

**A PROSPECTIVE CLINICOPATHOLOGICAL
STUDY AND MANAGEMENT OF BENIGN
LESIONS OF LARYNX**

Dissertation submitted to

THE TAMILNADU DR. M. G. R. MEDICAL UNIVERSITY

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THANJAVUR MEDICAL COLLEGE

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

THANJAVUR – TAMILNADU

MAY 2022

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This is to certify that this dissertation entitled “**A PROSPECTIVE CLINICOPATHOLOGICAL STUDY AND MANAGEMENT OF BENIGN LESIONS OF LARYNX**” is submitted to THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI in partial fulfilment of the requirements for the award of M.S. DEGREE, BRANCH-IV, OTORHINOLARYNGOLOGY, in the examinations to be held during May 2022.

This dissertation is a record of original work done by **Dr. JAYALEKSHMI.P.A** Register Number: **221914203** during the course of the study **JANUARY 2020 – JULY 2021**. This work is carried out by the candidate herself under my guidance and supervision.

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DECLARATION

I, **Dr. JAYALEKSHMI.P.A** solemnly declare that this dissertation entitled "A PROSPECTIVE CLINICOPATHOLOGICAL STUDY AND MANAGEMENT OF BENIGN LESIONS OF LARYNX" is a bonafide and genuine research work carried out by me in the Department of Otorhinolaryngology and Head & Neck Surgery, Thanjavur Medical College & Hospital, Thanjavur, during January 2020 to July 2021 under the guidance and supervision of **Prof.Dr.C.BALASUBRAMANIAN.M.S.,(ENT)**, Department of Otorhinolaryngology and Head & Neck Surgery, Thanjavur Medical College Hospital, Thanjavur.

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INTRODUCTION

Definition :- The benign lesions of larynx are any tissue or mass in the larynx which does not present with the characteristics of malignancy

Larynx the” voice box” is an important organ of the body. It protects lower respiratory tract , provides a controlled airway , allows phonation and generation of high intrathoracic pressure for coughing and lifting. The powerhouse or generator of voice is infraglottic tract which puts into vibration of true vocal folds creating buzzing sound which is amplified and given a significant character by supraglottic vocaltract. Even without the help of language, voice helps in expressing emotions. It helps to express the mood and attitude. For professional voice users like singers the quality of voice is very significant.

Its impact on different individuals varies as spectrum of voice disorders is very wide . Any disease or disorder which affects the vibration will produce phonatory and laryngeal dysfunction, of which non-malignant lesions share a major part.

Non malignant lesions can be classified as—

- i) Benign neoplastic lesions.
- ii) Benign non neoplastic lesions.

The laryngeal or phonatory dysfunction demands attention regardless of the age of the patient. In spite of the various etiologies, when diagnosed early and treated properly these lesions can have remarkable recovery. Some lesions like vocal nodule and Reinke's edema are treated by voice rest alone, while in others LASER or Microlaryngeal excision is needed. The main aim of treatment is to bring back the near normal voice to the patient. Understanding anatomy and physiology is essential to achieve good surgical outcomes.

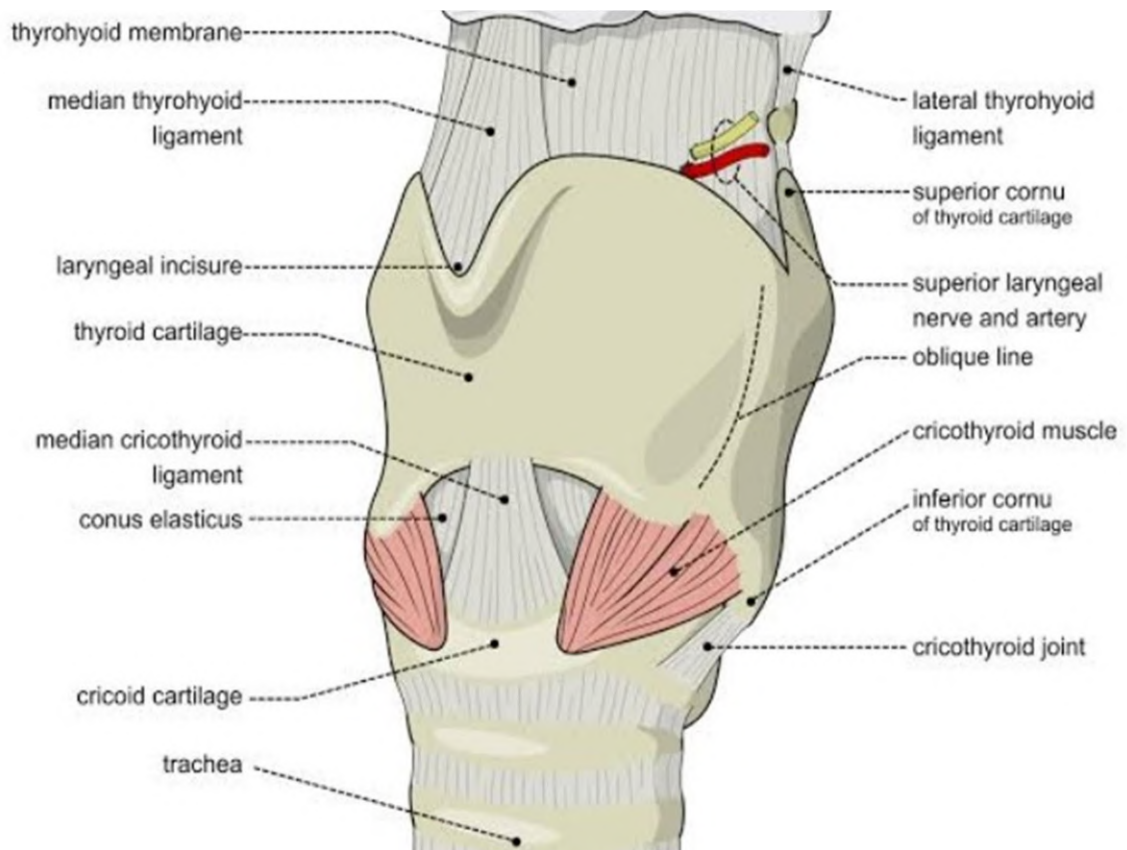
REVIEW OF LITERATURE

ANATOMY OF LARYNX EMBRYOLOGY

During the fourth week of life ,the respiratory tract develops as an outgrowth from the primitive gut termed as the tracheobronchial groove. The larynx develops from two parts The supraglottis from the buccopharyngeal bud-fourth arch of branchial system .

The glottis and subglottis from the tracheobronchial bud-fifth and sixth arch.The intrinsic musculature of larynx is derived from the branchial arch mesenchyme of the fourth and sixth arches ,therefore carry the superior and recurrent laryngeal nerves respectively as their segmental innervation. The human epiglottis ,unrelated to the primitive branchial arches ,is a unique addition in mammalian .

Anatomy-framework of larynx The fibro cartilagenous framework of the larynx suspended in the neck from the hyoid bone comprises cartilages, ligaments ,membranes and muscles The laryngeal cartilages are classified as Paired cartilages-arytenoids ,corniculate and cuneiform cartilages Unpaired cartilages- thyroid, cricoid and epiglottis



Hyoid bone

It is an U shaped bone suspended by suprahyoid muscles and ligaments . It consists of body anteriorly from which greater cornua projects backwards on each side, and lesser cornua which is small conical eminences attached to the upper lateral aspect of hyoid.

Thyroid cartilage –

A hyaline type cartilage which can undergo endochondrial ossification or calcification. The most prominent cartilage with two laminae which fuse in the midline at about 90 degrees in males and 120 degrees in females.

Thyroid notch in the superior border serves as landmark for anterior neck surgeries. Superior cornua a long horn like projection laterally which articulate with the hyoid bone and inferior cornua forms a synovial joint with cricoid cartilage

Cricoid cartilage

It is signet ring shaped cartilage with shorter anterior arch and longer posterior lamina. It is the narrowest part of airway in the infant larynx. It corresponds to 6th cervical vertebrae .Cricovary tenoid joint is a synovial joint plays an important role in respiration and phonation.

Arytenoid cartilage Pyramid shaped cartilage with their apices superiorly, which support the corniculate cartilage. Vocal process-anterior projection to which vocal ligament attaches. Muscular process-laterally to which intrinsic muscles are attached.

Corniculate and Cuneiform cartilage The Corniculate cartilage (of Santorini)-small conical nodules of fibroelastic cartilage articulates with the arytenoid through synovial joint.

The Cuneiform cartilage (of Wrisberg) -small elongated flakes of fibroelastic cartilage at the free margins of aryepiglottic fold.

Epiglottis

It is a fibroelastic cartilage forms a leaf like protective covering over the laryngeal inlet. It flops down and approximates with the arytenoid cartilages to cover the glottis inlet during swallowing and prevents aspiration of food and water into the airway. Suprahyoid epiglottis is its upper free end which lies above the hyoid bone and infrahyoid epiglottis is its lower half. It is attached to the thyroid cartilage by the thyroepiglottic ligament just above the anterior commissure of the glottis .It has two surfaces- the lingual and a laryngeal surface. There are several pits like depressions over the laryngeal surface which also have taste buds on it.

Preepiglottic space of Boyer

A triangular shaped potential space anterior to epiglottis ,which contains fat and bounded anteriorly by thyrohyoid membrane ,superiorly hyoepiglottic ligament and posteriorly by infra hyoid epiglottis. Ligaments and membranes of larynx Extrinsic ligaments-Connects laryngeal cartilages to the hyoid above and trachea below.

Thyrohyoid membrane

It is a fibrous layer between superior border of thyroid cartilage and body of hyoid bone . It is thickened medially and laterally to form medial and lateral

thyrohyoid ligament. It is pierced by internal branch of superior laryngeal nerve and superior laryngeal vessels.

Cricothyroid membrane

It connects upper margin of cricoid cartilage to the lower margin of thyroid cartilage. Its median condensation is cricothyroid ligament. Cricothyrotomy is done for emergency airway access. In muscle tension dysphonia cricothyroid space gets obliterated and tender due to excessive tightness of muscles.

Intrinsic ligaments-Connects laryngeal cartilages together. Upper Quadrangular membrane –It forms medial wall of pyriform fossa. Upper margin forms the framework of AE fold and lower margin is thickened and folds inwards to form vestibular ligament . Conus Elasticus-cricothyroid ligament ,its upper free border rolls medially to form vocal ligament and is attached below to the upper border of cricoid cartilage.

Muscles of larynx

It is divided into two groups,The extrinsic muscles provides stabilization of laryngeal framework.Suprahoid group – mylohyoid, digastric, geniohyoid and stylohyoid elevates the larynx.

Infrahyoid group-strap muscles: sternothyroid, thyrohyoid , sternohyoid and omohyoid depresses the larynx The Intrinsic muscles alter

the shape ,tension and position of vocal folds ,grouped as adductors ,abductors and tensors of vocalcord. Adductors are lateral cricoarytenoid , thyroarytenoid and inter arytenoid. The sole abductor is posterior cricoarytenoid and Tensor is cricothyroid. All are supplied by recurrent laryngeal nerve except cricothyroid which is supplied by external branch of superior laryngeal nerve.

Lateral cricoarytenoid -

Extends from anterior part of muscular process of arytenoid to the superior surface of cricoid laterally .Its contraction results in downward and medial rotation of vocal process causing its adduction and lengthening.

Thyroarytenoid

It forms main bulk of vocal folds.It has two bellies-internus or vocalis muscle which arises from anterior commissure and inserts to vocal process of arytenoid. Its contraction causes shortening and thickening of vocal folds. Externus arises from lower half of thyroid cartilage and inserted into base of arytenoid cartilage.

Interarytenoid

Unpaired muscle run between two arytenoids, consists of transverse and oblique fibres. Its contraction causes adduction of vocal folds ,closure of posterior glottis by rotation of arytenoids medially .

Posterior cricoarytenoid

It is a sole abductor of vocal folds , paralysis of muscles on both sides can leads to respiratory distress. It arises from the posterior face of the cricoid lamina and runs diagonally to insert into posterior surface of muscular process of arytenoid horizontal belly into medial aspect of muscular process causing true abduction vertical belly into its lateral aspect maintaining arytenoids upright and regulating vocal fold length and tension.

Cricothyroid

It is the tensor of vocal folds .It has two bellies , pars recta more vertical component medially from superior rim of cricoid to the inferior rim of thyroid and Pars oblique runs obliquely from superior arch of cricoid to inferior cornu. Its contracts and pulls thyroid forwards causing stretching and tensing vocal folds . It is supplied by external branch of superior laryngeal nerve.

As per Semons law the weight of abductors is not more than 25% of the weight of the adductors which explains the greater vulnerability of the abductors⁽¹⁾ in partial injury to the recurrent laryngeal nerve.

Interior of larynx

Larynx extends from laryngeal inlet to the beginning of the lumen of the trachea at the lower border of cricoid cartilage and it is divided into three

zones. The supraglottis which extends from the laryngeal inlet to the ventricle, the glottis which is constituted by the true vocal folds and the subglottis which extends upto to the lower border of the cricoid cartilage. The aryepiglottic folds with free margin of epiglottis and mucosa in between the arytenoids forms the inlet .

The sinus of the larynx is situated in between vestibular and vocal folds and it is elongated in the anterior part as Saccule. The saccule is known as the oil can of larynx as it contains mucous glands. The mucous glands are situated all over the membrane more so over the posterior surface of epiglottis and saccule but devoid over the vocal cords. The vocal cords are lubricated by the saccule.

Spaces in the larynx

Ventricle

It is the space between true and false vocal fold. A tumour in this area is usually missed during IDL examination and it will spread easily to paraglottic space and get upstaged .

Pre epiglottic space of Boyer

It is a triangular shaped potential space anterior to the epiglottis. Thyrohyoid membrane anteriorly ,infrahyoid epiglottis posteriorly and

thyrohyoid ligament superiorly. Malignancy infiltrated here is less sensitive to radiation alone.

Paraglottic space of Tucker

It lies on either side of glottis bounded laterally by thyroid cartilage and cricothyroid membrane and posteriorly by mucus membrane of pyriform sinus. Anterosuperiorly it communicates with preepiglottic space. The spread of malignancy here is a relative contraindication for LASER excision.

Reinkes space

It is a sub epithelial potential space composed of loose fibrous tissue , lying between the vocal ligaments and overlying mucosa. The Reinkes edema occurs as a result of chronic irritation due to smoking or as a manifestation of myxoedema in hypothyroidism

CELLULAR PHYSIOLOGY OF VOCAL CORDS:

For understanding the aetiopathology of various clinical conditions knowledge of the macro and microscopic anatomy as well as physiological process is essential.

The true vocal folds are shelves of tissues over the thyroarytenoid muscle and as such have a four layered complex structure :the epithelium , reinkes space, vocal ligament and vocalis muscle. The epithelium over

anterior vibratory portion of larynx is stratified squamous epithelium and in posterior glottis is pseudostratified ciliated epithelium. The supra and subglottic areas are lined by respiratory pseudostratified ciliated columnar epithelium.

