

## Unusual causes of throat pain: A pictorial discussion

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### Abstract

As a common entity, throat pain or sore throat is related chiefly to various infective pathologies, viral (lately COVID), bacterial or fungal. When these are treated with no relief for the same, endoscopic procedures and imaging modalities like USG, CT Scan, MRI etc. are ordered to detect the occult diagnosis. Our study included 51 participants, 20 females and 31 males, primarily complaining of throat pain with few other mild symptoms. Here we discuss not so commonly thought of entities pertaining to head and neck pathologies and few thoracoabdominal lesions detected by various imaging modes like MRI, CT and virtual endoscopy, Endoscopy, USG and X Ray Barium studies. Anatomic variants to potentially serious diseases were reported. A strong clinical suspicion and customized mode of imaging assisted in arriving to a definitive diagnosis.

**Keywords:** USG-ultra sonography, CT-computed tomography, CECT-contrast enhanced computed tomography, MRI-magnetic resonance imaging, CEMRI-contrast enhanced magnetic resonance imaging, ICA-internal carotid artery, IJV-internal jugular vein,

### Introduction

The throat, comprising of pharynx and larynx is an oblong muscular tube for passage of air and food and located behind the nasal and oral cavity. It connects them further extending caudally to deliver air and food separately into trachea and esophagus. It consists of highly coordinated neuromuscular mechanics. Various structures tonsils and adenoids, pharynx, epiglottis, larynx, subglottic region and their intrinsic structures and muscles, function in a precise coordination. A variety of lesions arising from these were encountered in our survey. Our study also included structures of neck and their pathologies, skull base lesions and few pathologies in vicinity of brain stem. Tracheal, esophageal and upper mediastinal pathologies were also taken into consideration. Cervical spinal pathologies and infective pathologies were not included in study due to their obvious symptomatology. A single or multi-modality approach and deciphering the pixel-voxel maze proved worthwhile for each of our patient.

## Material and Methods

This is an institutional based prospective observational study. Following ethical committee clearance, study was conducted from August 21 to Feb 2022. 51 patients were incorporated 20 females and 31 males, age range being 12 years to 80 years, with complaints of throat pain with or without dysphagia, associated mild otalgia, early change in voice, or mild cervical pain, occasional headache, vomiting, vertigo had been treated medically with no relief. A step further, they were projected to customized investigations. Use of multiple modalities at our institution was made. MRI, CT scan, CT virtual endoscopy, Ultrasound, X Ray Barium study and Endoscopy conducted after taking informed consent.

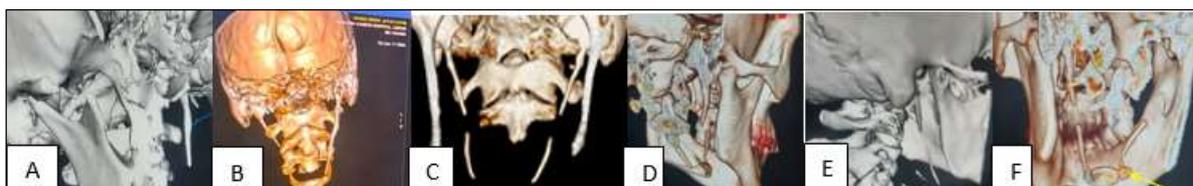
## Results

Evaluation of 51 Patients, 20 females and 31 males between age groups of 12 years to 80 years who visited as outdoor patients, with no significant co-morbidity at time of initial presentation revealed a myriad of surprising results, some with simple lesions and pathologies to follow and some requiring surgical intervention. This pictorial essay depicts many unusual reasons for a sore throat like Eagle's syndrome, Lesions involving Carotid sheath, Lesions around jugular foramen, Nerve Sheath tumours, Reflux esophagitis, hiatus hernia, Esophageal mass lesions, scleroderma, Laryngeal lesions, vocal cord lesions, pathologies of submandibular, tonsillar, thyroid and parathyroid glands, Pneumomediastinum. Aberrant blood vessels /loops around brain stem, and the list may go on. Here we discuss each entity included in our study.

### Eagle's Syndrome

Styloid process is a bony cylindrical pillar arising from temporal bone anterior to stylomastoid foramen, formed by ossification of stylohyoid ligament <sup>[1]</sup>. The normal length is 2-3 cm. An elongated styloid process (ESP) causes throat pain, dysphagia, foreign body sensation and earache. The exacerbation of pain by swallowing, yawning and crying, help in diagnosis. Patients underwent clinical examination and non-specificity of symptoms often lead to symptomatic medication. Multidisciplinary approach, early radiological investigation, especially MDCT of the styloid process is advisable. In 1937, Watt W Eagle coined the term Stylalgia as pain arising from ESP. Six adult subjects with primary complaint of pain in throat with uneasiness in cervical region underwent CT scan and 3 D reconstruction <sup>[3]</sup> images revealed various types of styloid processes.

