of conventional electrosurgery: surface tissue temperatures in excess of 400°C; rapid and deep tissue heating; significant collateral tissue necrosis. Characteristics of coblation electrosurgery: surface tissue temperatures 40-70°C; tissue removal; minimal thermal penetration and collateral tissue necrosisThe main parameters of the system are given below: modes of operation: ablation, dissection, and coagulation; operating frequency, 100 kHz; output voltage range (rated load), 0-330 V; rated power (load, 317 Ω), 284 W; weight, 8.2 kg; dimensions, 133 × 305 × 400 mm; BF; power consumption, 110/240 V, 50/60 Hz; current consumption,

2 A. Coblator systems are supplied with tools for dissection, coagulation, and removal of tissues. The electrodes are usually implemented as coaxial systems with rigid external casing (return

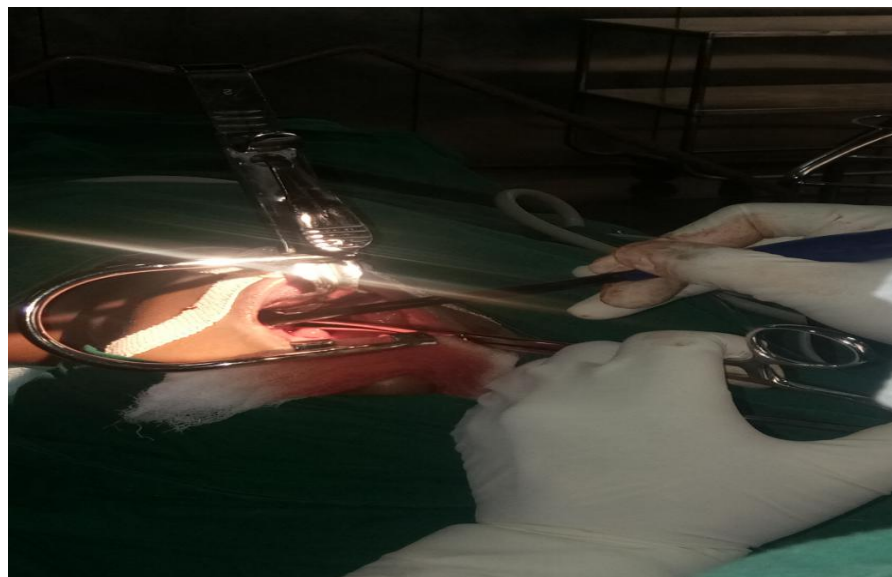
electrode) and one or several internal conductors (active electrode). Some tools are supplied with thermosensitive elements for monitoring the temperature at the site of surgical intervention and automatic control of the output power. The active electrodes are usually installed in an insulated casing covering the whole length of the electrode. In some modifications of the Coblator system the electrode casing (substrate) has a layer structure. The substrate is usually made of ceramic materials, such as aluminum oxide. The electrode is made of an alloy based on gold, copper, platinum, palladium, tungsten, silver, or another metal. Multilayer ceramic electrodes used in the Coblator system are available

During treatment, tissues are exposed to temperatures not exceeding 70-89°C. One of the major advantages of this method of treatment is that it can be performed under local anesthesia. The pain syndrome and discomfort are insignificant. A positive effect is usually achieved in 2-3 sessions of coagulation.

Equipment used in our study was tonsillar wand Evac -70, patient was admitted and surgery done. Patients were discharged on 3rd postop day and asked to come for review on 7th post op day.

ADVANTAGES:

1. Absence of high-temperature heating of the biological tissue at the site of surgery and, therefore, minimization of necrosis;
2. possibility of performing fine surgical interventions without damage to adjacent tissues;
3. wide range of application.



REVIEW OF LITERATURE

Shapiro et al March 2007 : A prospective, randomized, single-blind trial of pediatric patients aged 2 to 16 years undergoing adenotonsillectomy was conducted. Patients were randomized to undergo either CDA or CAA. Coblation tonsillectomy offers better operative speed and intraoperative hemostasis as compared with conventional method.. However there was no significant difference between post operative pain noted in both groups.²²

Twenty adult patients underwent tonsillectomy, each having one randomly selected tonsil removed by dissection and the other removed by coblation. For each side, subjective pain levels were recorded on a daily basis for 10 postoperative days, using a visual analogue scale.

In 2004, **Stoker** et al.²⁸ performed a prospective, controlled, single-blind study comparing coblation with electrocautery adenotonsillectomy in children. The investigators found no difference in postoperative return to diet, normal activity levels, absence of pain, or use of nonnarcotic pain medications between these two methods. However, coblation patients stopped narcotic pain medication sooner than electrocautery patients, with a trend toward significance (P .07)²⁸

Chang performed a randomized, prospective, double-blind study comparing children undergoing coblation tonsillectomy with children undergoing electrocautery tonsillectomy. Postoperative pain scores,

using the Wong-Baker FACES pain scale, were found to be better on each postoperative day from days 1 through 6 in the coblation patients (P .005). Similarly, coblation patients also resumed normal diet sooner than the electrocautery patients (P .005) and resumed normal activities sooner as well by postoperative day 5 (P .005).²⁹

Vangelin.G et al [2013] a meta analysis report showed intra operative bleeding was significantly less in coblation.

Hong SM et al⁷² [2013] conducted a study in pediatrics patients undergoing tonsillectomy and demonstrated coblation tonsillectomy has lesser blood loss.

Similar studies were done by **Omran et al**(2011) and Suresh et al(2012) found that conventional(44.2ml) had more amount of blood loss compared to coblation(18.74ml) p value <0.001 statistically significant.

Noon and Hargreaves were the first to report on haemorrhage after coblation tonsillectomy (n = 36); they showed a significant increase in the secondary haemorrhage rate and abandoned coblation for this reason.

In contrast, a prospective study by **Belloso and Chidambaram** showed a decreased incidence of secondary haemorrhage after coblation tonsillectomy, which was more significant in the paediatric age group

Battacharjee et al reported on a multicenter retrospective study of 578 children in 6 pediatric sleep centers in the United States and 2 in Europe who had a tonsillectomy for OSA with pre- and postoperative PSG.¹⁶⁴ Approximately 50% of the children were obese. Tonsillectomy resulted in a significant reduction in AHI from a mean 18.2 to 6.4.

MATERIALS AND METHODS

Study place: Department of Otorhinolaryngology,

Govt Stanley medical college, Chennai.

Study design: Prospective study

Study period : 6 months April 2019-September 2019

Study population: 50 patients

Inclusion criteria:

-Chronic tonsillitis patients above 5yrs of age

Paradise criteria for tonsillectomy (episodes of sore throat)

- 7 or more episodes in the preceding year,

-5 or more episodes in each of the preceding 2year

-3 or more episodes in each of the preceding 3 year

Exclusion criteria:

-Bleeding disorders

-less than 5 yrs of age

-acute tonsillitis

Ethical committee approval obtained.

Conflict of interest: Nil

Financial support: Nil

METHODS:

50 patients with chronic tonsillitis

after proper history taking, clinical examination, routine blood investigations, chest xray ,ecg and general anaesthesia assessment.

-25 patients randomly selected for Coblation tonsillectomy-

-25 patients randomly selected for Conventional tonsillectomy,

-to compare operative time, intra operative complications, intra operative blood loss ,post operative complications,

-post operative pain on 1st, 2nd, 7th post operative day using visual analog scale

OPERATIVE DURATION

Operative duration was calculated from the time the Boyle Davis mouth gag was inserted until the time adequate hemostasis was achieved.

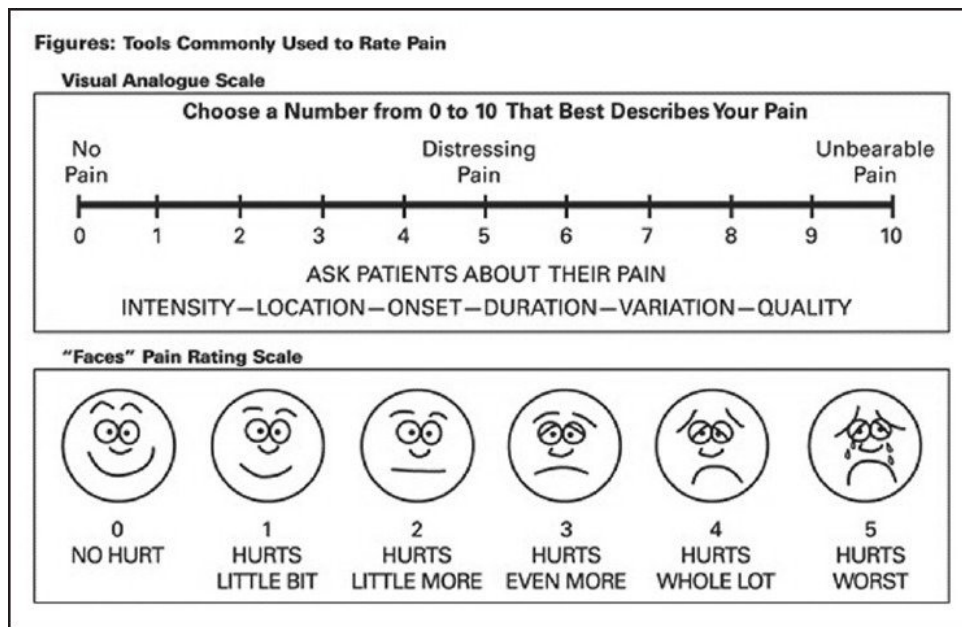
POSTOPERATIVE COMPLICATIONS

Reactionary hemorrhage occurs within first 24 hrs after surgery. secondary hemorrhage occurs after 24 hrs after surgery upto 7 days.