The vocal cord epithelium is 5-25 cell thick. The basement membrane serves as a transition zone between epithelium and reinkes space. Anchoring filaments made of type IV collagen and fibronectin secure lamina lucida to the lamina densa which are two layers of basement membrane. Anchoring fibrils made of type VII collagen loop between lamina densa and underlying lamina propria. These fibrils providing structural integrity are more dense at midmembraneous region where maximum phonotrauma occurs.

The luminal layer of the mucous blanket is composed of mucin molecules ensuring adequate moisture and lubrication of vocal folds. The inner serous layer has high water content and is in direct contact with epithelial cells. Inhibition of mucociliary clearance can lead to impaired function of upper respiratory tract.

The serous layer which is the underlying layer of mucociliary blanket shows a higher percentage of water. It has been shown that one puff of cigarette can slow the clearance of mucociliary blanket to lower than normal levels⁽²⁾. This slow clearance of mucociliary blanket exposes the underlying epithelium to more toxins, inflammatory agents and dehydration.

THE LAMINA PROPRIA

Beneath the basement membrane is lamina propria having three layers, the Superficial layer or Reinkes space-acellular, made up of loose fibroareolar tissue of elastin and collagen. The gelatinous nature of this layer provides viscoelasticity needed for vibration and allows to vibrate smoothly at high speeds over the underlying vocal ligament and vocalis muscle(body).this is the basis for HIRANO'S BODY COVER theory

In vocal fold lesions like nodules or polyps the area of insult is limited to epithelium and superficial layer of lamina propria , healing process results in a minimal effect on vocal fold function because fibres are restored parallel to epithelium .if the injury or surgery involves deep layer then the scar can develop perpendicular to epithelium causing vocal fold stiffness and permanent voice change.

Intermediate layer-mostly composed of elastin fibres and deep layer – collagen and fibroblasts together forms vocal ligament. Deep to vocal ligament lies the vocalis muscle which is the main bulk of vocal fold.

In a newborn there is loose pliable and thick lamina propria with no evidence of vocal ligament. Differentiation between the two layers of vocal ligament starts between 6 and 12 years. After adolescence three layered lamina propria becomes evident.

Electron microscopy has shown several arterio- venous shunts that are present in the vocal fold micro circulation. These allow auto regulation of blood flow to this area ⁽³⁾. With increasing age elastic fibres in the intermediate layer becomes atrophied and thinner and collagenous fibres of the deep layer becomes thicker and denser ,vocalis muscle tends to atrophy. Myofibroblasts are fibroblasts that are cells of repair found in a higher density in superficial layer and are capable of repairing minor injuries efficiently by taking voice rest for 2 -3 days for repair.

NON MALIGNANT LESION OF LARYNX

It as defined as any tissue or mass in the larynx which does not present with the characteristic of malignancy is called as non malignant lesion of the larynx.⁽⁴⁾

BENIGN NEOPLASTIC LESIONS

EPIDERMAL	NEURAL	GLANDULAR	VASCULAR	CARTILAGENOUS	MISCELLANEOUS
Papilloma	Neurofibroma	Oncocytic tumour	haemangioma	chordoma	Lipoma
	Schwannoma				Fibroma
	paraganglioma				Rhabdomyoma

BENIGN NON NEOPLASTIC LESIONS				
CONGENITAL	TRAUMATIC	INFLAMMATORY	GRANULOMA	MISCELLANEOUS
Laryngocoele		Keratosi	Bacterial	Sarcoidosis
Saccular cyst		Vocal polyp	Tuberculosis	Amyloidosis
Lymphangioma		Vocal nodule	Hansens disease	Wegeners granuloma
Laryngeal webs		Reinkes edema	Syphilis	
Congenital subglottic stenosis		Intracordal cyst	Rhinoscleroma	
Subglottic haemangioma		Contact ulcer	Fungal	
Laryngeal and laryngotracheo esophageal cleft			Rhinosporidiosis	

General Consideration:

Benign lesions can be either proliferative or stenotic lesion.

Proliferative lesions can be a polyp, granulation, or a mass lesion while stenotic lesion can be a web, cleft or a stenotic segment.

Two outcomes of these lesions symptomatically are

- 1) Phonatory dysfunction
- 2) Obstructed airway.

Benign neoplastic lesion: 85% of benign neoplastic lesions are papilloma of larynx, of which 25% were recurrent respiratory papillomatosis.

Adult papilloma

The adult papillomas are solitary or more localized so called carpet variant. Mostly small and less aggressive in behaviour. Doesn't show typical exophytic growth but a velvety appearance with little projection from surface. It occurs on the vocal cord. Endoscopic removal usually cures. It consists of fronds of connective tissue covered by well differentiated squamous epithelium, no invasion of stroma or submucosa. More frequent for Malignant transformation.

The adult type and children type are histologically the same, but tumour behaviour is different and they belong to clinically different groups. These neoplastic lesions are due to the human papilloma virus (subtypes 6 and 11) and frequently recur. Found at areas of transition in the upper aerodigestive tract where there is increased air turbulence, drying and cooling of mucosa, and at the change of ciliary to squamous epithelium. CO₂ LASER is the treatment of choice.

Recurrent respiratory papillomatosis.

Most common benign neoplasm of larynx and majority of infections are by HPV 6 and 11. Type 11 is more aggressive, more frequently need surgery and high risk of tracheopulmonary involvement. Both juvenile and adult forms are present, but juvenile form has more aggressive clinical course. Common sites are midzone of laryngeal surface of epiglottis, upper and lower margins of ventricle and under surface of vocal folds. Usually presented with hoarseness and airway obstruction. On laryngoscopic examination exuberant tissue that resembles miniature cluster of grapes may be seen on the anterior part of true vocal folds, false cord or epiglottis.

Jones and colleagues found that 84% of the benign laryngeal tumours they managed were papillomata. Shah and associates studied association between genital condylomata and RRP and found that only 1 in 400 children at risk because of maternal infection suggests low infectivity. In children there is a female preponderance. Jones, Myers and Barnes⁽⁵⁾ found that 84% of the benign laryngeal tumours they managed were papillomas

The virus may remain in the basal layer of mucous membrane after infection and will replicate by a process known as Episomal maintenance, where virus is undetectable but with the help of DNA hybridization⁽⁶⁾ we

can be determine the presence of virus. In the McMillan and associates study CO2 or pulsed dye LASER was used. Early edema was found to be less as they coagulates microvasculature leaving the epithelium intact. Regression is by deprivation of nutrients and oxygen.

Natural history: The transmission occurs from mother with genital warts to child in about 60% of cases. Remission can take place at any age unrelated to treatment and relapse can occur at any age. Malignant transformation is very rare⁽⁷⁾ and usually seen after radiotherapy and in smokers.

Management: CO2 LASER remains the most widely accepted management

Adjuvant therapy:

- Systemic Cis-Retinoids -The recurrence rate is reduced
side-effects - skin excoriation
- Indole-3-carbinol a natural derivative of cruciferous vegetables ,
cabbage and broccoli.
- Interferons – decrease in recurrence
temporary remission.

- Avidano and Singleton⁽⁸⁾ reported the use of Methotrexate in

Severe RRP not responding to interferon or cis retinoic acid.

- Intralesional cidofovir

Neurofibroma– Supance and colleagues reported that solitary neurofibroma not associated with Von Recklinghausens were more common. Most common site are arytenoid or aryepiglottic fold .Most common symptoms are hoarseness of voice , Dyspnoea and dysphagia are the other features. Surgical excision is the treatment .External approaches such as lateral pharyngotomy, laryngofissure or lateral thyrotomy may be needed in larger tumours.

Laryngeal paraganglioma

It arises from paired superior and inferior paraganglia and it is situated in relation to superior laryngeal nerve and loop of Gallen. Usual presentation is small red painful mass located on the aryepiglottic fold. There will be radiating pain to the ear which resolves by excision. They are very vascular and may bleed if injured .Treatment is Excision by open surgical technique or endoscopic removal.

Hemangioma

The haemangioma should be differentiated from granulation tissue in all cases. It is of two types - juvenile and adult forms.

The juvenile type occurs in children in subglottic area and remission can occur. Infants with laryngeal hemangioma will often have associated cutaneous hemangiomas. It is the most common neoplasm of infantile airway. Mainly two types- Involuting type regresses by the age of 1 yr, but noninvoluting type grows along with child and never regresses. They usually presents with biphasic stridor or pseudocroup within first 6 months of life.

On direct laryngoscopy a mucosa covered mass with or without bluish discoloration in subglottis which shrinks with administration of adrenaline and compressable on palpation. Systemic steroids has been found to be effective,if not respond in 2-3 weeks look for other modalities such as endoscopic surgical excision preferably with laser is done. But in adults due to the bigger diameter of vessels, this is less successful.

The adult type lesion occurs in the glottic or supraglottic areas, producing hoarseness and stridor and is treated by open surgical excision.

Miscellaneous Tumours

The chondroma, a smooth, encapsulated mass which occurs between the age group of 60-70 yrs. Male:Female ratio 4:1. about 20% of them are malignant. Most commonly affected part is Cricoid cartilage. The treatment of choice is wide excision. Other rarely seen tumours are

lipoma, fibroma and rhabdomyoma .Granular cell tumours occurs between 30-50 years of age. It may be congenital, neoplastic or degenerative. They are having granular cytoplasm which is PAS positive with pseudo epitheliomatous hyperplasia. The treatment of choice is Surgical excision.

BENIGN NON-NEOPLASTIC LESIONS

Congenital Lesions: Laryngocele

Abnormal dilatation of the saccule, an anterior appendage of the laryngeal ventricle is called laryngocele. Any obstruction in the laryngeal ventricular lumen⁽¹²⁾ traps air inside the sac producing laryngocoele. It is commonly seen in adult males such as trumpet players ,glass blowers and in people using unusually forceful ways causing increase in transglottic pressure . Ratio is 5:1 in favour of males⁽¹¹⁾ Usually asymptomatic, it can presents with hoarseness ,foreign body sensation throat,neck swelling ,cough ,stridor or dysphagia based on whether it is internal ,external or combined.

On examination submucosal swelling that protrudes from anterior ventricle or deep within false vocal fold which increases on doing valsalva - BRYCE'S sign . if it extends through the thyrohyoid membrane ie, external

type a mass will be palpable in the lateral neck which reduces on compression with hissing sound..

The fluid filled laryngocele is called saccular cyst which can get superadded infection is called laryngopyocoele⁽¹³⁾. CT allows delineation of cystic and laryngeal architecture, MRI allows better characterization of soft tissue abnormalities. Management is surgical, If presents in stridor secure the airway. Either via classical lateral external approach or endoscopically using CO2 LASER.

Laryngeal cyst - The laryngeal cysts are classified as saccular, ductal and thyroid foraminal cysts. They are commoner in females⁽¹⁰⁾

Laryngeal trauma

More commonly seen in males in 2nd and 3rd decades due to participation in violent sports and other physical activities. With improved standards of road safety and increasing violent crimes in community, incidence of penetrating injury is more than blunt injuries. Most common presenting symptoms are dyspnoea, dysphonia followed by dysphagia, neck pain and haemoptysis. In penetrating injuries neck wounds, bleeding and expanding haematomas, hypovolemic shock.

EXTERNAL TRAUMA		INTERNAL TRAUMA	
BLUNT INJURY	PENETRATING INJURY	ACCIDENTAL INJURY	IATROGENIC
Seat belt trauma in Road traffic accident	Cut throat injury	Ingestion of corrosives	Traumatic Intubation
Strangulation	Gunshot wounds	Inhalation of toxic gases	Cricothyroidotomy or routine tracheostomy
Fall on a blunt object		Exposure to fire	
Clothesline injury			
Sports injury			

Healing by secondary intention results in scarring , subluxation and ankylosis of arytenoids and cricoarytenoid joint ,fibrosis of laryngeal muscles, anterior and posterior glottis webbing, supra and subglottic scarring .Neural injury can leads to muscle palsy ,Cartilage fractures may heal by secondary intention . Primary goal is to ensure the airway.as tracheostomy will enable examination of site of injury ,it is preferred than blind endotracheal intubation which cause complete laryngotracheal separation in

a partially transected airway .Once airway is established and stabilization of patient, CT and MRI to assess the larynx. CT angiography in penetrating injury cases. Surgery is aimed at airway preservation ,prevention of secondary sequelae of healing and restoration of function via repair of endolaryngeal and other concomitant injuries.

INFLAMMATORY: caused by chronic irritation due to smoking, alcohol ,GERD, chronic upper and lower respiratory tract infection, voice abuse or misuse.

Keratosi:

It is an inflammatory disease of the epithelium of vocal cords due to chronic hyperplasia and hyperkeratosis .Its risk factors includes smoking , alcohol, GERD, and HPV infection. Confluent or patchy white plaques may be seen on examination. Treatment- surgical excision by coldsteel or LASER .Histological diagnosis is mandatory to exclude dysplasia and malignant change.

Vocal nodules



These are benign small nodular swellings on medial edge of vocal fold at its junction between anterior and middle third . It occurs most commonly in middle aged women and in boys and is mostly bilateral .Intrinsic talkativeness correlate more constantly than occupation ,unless occupation is extraordinarily demanding vocally such as rock singer, stock trader .It is frequently seen in children with cleft palate as they use glottal stops to compensate for velopharyngeal incompetence. Laryngopharyngeal reflex has also emerged as a major contributory factor . Inhalational and nutritional allergens may also contributes to this.

Pathophysiology-vibration that is too forceful or prolonged causes localized vascular congestion with edema at the midportion of the membranous portion of vocal folds ,where shearing and collisional forces are greatest. Fluid accumulation in the submucosa from acute abuse or overuser results in submucosal swelling ,incipient or early nodules . Long term voice abuse leads to hyalinization of the potential space of reinke and thickening of overlying epithelium with increased deposition of type IV collagen and fibronectin. This explains the easily reversible nature of most acute ,nonhaemorrhagic swellings in contrast to slower incomplete or failed resolution of chronic nodules.