Langlais Classification <sup>[2]</sup> of elongated styloid process depicts three types. Type I, elongated, Type II, pseudoarticulation, and Type III, segmented. These types were further described by a pattern of calcification, calcified outline, partially calcified, nodular, and completely calcified. In our study, we also came across interrupted subtype ESP and dislocated interrupted subtype. Styloid processes in symptomatic patients measured more than 3cm. The cervical stylalgia was attributed to ipsilateral ESP. Patient with displaced interrupted subtype experienced throat pain during turning the head. Hence imaging concluded their concern. Patients were not subjected to further investigations and managed conservatively.



**Fig 1:** Various types of Elongated styloid processes - **A.** Unilateral elongated SP. **B.** Pseudoarticulated

**C.** Bilateral Interrupted (left proximal segment 3.31cm, right, and 3.87cm). **D.** Displaced interrupted SP **E.** Unilateral interrupted Elongated styloid process. **F.** Calcified distal segment of styloid process.

## Parapharyngeal space lesions-carotid sheath and lesions in vicinity of Jugular Foramen

The poststyloid compartment of the parapharyngeal space and the deep cervical fascia encloses the carotid sheath, extending from the base of skull up to arch of aorta. With sternocleidomastoid muscle anterolaterally, parapharyngeal space and visceral space anteromedially, and prevertebral space posteriorly, it encloses the carotid artery, internal jugular vein, and vagus nerve, other lower cranial nerves (CN IX, XI, XII) superiorly, cervical sympathetic plexus anteriorly and ansacervicalis posteriorly and the deep cervical lymph nodes at various levels <sup>[4]</sup>. Hence, serious neurovascular pathologies affect this space and attribute to a trivial symptom of throat pain. Four male patients presented with pain in throat, swelling and feeling of fullness in ipsilateral ear. They were treated conservatively for months with antibiotics and proton pump inhibitors with no relief. Contrast enhanced CT Scans revealed heterogeneously enhancing lymph nodal mass lesions involving and encasing ipsilateral carotid sheath.

The jugular foramen <sup>[5]</sup> situated at the junction between the petrous temporal and occipital bones is divided into pars nervosa, which is smaller and anteromedial, contains the inferior petrosal sinus and gloss oropharyngeal nerve. Larger and posterolateral, the pars vascularis contains the jugular bulb, vagus and hypoglossal nerve.

The most common primary tumors are paraganglioma, schwannoma, and meningioma. The most common metastases are from lung, breast, and prostate malignancies also including lymphoma and multiple myeloma. Lesions of salivary gland, nerve and connective tissue lesions, cysts and lymphnodal foci and metastasis. Benign Neurogenic lesions include vagal paragangliomas and carotid body tumors are also common in this region <sup>[6]</sup>.

An extensive lymph nodal mass lesion with carotid sheath infiltration was seen in a young female presenting with sore throat, ear pain and dysphagia. A 62 year old male (C) presented with intermittent throat pain and odynophagia. Endoscopy was inconclusive. CECT suggested a lobulated soft tissue lesion in left supra hyoid carotid space /post styloid parapharyngeal space distal to base of skull with encasement and splaying of distal cervical right ICA and IJV. Minimal encroachment of left hypoglossal canal and jugular foramen seen. Lesion crossed right carotid sheath and abuts styloid process and stylohyoid ligament. A left buccogingival mass lesion in a tobacco chewer is seen to extend to parapharyngeal region and carotid sheath. (E). A myriad of lesions depicted below help us derive the exact cause of symptoms.



**Fig 2:** CECT of lesions with carotid sheath involvement **A & B.** Rt parapharyngeal mass encasing carotid sheath. **C.** Lt Parapharyngeal, parajugular mass **D.** Lt Parapharyngeal lymph nodal mass lesion involving carotid sheath contents. **E.** Left Buccogingival mass lesion

A complain of pain along left buccal region, throat and ear was deciphered through MRI revealing Parotitis due to blocked duct <sup>[7]</sup>. An intermittent jaw pain, difficulty in chewing and throat pain in a patient helped us discover an inflammatory Dentigerous cystic region of

posterior ramus of mandible, which forms when fluid accumulates between reduced enamel epithelium and an unerupted tooth crown. This necessitated further management as the cyst has mitotic potential. A chance finding of osteochondroma of mandible on CECT in a patient of intermittent jaw and throat pain although craniofacial osteochondromas are rare, they are important to treat due to their potential to develop into osteosarcomas [8]. A tender throat showed up as prominent lymph node in submandibular region as seen on USG and later followed up [9].