POSTOPERATIVE PAIN

Postoperative pain was analysed using the Visual Analog Scale (VAS) and the scores were observed over a period of 7 days. The VAS score on the day of surgery was taken into consideration

VISUAL ANALOGUE SCALE



RECOVERY TIME

Recovery time was calculated as the time taken for return to normal activity. This was calculated as the number of days the patient required an analgesic for postoperative pain. The patient was considered to have recovered when there was an absence of requirement for analgesia.



STATISTICAL ANALYSIS

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

RESULTS

We have conducted this comparative study in 50 patients who had attended our otorhinolaryngology outpatient department. In this 50 patients, we have done coblation tonsillectomy for 25 patients and conventional tonsillectomy for 25 patients. Patients were selected randomly.

AGE GROUP DISTRIBUTION

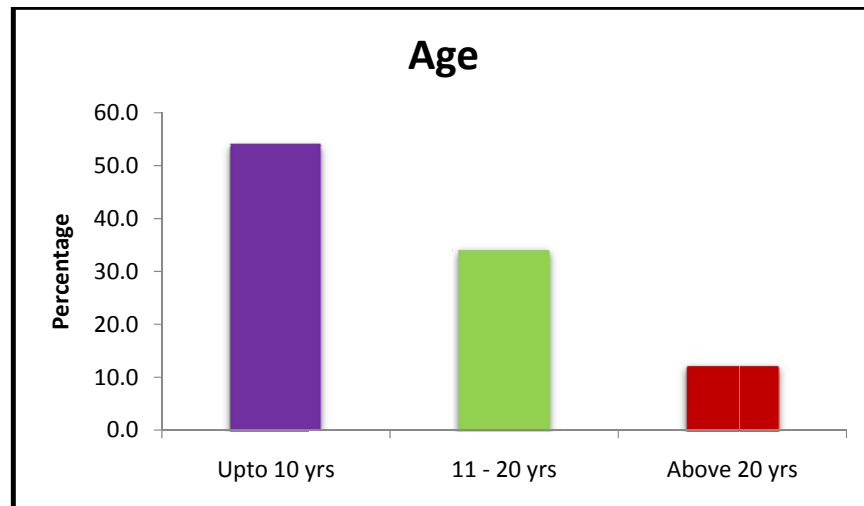


Fig 1 .age group distribution

In 50 patients, 27 patients were under 10 years of age contributing to 54% of total study group. 11 to 20 years of age group contributing 34% of the total study group. Age group above 20 yrs had 6 patients contributing to just 12%. Most of the patients belonged to age below 20. This is showing that incidence of chronic tonsillitis is reduced with the advancing age.

GENDER WISE DISTRIBUTION

| | Frequency | Percent |
|--------|-----------|---------|
| Female | 24 | 48.0 |
| Male | 26 | 52.0 |
| Total | 50 | 100.0 |

Table 1. Gender wise distribution

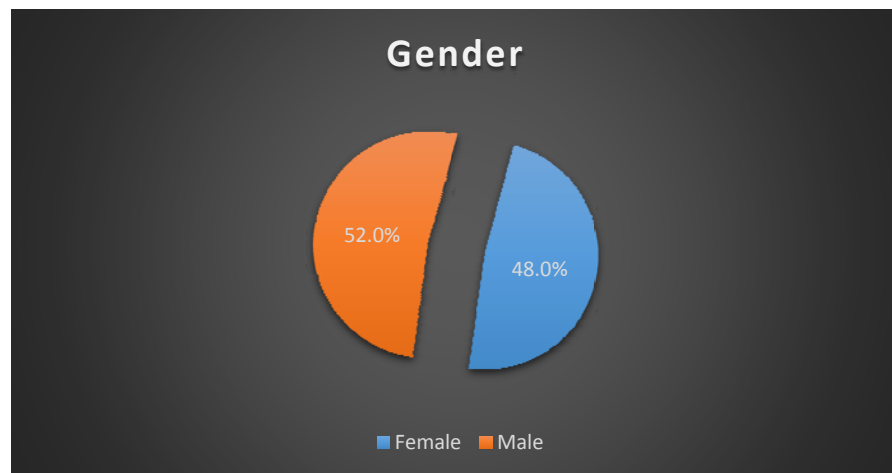


Fig 2. Gender wise distribution

In the total study group of 50 patients ,male patients were 26 ,24 patients were female. Gender wise distribution was 52% for males and only 48% were females. This gender wise distribution shows the common occurrence of chronic tonsillitis being more in males than females

Table 2:**AGE WISE DISTRIBUTION ACCORDING TO SURGERY**

| Comparison between Age with Groups | | | | | | | |
|---|--------------|-------|-----------|--------------|--------|------------------------|---------|
| | | | Groups | | Total | χ ² - value | P-value |
| | | | Coblation | Conventional | | | |
| AGE | Upto 10 yrs | Count | 15 | 12 | 27 | 3.059 | 0.217 # |
| | | % | 60.0% | 48.0% | 54.0% | | |
| | 11 - 20 yrs | Count | 9 | 8 | 17 | | |
| | | % | 36.0% | 32.0% | 34.0% | | |
| | Above 20 yrs | Count | 1 | 5 | 6 | | |
| | | % | 4.0% | 20.0% | 12.0% | | |
| | Total | Count | 25 | 25 | 50 | | |
| | | % | 100.0% | 100.0% | 100.0% | | |
| # No Statistical Significance at P>0.05 level | | | | | | | |

| | Coblation | Conventional |
|--------------|------------------|---------------------|
| Upto 10 yrs | 60.0% | 48.0% |
| 11 - 20 yrs | 36.0% | 32.0% |
| Above 20 yrs | 4.0% | 20.0% |

Table 3 Age wise distribution according to surgery

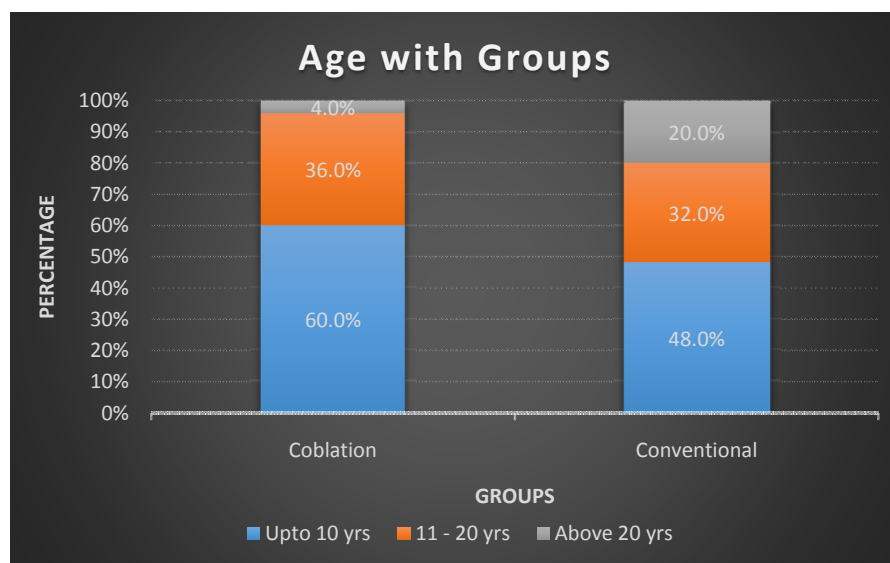


Fig 3 surgery wise distribution - age group

SURGERY WISE DISTRIBUTION - AGE GROUP

Among the surgery wise distribution of the age group almost 60% were in the age group of upto 10years in the coblation group and 48%were in the conventional group.

In the age group 11 to 20yrs,9 patients were included in the study contributing to 36% in the coblation group and 8 patients were included in the conventional group contributing to 32% of the total.