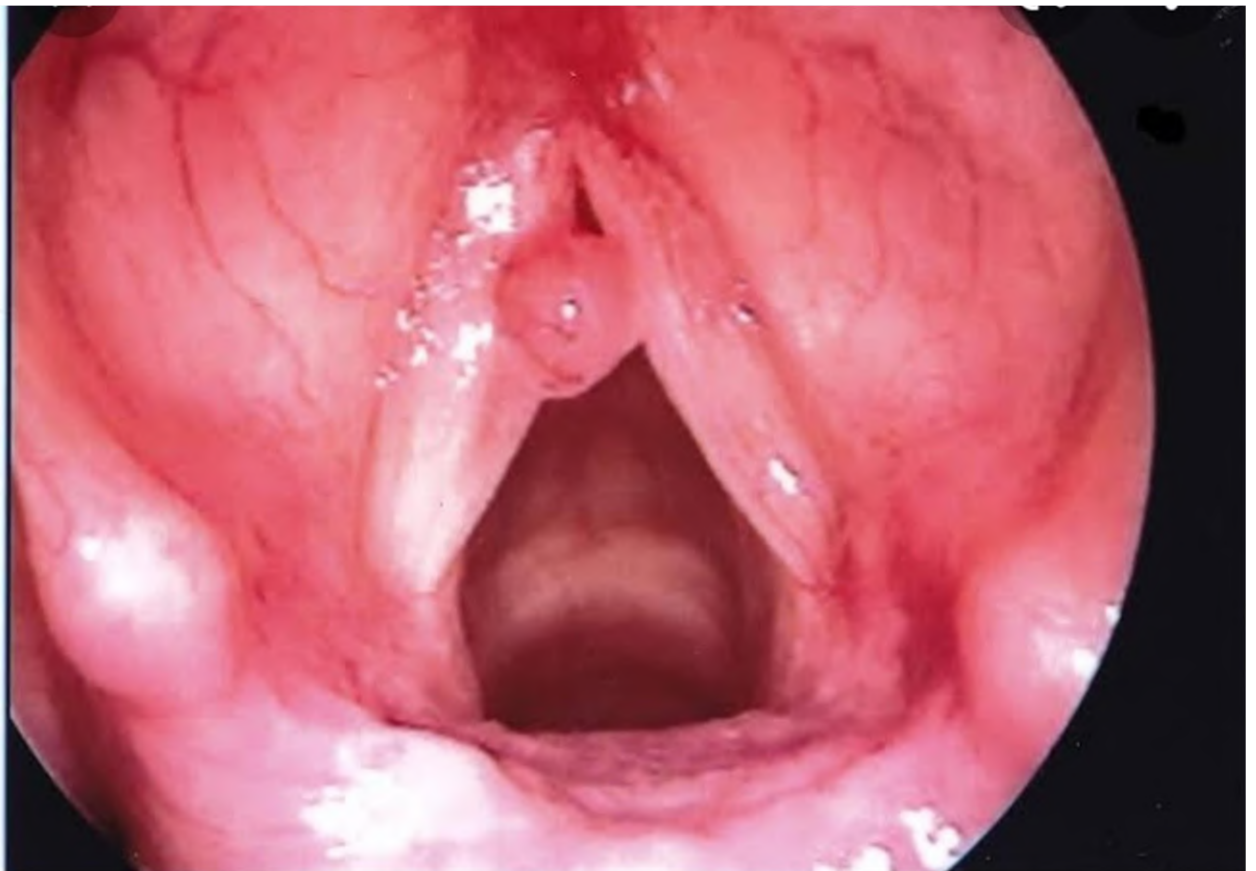
Symptoms :hoarseness of voice ,increased breathiness ,roughness and harshness ; Increased effort for speech.

Management: Conservative – primary treatment is Speech therapy in the form of vocal education and hygiene, good laryngeal lubrication through adequate hydration ,treat allergy and reflux.

Surgery : Microlaryngeal excision or LASER becomes an option when nodules of any size persists with unacceptably impaired voice even after adequate trial of conservative treatment for 3 months.

Vocal polyp

It is usually unilateral benign swelling sessile or pedunculated involving the free edge of the vocal fold. It is more common in men in between 30-40 yrs , those who engaged in work at noisy environments with intermittent severe voice abuse. In addition to phonotrauma smoking, reflux and prolonged use of anticoagulants predisposes its formation. It presents with varying degree of hoarseness , pitch break and loss of range.



Pathophysiology: shearing forces that act on capillaries within the mucosa during extreme vocal exertion leads to capillary rupture. Breakage of superficial capillaries leads to thin widely suffused bruise which resolves within 2 weeks .If extravasation of blood from a deeper capillary leads to focal accumulation of blood ,alters the margin contour and stiffens the mucosa. Long standing haemorrhagic polyp may loose their vascular appearance and may become pedunculated , moving in and out with respiration.

On videostroboscopy mucosal waves are found to be normal in 80 % of polyps, which helps to differentiate it from the vocal fold cysts where it is diminished or absent in all cases.

Management: Acute haemorrhagic polyp may shows signs of remission with low dose steroids and voice rest, treat acid reflux ,voice therapy to instruct voice care . Most polyps requires Microlaryngeal excision or LASER excision.

Vocal cysts

It may be congenital or acquired due to phonotrauma. Glottis subepithelial cysts may be mucous retention cysts or epidermoid cysts. Voice of patient is typically very hoarse , disproportionate to apparent size of lesion. On

stroboscopic examination , the epithelium seen moving over the lesion like an egg in a soup ,hour glass closure pattern seen. Management: if symptomatic , surgery is the definitive treatment.

Comparison between mucus retention and epidermoid cysts		
Cyst type	MUCUS RETENSION CYST	EPIDERMOID CYST
Cyst wall	Cuboidal or columnar epithelium	Stratified squamous epithelium
Cyst content	Fluid	Keratin ,cholesterol
Etiology	Acquired ,blocking of duct of mucous gland	Congenital cell rests in SLPof remnants of 4 th and 6 th branchial arch Occasionally acquired through phonotrauma.
Size	May wax and vane in size	Constant in size
Location	Often medial vibrating edge or infraglottic	Often superior surface of vocal fold.

Reinkes edema

It is a form of chronic laryngitis characterized by accumulation of inflammatory gelatinous amorphous material in the reinkes space and it typically affects both the vocal folds along their entire length. Chronic smoking and voice abuse results in edema , vascular congestion and venous stasis causing diffuse polypoidal changes . It presents with low pitched gravelly voice , reduced pitch ,frequent clearing of throat. On laryngoscopic examination pale watery bags of fluid attached to the superior surface and the margins of the folds . Management: combined modality treatment surgery –Phonomicrosurgery /LASER , voice therapy and smoking cessation , TFT should be done if suspecting hypothyroidism.

Chronic granulomatous lesions

A number of granulomatous lesions may involve the larynx ,either primarily or as a part of a generalized affection .These may be attributable to bacteria (Tuberculosis, Leprosy ,Syphilis, Rhinoscleroma),to fungi (histoplasmosis , blastomycosis ,candidiasis)to an idiopathic cause(Sarcoidosis, Wegeners granulomatosis ,amyloidosis) .

Tuberculous laryngitis:

Tubercular laryngitis occurs secondary to pulmonary disease. Pathology –

Pathogenesis has two theories:

Sputogenic theory : Coughed up sputum lodges in the posterior commissure for a certain period of time causing disease due to mucosal invasion⁽¹⁶⁾.

Bloodborne or Hematogenous theory: As in miliary tuberculosis⁽¹⁷⁾.

Macroscopic : Diffuse congestion and edema of larynx predominantly affecting posterior 1/3rd of glottis with ulceration ,swollen arytenoids obscuring pyriform fossa, swollen or turban epiglottis ,inter arytenoid mammilations .

Microscopic : histopathological examination shows granuloma with caseating necrotic centers , Langhans type giant cells and acid fast bacilli..

Clinical features : dysphonia ,pain on speaking and swallowing. Diagnosis is made by biopsy of the laryngeal tissues .Treatment - Anti tuberculosis drugs and tracheostomy to secure airway if necessary.

Syphilis

Larynx is rarely involved, usually presented with hoarseness and dysphagia . On examination diffuse erythematous papules seen in secondary stage and nodular infiltrates coalescing into painless ulcers in tertiary stage with epiglottis and aryepiglottic folds being principally involved. Diagnosis by positive syphilis serology and treatment is with high dose penicillins.

Intubation granuloma

Granuloma after intubation can occur because of direct abrasion of the arytenoid perichondrium , a break in the mucosa covering it as a result of coughing on an endotracheal tube or long term pressure necrosis of the vocal process area . The granulomas are attached directly to the vocal process of arytenoid and are usually unilateral sessile bilobed lesions. Botox injections with voice therapy and acid reflux treatment .If present in advanced stage excise through Phonosurgery.

Contact ulceration

Saucer like lesion on the medial edge of vocal cord at the vocal process. There is no epithelial defect but is caused due to central indentation in the thickened mucosa over the vocal process. They results from injury to the thin mucoperichondrium over the vocal process from mechanical trauma from repeated high velocity impact of the vocal processes against each other

from chronic coughing, throat clearing talking in habitually low pitched , creaky hyperfunctional manner.

Granulomatosis with polyangitis

Formerly called as Wegeners granulomatosis is an immune disorder characterized by inflammation of small and medium vessels. In upto 25% larynx is affected with appearances of an inflammatory reaction initially, eventually granulomatous ulcers develops primarily at subglottis

Diagnosis-C-ANCA is specific with biopsy findings of necrotizing granuloma and vasculitis

Treatment is with steroids or cyclophosphamide . Intralesional steroids and radiate lesion cuts and dilatation will treat stenosis.

Treatment: Reduce the effect of laryngeal irritants ,treat respiratory tract infections and acid reflux and voice therapy.

Sarcoidosis

Laryngeal involvement in <5 % of cases, supraglottic structures being primarily involved. Diagnosis by demonstration of microorganism negative , non necrotizing granulomas in a biopsy specimen with concurrent evidence of multisystem involvement . Treatment is to ensure airway and systemic steroids.

Amyloidosis

Deposition of amyloid proteinaceous aggregates as a diffuse submucosal or subepithelial masses. They usually presents with dysphonia.

Diagnosis :Histologically confirmed by its affinity for Congo Red.

Treatment: Microlaryngeal surgery / LASER excision.

REVIEW OF PREVIOUS STUDIES DONE

Comparison of benign to malignant laryngeal lesions.

Author	Stewart ⁽¹⁸⁾	H.Shaw(19)
Year	1957	1979
Ratio	3:4	2:3

Comparison of non neo plastic lesion to neo plastic lesion

Author	Chathopadyay ⁽²⁰⁾	Shaw	Sellars
Year	1972	1972	1979
Total number of benign lesion	97	1505	743
Non-neoplastic	66	1300	205
Neoplastic	31	205	192

AGE – Benign tumours can occur at any age ,it frequently occurs 3rd – 5th

decade.

Author	Year	Lesions	Age
M. Nelson	1986	Reinke's Oedema	31-78
B .Benjamin ⁽²¹⁾	1985	Vocal cord Granuloma	10-69
M.Bouchayer ⁽²²⁾	1985	Epidermoid cyst and Sulci	5-59
Yates et al(23)	1984	Polypoid vocal cords	38-77

SEX:

Benign lesions are more common in males except in some studies like study by M.Bouchayer (1988).

Author	Kleinsausser ⁽²⁴⁾	Bruce bengamin ⁽²⁵⁾	Bouchayer
Year	1982	1985	1988
M:F ratio	3:1	4:1	1:4

AETIOLOGY:

Vocal abuse:

Faulty use of voice causes benign lesions of vocal cord. In teachers, singers, vendors vocal nodules are common . In pop singers, politicians and radio commentators contact ulcers are commonly seen. Due to forceful voice usage micro rupture in the vocal ligaments occurs and leads to polyp formation. (Harma 1975). Factors predisposes to polyp formation are excessive vocal use, faulty vocal technique and unfavourable environment of work (Kambic 1981). According to Walter and Larsen⁽²⁶⁾ (1984) vocal abuse is the most common cause for hoarseness in childhood .

Smoking:

Chronic inflammation due to smoking leads to vocal cord polyp and nodule formation. In 1979 Toriya⁽²⁹⁾ found significant association between smoking and development of sessile polyp and polypoidal changes in vocal cord.

Gastro esophageal reflux :]

One of the frequent complaint is morning hoarseness ,as is chronic cough that is worst at night . Other symptoms are bad taste in the morning, excessive phlegm, scratchy or dry throat irritation which is worse in the morning, habitual throat clearing. In severe cases ,vocal cord inflammation

occurs particularly in posterior commissure causing posterior laryngitis and also implicated in the development of granuloma and subglottic stenosis .

In 1984 Feder and Michell found that granulomas were caused by hyperfunction, hyperacidity and intubation.

Alcohol:

Risk is increased to approximately 50% by the combined exposure to both tobacco and alcohol. GERD is also aggravated by its usage.

Miscellaneous factors:

Other factors implicated in causing chronic laryngitis are allergy, infection and chronic sinusitis .

SYMPTOMS:

Majority of laryngeal lesions are presented with some kind of voice disorder. In 1957 Epstein ⁽³²⁾ studied 366 cases of benign laryngeal lesions and all of them had some kind of voice problem. Vocal fatigue and reduced vocal range are other associated symptoms . Usually patients reporting earlier aphonia is rare . Dyspnoea , cough, soreness and haemoptysis are also some of the symptoms.

VOICE DISORDERS:

Benign lesions can cause wide range of voice disorders varying from mild dysphonia to total aphonia. James A Kauffman⁽³⁴⁾ proposed a classification depending on the levels of vocal usage which helps in treatment protocol.

Level 1	Level 2	Level 3	Level 4
Elite Vocal performer	Professional voice user	Non vocal professional	Non vocal non professional
Singers, actors	Lecturers, clergyman	Doctors ,lawyers, teachers.	Clerk, labourer

Common vocal complaints are dysphonia or abnormal voice, aphonia (Loss of voice) , diplophonia or double tone , dysresonance or loss of resonance , vocal fatigue which is worsening of voice with prolonged use. Voice breaks or Pitch specific dysphonia , reduction in vocal range or dynamic range ,odynophonia which is painful phonation etc.

INVESTIGATIONS:

Evaluation of larynx is primarily and easily performed by endoscopy /stroboscopy , which allows excellent visualization of the mucosal surface and its abnormalities ,permitting guided biopsy of suspicious lesions and

allowing assessment of vocal cord mobility. Among various imaging CT and MRI play an indispensable complimentary role as these enable evaluation of the deep submucosal structures and spaces to assess deeper extent of lesions and visualize the laryngeal skeleton.

COMPUTED TOMOGRAPHIC SCAN:

Multi detector CT is the preferred imaging modality with known advantages of easy availability, high speed scanning which reduces artifacts by breathing and swallowing ,allowing excellent visualization of soft tissues and osseous structures which enables reconstruction of data in coronal, sagittal and axial planes. Contrast study is better for evaluation of tumours and detection of lymph nodes

MAGNETIC RESONANCE IMAGING:

The advantages of MRI are improved soft tissue definition, multiplanar imaging, and lack of ionising radiation. The use of coronal and sagittal planes has enhanced the ability to identify the intrinsic musculature and thereby increases recognition of subtle tumour extensions which is not identified previously . It is having better soft tissue delineation but less effective on bony defects. Disadvantages are its cost , failure to identify recurrence after radiotherapy.

The Gadolinium enhanced MRI gives vascular anatomy of lesions like neurofibroma. In neurofibroma which is having significant enhancement like other vascular lesions and due to abnormally permeable vessels causing leak of contrast into extra vascular tumour bed it falsely mimic vascular lesion.

BIOPSY:

Confirmation of non malignant lesion is by biopsy taken using endoscopy i.e. through flexible fiberoptic scope or rigid scope. Incisional, excisional or punch biopsy can be taken , Open excision biopsy is needed only rarely

ASSESSMENT OF VOCAL CORD MOBILITY:

FIBRE OPTIC VIDEO LARNGOSCOPY:

This is one of the most advanced technique done under local anaesthesia to visualize the entire anatomy including the vocal cord mobility during phonation. It is a less traumatic procedure which can be used in patients with neck stiffness & trismus. High resolution magnified image enable easy visualization of even minute details . It permits good documentation and teaching facilities.

STROBOSCOPY :

In the era of modern laryngology it is the most practical and widely accepted modality for viewing vibratory pattern of vocal folds worldwide.