Calculi/calcification in submandibular gland [10] and tonsils were well demonstrated on CT [11]. Their presence indicates chronic or low grade infection. Our patient of sialolithiasis was a beetle nut and tobacco chewer. Etiology also includes dehydration and certain drugs. Tonsiloliths form by accumulation of bacteria and tissue debris and cause sore throat, halitosis and odynophagia. Dryness of throat and consequent pain was attributed to open mouth breathing in a child with prominent adenoids.

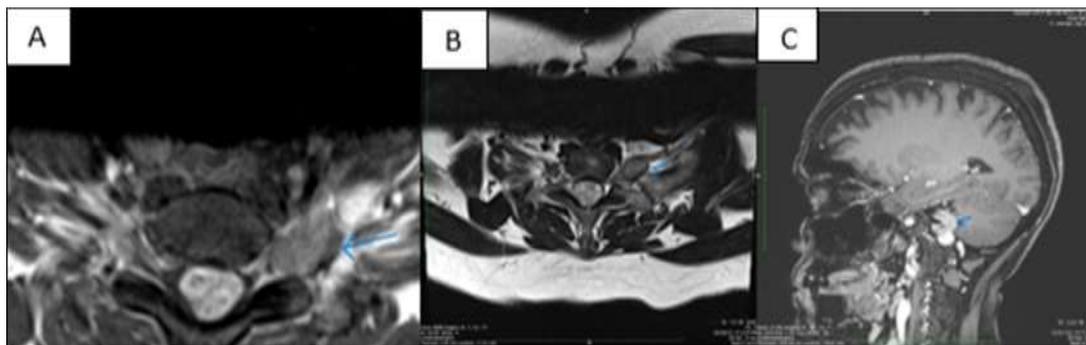


**Fig 3:** A&B. MR images show enlarged hyperintense right parotid gland with ductal prominence with oedema of right buccal fat s/o inflammation. C. Dentigerous cyst of right 3<sup>rd</sup> molar, CT bone window. D. USG of Prominent right submandibular lymph node E. CT bone window Osseo sclerotic focus at right mandible, Osteochondroma F&G. Submandibular sialolithiasis H. Tonsiloliths I. Prominent adenoids

### Tumours of nerve sheath and cerebellopontine angle

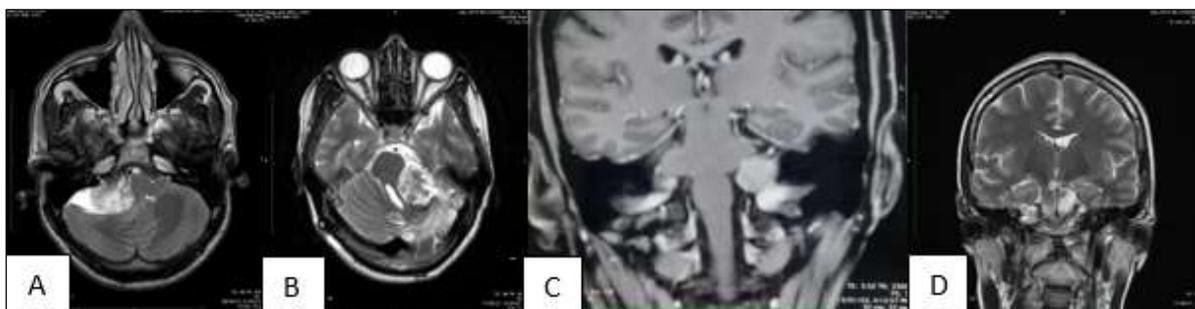
Peripheral nerve sheath tumours are most commonly seen as Schwannomas and Neurofibromas are well-circumscribed encapsulated masses with homogenous enhancement. They appear as marginated fusiform masses with tapering of ends and nerve segment entering and exiting the lesion. Paragangliomas are an important differential diagnosis. A male patient 22y age presented with mild throat pain and radicular pain along left side of neck. An incidental finding of C4-C5 Nerve root Neurofibroma was observed. (A&B) [13].

A 53-year-old man with sore throat and change in voice, thought to be due to reflux but not improved with proton pump inhibitor. MR images reveal a well-circumscribed enhancing lesion extending through the jugular foramen into the carotid space. The internal jugular vein is abutted by the mass within the carotid sheath. Vagal Schwannoma, with intracranial and extra cranial extent was concluded (C).



**Fig 4:** A&B. MRI of C4-C5 Nerve root Neurofibroma. C .MRI of CP Angle tumour also involving jugular foraminal structures.