In the age group above 20yrs, one patient was included in the coblation group contributing to 4% of the total and 5patients were included in the in the conventional group contributing to 20% of the total.

So this age wise distribution with regards to surgery shows almost 54% were within the age group of upto 10 yrs indicating the commonest occurrence of chronic tonsillitis between the above mentioned age group.

| Age comparison by Unpaired T-Test | | | | | | |
|---|--------------|----|------|------|---------|---------|
| Groups | | N | Mean | S.D | t-value | P-value |
| Age | Coblation | 25 | 12 | 8.94 | 0.387 | 0.700 # |
| | Conventional | 25 | 13 | 7.02 | | |
| # No Statistical Significance at P>0.05 level | | | | | | |

Tab 4 Age comparison by Unpaired T-Test

GENDER WISE DISTRIBUTION ACCORDING TO SURGERY

| Comparison between Gender with Groups | | | | | | | |
|---|--------|-------|-----------|--------------|--------|--------------|---------|
| | | | Groups | | Total | 2 - value | P-value |
| | | | Coblation | Conventional | | | |
| sex | Female | Count | 10 | 14 | 24 | 1.282 | 0.396 # |
| | | % | 40.0% | 56.0% | 48.0% | | |
| | Male | Count | 15 | 11 | 26 | | |
| | | % | 60.0% | 44.0% | 52.0% | | |
| Total | | Count | 25 | 25 | 50 | | |
| | | % | 100.0% | 100.0% | 100.0% | | |
| # No Statistical Significance at P>0.05 level | | | | | | | |

Tab 5 gender wise distribution

| | Coblation | Conventional |
|--------|-----------|--------------|
| Female | 40.0% | 56.0% |
| Male | 60.0% | 44.0% |

Tab 6 gender wise distribution

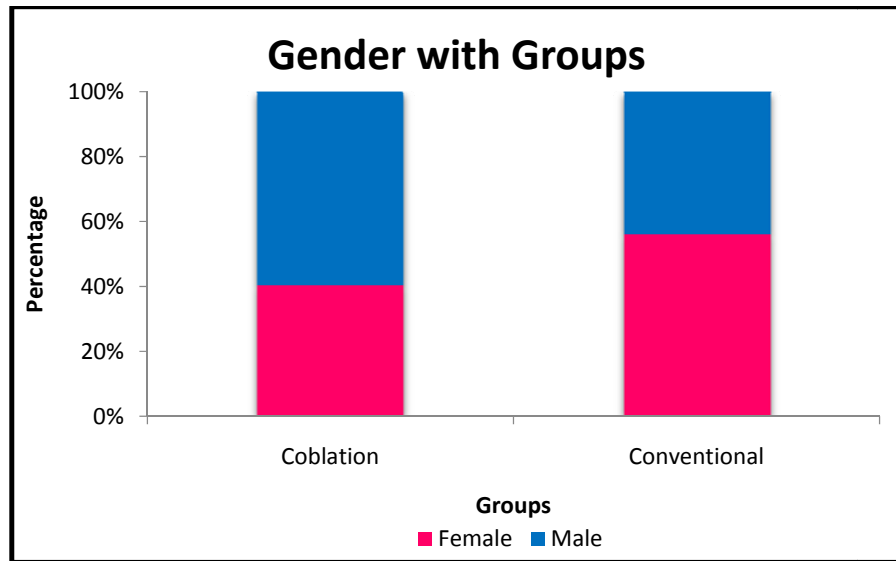


Fig 4gender wise distribution according to surgery

The above results shows almost patients were 15 male in the Coblation group contributing to 60% and 10 were females contributing to 40% of the total patient.

In the conventional group 11patients were male contributing to 44% and 14 were females contributing to 56% of the total.

The above results shows majority of the patients are males who underwent surgery in coblation group.

INTRA OPERATIVE BLOOD LOSS

Both the surgical techniques included in the study had a certain amount of blood loss during the procedure. This parameter was compared between the two groups

Table7: Intraoperative estimated blood loss for conventional tonsillectomy versus coblation tonsillectomy

| Blood loss in ml comparison by Unpaired T-Test | | | | | | |
|--|--------------|----|-------|-------|---------|-----------|
| Groups | | N | Mean | S.D | t-value | P-value |
| Blood loss in ml | Coblation | 25 | 43.20 | 11.63 | 10.674 | 0.0005 ** |
| | Conventional | 25 | 91.80 | 19.57 | | |
| ** Highly Significant at P < 0.01 level | | | | | | |

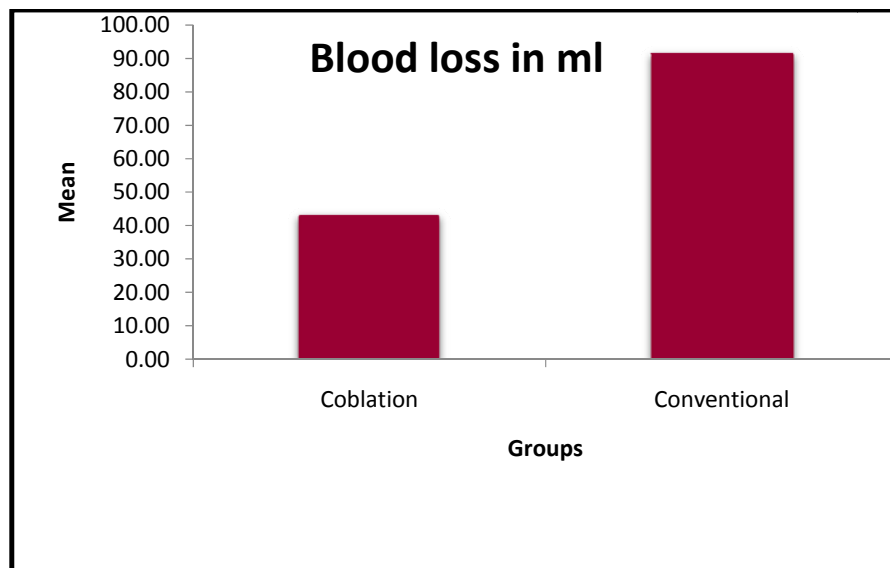


Fig 5 Intraoperative estimated blood loss for conventional tonsillectomy versus coblation tonsillectomy

Among the intra operative blood loss, for conventional tonsillectomy it was in the range of 78.33 to 111.37 with mean of 91.80 and for coblation tonsillectomy it was in the range of 31.57 to 54.83 with the mean of 43.20. T stat value 10.674 and P value 0.0005 statistically highly significant.

Table 8: INTRAOPERATIVE TIME FOR CONVENTIONAL TONSILLECTOMY VERSUS COBLATION TONSILLECTOMY

| Operative time in mins comparison by Unpaired T-Test | | | | | | |
|--|--------------|----|-------|-------|---------|-----------|
| Groups | | N | Mean | S.D | t-value | P-value |
| Operative time in mins | Coblation | 25 | 26.40 | 5.02 | 10.734 | 0.0005 ** |
| | Conventional | 25 | 53.88 | 11.78 | | |
| ** Highly Significant at P < 0.01 level | | | | | | |

The time taken for the surgical procedure was calculated in both the groups. The time taken for the operative procedure was calculated from the time the Boyle Davis mouth gag was inserted until the time adequate hemostasis was achieved.

The mean operative duration in coblation group was 26.40 ± 5.02 and 53.88 ± 11.78 in conventional group with a p value of 0.0001 which is given.

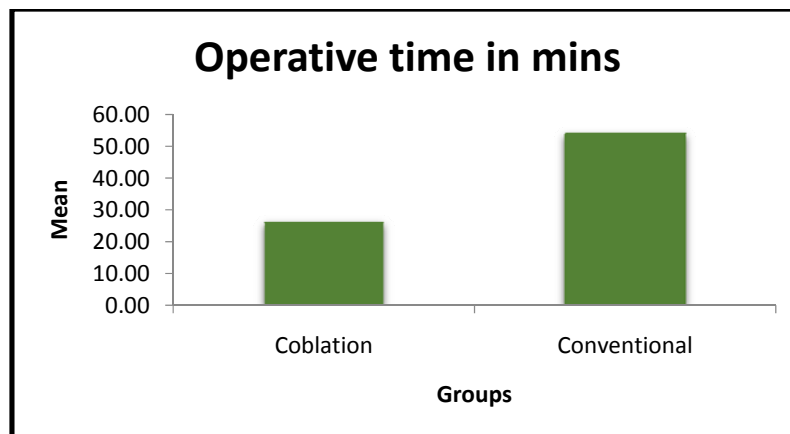


Fig.6: Operative duration.