A stroboscope is a tool used to assess different phases of motion, utilizing a pulsed light source. It is equipped with a tungsten filament, which emits brief pulses of light flashes for microseconds to illuminate the vocal folds. These short spells of bright light can be synchronized repetitively with the frequency of vocal fold vibratory cycle and can apparently freeze the motion to illuminate a particular phase of phonation. If the frequency of flickering light is synchronous with the phonatory frequency, the same phase of each cycle is illuminated and a stationary picture is produced. The phonatory frequency and amplitude are picked by a microphone and the video images are recorded by camera connected to laryngoscope.

For a standard stroboscopy there is a difference of 2-3 Hz between the frequency of phonation and triggered frequency of bulb so that subsequent phases of vibratory cycle get illuminated and perceive a slow pursuit motion of vibratory cycle.

When a number of images are presented to the human eye, each image persists for only 200 milliseconds on the retina after exposure. This suggests

that retina can process and perceive only 5 images in a second, subsequent images of shorter durations go unrecognized and are fused with successive images to produce an optical illusion .The fusion of these brief images by brain provides an apparent slow motion view of the vibratory function .This phenomenon of apparent motion is known as TALBOT’S LAW and forms the stroboscopic theory.

Advantages-recordings are easy to preserve ,use and interpret,it gives good visual feedback to the patients and can be used for early and accurate detection of glottis pathology,also detecting early recurrence .

Disadvantages – it highlights the superior surface of vocal folds only and is unable to evaluate the lower lip region when the upperlip is closing .It is not appropriate for a patient who has rapid changes in periodicity of voice .Patients with laryngeal tremor ,pitch breaks and diplophonia are also not ideal candidates .

ELECTROGLOTTOGRAM(EGG):

Electroglottography measures the conductance of a low frequency electric signal across the neck between two surface electrodes .The conductance of the signal varies with the vibration of the vocal folds: When the vocal folds contact each other the conductance increases ,the slope of the

resultant EGG trace is positive :as vocal folds separate the conductance decreases ,and slope is negative .The results are relative and donot measure glottal area or closure .The waveforms shape is potentially meaningful for describing the pattern of vocalfold vibration and many quotients to quantify the waveform have been proposed (eg open,skewing,contact)

Techniques for quantifying waveform have not yet been standardized because of technical challenges and difficulty relating EGG waveform to vocalfold motion.

Advantages -Determines the presence of glottic vibration ,the fundamental period of vibration and tracing is reproducible. It reflects glottal condition more correctly in closed phase. It measures the efficiency of glottal closure by graphically recording the contact time of the vocal folds. It shows the opening and closing rates of the vocal folds not well visualised by stroboscopy.

MANAGEMENT OF NON-MALIGNANT LESIONS:

Surgery forms the main modality of treatment especially microlaryngeal excision or LASER excision for most of these non malignant lesions of larynx ,therefore only in hospitals which has a microscope or LASER with good postoperative care is essenti

The available treatment modalities are Conservative management for lesions which can revert back to normal while LASER for lesions like vocal cord polyp and Endoscopic excision particularly micro laryngeal excision

LASER IN PHONOMICROSURGERY

It is an acronym for light amplification by stimulated emission of radiation. A LASER consists of three key components :the lasing medium-eg.CO2 , an excitation source- alternating electrical current , and a resonant chamber with a mirror at either end to create positive optical feedback. LASER energy is the result of electrons in the lasing medium transitioning from high to low energy states .The wavelength of laser depends on the lasing medium. Fundamental characteristics which differs LASER from ordinary light are Brilliancy-extremely intense

Coherence-all the emitted photons vibrate in phase both space and in time.

High collimation-all the photons travel in one direction with minimum dissipation of energy. This allows the emission of an extremely narrow beam ,which can be focused on a very small spot size.

Monochromaticity-the emitted light has only one wavelength. This allows precise targeting of chromophores while sparing the surrounding tissues.

Neodymium (Nd) doped Yttrium – aluminum Garnet (YAG) rod that emitted a laser near the infrared position of the spectrum is developed by Johnson ⁽³⁶⁾ in 1961 . The argon LASER was developed by Bennet ⁽³⁷⁾ . The Patel ⁽³⁸⁾ developed the Carbondioxide LASER in the far infrared portion .

The most common types of lasers used in laryngology are CO2 LASER ,potassium titanyl phosphate LASER (KTP),dye LASER, neodymium –doped yttrium aluminium garnet LASER (Nd:YAG).each type exhibits characteristic and different biological effects on tissue and is useful for different applications. The CO2 LASER is having wavelength of 10600nm is in the far infrared and has a high coefficient

of absorption by water ,so its energy is absorbed by all water containing tissues.CO2 LASER is developed by Kumar patel in 1964. The YAG is a solid state LASER that uses a crystal of Yttrium aluminum garnet. and is doped with 1% to 3% neodymium which serves as a actual lasing medium .It was real break through mainly due to its fiberoptic delivery system.

LASER coupled to the microscope offer an unobstructed view of the operation field as the surgeons hand and the instruments donot hamper the field of vision .There is minimal tissue manipulation and better hemostasis and precision. The use of LASER requires strict adherence to laser safety protocols and proper training of the medical staff to ensure effectiveness and safety . The face and all exposed skin surfaces must be covered with moist towels .Nitrous anesthetic must not be utilized during the case .Oxygen levels should be titrated to maintain saturations at the lowest possible oxygen concentration. There is also a significant cost associated with the installation of the equipment , maintenance and updating technical developments can be significantly more costly than using cold instruments.

MICROLARYNGEAL EXICION

Phon microsurgery is an attempt to preserve vocal fold function through minimal interruption of the basement membrane and SLP. General anesthesia is typically recommended with muscular relaxants (paralytic agents) can be administered to maintain motionless vocal folds during surgery .The smallest possible endotracheal tube ideally 5 size should be utilized during intubation .A flexed cervical-thoracic junction and extended atlanto-occipital joint ,described by Chevalier Jackson. a suspension laryngoscope with a microscope having 400mm objective lens. The type of laryngoscope used are Kleinsaussers suspension laryngoscope ,Hollinger and Dedo anterior commissure laryngoscope Lynch laryngoscope and Negur's laryngoscope to name a few.

Surgery is done with micro laryngeal instruments which must be fine, sharp and well maintained to limit the scarring risk. . Good exposure of the vocal fold is critical to obtain ideal results . Use of precise and reliable instrumentation with appropriate hemostasis is necessary for success. for obtaining hemostasis cottonoids soaked with adrenaline (1:100000) are placed on the resection site. Topical lidocaine is placed on the vocal folds to decrease the chance of laryngospasm .Voice rest in postoperative period atleast for 3- 5 days to reduce stress on surgical site and helps with early healing .Postoperatively they should undergo voice

therapy to prevent recurrence .They should be followed closely for 3 months as healing mostly occurs by this time and then at regular intervals for 1-2 years to assure compliance with their new vocal use regimen.

PRIMARY OBJECTIVE

The present study on non malignant lesions of larynx is undertaken to study— The incidence and distribution of cases according to age, sex, etiology ,occupation etc.

To study pathophysiology of the disease To study symptomatology of benign lesions of larynx To study about various diagnostic tools and modalities of treatment available

To study prognosis of the most frequent benign lesions of larynx along with follow up of the patients upto 6 months after treatment.

MATERIALS AND METHODS

This is a study conducted in the Thanjavur Medical College ,Department of Otorhinolaryngology between January 2020 – july 2021 . Thanjavur we receives a number of referred cases from all nearby district headquarters Govt. Hospitals.

We analysed 30 patients with benign lesion of larynx incuding both neoplastic and nonneoplastic lesions and selected patients with persistent hoarseness or other vocal symptoms for more than three weeks. All patients underwent a complete ENT examination and once suspected , that patients were examined under direct laryngoscope or fibreoptic laryngoscope and if needed microlaryngeal examination was also done. Benign non neoplastic lesions were treated by speech therapy ,voice rest, LASER , or excision biopsy and confirmed with biopsy results.

The benign neoplastic lesions underwent direct laryngoscopic examination and routine x-rays . If needed CT scan was done. The deserved cases underwent surgical procedures and management results were analysed. We analysed with all this information and obtained the aim of the study.

INCLUSION AND EXCLUSION CRITERIA :

Inclusion criteria: All patients in the age group of 15-65 years of both sexes with manifestations of benign lesions of larynx , who presented to the ENT OPD from January 2020 to July 2021.

Exclusion criteria:

All patients with lesions of larynx that showed features of malignancy,CNS pathology and all critically ill patients where excluded.

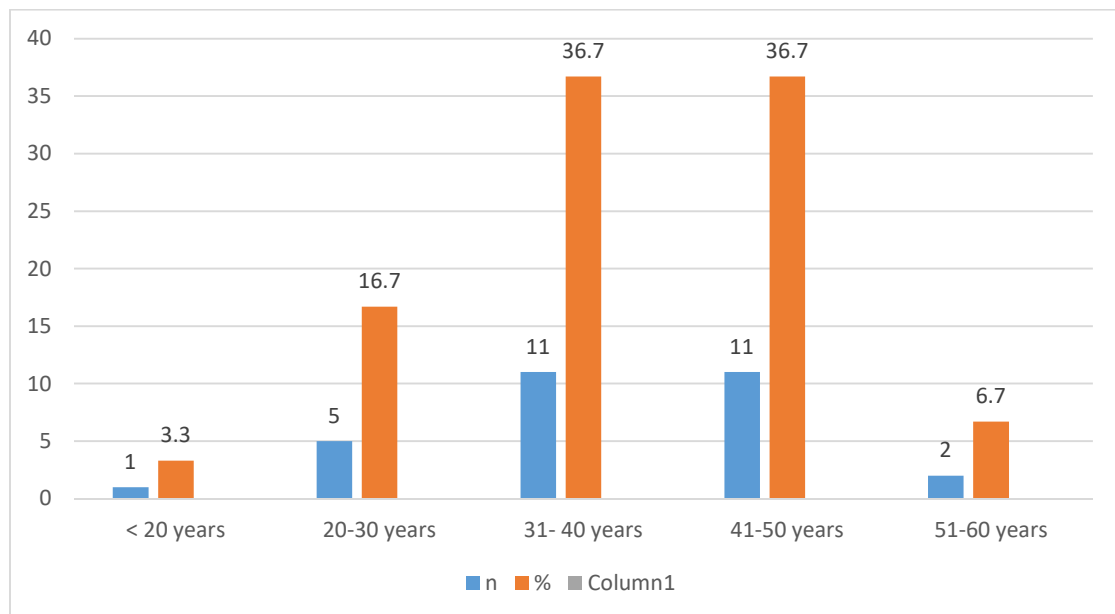
OBSERVATIONS AND DISCUSSION

Statistical analysis: The data were entered in MS office excel sheet and analyzed using SPSS version 16. Continuous data with normal distribution was expressed as mean with standard deviation. Categorical data were expressed as frequency with %. Fisher's exact test was used to compare the frequency between the groups. Unpaired 't' test was used to compare the mean values between the two groups. One way ANOVA with Bonferroni post hoc test was used to compare the variance between the four groups. $P < 0.05$ was considered statistically significant.

Table 1. Frequency distribution of age category noted in patients with benign lesions (N=30).

S.No	Age category	n	%
1	<20 years	1	3.3
2	20 – 30 years	5	16.7
3	31 – 40 years	11	36.7
4	41 – 50 years	11	36.7
5	51 – 60 years	2	6.7

Data are expressed as n with %.



Eventhough lesions are found in all age groups , it is more commonly seen in the third to fifth decades according to our study.

Table 2. Frequency distribution of gender category noted in patients with benign lesions of larynx (N=30)

S.No	Gender category	n	%
1	Male	17	56.7
2	Female	13	43.3

Data are expressed as n with %.

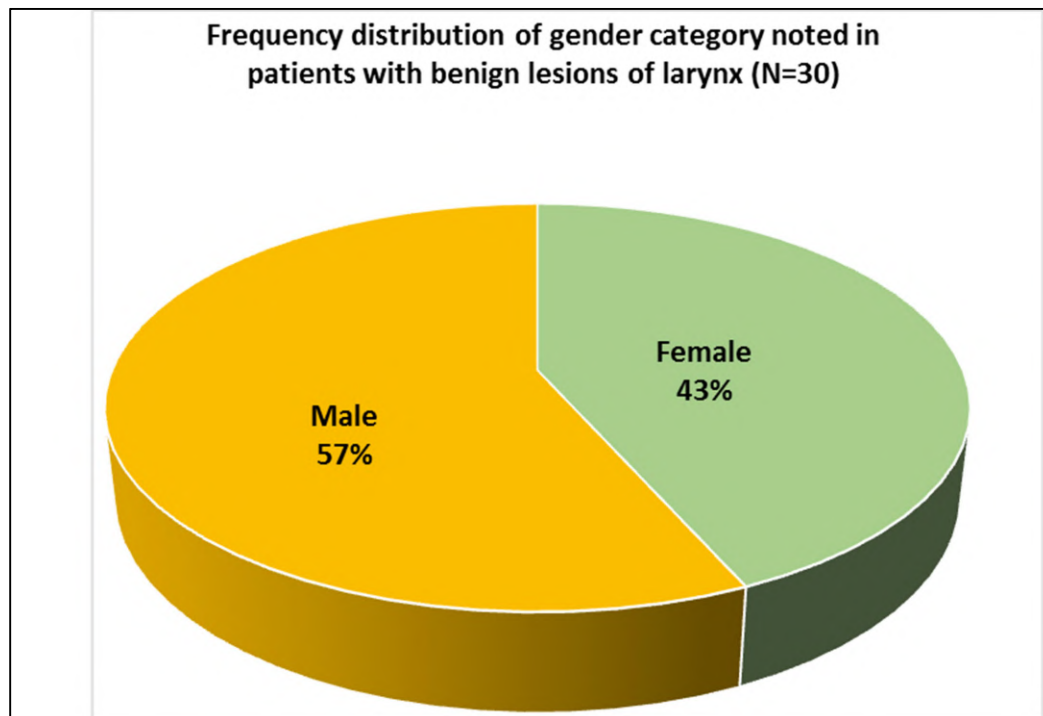
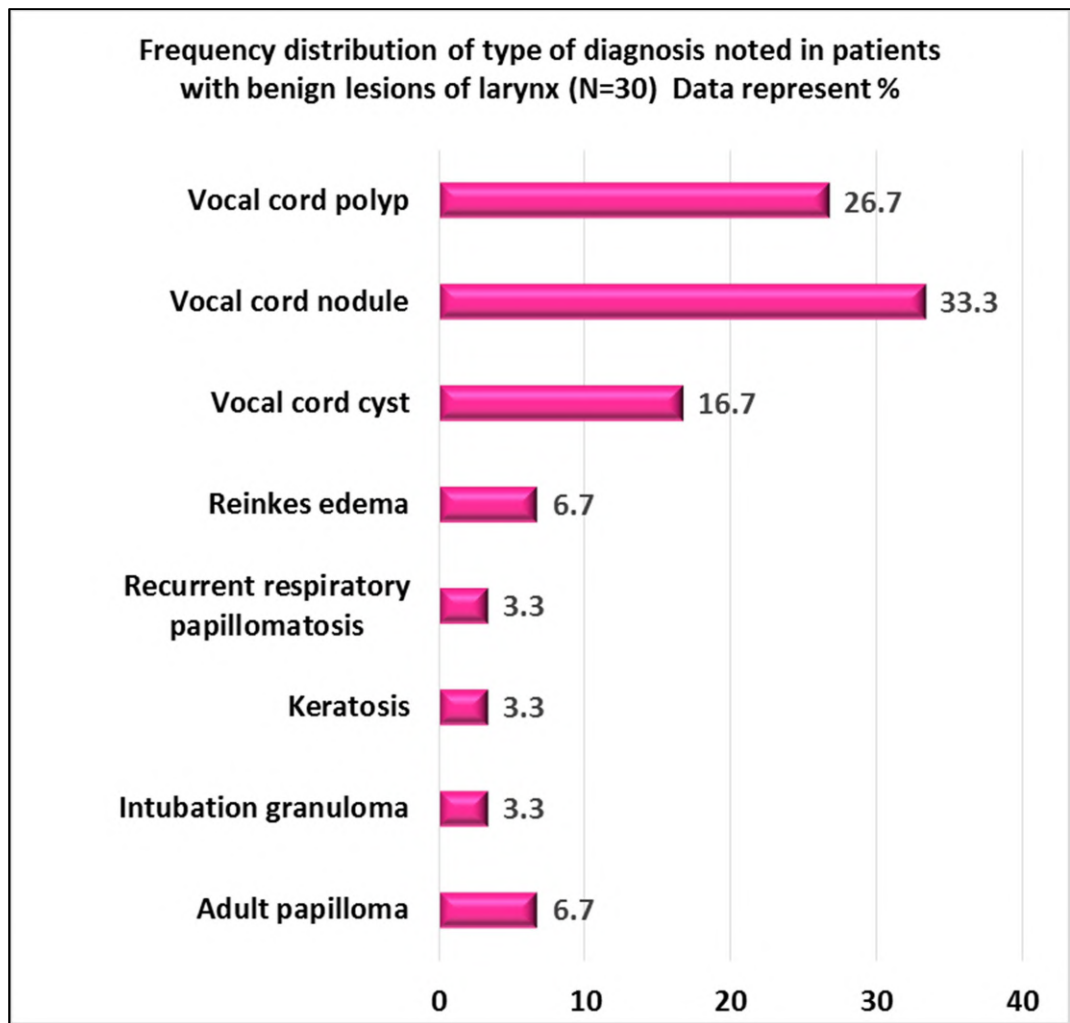