Cerebellopontine angle tumours <sup>[14]</sup> are frequent, and acoustic neuromas and meningiomas represent the majority .In our study, these are usually round to oval masses in CP Angle cistern .Our patients presented with headache, hearing and gait disturbances, throat and neck pain. A wide spectrum of size of tumours was seen with subtle clinical symptoms. MRI is an excellent modality to detect lesions affecting lower cranial nerves. Surprising tumoral masses were observed in MR sequences around brain stem and posterior fossa structures. Slow growing mass lesions present late and with few symptoms.

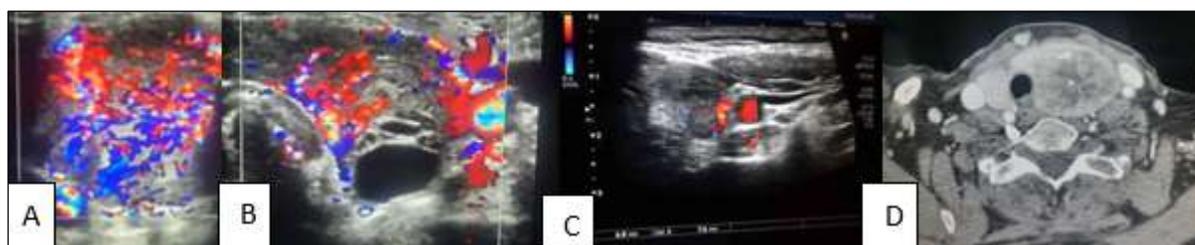


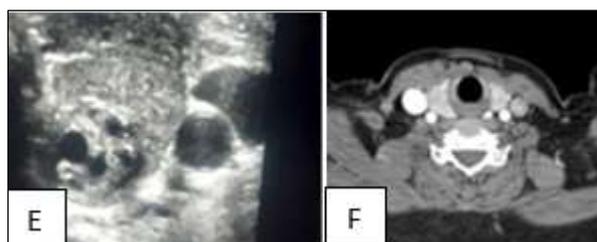
**Fig 5:** MR images show large cerebellopontine angle tumours presenting with headache, throat pain, tinnitus and gait disturbances

**Thyroid and parathyroid disease**

The thyroid gland is stationed in anterior infrahyoid-infraglottic neck resting on the thyroid cartilage. Many conditions such as multinodular goiter, thyroiditis, or carcinoma stretches the recurrent laryngeal nerve. Thyroiditis <sup>[15]</sup> can result in a painful or sore throat and raspy voice mimicking pharyngitis. Parathyroid adenoma was noted in a patient of sore throat and neck discomfort <sup>[18]</sup>.

Our patients were evaluated using USG with colour Doppler <sup>[16]</sup> and CECT <sup>(17)</sup> to detect cause of throat discomfort.





**Fig 6:** A&B. USG of Diffuse Thyromegaly and thyroiditis. C&D. USG AND CECT of Malignant left lobar thyroid nodules E. USG of left lobe Cystic goitre F.CECT showing Left parathyroid adenoma

### Laryngeal lesions

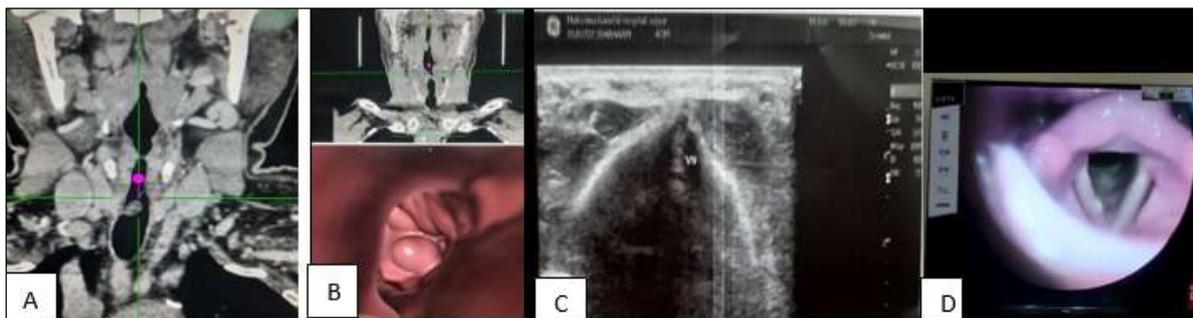
Our study includes only non- infectious laryngeal lesions .Pathologies of larynx indirectly affect the throat and patients presents with pain and hoarseness of voice <sup>[19]</sup>.Acute and chronic non-infectious laryngitis due to repetitive strain and insult to the laryngeal mucosa in high pitched loud singers, in subjects who shout or smoke and in situations of gastro esophageal acid reflux allergy, asthma, environmental pollution and inhalational injuries, leads to a number of benign inflammatory lesions, especially of the vocal cords. Although related in etiology, these lesions differ in mechanics of origin and appearance .In our study, we performed functional assessment of vocal cord by ultrasound used CT Endoscopic virtual reconstruction and contrast enhanced study for various laryngeal pathologies. Ultrasound dynamic study during phonation revealed vocal cord nodules, vocal cord asymmetry and oedema in laryngeal mass lesions depicted in CECT involving left recurrent laryngeal nerve region thus affecting vocal cord, leading to voice strain and consequent throat pain.