Intra op complication in the study groups

Most common complication encountered during the surgery were primary hemorrhage.

| Comparison between Intra Op Complications with Groups | | | | | | | |
|---|---------|-------|-----------|--------------|--------|-----------|---------|
| | | | Groups | | Total | 2 - value | P-value |
| | | | Coblation | Conventional | | | |
| Intra Op Complications | Absent | Count | 21 | 13 | 34 | 5.882 | 0.032 * |
| | | % | 84.0% | 52.0% | 68.0% | | |
| | Present | Count | 4 | 12 | 16 | | |
| | | % | 16.0% | 48.0% | 32.0% | | |
| | Total | Count | 25 | 25 | 50 | | |
| | | % | 100.0% | 100.0% | 100.0% | | |
| * Statistical Significance at P < 0.05 level | | | | | | | |

Table 9: Occurrence of Intra op complication in the study groups

| | Coblation | Conventional |
|---------|-----------|--------------|
| Absent | 84.0% | 52.0% |
| Present | 16.0% | 48.0% |

Table 10: Occurrence of Intra op complication in the study groups

In our study we encountered complications in 4 patients in coblation group had primary hemorrhage which was controlled with adequate care with ligation of bleeding point&bipolar cauterization.

Three patients had inferior pole bleed.In this 2 patients bleeding was controlled with bipolar cauterization. In one patient bleeding was controlled with ligation of bleeding point.

In the conventional group 12 patients had intraoperative complications. In this 12 patients 5 patients had inferior pole bleed, 3patients had Superior Pole bleed, 3 patients had posterior pillar injury. 1 Patient had anterior pillar injury.

Inferior pole bleed in 3 patients bleeding was controlled with ligation of bleeding vessel .2 patients bleeding was controlled with bipolar cauterization. Superior pole bleed in all 3 patients bleeding was controlled with ligation .`

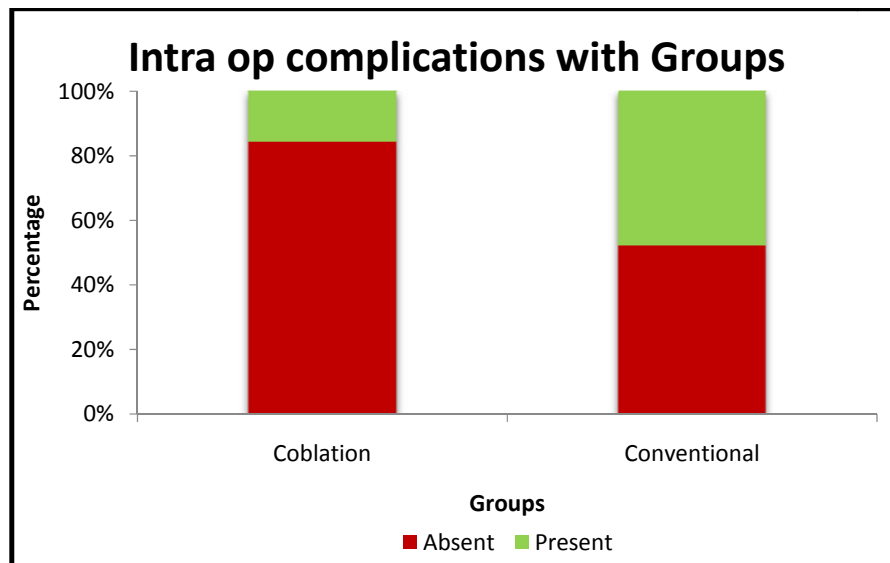


Fig 7 intraoperative complications with groups

Intraop complications encountered in coblation group were 16%, in conventional group were 48%. P value 0.032 statistically significant.

POSTOP COMPLICATIONS WITH GROUPS

Postop complications after tonsillectomy are reactionary hemorrhage, secondary hemorrhage.

Reactionary hemorrhage occurs within first 24 hrs of surgery.—within 24 hours after the surgical procedure mainly due to slippage of knot. Controlled by removal of clot, application of pressure, vasoconstrictors if not controlled proceed to ligation or cauterization..

Secondary haemorrhage after 24 hours of the surgical procedure upto 5th post operative day due sepsis and premature separation of the membrane.

| Comparison between Post op complication with Groups | | | | | | | |
|---|---------|-------|-----------|--------------|--------|--------------|---------|
| | | | Groups | | Total | 2 - value | P-value |
| | | | Coblation | Conventional | | | |
| post op complication | Absent | Count | 24 | 22 | 46 | 1.087 | 0.609 # |
| | | % | 96.0% | 88.0% | 92.0% | | |
| | Present | Count | 1 | 3 | 4 | | |
| | | % | 4.0% | 12.0% | 8.0% | | |
| Total | | Count | 25 | 25 | 50 | | |
| | | % | 100.0% | 100.0% | 100.0% | | |
| # No Statistical Significance at P>0.05 level | | | | | | | |

Table 11 : Comparison between Post op complication with Groups

| | Coblation | Conventional |
|---------|-----------|--------------|
| Absent | 96.0% | 88.0% |
| Present | 4.0% | 12.0% |

Table 12 : Comparison between Post op complication with Groups

In our study in coblation tonsillectomy one patient had secondary emorrhage on 5 th postoperative day. there is bleeding from inferior pole.

In conventional group 3 patients had post operative complication.

One patient had secondary hemorrhage on 4th pod.pt was shifted to emergency operative room.Bleeding was controlled with bipolar cauterization.

Other 2 patients had secondary hemorrhage on 2nd&4th pod.both were treated conservatively.

In coblation group postop complications was 5%.In conventional group post op complications were 12%.p value 0.609.No statistical significance

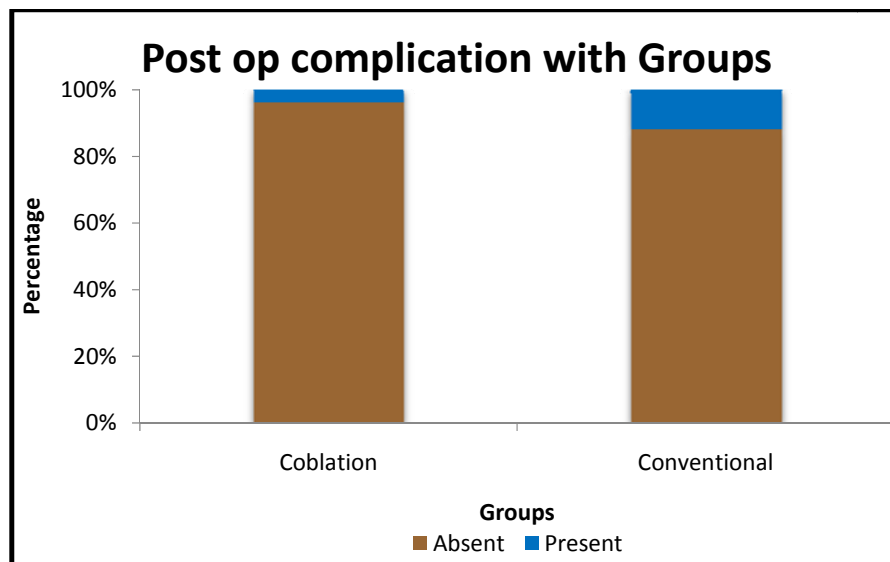


Fig 8 Postop complicaions with groups

POSTOPERATIVE PAIN

The postoperative pain was assessed on 1st, 2nd, & 7th postoperative days by visual analogue scale.

In first postoperative day mean pain score in coblation tonsillectomy was 5.12. In conventional tonsillectomy mean pain score was 6.68. P-value 0.0005. It is highly significant.

| Post op pain score comparison by Unpaired T-Test | | | | | | |
|--|--------------|----|------|------|---------|---------|
| Post op | | N | Mean | S.D | t-value | P-value |
| Pain Score | Coblation | 25 | 5.12 | .726 | 6.362 | 0.0005 |
| 1 st day | Conventional | 25 | 6.68 | .988 | | ** |
| Pain Score | Coblation | 25 | 3.92 | .759 | 4.126 | 0.0005 |
| 2 nd day | Conventional | 25 | 4.88 | .881 | | ** |
| Pain Score | Coblation | 25 | 1.28 | .792 | 4.466 | 0.0005 |
| 7 th day | Conventional | 25 | 2.28 | .792 | | ** |
| ** Highly Significant at P < 0.01 level | | | | | | |

Table : 13 Post op pain score comparison by Unpaired T-Test

In second postoperative day mean pain score in coblation tonsillectomy was 3.92. In conventional tonsillectomy mean pain score was 4.88. P-value 0.0005. It is highly significant