Table 3. Frequency distribution of type of diagnosis noted in patients with benign lesions of larynx (N=30)

S.No	Type of laryngeal lesion	n	%
1	Vocal cord nodule	10	33.3
2	Vocal cord polyp Intubation granuloma	8	26.7
3	Vocal cord cyst Keratosis	5	16.7
4	Adult pappiloma	2	6.7
5	Reinkes edema	2	6.7
6	Intubation granuloma	1	3.3
7	Keratosis	1	3.3
8	Recurrent respiratory papillomatosis	1	3.3

Data are expressed as n with %.



Vocal Cord nodule The most common lesion observed in our study was vocal nodule (33.3%) With size ranged from 1-3mm ,Six of them were less th an 2mm and Two of them were less than 1mm in size. Eight of them were bilateral and two were unilateral . Most of them were given voice therapy and rest , No recurrence was observed.

Vocal Cord Polyp:

The second most common lesion observed was vocal cord polyp (26.7%). Five of them were pedunculated and three were sessile. Two of them were of angiomatous type. Most of them underwent microlaryngeal excision and confirmed diagnosis with biopsy results. No recurrence was observed.

Vocal Cord Cyst:

Among the total five patients of cyst (16.7%), four of them were unilateral cyst. Most of them were treated by excision. No recurrence was noted.

Papillomas:

Two patients of Papillomas were observed in this study (6.7%). Both of them were males and the lesions were seen occupying the vocal cords. Both of them were excised by Microlaryngeal excision. No recurrence was noted.

Recurrent Respiratory Papillomatosis: Only patient case was analysed in the study period. Repeated micro laryngeal excision has been done for recurrence of lesion, also underwent tracheostomy for airway securing.

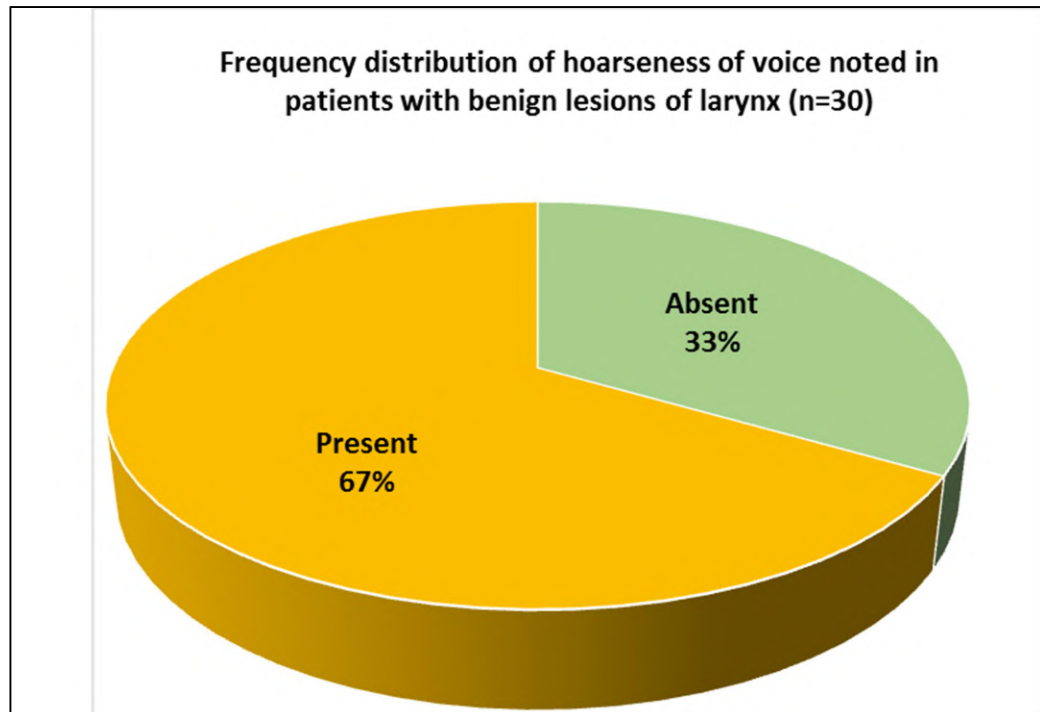
Intubation Granuloma:

One patient was observed with history of endotracheal intubation. MLE was done . No recurrence was noted in follow up period.

Table 4. Frequency distribution of hoarseness of voice noted in patients with benign lesions of larynx (n=30)

S.No	Voice Hoarseness	n	%
1	Present	20	66.7
2	Absent	10	33.3

Data are expressed as n with %.

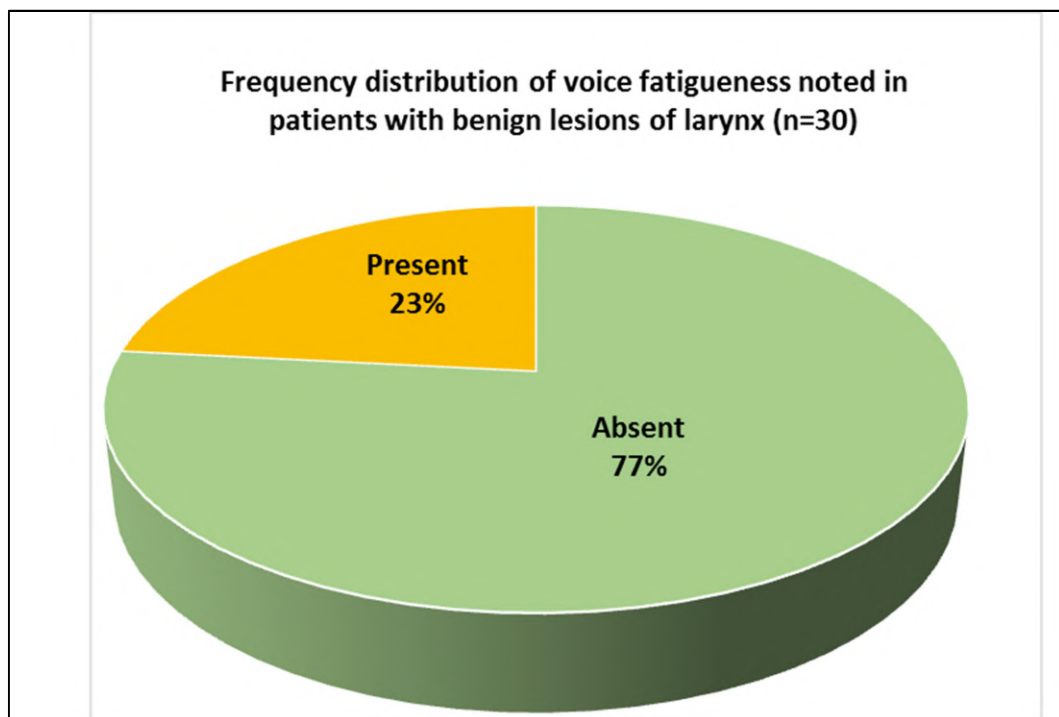


Hoarseness is the commonest and often the first symptom, which brings the patient to the clinician. Most of these patients are talkative and have a hyperkinetic personalities. In our study also it was most common symptom (66.7%)

Table 5. Frequency distribution of voice fatigueness noted in patients with benign lesions of larynx (n=30)

S.No	Voice fatigue	n	%
1	Absent	23	76.7
2	Present	7	23.3

Data are expressed as n with %.

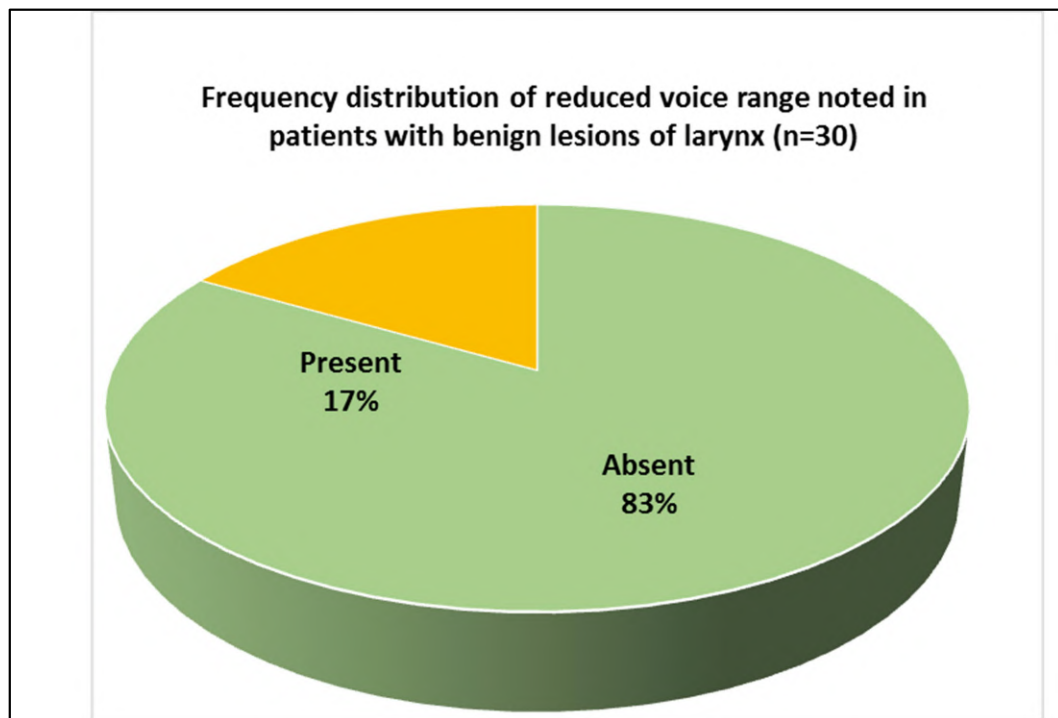


Inability to talk as previously and feeling of tiredness associated with talking is referred as Vocal fatigue and was found in about 23% of patients in our study

Table 6. Frequency distribution of reduced voice range noted in patients with benign lesions of larynx (n=30)

S.No	Reduced voice range	n	%
1	Absent	25	83.3
2	Present	5	16.7

Data are expressed as n with %.