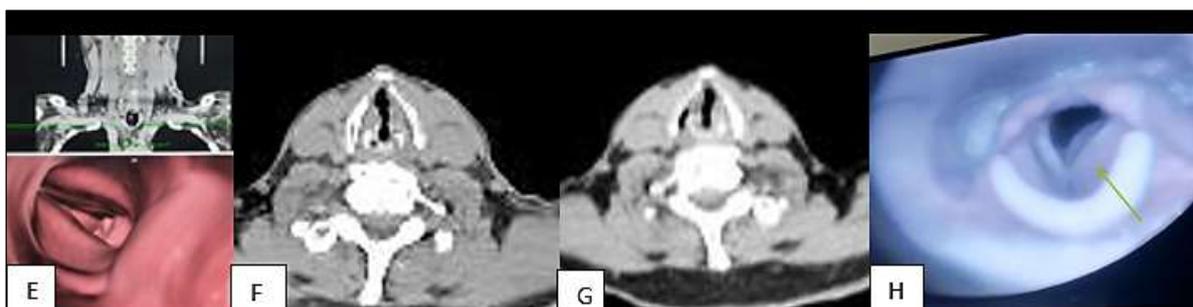
### Laryngeal polyp formation

Occurs due to trauma to the submucosal capillary bed, resulting in inflammatory changes and mucosal out pouching. A case of constant throat pain and voice strain upon CT revealed laryngeal polyp and was benefited by polypectomy. Virtual reconstruction image B well defines the lesion.

### Vocal cord nodules

These are callous like nodular swellings along margins of vocal cords occurring at the midpoint of the cords. High shearing force during apposition of cords leads to damage to lamina propria layer resulting in its formation. A functional Vocal cord USG revealed vocal nodule image C, proved upon endoscopy (D).CT virtual endoscopy also detected subglottic nodules as cause and effect of chronic voice strain. Vocal cord asymmetry was noted in chronic smokers who complained of change in voice and throat discomfort.





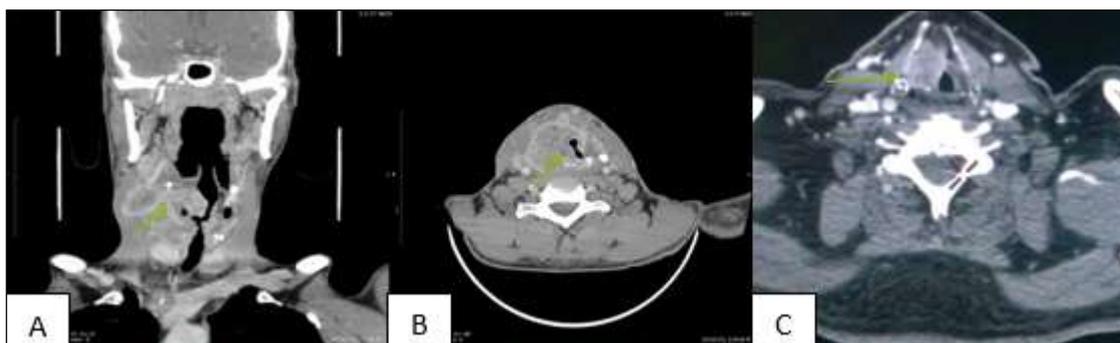
**Fig 7:** A&B .Laryngeal polyp on CT endoscopy C. Vocal cord nodule on functional USG D. Vocal nodule, endoscopy E .CT Virtual Endoscopy subglottic nodule F&G.CT shows Vocal cord asymmetry &nodules H. Endoscopic view of Unilateral vocal cord oedema and cyst

### Laryngeal cyst

Visualized on endoscopy appeared similar to a laryngocele. A case of vocal cord oedema with laryngeal cyst is seen in a hypothyroid patient. A retention cyst of larynx occurs, due to obstruction of glands with trapped secretion. Vocal strain in myxoedema may result in oedema, a form of Reinke's edema [20].

### Laryngeal masses

We came across two patients with persistent sore throat, ear pain and feeling of fullness in neck, Dyspnea and history of smoking. CECT revealed malignant laryngeal mass lesions infiltrating into paralaryngeal soft tissue. Laryngeal squamous cell carcinomas account for one third of all head and neck cancers (5).subglottic and glottic subtypes were noted in our study. Perineural infiltration of 9<sup>th</sup> nerve and recurrent laryngeal nerve occurs in such lesions to produce symptoms.