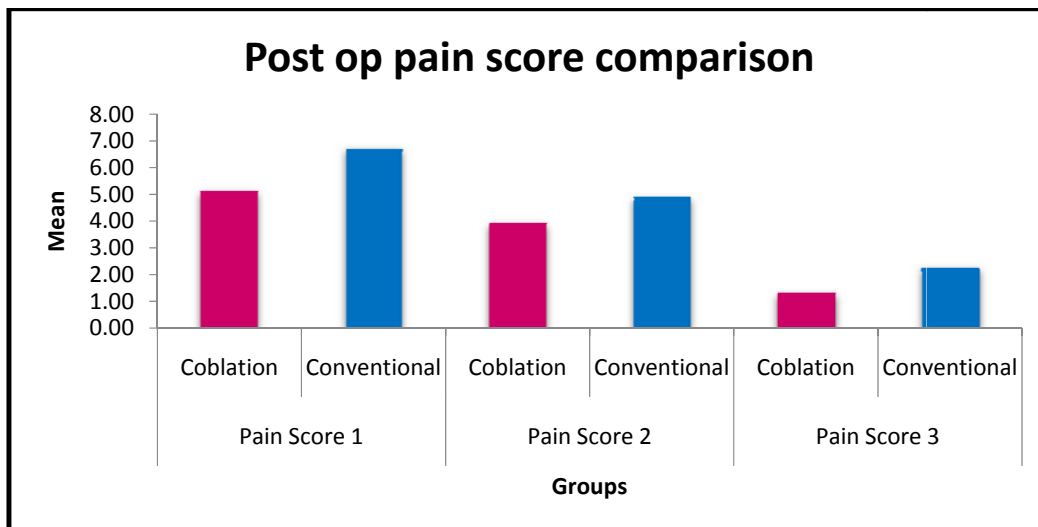
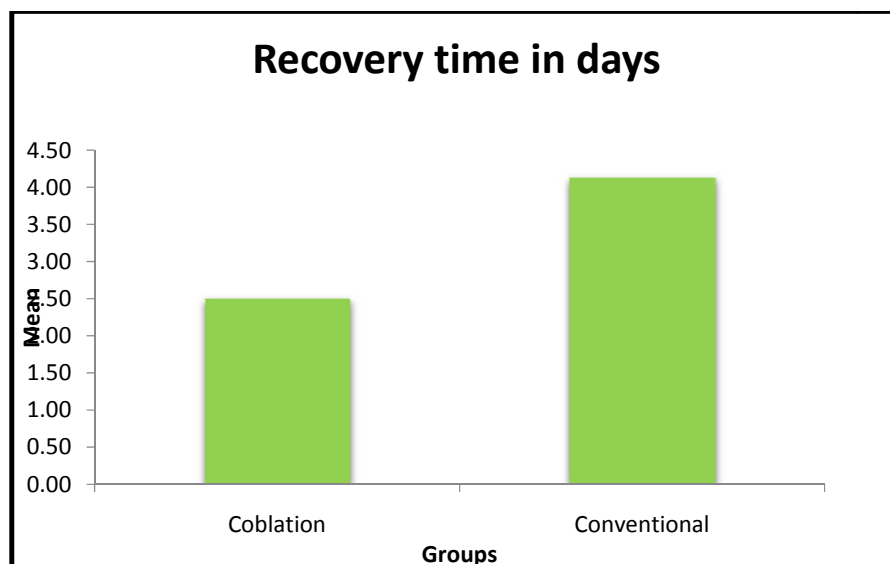


Fig 9 Postoperative pain score comparsion

In postoperative day mean pain score in coblation tonsillectomy was 1.28. In conventional tonsillectomy mean pain score was 2.28. Pvalue 0.0005. It is highly significant.

Recovery period

Recovery period was considered as the time required for the patient to return to normal activity following surgery.



The mean recovery period in coblation group was 2.48 ± 0.51 days .In Conventional group recovery period is 4.12 ± 1.05 shown in table 13 and fig 26.The coblation group was found to recover earlier than the conventional group. As P value 0.0005 is highly significant.

| Groups | | N | Mean | S.D | P-value |
|-----------------------------|--------------|----|------|------|-----------|
| Recovery time in days | Coblation | 25 | 2.48 | 0.51 | 0.0005 ** |
| | Conventional | 25 | 4.12 | 1.05 | |

Table :14 Recovery days

DISCUSSION

Tonsillectomy is the most common procedure done in india.In childhood, the tonsillectomy is commonly the first surgical procedure.

There are different types of complications, primary hemorrhage, reactionary hemorrhage, secondary hemorrhage .postoperative pain can lead to difficulty in intake of food and liquids. It can further delay the healing of wound and it will prolong the recovery period. Post operative bleeding is serious complication. Bleeding in the throat can hide a high risk of aspiration especially in children .

Tonsillectomy with steel forceps (as conventional) consumes longer time than coblation tonsillectomy does as a slower dissection.¹⁹

AGE :

In our study 54% patients were less than 10 yrs.

GENDER:

Male patients are more than female patients.

OPERATIVE TIME:

In coblation tonsillectomy operative time is less than conventional tonsillectomy.In coblation operative time is 26mins.In Conventional tonsillectomy operative time is 53mins. Omrani et al(2012)

68 described the duration of surgery in their studies showed evidence that coblation method had less duration compared to conventional method.

In the study by silvola etal-2011, 80 patients were included and divided into equal groups for whom the average intraoperative time was 30 min for convential and 15 min for coblation in comparison with our study mean average time duration for coblation tonsillectomy is 26 mins and 53mins in conventional group.as compared with the study operative time is less with coblation than conventional.

INTRAOPERATIVE BLOOD LOSS

In the study by silvola etal-2011, 80 patients were included and divided into equal groups for whom In the study sezen etal-2008, 125 patients were included in the group with a mean average intraoperative time of 36.4 min for group I and 21.5 min for group II which on comparison our study was found to be more introperative bleeding was 43 ml for coblation and 91ml for conventional. It is less in coblation tonsillectomy(43 ml) as compared to conventional method(91 ml)

POSTOPERATIVE PAIN :

In our study postoperative pain in patients who undergoing coblation tonsillectomy have a significantly low pain on the 1st,2nd&7th day comparing with conventional method.

VAS Score is less in coblation tonsillectomy

POST OP COMPLICATIONS

Post op complications are equal in both coblation and conventional tonsillectomy.

RECOVERY

It is more rapid 2.4 days in coblation tonsillectomy than conventional.

Lee et al 2008 has conducted study in 48 patients ,in this conventional group has 25 min vs coblation 17.9 min. Lesser peroperative complications, early return to normalcy were better with coblation as our study.

The results were significantly different. In our study, the intraoperative blood loss and operation time were significantly less in the coblation group. The reduction of intraoperative blood loss and operation time in coblation tonsillectomy was obvious and reduction of the postoperative pain and early return to normal diet and activities were clinically and statistically significant. Therefore, we believe that the coblation tonsillectomy is an effective and cost-effective method.

CONCLUSION

With the above study we have conducted in our institution. We have made the following conclusions

1. Intraoperative blood loss was less in Coblation tonsillectomy when compared to conventional method.
2. Operative time was less in Coblation tonsillectomy. As longer the time taken in conventional method the blood loss was more.
3. Intraoperative complications were more in conventional tonsillectomy when compared to Coblation tonsillectomy.
4. Post operative pain is significantly less in Coblation tonsillectomy, as compared to conventional method.
5. Recovery time was early in Coblation tonsillectomy, as patient returns to routine daily activities earlier.
6. Postoperative complications are equal in Coblation and conventional tonsillectomy.

Coblation tonsillectomy is preferable to conventional method. It is a safe procedure to do. As it is easy to perform, produce less tissue damage and blood less operating field.

LIMITATIONS

1. Pain score used to assess post operative pain has subjective bias.
2. Coblation has Cost effectiveness, surgical skills.

BIBLIOGRAPHY

1. Scott Brown –Textbook of Otorhinolaryngology and Head and Neck Surgery , 8th Edition
2. Blue stone and stool's paediatric otorhinolaryngology,5th edition
3. Zaki M F,Coblation versus Traditional Tonsillectomy:A Double Blinded Randomized Controlled Trial.Glob J Oto 2017;6(3)
4. Nallasivam,A Comparative study of coblation versus conventional tonsillectomy,2017 IOSR 10.9790
5. Stefan konsulov,Comparsion between Coblation assisted Tonsillectomy versus Conventional Tonsillectomy Regarding post operative pain and bleeding.Inter
6. Surow JB, Handler SD, Telian SA, et al. Bacteriology of tonsil surface and core in children. Laryngoscope 1989; 99: 261–6.
7. Caplan C. Case against the use of throat culture I in the management of streptococcal pharyngitis. J Fam Pract 1979; 8: 485–90.
8. Brook I, Gober AE. Increased recovery of *Moraxella catarrhalis* and *Haemophilus influenzae* in association with group A beta-haemolytic streptococci in healthy children and those with pharyngo- tonsillitis. J Med Microbiol 2006; 55: 989–92.
9. Brook I, Shah K. Bacteriology of adenoids and tonsils in children with recurrent adenotonsillitis. Ann Otol Rhinol Laryngol 2001; 110: 844–8.