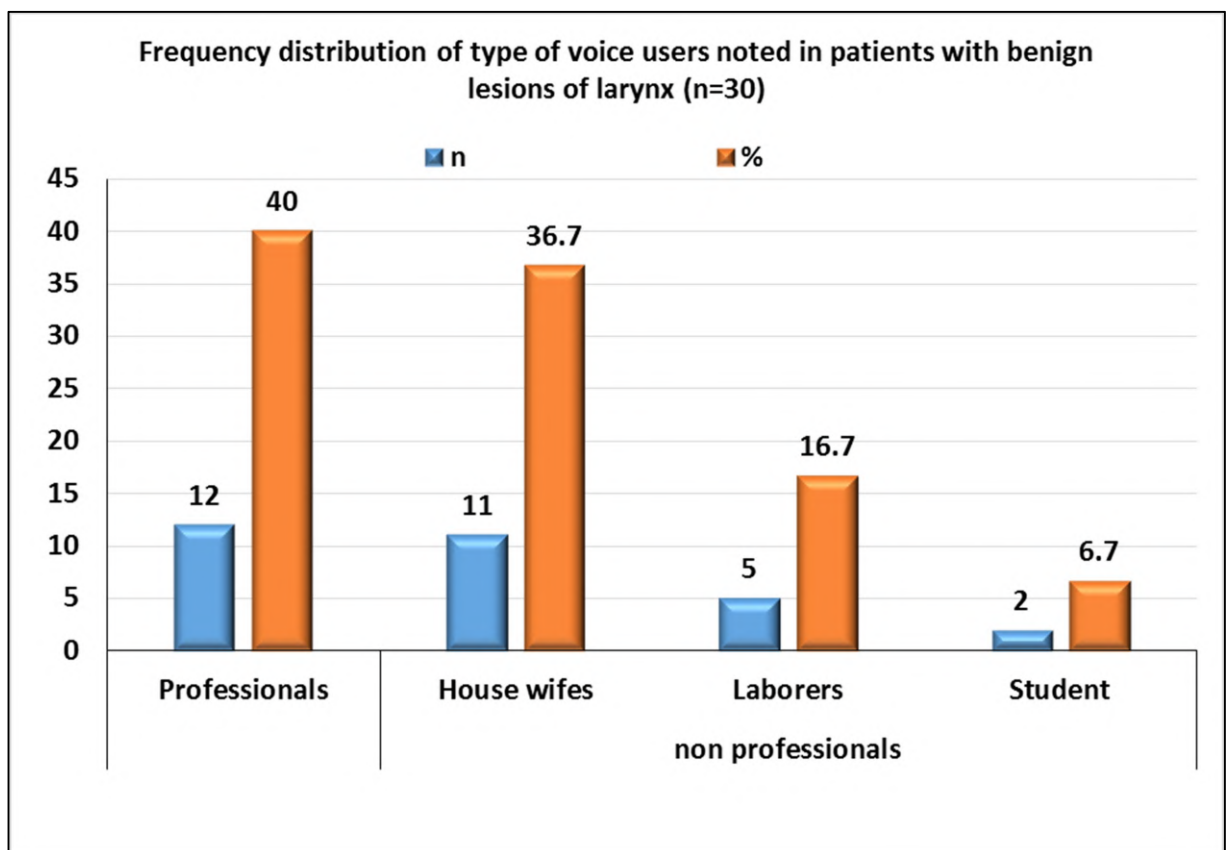


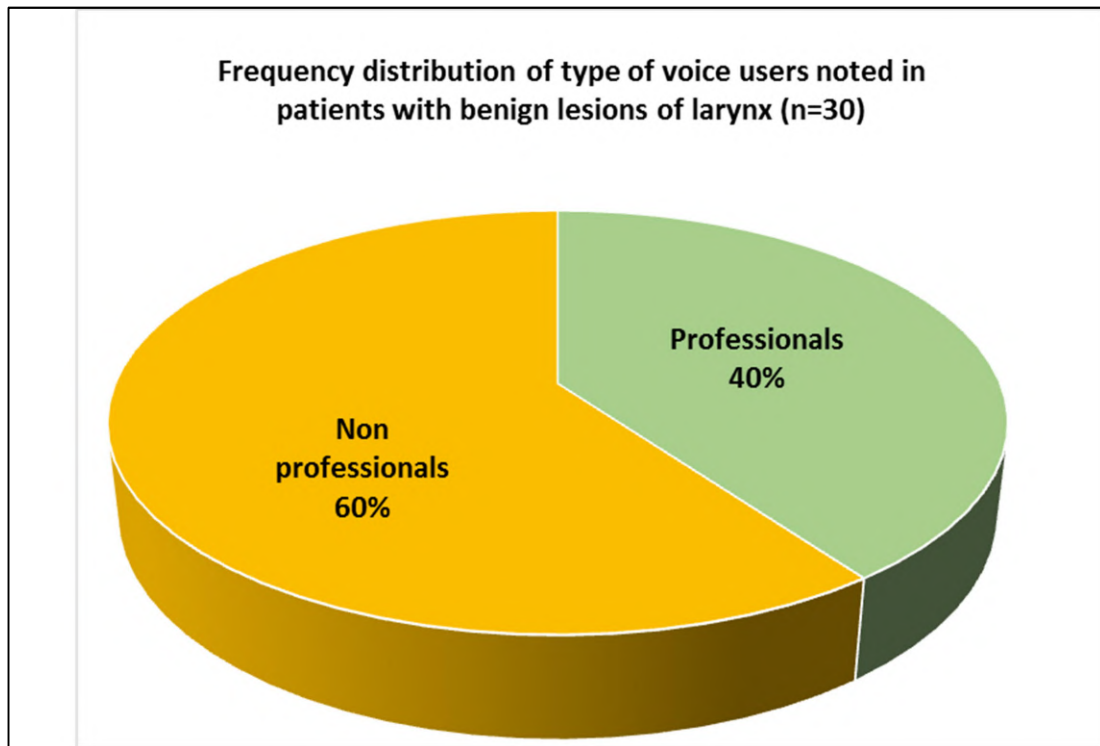
Reduced Vocal Range was present in about 17% of patients in our study.

Table 7. Frequency distribution of type of voice users noted in patients with benign lesions of larynx (n=30)

S.No	Type of voice users	n	%
1	Professionals	12	40
2	Non professionals		
3	Housewife	11	36.7
4	Laborers	5	16.7
5	Student	2	6.7

Data are expressed as n with %.





In our study the commonest occupation was house wife followed by manual labourers. Traditionally these lesions have been associated with professions like lawyers, Priests and Singers ,However now it is proved that these lesions can occur in any individual who are talkative, and have a tendency of voice abuse. Our hospital caters to the middle class and lower socio economic group. So an important point to be considered is that only housewives and labourers were most of our patients, hence the percentage of professional voice users in our study is less.

Table 8. Frequency distribution of smoking noted in patients with benign lesions of larynx (n=30)

S.No	Smoking	n	%
1	Absent	20	66.7
2	Present	10	33.3

Data are expressed as n with %.

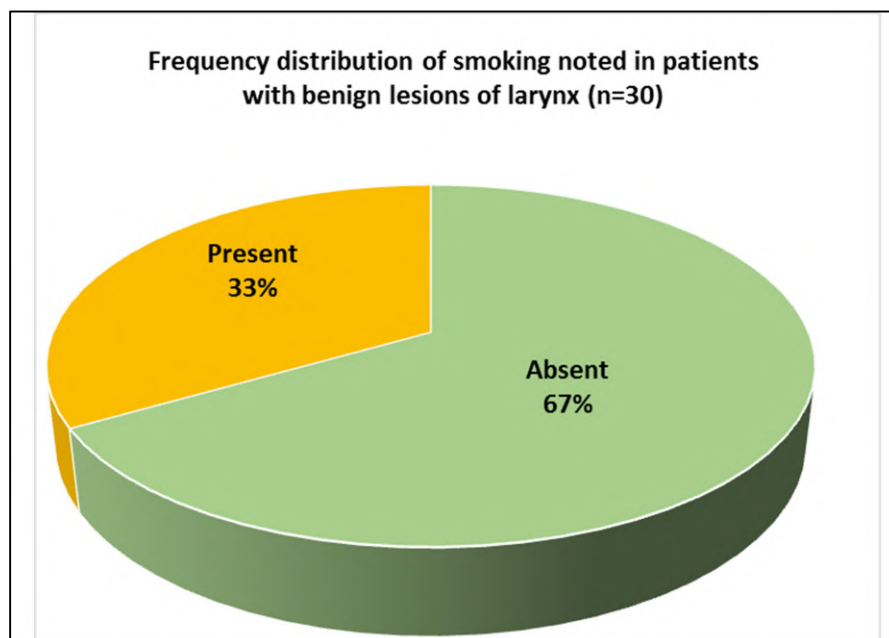
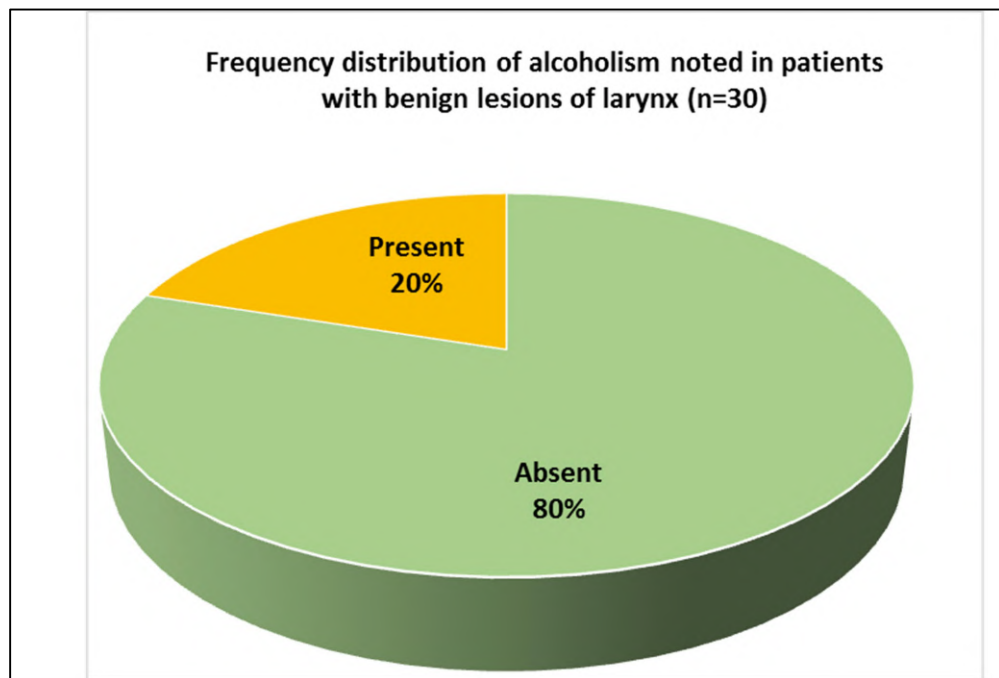


Table 9. Frequency distribution of alcoholism noted in patients with benign lesions of larynx (n=30)

S.No	Alcoholism	n	%
1	Absent	24	80
2	Present	6	20

Data are expressed as n with %.



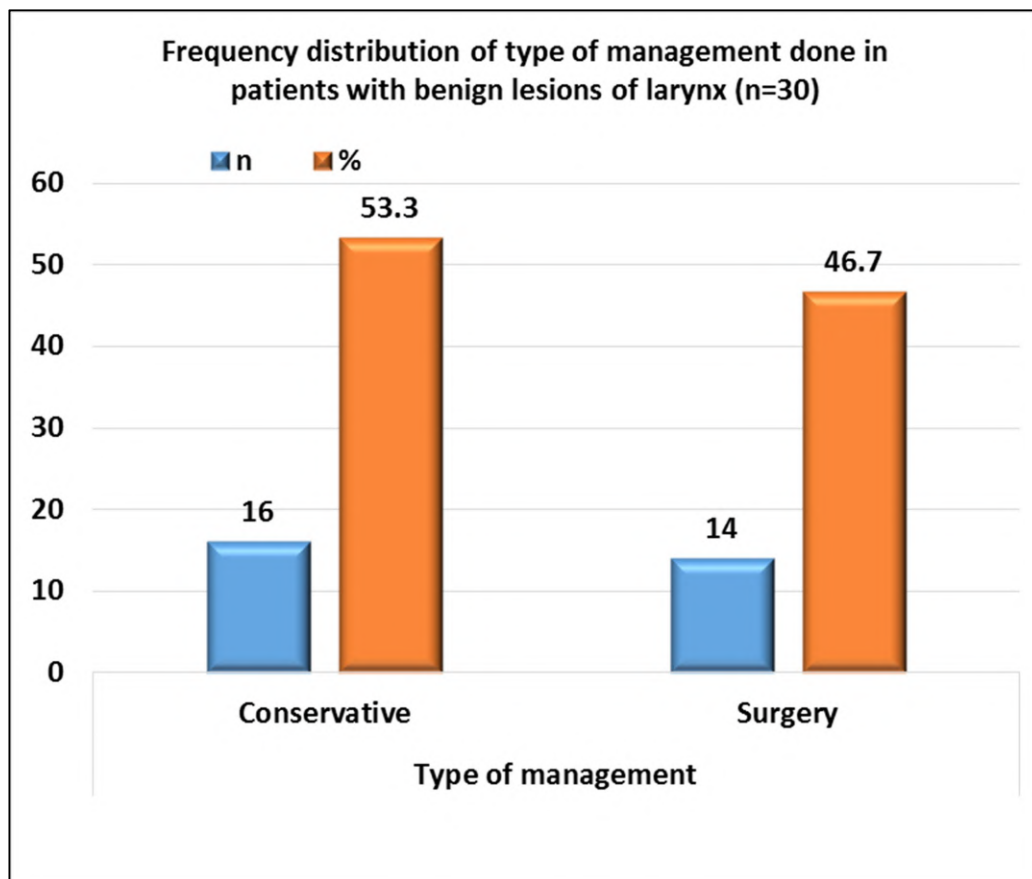
All patients who gave a positive history for smoking and drinking alcohol were only males. Total number =14. Total number of patients with positive alcohol intake =6 , Smokers –10 (Patients who smoked either Beedi or cigarette).

Smoking makes patients more prone for these lesions as it has been associated with decreased mucociliary clearance

Table 10. Frequency distribution of type of management done in patients with benign lesions of larynx (n=30)

S.No	Management	n	%
1	Conservative	16	53.3
2	Surgery	14	46.7

Data are expressed as n with %.



Management in our study was done using both Microlaryngeal excision /LASER and conservative management. Most of the patients after treatment were discharged within a couple of days, thereby saving the number of man days lost. Since microlaryngeal excision was done under general anaesthesia, these patients were admitted in the hospital for more than 24 hours. Conservative treatment of voice rest and speech therapy alone was sufficient for most of the cases of vocal nodule. In all cases after MLE, patient was advised voice rest of about 5 days.

Patients who had associated symptoms of Acid Peptic Disease were given anti reflux medications and they were also advised certain life style modifications, like avoiding spicy meals and taking early dinner. Patients who were smoking and taking alcohol regularly were explained the associated risks and were advised to discontinue.

Follow up

All the patients were followed for a period of 6 months. At the end of 6 months much to our satisfaction none of the cases of vocal nodule, vocal polyp, vocal cord cyst and intubation granuloma reported with any recurrence. Only one RRP patient had to be taken up for second sitting.

Table 11. Frequency distribution of type of management done in patients with benign lesions of larynx (n=30)

S.No	Recurrence	n	%
1	Absent	29	96.7
2	Present	1	3.3

Data are expressed as n with %.

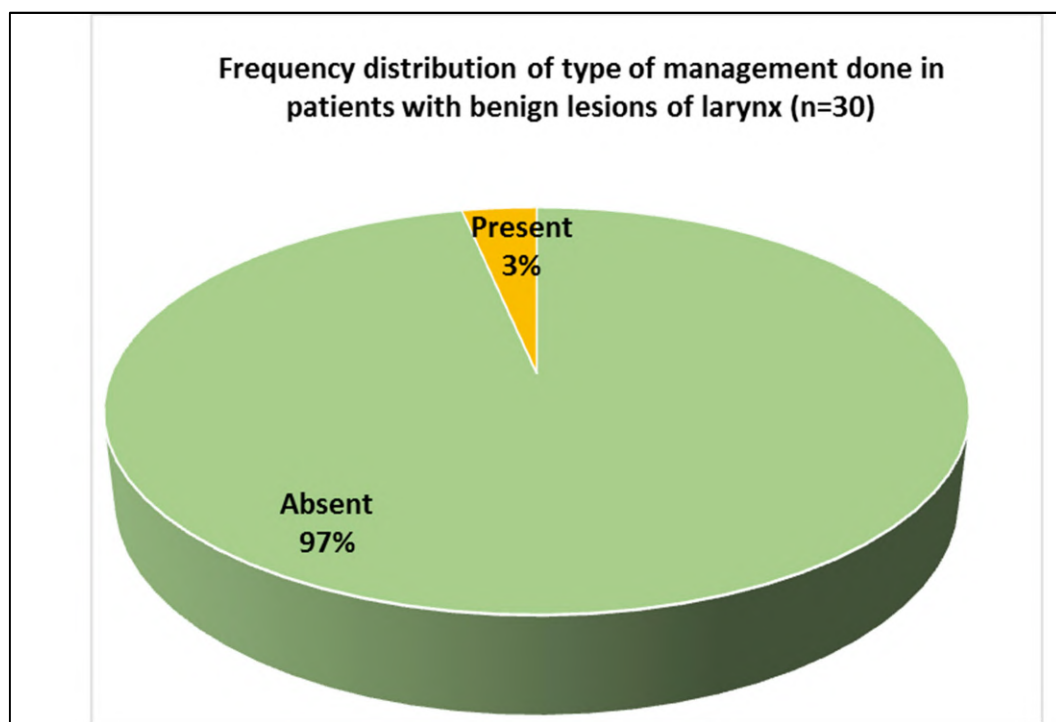


Table 12. Comparison of mean age between the different diagnosis of patients with benign lesions of larynx.