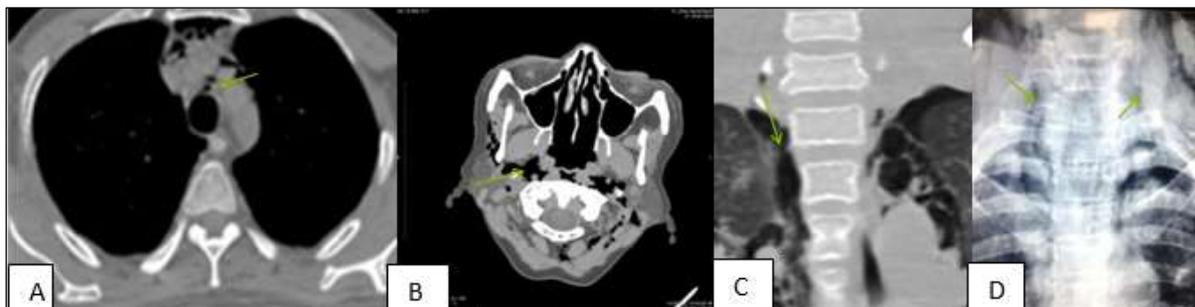


**Fig 8:** Infiltrating Laryngeal malignancies presenting with throat pain, dyspnea and hoarse voice

### Spontaneous pneumomediastinum and retropharyngeal emphysema

It is the presence of air in the mediastinum with no prior known etiology. It is a benign condition and usually resolves in 1 to 2 weeks [21].The symptom of spontaneous pneumomediastinum is sore throat and retrosternal chest pain. An evaluation of 4 patients was done. A 12 year old female was sent for CT of chest for initial unexplained throat pain with no history of vomiting, asthma, trauma etc. After preliminary examination that revealed crepitus in neck and upper chest, mediastinal emphysema was noted by neck X-ray and HRCT scan revealed air extending along pulmonary arteries and few emphysematous bullae along right apical lung .Thus a random complain by a child led to a thorough workup.

Retropharyngeal emphysema <sup>[22]</sup> in an adult male 46 years complaining of throat and neck pain, was confirmed on CT. A male 61 years, smoker, presented with throat pain and unilateral ear pain. CT was suggestive of pneumomediastinum with air extending from trachea upto submandibular space. Pneumomediastinum if unattended may lead to pneumopericardium and retropharyngeal emphysema progresses to sepsis. Hence value of careful investigations prevails.

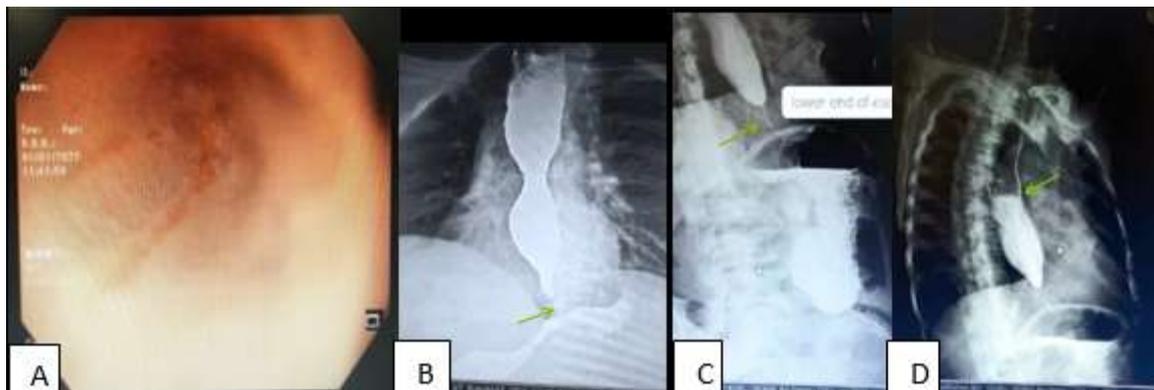


**Fig 9:** A. CT Pneumomediastinum B. Air in retropharyngeal soft tissue C. CT showing air around mediastinal vessels D. Skiagram showing Pneumomediastinum and air in soft tissue of neck