10. Brook I, Foote PA. Isolation of methicillin resistant *Staphylococcus aureus* from the surface and core of tonsils in children. *Int J Pediatr Otorhinolaryngol* 2006; 70: 2099–102.
11. Kaygusuz I, Alpay HC, Gödekmerdan A, et al. Evaluation of long-term impacts of tonsillectomy on immune functions of children: a follow up study. *Int J Pediatr Otorhinolaryngol* 2009; 73: 445–9.
12. Sprinkle PM, Veltri RW. The tonsils and adenoids. *Clin Otolaryngol* 1977; 2: 153–67.
13. Little P, Williamson I, Warner S, et al. Open randomised trial of prescribing strategies in managing sore throat. *BMJ* 1997; 314: 722–7.
14. Powell J, Wilson JA. An evidence-based review of peritonsillar abscess. *Clin Otolaryngol* 2012; 37: 136–45.
15. Brook I. Microbiology and management of peritonsillar, retropharyngeal and parapharyngeal abscesses. *J Oral Maxillofac Surg* 2004; 62: 1545–50.
16. Johnson RF, Stewart MG, Wright CC. An evidence-based review of the treatment of peritonsillar abscess. *Otolaryngol Head Neck Surg* 2003; 128: 332–43. 1

17. 7. Wong DK, Brown C, Mills N, et al. To drain or not to drain – management of pediatric deep neck abscesses: a case control study. *Int J Pediatr Otorhinolaryngol* 2012; 76: 1810–13.
18. 18. Daya H, Lo S, Papsin BC, et al. Retropharyngeal and parapharyngeal infection in children: the Toronto experience. *Int J Pediatr Otorhinolaryngol* 2005; 69: 81–6.
19. Mohammadreza Omrani Coblation versus traditional tonsillectomy: A double blind randomized controlled trial 2012 Jan; 17(1): 45–50.
20. 20 Ajulo P, Qayyum A, Brewis C, Innes A. Lemierre's syndrome: the link between a simple sore throat, sore neck and pleuritic chest pain. *Ann R Coll Surg Engl* 2005; 87: 303–5.
21. Johannesen K, Bodtger U, Heltberg U. Lemierre's syndrome: the forgotten disease. *J Thromb Thrombolysis* 2014; 37(3): 246–8.
22. Shapiro NL, Bhattacharyya N. Cold Dissection Versus Coblation-assisted adenotonsillectomy in children. *Laryngoscope*. 2007; 117(3): 406-410.
23. Polites N, Joniau S, Wabnitz D, Fassina R, Smythe C, Varley P, Carney AS. Postoperative pain following coblation tonsillectomy: randomized clinical trial. *ANZ J Surg*. 2006; 76(4): 226-229.

24. Belloso A, Chidambaram A, Morar P, Timms MS. Coblation tonsillectomy versus dissection tonsillectomy: postoperative hemorrhage. *Laryngoscope*. 2003; 113(11): 2010-3.
25. . Divi V, Benninger M. Postoperative tonsillectomy bleed: coblation versus noncoblation. *Laryngoscope*. 2005; 115(1): 31-3.
26. Glade RS, Pearson SE, Zalzal GH, Choi SS. Coblation adenotonsillectomy: an improvement over electrocautery technique *Otolaryngol Head Neck Surg*. 2006; 134(5): 852-5.
27. Noon AP, Hargreaves S. Increased post-operative haemorrhage seen in adult coblation tonsillectomy. *J Laryngol Otol*. 2003; 117(9): 704-6.
28. Stoker KE, Don DM, Kang DR, et al. Pediatric total tonsillectomy using coblation compared to conventional electrosurgery: a prospective, controlled, single-blind study. *Otolaryngol Head Neck Surg* 2004;130:666 – 675.
29. Chang KW. Randomized controlled trial of coblation versus electrocautery tonsillectomy. *Otolaryngol Head Neck Surg* 2005;132:273–280.
30. Hayward G, Thompson MJ, Perera R, et al. Corticosteroids as stand-alone or add-on treatment for sore throat. *Cochrane Database Syst Rev* 2012; 10: CD008268.

31. Zwart S, Rovers MM, de Melker RA, Hoes AW. Penicillin for acute sore throat in children: randomised, double blind trial. *BMJ* 2003; 327: 1324.
32. Paradise JL, Bluestone CD, Bachman RZ, et al. History of recurrent sore throat as an indication for tonsillectomy. Predictive limitations of histories that are undocumented. *N Engl J Med.* 1978;298:409–413.
33. Brook I, Yocum P, Shah K. Surface vs core-tonsillar aerobic and anaerobic flora in recurrent tonsillitis. *JAMA* 1980; 244: 1696–8.
34. Feery BJ, Forsell P, Gulasekharan M. Streptococcal sore throat in general practice: A controlled study. *Med J Aust* 1976; 1: 989–91.
35. Christensen PH et al: Unilateral immediate tonsillectomy as the treatment of peritonsillar abscesses: results with special attention to pharyngitis. *Journal Laryngology Otolaryngology* 1983;87
36. Alexandria et al american academy of otolaryngology head and neck surgery 1995 94
37. Paradise J L, Bluestone CD, et al 2001. Efficacy of tonsillectomy for recurrent throat infection in severely affected children. 113-27 91
38. Bailey, Byron J. Title: Head & Neck Surgery - Otolaryngology, 4th Edition volume 2 1188
39. Micheal gleason, George G Browning, Martin J Burton Scott brown's Otorhinolaryngology, Head and neck surgery, 7th edition 2008 volume 2 ;1998 47

40. Ali NJ, Pitson D et al: Sleep-disordered breathing: effects of adenotonsillectomy on behavior and psychological functioning. 1996;34
41. Bolger WE et al: Preoperative hemostatic assessment of the adenotonsillectomy patient. Otolaryngology Head Neck Surgery 1990; 103:396.
42. Pinder D et al . Dissection versus diathermy Cochrane Database of Systematic Reviews. Parker,45
43. Alexiou et al Modern technology-assisted vs conventional tonsillectomy: a meta-analysis of randomized controlled trials 2011 Jun;137(6):558-70.
44. Bergler W et al Tonsillectomy with argon plasma coagulation (APC). evaluation of pain and haemorrhage. Laryngoscope. 2001; 39
45. Krespi YP, Ling EH. Laser assisted serial tonsillectomy.: Journal of Otolaryngology. 1994 98
46. Koltai PJ,et al . Intracapsular partial tonsillectomy for tonsillar hypertrophy in children Laryngoscope. 2002 ; 112 : 17-9
47. Wire klint et al Health-related quality of life after tonsillotomy versus tonsillectomy in young adults: 6 years postsurgery follow-up. 2012 Aug;269(8):1951-8
48. Philpott, C.M.et al, A double-blinded randomized controlled trial of coblation versus conventional dissection tonsillectomy on

postoperative symptoms Clinical. Otolaryngology. 2005, 30, 143–148

49. Burton MJ,et al Coblation versus other surgical techniques for tonsillectomy. Cochrane Database Systematic Review 2007; (3): CD004619
50. Nelson LM,et al Radiofrequency treatment of obstructive tonsillar hypertrophy. Archives of Otolaryngology Head and Neck Surgery. 2000; 126 : 736-40
51. Bameshki AR et al The Effect of Local Injection of Epinephrine and Bupivacaine on Post-Tonsillectomy Pain and Bleeding. 2013 Sep;25(73):209-214
52. Fernandez et al Anesthesia in children for tonsillectomy by dissection in the Rose position 1968 Apr;15(2):234-7
53. Schmidt R, Herzog A, Cook S, et al: Complications of tonsillectomy: a comparison of techniques. Archives Otolaryngology Head Neck Surgery 2007; 133:925-928
54. Rosen D et al Parental perceptions of sleep disturbances and sleep-disordered breathing in children with Down syndrome. 2011 Feb;50(2):121
55. Wake M, Glossop P. Guillotine and dissection tonsillectomy compared. Journal of Laryngology and Otology. 1989 ; 103 : 588-9

56. Derkay CS, et al: Post-tonsillectomy morbidity and quality of life in pediatric patients with obstructive tonsils and adenoid: Microdebrider vs electrocautery. Otolaryngology Head Neck Surgery 2006; 143:114-120..
57. Zarnetzki et al How to make tonsillectomy a safer procedure: the anaesthetist's view. 2013;75(3):144-51
58. Younis RT, Hesse SV, Anand VK. Evaluation and utility and cost effectiveness of obtaining histopathologic diagnosis on all routine tonsillectomy specimens. Laryngoscope. 2001 ; 111 : 2166-9.
59. Hall MD et al: The effect post-operative diet on recovery in the first twelve hours after tonsillectomy and adenoidectomy. Int J Pediatr Otorhinolaryngology 1995; 31:215.
60. Salonen A et al Recovery after tonsillectomy in adults: a three week follow up study. Laryngoscope. 2002 ; 112 : 94-8.
61. F. Javed et al, A completed audit cycle on post-tonsillectomy haemorrhage rate: Coblation versus standard tonsillectomy , 2007; 127: 300_304
62. N Polites et al Post operative pain following coblation tonsillectomy randomized control trial . 2006; 76: 226–229
63. Ozkris et al Comparison of two different adenoidectomy techniques with special emphasize on postoperative nasal mucociliary clearance rates: coblation technique vs. cold curettage 2012 Sep;22(9):579-81.