S.No	Diagnosis	Mean	SD
1	Vocalcord polyp(n=8)	36.7	6.8
2	Vocalcord cyst (n=5)	37.4	3.7
3	Vocalcord nodule (n=10)	37.4	8
4	Others (n=7)	38.4	17.2
F = 0.034; degree of freedom = 3, 26; p value = 0.992 (NS)			

Data are expressed as mean with SD. One Way ANOVA test was done to compare the variance between the groups. NS = Not significant.

Comparison of mean age between the different diagnosis of patients with benign lesions of larynx.

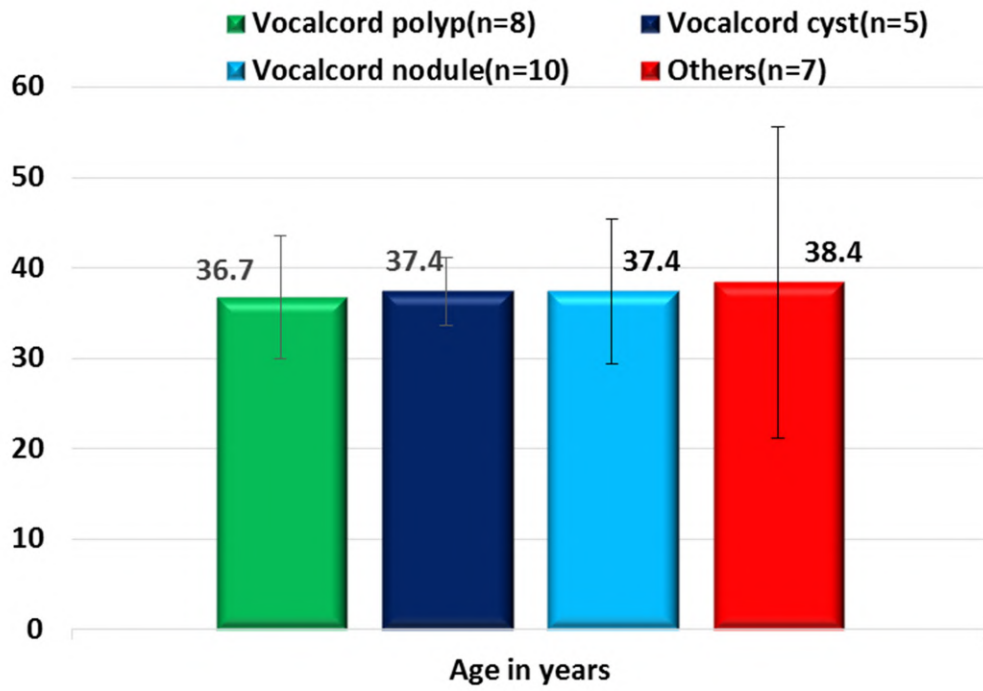


Table 13. Comparison of age category with respect to diagnosis in patients with benign lesions of larynx

S.No	Diagnosis	<20y (n=1)		21-30y (n=5)		31-40y (n=11)		41-50y (n=11)		51-60y (n=2)		Chi square value	P value
		n	%	n	%	n	%	n	%	n	%		
1	Adult papilloma	0	0	0	0	1	9.1	1	9.1	0	0	49.03 (df = 28)	0.008*
2	Intubation granuloma	0	0	1	20	0	0	0	0	0	0		
3	Keratosi s	0	0	0	0	0	0	1	9.1	0	0		
4	Recurrent respiratory papillomatosis	1	100	0	0	0	0	0	0	0	0		
5	Reinkes edema	0	0	0	0	0	0	1	9.1	1	50		
6	Vocal cord cyst	0	0	0	0	3	27.3	2	18.2	0	1		
7	Vocal cord nodule	0	0	2	40	5	45.5	2	18.2	1	50		
8	Vocal cord polyp	0	0	2	40	2	18.2	4	36.4	0	0		

Data are expressed n with %. Fisher's exact test was used to compare the frequency between the groups. *indicates $p < 0.05$ and considered statistically significant.

Table 14. Comparison of gender category with respect to diagnosis in patients with benign lesions of larynx

S.No	Diagnosis	Female (N=13)		Male (N=17)		Chi square value	P value
		n	%	n	%		
1	Adult papilloma	0	0	2	11.8	12.4 (df = 7) = 0.086 (NS)	
2	Intubation granuloma	0	0	1	5.9		
3	Keratosi	0	0	1	5.9		
4	Recurrent respiratory papillomatosis	0	0	1	5.9		
5	Reinkes edema	0	0	2	11.8		
6	Vocal cord cyst	3	23.1	2	11.8		
7	Vocal cord nodule	8	61.5	2	11.8		
8	Vocal cord polyp	2	15.4	6	35.3		

Data are expressed n with %. Fisher's exact test was used to compare the frequency between the groups. NS = not significant.

Comparison of gender category with respect to diagnosis in patients with benign lesions of larynx. Data represent %

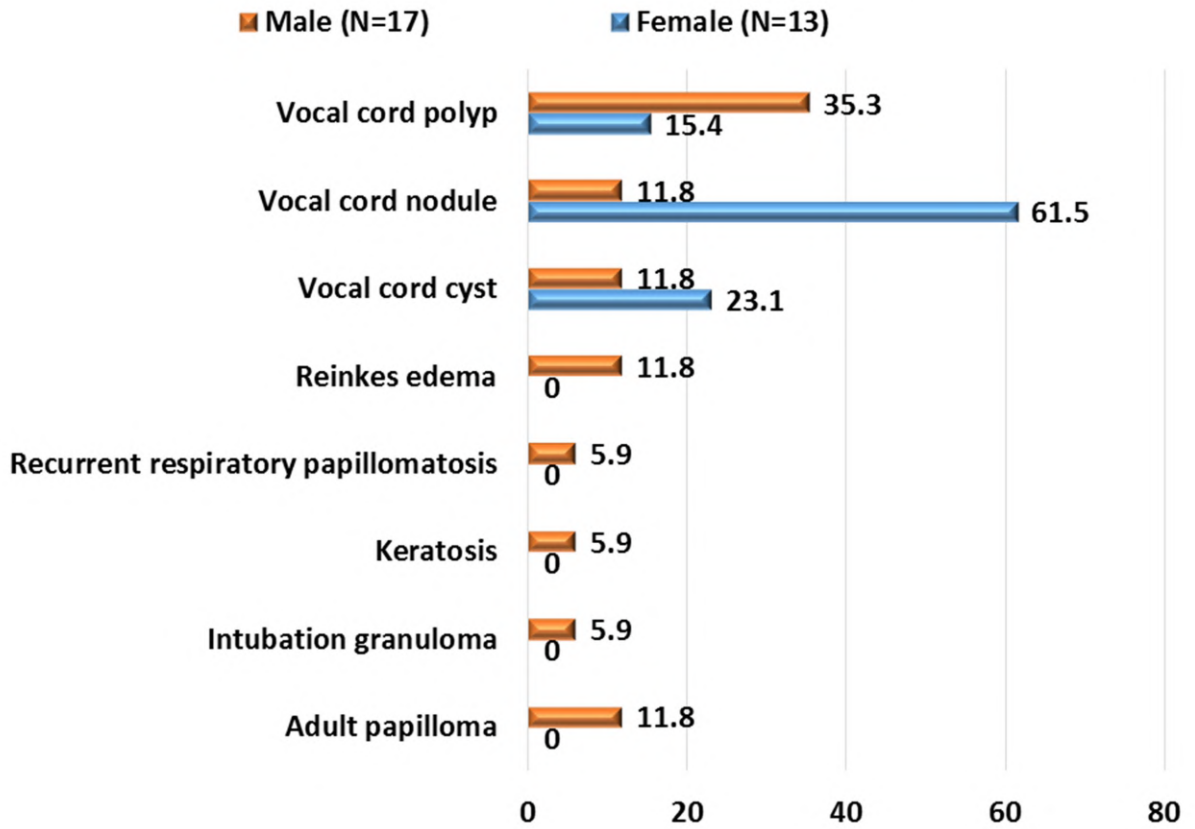
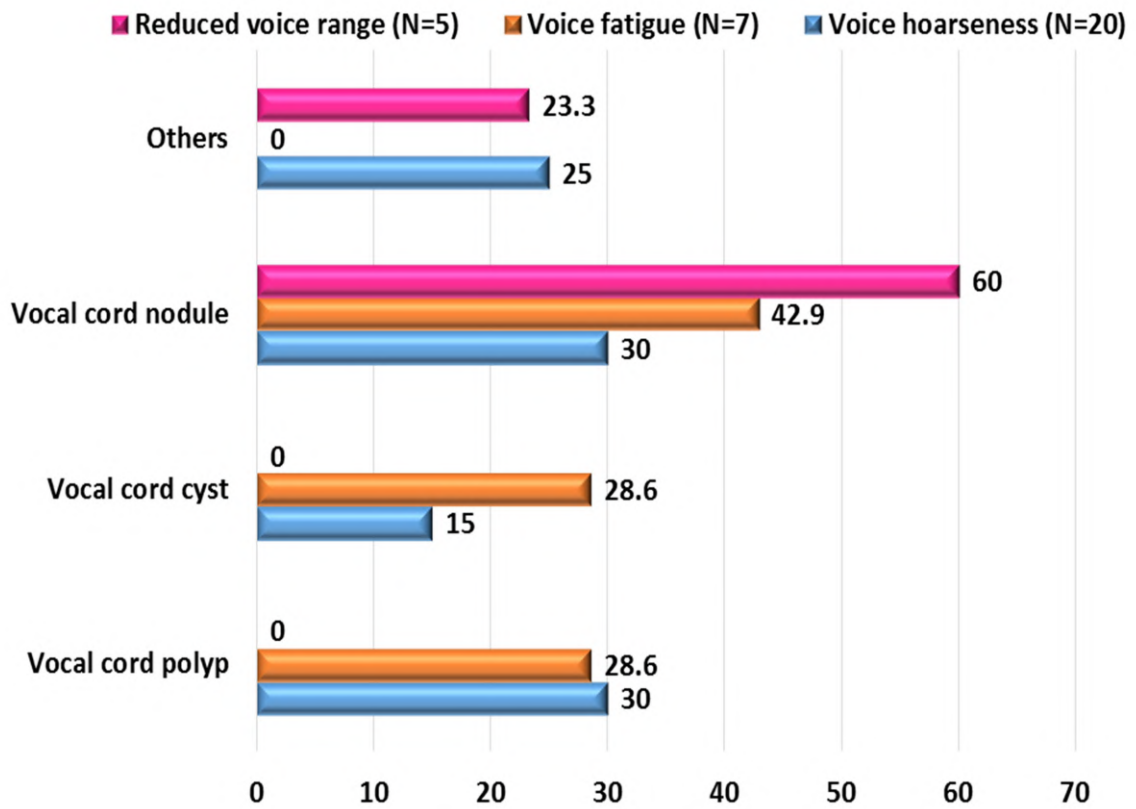


Table 15. Comparison of type of symptoms with respect to the type of diagnosis in benign lesions of larynx

S.No	Diagnosis	Voice hoarseness (N=20)		Voice fatigue (N=7)		Reduced voice range (N=5)		Chi square value	P value
		n	%	n	%	n	%		
1	Vocal cord polyp	6	30	2	28.6	0	0	6.42 (df = 6)	0.377 (NS)
2	Vocal cord cyst	3	15	2	28.6	0	0		
3	Vocal cord nodule	6	30	3	42.9	3	60		
4	Others	5	25	0	0	2	23.3		

Data are expressed n with %. Fisher's exact test was used to compare the frequency between the groups. NS = not significant

Comparison of type of symptoms with respect to the type of diagnosis in benign lesions of larynx . Data represent %



SUMMARY

Benign lesions of the larynx include neoplastic and non neoplastic lesions both of them are broadly classified together because clinically they behave similarly. Any lesion affecting the larynx will cause a range of voice disorder in which due to benign lesions are correctable by voice rest , voice therapy and surgery . In the present study 30 patients of benign lesions of the larynx ,diagnosis were established by history clinical examination and videolaryngoscopy. 90% of the lesions observed were non-neoplastic lesions. The most common neoplastic lesion was papilloma. Vocal nodules were the most common nonneoplastic lesion (33.3%),while vocal polyps were the second most common lesion(26.7%), followed by vocal cyst. One patient of Vocal Granuloma(3.3%) was observed. All lesions presented with some kind of voice disorder among which 66.7% of the them presented with hoarseness, while another 23.3% had vocal fatigue and 17% had reduced vocal range .

Amongst the causative factors of vocal nodule, vocal abuse was a common constant cause. 33% of the affected patients were smokers while the case of vocal granuloma had a previous history of endotracheal intubation. Maximum patients presented were in the third decade (36.7). This was followed closely by patients in the second, fourth and fifth decade.

Video laryngoscopy and stroboscopy was the most specific modality of investigation. Computed Tomography, Magnetic Resonance Imaging and Electroglottogram were not considered necessary. Microlaryngeal excision was done for majority of the cases followed by voice rest and anti reflux medicines in some cases. Results were very good thereby saving substantial number of working days.

CONCLUSION

90% of the benign lesions observed in larynx non-neoplastic type. Vocal nodule was the commonest benign non-neoplastic lesion while papilloma was the commonest neoplastic lesion observed in adults and in children Recurrent Respiratory Papillomatosis was the commonest. The most common symptom was hoarseness followed by vocal fatigue and reduced vocal range. Vocal abuse was the predisposing factor in vocal nodules. Smoking was the major predisposing factor for vocal polyp. Previous history of endotracheal intubation predisposed to vocal granuloma formation. The most commonly done examination procedure in OPD was Indirect laryngoscopy and the most useful investigation of choice was video laryngoscopy and stroboscopy .The most common surgical modality of treatment was Microlaryngeal excision . As far as morbidity is concerned prognosis is good .Recurrent respiratory papillomatos, trauma have poor prognosis as some morbidity is always there. All lesions when treated early and completely and followed up properly with voice rest have very good prognosis.

PROFORMA

I.P./O.P.NO.:

Name:

Age:Sex:

Occupation:

Address:

Level of vocal usage:

Presenting complaints:

History of present illness:

Change of voice Yes No Duration

Hoarseness

Breathiness of voice

Vocal fatigability

Voice breaks

Reduction in voice range

Double tone

Aphonia

Pain while talking

Pain while swallowing

Cough

Vocal abuse

Heart burn

Repeated sneezing

Nasal obstruction

Sore throat

Fever

Endotracheal intubation

Working in noisy surroundings

Past history : Pulmonary tuberculosis, Nasal
allergy, Recurrent cold, Bronchial
asthma,
Hypertension, Diabetes mellitus

Personal history : Diet, Appetite, Sleep, Smoking, Alcohol
intake, Bowel habits, Micturition.

Family history : Married/Unmarried No: of children

Socio-economic history: Low Middle High

General Physical Examination

Appearance

Temperature

Pallor

Cyanosis

Jaundice

Pedal oedema

Lymphadenopathy

Thyroid enlargement

Pulse : Blood pressure Respiratory rate

Systemic examination:

Cardiovascular system

Respiratory system

Central nervous

Per Abdomen

system

Local examination :

Mouth and throat :

Palate

Pillars

Tonsil

Posterior pharyngeal wall

Indirect laryngoscopy

Base of tongue:

Valleculae:

Epiglottis:

Aryepiglottic folds:

Pyramidal fossae:

Vestibular bands:

Vocal cords:

Sub glottis:

Diagram:

Examination of

Neck

Rt.