### Reflux pharyngo laryngo esophagitis

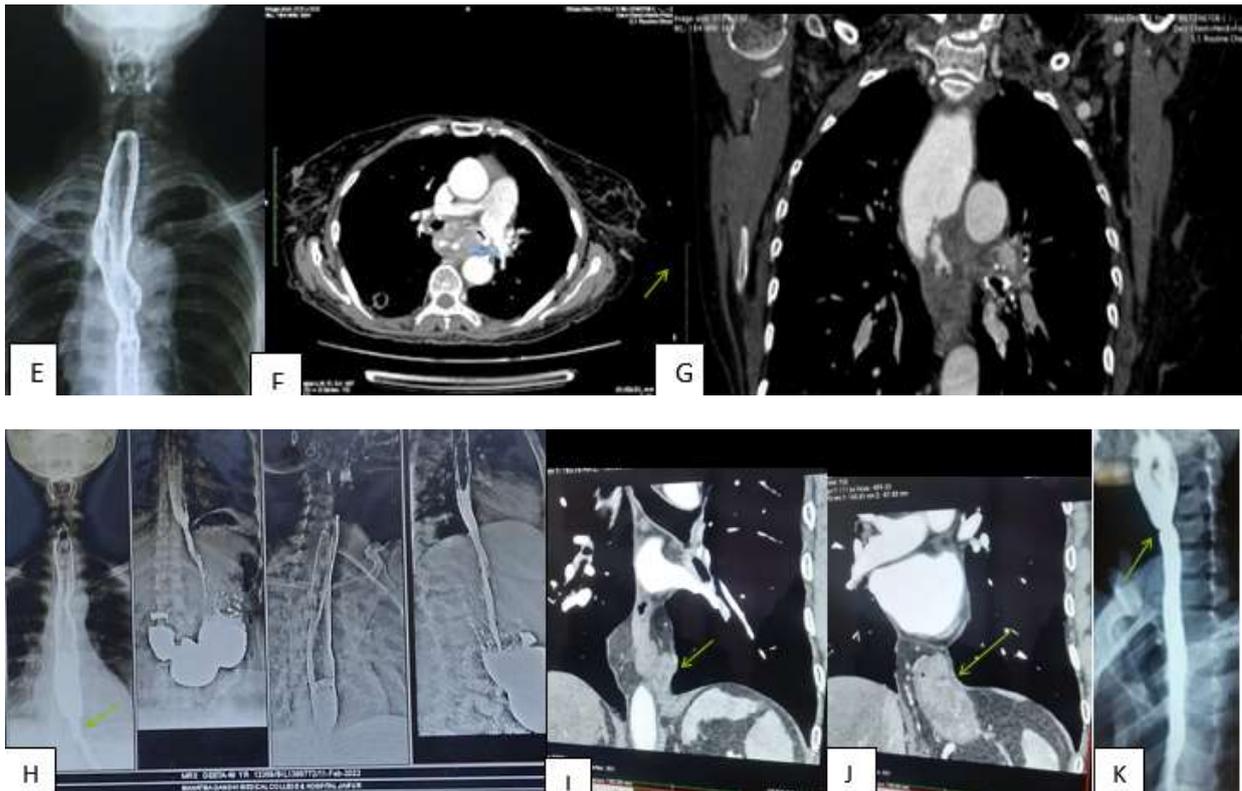
It is a common condition worldwide <sup>[23]</sup> due to reflux of acid contents from stomach upto laryngopharynx irritating the mucosa and resulting in sore throat and odynophagia. Our study includes 8 patients complaining of sore throat, with or without odynophagia treated with antibacterial agents etc.

Endoscopic findings suggested non erosive reflux disease in 6 subjects and erosive esophagitis in 1 patient. Others were subjected to barium swallow studies. Findings of achalasia cardia <sup>[25]</sup>, hiatus hernia, paraesophageal hernia and esophageal web were seen. Three patients with luminal narrowing of mid and lower esophagus were further evaluated. CECT revealed circumferential mass lesion of esophagus <sup>[24]</sup>. Scleroderma is a connective tissue disease and dysphagia is a common manifestation related to pharyngo esophageal dysmotility <sup>[26]</sup>. Sliding hiatus hernia is the most common type of hiatus hernia where the gastro-oesophageal junction (GOJ) is usually displaced >2 cm above the esophageal hiatus as seen in our patient. The esophageal hiatus is often abnormally widened to 3-4 cm, 3.7 cm in our patient, (normal is upto 1.5 cm) <sup>[27]</sup>. The rolling or paraesophageal hiatus hernia is less common. Here the GOJ remains in its normal location and a portion of the stomach herniates above the diaphragm. Throat pain consequent to reflux was seen in a patient with esophageal web. These are limited to the proximal cervical esophagus with gastroesophageal reflux as most common etiology <sup>[28]</sup>.