64. N Polites et al Post operative pain following coblation tonsillectomy randomized control trail . 2006; 76: 226–229 94
65. Paramasivam et al Randomised comparative study of adenotonsillectomy conventional and coblation method for children with obstructive sleep apnoea. 2012 Jun;76(6):816-21.
66. Fried man et al retrospective study intra capsular tonsil coblation with uvulo palatoplasty 2004 2-3
67. Mohammadreza Omrani,et al Coblation versus traditional tonsillectomy: A double blind randomized controlled trial J Res Med Sci 2012; 17(1): 45-50
68. 69. Singh Rakesh et al A Prospective, Randomized, Double-Blind Study of
69. Coblation versus Dissection Tonsillectomy in Adult Patients Indian Journal Otolaryngology Head Neck Surgery (July–September 2012) 64(3):290–296
70. Paramasivam V K et al Randomised comparative study of adenotonsillectomy by conventional and coblation method for children with obstructive sleep apnoea. 2012 Jun;76(6):816-21.
71. Vangelin G et al Meta analysis of intra operative blood loss in various methods of tonsillectomy 2012 12-14
72. Hong S M et al Coblation tonsillectomy in paediatric patients 2013 22-28

73. Lister MT, Cunningham MJ, Benjamin B, et al. Microdebrider tonsillotomy vs. electrosurgical tonsillectomy: a randomized, double-blind, paired control study of postoperative pain. *Arch Otolaryngol Head Neck Surg.* 2006;132:599–60
74. Timms MS, et al Coblation tonsillectomy: a double blind randomized controlled study. 2003 Sep;117(9):704-6
75. Temple RH et al Paediatric coblation tonsillectomy. 2002 Pinder D, Wilson H, Hilton MP. Dissection versus diathermy for tonsillectomy. *Cochrane Database Syst Rev* 2011; (3): CD002211.
76. Philpott CM, Wild DC, Mehta D, Banerjee AR. A double blinded randomised controlled trial of coblation versus conventional dissection tonsillectomy on postoperative symptoms. *Clin Otolaryngol* 2005; 30: 143
77. Walton J, Ebner Y, Stewart MG, April MM. Systematic reviews of randomized controlled trials comparing intracapsular tonsillectomy with total tonsillectomy in pediatric population. *Arch Otolaryngol Head Neck Surg* 2012; 138(3): 243–9.
78. Goldman JL, Baugh RF, Davies L, et al. Mortality and major morbidity after tonsillectomy: etiologic factors and strategies for prevention. *Laryngoscope* 2013; 123(10): 2544–53

79. Brandtzaeg P. Immune functions and immunopathology of palatine and nasopharyngeal tonsils. In: Bernstein JM, Ogra PL, eds. Immunology of the Ear. New York, NY: Raven Press; 1987:63–106.
80. Ron B Mitchell Clinical practice guideline:Tonsillectomy in children updates 2 2011

PROFOMA

Name :

Age:

Sex:

OP/IP no:

Presenting complaints

1.Sore throat:

Duration:

No of episodes:

Aggravating factor

Relieving factor:

2.Difficulty in swallowing:

Duration:

No of episodes:

Aggravating factor

Relieving factor:

Past History :

Diabetes mellitus/Hypertension/seizure disorder/bronchial asthma

Previous h/o s:urgery

H/O Bleeding diathesis

General examination

Systemic examination:

CVS-

RS-

P/A-

CNS-

Clinical Examination

Throat: Oral cavity

Oropharynx:

Soft palate:

Uvula:

Anterior tonsillar pillar:

Tonsillar fossa:

Posterior tonsillar pillar

Neck:

Jugulodigastric node:

Ear:

Nose:

Operative procedure done:

Operative time:

Intraoperative blood loss:

Intraoperative complications:

Post operative pain:(using visual analog pain scale)

Ist pod :

IIInd pod:

VIIth pod:

Post operative complications:

Recovery time:



GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL, CHENNAI -01
INSTITUTIONAL ETHICS COMMITTEE

TITLE OF THE WORK : COMPARITIVE STUDY OF COBLATION TONSILLECTOMY VS
CONVENTIONAL TONSILLECTOMY.

PRINCIPAL INVESTIGATOR : DR. S. MATHUMITHAA,
DESIGNATION : PG IN MS ENT,
DEPARTMENT : DEPARTMENT OF OTORHINOLARYNGOLOGY,
GOVT. STANLEY MEDICAL COLLEGE.

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 03.04.2019 at the Council Hall, Stanley Medical College, Chennai-1 at 10am.

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

K. Kuland 26/4/19
MEMBER SECRETARY,
IEC, SMC, CHENNAI

Urkund Analysis Result

Analysed Document: MADU'S THESIS.docx (D57898312)
Submitted: 10/30/2019 12:20:00 AM
Submitted By: mathumithaa.s@gmail.com
Significance: 6 %

Sources included in the report:

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<https://www.ijorl.com/index.php/ijorl/article/view/233>
https://www.researchgate.net/publication/319632089_Coblation_Versus_Conventional_Tonsillectomy_A_Double_Blind_Randomized_Controlled_Trial
<https://jamanetwork.com/journals/jamaotolaryngology/fullarticle/1107008>
https://www.researchgate.net/publication/233942307_Coblation_versus_traditional_tonsillectomy_A_double_blind_randomized_controlled_trial

Instances where selected sources appear:

PATIENT CONSENT FORM

- STUDY DETAIL: COMPARATIVE STUDY OF COBLATION TONSILLECTOMY
CONVENTIONAL TONSILLECTOMY

Vs

STUDY CENTRE: GOVT STANLEY MEDICAL COLLEGE, CHENNAI

PATIENT NAME:

PATIENT AGE:

IDENTIFICATION NUMBER:

PATIENT TO TICK () THESE BOXES

I conform that I have understood the purpose of procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I understand that my participation in the study is voluntary and that I am free to withdraw at anytime without giving any reasons, without my legal rights being affected.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperative with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or wellbeing or any unexpected or unusual symptoms.

I hereby give consent to participate in this study.

I hereby give permission to undergo complete clinical examination and diagnostic test.

Place:

Signature/Thumb impression:

Date:

Patient/guardian name and address:

Place: Date:

Signature of the investigator:

Study investigator's name:

சுய ஒப்புதல் படிவம்

ஆய்வின் தலைப்பு : தொண்டையில் வளரும் சதைமைய அகற்றும் அறுவை சிகிச்சை பற்றிய ஆய்வுச்சி

ஆய்வுச்சி நிலையம் : காது, மூக்கு, தொண்டை, நுரை, அடிக் கூடல் மருத்துவக் கல்லூரி, சென்னை-600 001.

பங்கு பெறுவதில் பெயர் : மயது :

பங்கு பெறுவதில் எண் :

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்திரகங்கண கோவடி, அத்தகைய தகுந்த விளக்கங்களைப் பெறவும் வாய்ப்பளிக்கப்பட்டது.

நான் இவ்வாய்வில் தன்னிச்சையாகத்தான் பங்கேற்கிறேன். எந்தக் காரணத்தினாலும் எந்தக் கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விவகிக் கொள்ளலாம் என்று அறிந்து கொள்கிறேன்.

இந்த ஆய்வு சம்பந்தமானவோ, இதைச் சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும்போது இந்த ஆய்வில் பங்குபெறும் மருத்துவ என்னுடைய மருத்துவ அறிக்கைகளைப் பாப்பதற்கு என் அனுமதி தேவையென்பதை என் அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விவகிக் கொள்ளலாம் விது பொருத்தும் என அறிக்கிறேன்.

இந்த ஆய்வில் ஏதாவது சம்பந்தம் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான முடிவுகளையும் மருத்துவ மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அனுமதி கோரிக்கவும் என் முழு மனதுடன் சம்மதிக்கிறேன்.