Lt.

Ears:

EAC:

TM:

Investigations

Blood: Hb% TC

DC

ESR

Urine:Albumin

Sugar

Microscopic examination:

Video endoscopy Date:

Patient Name: Age/Sex:

MRD no.:

Diagnosis

Procedure:

Anesthesia: GA / LA

Procedure notes

Biopsy

Final Diagnosis:

Abbreviations

RRP	-	Recurrent Respiratory Papillomatosis
TB	-	Tuberculous laryngitis
VN	-	Vocal Nodule
VP	-	Vocal Cord Polyp
VCC	-	Vocal cord cyst
LR	-	Laryngocoele
AMY	-	Amyloidosis
PAP	-	Papilloma
SV	-	Sulcus Vocalis
IG	-	Intubation Granuloma
RO	-	Reinke's oedema
RLN	-	Recurrent Laryngeal Nerve
VeC	-	Ventricular cyst
Sch	-	Schwanoma
KS	-	Keratosi

BIBLIOGRAPHY

1. Watt – Boolsen, Blichert – Toft. M. Hense and Bobexg A. Late voice function after injury to the recurrent nerve *Clinical Otolaryngology*, 2,191-197
2. Goodman RM, Yergin BM, Landa JF et al : Relationship of smoking history and pulmonary function tests to tracheal mucus velocity in non-smokers, ex-smokers and patients with chronic bronchitis. *American Review Of Respiratory Diseases* 117:205 – 214, 1978.
3. Nakai Y and others: Microvascular structure of the larynx. *Acta Otolaryngol Suppl* 486:254, 1991.
4. Holinger PH and Johnston K.C, *Benign Tumours Of Larynx*. *Ann Otol* 60 : 496, 1957.
5. Jones SR, Myers EN, Barnes L; *Benign Neoplasms Of The Larynx*, *Otolaryngol Clinic of N. America* 17:151, 1984.
6. JNG Evans, *Scott Brown's Paediatric Otolaryngology* Butterworth – Heinmann Co. 6/34/1 – 6 /34/ 5.

7. Steinberg B, Topp WC, Scheinder and Abramson Laryngeal Papilloma virus infection during clinical remission. New England Journal Of Medicine 308 : 1262 – 1264.
8. Avidano MA, Singleton GT: Adjuvant drug strategies in the treatment of RRP, Head And Neck Surgery 112 – 197 , 1995.
9. Batsaki's: Tumours Of Clinical And Pathological Considerations. Baltimore, 254 – 261.
10. Kleinsasser. O. Pathogenesis Of Vocal Cord Polyps Ann. Otl. 91:378 – 381.
11. AGD. Maran Laryngology And Head And Neck Surgery. Butterworth and Heinemann. Sixth edition 5/16/17 – 5 /16/ 18
12. Micheau C, Lanchi P and Cachin Y : Relationship Between Laryngocoele And Laryngeal Carcinoma, Laryngoscope 88 : 680, 1978.
13. Thawley SE and Bone RC ; Laryngopyocoele, Laryngoscope 83 : 362, 1973.
14. Hjslet P, Moesgard – Neilson and KarlsloseM. Smoking cessation in chronic Reinkes edema.

15. Ohmanl, Tibbing, Oloffson J and Ericsson G : Esophageal Dysfunction in Patients with Contact Ulcer of Larynx. Ann, Otol, Rhinol, Laryngol 92 – 228 – 230, 1983 16. Auerbach : Laryngeal Tuberculosis. Arch Otol 44.191 – 201, 1946.
17. Hunter AM, Millar JW, and Wightman SJ. The Changing Pattern of Laryngeal Tuberculosis. J Laryngol Otol 95 : 393 – 395.
18. Stewart JP. The Histopathology Of Benign Tumours Of The Larynx. J. Laryngol, 71: 718-729,1957.
19. Brunings W Quoted by Myerson Human Larynx. Springfield U.S.A.
20. HJ. Shaw. Scott Browne's Diseases of Ear, Nose, Throat.4th edition, Butterworth Co. 421-508
21. Eugene Rental, Michael Rental1991. Vocal Cord Injection Technique. OCNA 24:1145
22. Marc Bouchayer and Gay Cornut. Microsurgery for benign lesion folds. Ear Nose and Throat. 67:446-466 1988.
23. Yates A. Carbon dioxide laser enucleation of polypoid vocal cords .Laryngoscope 94:731- 736,1984.

24. Kleinsasser O. Pathogenesis of vocal cord polyps. *Ann Otol* 91: 378-381, 1982.
25. Bruce Benjamin and Glen Crosson. Vocal cord Granulomas *Ann Otol* 94:538-541
26. Walter B. and Larsen B. Hoarseness in children, follow up on no therapy, surgery, voice therapy alone or combined therapy. *Otol Suppl* 412: 40-42, 1984.
27. Myerson MC Smokers Larynx. A Clinicopathological Entity. *Ann Otol*.59: 541-546,1950.
28. Kubo R and Ohno M. Influence of smoking on the development of laryngeal polyps. *Otol Tukoka* 17: 22-125, 1971.
29. Toriya. A. A Statistical Study Of Polypoidal Lesions Of Vocal Folds related to cigarette smoking. 25:448-452, 1979.
30. Bam W, Harrington JW ,Thomas LE and Shaeffer SD. Head and Neck manifestations Of Gastroesophageal Reflux. *Laryngoscope* 93: 175-179.
31. Singer and Blom. An endoscopic for restoration of voice after laryngectomy. *Ann. Otol. Rhin. Laryngol.* 89 : 529-533,1980.

32. Epstein SS, Winston P. Ormerod FC. The Vocal Cord Polyp. J Laryngol 71:673-688.
33. Jones SR. Myers EN and Barnes L. Benign Neoplasm of the Larynx. OCNA17:151, 1984.
34. James A Kaufman and Glen Issacson 1991. Spectrum of vocal dysfunction. OCNA 24:5 98-988.
35. Kitzing. Stroboscopy ; A Pertinent Laryngeal Examination. Journal of Otolaryngology 14,151-57
36. Johnson LF ; Optical Laser Characteristics Of Rare Earth Ions. In crystals J.Appl Physiol 1961 ; 34 ; 897 – 909.
37. Bennet WR, Faust WL, Mc Farlane RA et al: Dissociative Excitation Transfer and Optical Laser Oscillation in NeO₂ and ArO₂ discharges. Physiol 8 : 470 – 473.
38. Patel CKN, Mc Farlane RA, Fault WL: Selective Excitation Through Vibrational Energy Transfer Optical Maser Action in N₂ – Co₂ . Physiol Rev 13 : 617 – 619.
39. Parker R. Laryngoscopy, Microlaryngoscopy and Laser Surgery. In Rob and Smith's Operative Surgery, Head And Neck part 2, 4th edition, 451 – 463.
- 40.

41. Booth JB and Birck HG, Operative Treatment and Post Operative Management Of Saccular Cyst and Laryngocoele. Arch Otol 107 : 500, 1981.
42. Benign tumors of the neck, Comprehensive Management Of Head And Neck Tumors Vol II. Chap 55 1350 – 1385.
43. Stell and Maran's Head and Neck Surgery 4th edition 124 – 126.
44. Gillies HD and Mullard DR: The Principles And Art Of Plastic Surgery, Little Brown and Co. Boston.

THE END

CONSENT FORM

PART 1 of 2

INFORMATION FOR PARTICIPANTS OF THE STUDY

Title of the project: "A PROSPECTIVE CLINICOPATHOLOGICAL STUDY AND MANAGEMENT OF BENIGN LESIONS OF LARYNX"

A.

B. Name of the investigator/guide with mobile number:

INVESTIGATOR: DR.JAYALEKSHMI.P.A,MBBS,
FIRST YEAR MS (ENT) POST GRADUATE,
THANJAVUR MEDICAL COLLEGE.
MOBILE NO.9400510836

GUIDE:. DR.C.BALASUBRAMANIAN MS (ENT).,
PROFESSOR AND HOD,
DEPARTMENT OF OTORHINOLARYNGOLOGY,
THANJAVUR MEDICAL COLLEGE.
MOBILE NO.9486686690

Purpose of this project/study:.

To study the incidence and distribution of cases according to age ,sex ,occupation, etc.
To study prognosis of the most frequent benign lesions of larynx along with follow up of the patients upto 6 months after treatment

C.

1.Procedure/methods of the study:

A detailed history was taken .Patients with persistent hoarseness of voice /voice change,foreign body sensation,difficulty in breathing etc will be randomly selected from patients attending ENT opd.once suspected indirect laryngoscopy should be done.By videolaryngoscopythe entire structure and function of the vocal cords could be studied .ideally each patient should have baseline stroboscopy to be performed...xray soft tissue neck lateral view needs to taken if suspecting obstruction to air passages.if needed CT scan to be done accordingly.benign non neoplastic lesions were treated by voice rest ,laser or microlaryngeal excision and biopsy to be taken.later follow up the patient for a period of 6 months

D. **Expected duration of the subject participation:** 5 to 6 months

E. **The benefits to be expected from the research to the participant :** Early Diagnosis and treatment. Good prognosis ,Better quality of life.

F. **Any risks expected from the study to the participant:**Minimal risk

G. **Maintenance of confidentiality of records:** Yes

H. **Provision of free treatment for research related injury:** Yes

I. **Compensation for participating in the study:**NO

J. **Compensation to the participants for foreseeable risks and unforeseeable risks related to research study leading to disability or death:**yes

K. **Freedom to withdraw from the study at any time during the study period without the loss of benefits that the participant would otherwise be entitled:**yes

L. Possible current and future uses of the biological material and of the data to be generated from the research and if the material is likely to be used for secondary purposes or would be shared with others, this should be mentioned:No

M. Address and telephone number of the investigator and co-investigator/guide

INVESTIGATOR: DR.JAYALEKSHMI.P.A,MBBS
FIRST YEAR MS (ENT) POST GRADUATE,
THANJAVUR MEDIAL COLLEGE.
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GUIDE ; DR.C.BALASUBRAMANIAN MS (ENT).
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THANJAVUR MEDICAL COLLEGE.
MOBILE NO.9486686690

Dr.JAYALEKSHMI.P.A,MBBS

FIRST YEAR MS (ENT) POST GRADUATE,
INVESTIGATOR OF THE STUDY.

CONSENT FORM

PART 2 of 2- Participant consent form

Participant's name: Address:

**Title of the project "A PROSPECTIVE CLINICOPATHOLOGICAL STUDY AND
MANAGEMENT OF BENIGN LESIONS OF LARYNX"**

The details of the study have been provided to me in writing and explained to me in my own language. I confirm that I have understood the above study and had the opportunity to ask questions. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without the medical care that will normally be provided by the hospital being affected. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). I have been given an information sheet giving details of the study. I fully consent to participate in the above study.

(I also consent / do not consent to use my stored biological samples for future scientific purposes) – if applicable

Signature of the participant: _____ Date: _____

Signature of the witness: _____ Date: _____

Signature of the investigator: _____ Date: _____

SI NO	NAME	AGE(YEARS)	SEX	IP NO:	DIAGNOSIS	SYMPTOMS			PROFESSIONAL VOICE USERS TEACHERS/SINGERS/POLITICIANS/SALESMAN	NONPROFESSIONAL			ADDICTIONS		TREATMENT	
						HOARSENESS OF VOICE	VOICE FATIGUE	REDUCED VOICE RANGE		HOUSEWIVES	STUDENT	MANUAL LABOURERS	SMOKING	ALCOHOL	CONSERVATIVE	SURGERY
1	Mrs.SEETHALAKSHMI	41	F	4527	VOCAL CORD POLYP	YES			YES					YES		
2	Mr.VEERASAMY	35	M	9745	VOCAL CORD POLYP		YES	YES					YES		YES	
3	Mr.SELVAKUMAR	29	M	10251	VOCAL CORD POLYP	YES					YES	YES			YES	
4	Mr.KABILAN	26	M	15424	VOCAL CORD POLYP	YES				YES					YES	
5	Mr.DANDAPANI	42	M	25465	VOCAL CORD POLYP	YES					YES	YES			YES	
6	Mrs.AYIKANNU	34	F	41254	VOCAL CORD POLYP		YES		YES					YES		
7	Mr.RAJENDRAN	45	M	64521	VOCAL CORD POLYP	YES					YES	YES			YES	
8	Mr.GOVINDARAJ	42	M	72541	VOCAL CORD POLYP	YES					YES	YES	YES		YES	
9	Mrs.RENUKA	36	F	3421	VOCAL CORD CYST		YES		YES					YES		
10	Mr.DAKSHINAMOORTHY	41	M	10241	VOCAL CORD CYST	YES					YES	YES			YES	
11	Mrs.ROSEMARY	37	F	39457	VOCAL CORD CYST	YES			YES					YES		
12	Mrs.GOKILA	41	F	64545	VOCAL CORD CYST	YES					YES				YES	
13	Mr.SIVASAMY	32	M	74545	VOCAL CORD CYST		YES				YES	YES			YES	
14	Mrs.GEETHA	28	F	7565	VOCAL CORD NODULE	YES			YES					YES		
15	Mr.PARAMASIVAM	45	M	9654	VOCAL CORD NODULE		YES	YES					YES	YES		
16	Mrs.GUNAVATHY	52	F	22545	VOCAL CORD NODULE	YES		YES	YES					YES		
17	Mrs.SAROJA	39	F	35421	VOCAL CORD NODULE		YES		YES					YES		
18	Mr.SENGUTUVAN	43	M	47544	VOCAL CORD NODULE	YES			YES				YES	YES		
19	Mrs.PRAMILA	32	F	54245	VOCAL CORD NODULE	YES		YES	YES					YES		
20	Miss.JAYASREE	27	F	67512	VOCAL CORD NODULE			YES	YES					YES		
21	Mrs.SARASWATHY	31	F	75214	VOCAL CORD NODULE	YES			YES					YES		
22	Mrs.RADHA	40	F	79585	VOCAL CORD NODULE		YES	YES						YES		
23	Mrs.NEELAVATHI	37	F	86545	VOCAL CORD NODULE	YES			YES					YES		
24	Master.VIGNESH	16	M	54242	RECURRENT RESPIRATORY PAPILLOMATOSIS	YES				YES					YES	YES
25	Mr.GANESAN	49	M	5421	KERATOSIS	YES					YES	YES			YES	
26	Mr.RAMASAMY	49	M	9454	REINKES EDEMA			YES			YES	YES	YES	YES		
27	Mr.LAKSHMANAN	52	M	32121	REINKES EDEMA			YES			YES	YES			YES	
28	Mr.VELLASAMY	28	M	54214	INTUBATION GRANULOMA	YES			YES						YES	
29	Mr.LAKSHMANAN	40	M	15245	ADULT PAPILOMA	YES					YES	YES			YES	
30	Mr.VENKATACHALAM	47	M	6545	ADULT PAPILOMA	YES					YES		YES		YES	