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்குக் கூறப்பட்டிருள்ள அறிவுரைகளின்படி நடந்து கொள்வதுடன் என் உடல் நலம் பாதிக்கப்படாது உடனே அந்த மருத்துவ அணியிடம் ஒழிவிப்பேன் என அறிக்கிறேன்.

இந்த ஆய்வில் எனக்கு தேவையான பரிசோதனை, மசப்து கொள்ள நான் முழு மனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் பெற்றோர் கையொப்பம் இடம் _____ தேதி

கடனடவிரல் தேவை
பங்கேற்பவரின் பெயர் மற்றும் விவரம்
ஆய்வாளரின் கையொப்பம்
ஆய்வாளரின் பெயர்

MASTER CHART

| SN | NAME | Age | sex | IP NO | Opera time | Technique | Blood loss in ml | Intra Op Complications | Post Op pain1 | Post Op pain2 | Post Op pain7 | post op complication | Recovery time in days |
|----|----------------|-----|-----|---------|------------|-----------|---------------------|---------------------------|---------------------|---------------------|------------------|-------------------------|--------------------------|
| 1 | Geetha | 19 | F | 1920435 | 35 | coblation | 60 | Absent | 5 | 4 | 3 | Absent | 2 |
| 2 | Priyadharshan | 7 | M | 1921945 | 30 | coblation | 40 | Present | 6 | 5 | 1 | Absent | 2 |
| 3 | Sharmila | 6 | F | 1922438 | 22 | coblation | 30 | Absent | 5 | 3 | 1 | Absent | 2 |
| 4 | Sangeetha | 20 | F | 1922440 | 20 | coblation | 25 | Absent | 5 | 3 | 1 | Absent | 3 |
| 5 | Surendar | 15 | M | 1922437 | 24 | coblation | 45 | Absent | 6 | 5 | 2 | Absent | 3 |
| 6 | Mohammed aslan | 6 | M | 1923470 | 20 | coblation | 35 | Absent | 4 | 3 | 0 | Absent | 2 |
| 7 | Farhan | 6 | M | 1923471 | 26 | coblation | 50 | Absent | 5 | 4 | 0 | Absent | 2 |
| 8 | Saranraj | 8 | M | 1924913 | 23 | coblation | 30 | Absent | 5 | 4 | 1 | Absent | 3 |
| 9 | Yesini sri | 8 | F | 1924925 | 24 | coblation | 40 | Absent | 4 | 3 | 0 | Absent | 2 |
| 10 | Asakath | 8 | M | 1925389 | 25 | coblation | 35 | Absent | 6 | 4 | 1 | Absent | 3 |
| 11 | Saranya | 9 | F | 1927021 | 24 | coblation | 50 | Absent | 5 | 4 | 2 | Absent | 3 |
| 12 | vidyashree | 7 | F | 1927018 | 28 | coblation | 35 | Absent | 5 | 5 | 2 | Absent | 3 |
| 13 | Sakthivel | 16 | M | 1927016 | 35 | coblation | 40 | Present | 6 | 5 | 2 | Absent | 2 |
| 14 | Logesh | 6 | M | 1927575 | 24 | coblation | 35 | Absent | 4 | 4 | 1 | Absent | 2 |

| | | | | | | | | | | | | | |
|----|-----------------|----|---|---------|----|--------------|-----|---------|---|---|---|---------|---|
| 15 | Santosh | 8 | M | 1927577 | 25 | coblation | 40 | Absent | 5 | 3 | 1 | Absent | 3 |
| 16 | Mohammed diraj | 11 | M | 1927579 | 28 | coblation | 40 | Absent | 5 | 4 | 2 | Absent | 3 |
| 17 | Dineshkumar | 14 | M | 1928902 | 32 | coblation | 60 | Absent | 6 | 5 | 2 | Absent | 3 |
| 18 | Nareshkumar | 10 | M | 1928903 | 20 | coblation | 30 | Absent | 4 | 3 | 0 | Absent | 2 |
| 19 | Maheshwaran | 8 | M | 1928222 | 22 | coblation | 45 | Absent | 5 | 4 | 1 | Absent | 2 |
| 20 | yuvashri | 13 | F | 1993255 | 40 | coblation | 75 | Present | 7 | 5 | 2 | Present | 3 |
| 21 | Latha | 9 | F | 1929374 | 27 | coblation | 50 | Absent | 5 | 3 | 1 | Absent | 2 |
| 22 | Abdul hussain | 15 | M | 1915576 | 25 | coblation | 60 | Present | 5 | 4 | 2 | Absent | 2 |
| 23 | Muruga boopathi | 7 | M | 1916613 | 27 | coblation | 40 | Absent | 5 | 3 | 1 | Absent | 3 |
| 24 | Vanaja | 50 | F | 1917300 | 24 | coblation | 40 | Absent | 5 | 4 | 2 | Absent | 3 |
| 25 | Sai | 12 | F | 2520806 | 30 | coblation | 50 | Absent | 5 | 4 | 1 | Absent | 2 |
| 26 | Umar mathar | 9 | M | 1912763 | 37 | conventional | 80 | Absent | 6 | 5 | 3 | Absent | 3 |
| 27 | Abilash | 6 | M | 1931148 | 55 | conventional | 100 | Present | 7 | 6 | 4 | Absent | 5 |
| 28 | Sornalakshmi | 12 | F | 1931150 | 45 | conventional | 90 | Absent | 6 | 5 | 2 | Absent | 3 |
| 29 | Ajay | 13 | M | 1934713 | 60 | conventional | 100 | Present | 6 | 4 | 1 | Absent | 4 |
| 30 | Persia | 30 | F | 1936614 | 75 | conventional | 130 | Present | 7 | 5 | 2 | Present | 7 |
| 31 | Sandhiya | 12 | F | 1937170 | 57 | conventional | 100 | Absent | 5 | 4 | 2 | Absent | 4 |
| 32 | Sathish | 23 | M | 1937628 | 32 | conventional | 70 | Absent | 5 | 4 | 1 | Absent | 3 |

| | | | | | | | | | | | | | |
|----|----------------|----|---|---------|----|--------------|-----|---------|---|---|---|---------|---|
| 33 | Asath | 5 | M | 1935810 | 54 | conventional | 75 | Present | 8 | 6 | 2 | Absent | 5 |
| 34 | Parthasarthy | 15 | M | 1938421 | 50 | conventional | 80 | Absent | 6 | 4 | 1 | Absent | 3 |
| 35 | Munna | 29 | M | 1938405 | 70 | conventional | 140 | Present | 9 | 7 | 3 | Present | 6 |
| 36 | Srinithi | 21 | F | 193996 | 36 | conventional | 65 | Absent | 5 | 4 | 1 | Absent | 4 |
| 37 | Kashiba | 7 | F | 1939273 | 48 | conventional | 75 | Absent | 7 | 6 | 3 | Absent | 4 |
| 38 | Sriganth | 10 | M | 1958144 | 67 | conventional | 90 | Present | 8 | 6 | 2 | Absent | 5 |
| 39 | Gowtham | 7 | M | 1960101 | 50 | conventional | 100 | Absent | 7 | 5 | 3 | Absent | 4 |
| 40 | Mohamed aarif | 13 | M | 1960124 | 60 | conventional | 80 | Present | 7 | 6 | 3 | Absent | 5 |
| 41 | Thasleenn banu | 9 | F | 1913805 | 45 | conventional | 70 | Absent | 6 | 4 | 2 | Absent | 3 |
| 42 | Renuka | 11 | F | 1960141 | 54 | conventional | 110 | Present | 7 | 4 | 2 | Absent | 4 |
| 43 | Yasin | 22 | F | 1960559 | 69 | conventional | 120 | Present | 7 | 5 | 3 | Absent | 4 |
| 44 | Jayalakshmi | 9 | F | 2464466 | 40 | conventional | 70 | Absent | 7 | 5 | 2 | Absent | 3 |
| 45 | Shivani | 6 | F | 2456572 | 57 | conventional | 80 | Absent | 6 | 4 | 2 | Absent | 3 |
| 46 | Parkavi | 15 | F | 2277834 | 76 | conventional | 110 | Present | 8 | 5 | 3 | Absent | 5 |
| 47 | Aparna | 13 | F | 2520319 | 60 | conventional | 100 | Present | 7 | 5 | 3 | Present | 4 |
| 48 | Lydia | 8 | F | 2527720 | 54 | conventional | 80 | Absent | 6 | 4 | 2 | Absent | 3 |
| 49 | Devadharshini | 9 | F | 2529707 | 44 | conventional | 100 | Present | 7 | 4 | 3 | Absent | 5 |
| 50 | Udhayanidhi | 6 | M | 2591706 | 52 | conventional | 80 | Absent | 7 | 5 | 2 | Absent | 4 |