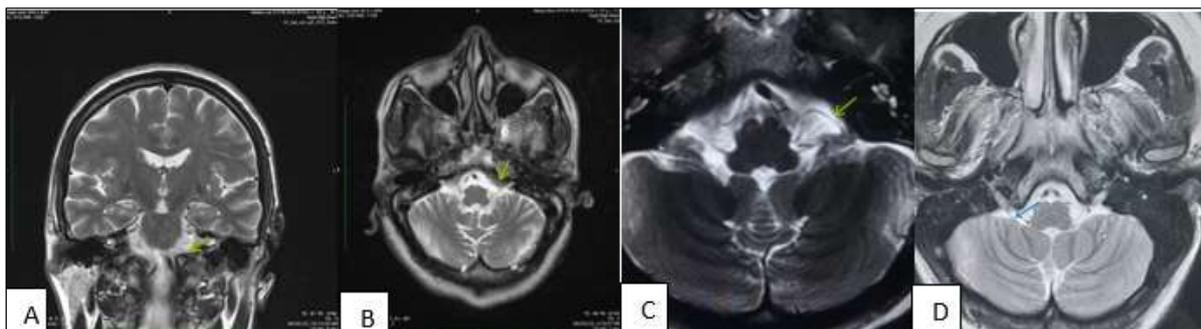
**A:** Endoscopy-Reflux Esophagitis.

**B:** Barium study depicting Achalasia Cardia. Barium study (C, D, E) and CECT (F, G) show circumferential esophageal malignancy at various levels.



**Fig 10:** G. Barium studies in scleroderma with lower oesophageal smooth tapering and dysmotility H&I. Paraesophageal and sliding hiatus hernias causing reflux and sore throat .J. Oesophageal web in cervical segment at Barium swallow

**Loops of blood vessels in ponto medullary cistern:** Loops of blood vessels, or their aberrant course eg. Posterior inferior cerebellar artery, pontine vessels if prominent, impress upon nerves exiting from brain stem producing symptoms accordingly. 4 Patients with mild throat pain were thoroughly investigated for the same. No organic lesion could be reported except for a few vessel loops in brainstem region.



**Fig 11:** MRI Sequences suggesting vascular loops in cerebellopontine angle cistern in vicinity of nerves. A Left PICA loop. B. Vessel loop overlying 9<sup>th</sup> nerve complex. C. Vessel loop in Left CP Angle cistern. D. Vessel loop in right CP angle cistern

The root of Glossopharyngeal nerve is located at the supra olivary fossette which is the most medial portion of the cerebellar pontomedullary angle. Although there is no apparent contact between the glossopharyngeal nerve and adjacent major vessels, in 4 patients of throat pain we found a loop of blood vessel 3 on left and one loop on right side around the supra olivary fossette in the PICA region. A possibility of the vascular loop at this fossette being an offending vessel in cases of glossopharyngeal neuralgia is suggested. 9<sup>th</sup> nerve course in all sequences appeared normal.MR images were viewed with the regular settings. Contact of the glossopharyngeal nerve and the vessel loop course was identified. Since no other findings on

examination and imaging were found, the symptom was attributed to above entity. Posterior inferior cerebellar artery group was forming loops, may cause compression over 9<sup>th</sup> nerve. In conclusion, MRI may be suggestive in patients with glossopharyngeal neuralgia and identification of a loop vessel artery [29].

## Observation

Our study group consisted of 51 subjects, 20 Females and 31 Males with age group ranging from 12 years to 80 years, carefully chosen for imaging protocol with one or more modalities mentioned in following table. Surprising revelations through our gadgets reiterate that all symptoms, trivial or serious, occur for a reason and need to be addressed. Radiological evaluation of a common symptom of throat pain has revealed a variety of findings upon investigations which if remained undetected or untreated, would have led to serious consequences specially neurovascular causatives and malignancies. We have not included cervical spinal pathologies in our study as they stand distinct in clinical symptomatology.

Here we present various ailments and diagnosis under consideration in patients with sore throat.

S. No.	Sex	Age	Complain	Modality	Findings
1	M	44	Throat Pain	3D MDCT	Unilateral Elongated Styloid Process (ESP)
2	M	37	Throat pain, tenderness	3D MDCT	Pseudoarticulated ESP
3	M	49	Throat pain ,Neck pain	3DMDCT	B/L Interrupted ESP
4	M	46	Throat & ear pain	3DMDCT	Interrupted displaced ESP
5	F	76	Throat, neck& ear pain	3DMDCT	Unilateral Interrupted ESP
6	F	39	Throat pain	3DMDCT	Calcified distal segment of right styloid process.
7	M	68	Throat pain, dysphagia	CECT	Infiltrating Malignancy oropharynx, lymphnodal mass.
8	M	62	Sore throat, dysphagia	CECT	Lymphoma parapharyngeal, jugular foramen region.
9	F	26	Throat, neck , ear pain, numbness	CECT	Parapharyngeal mass lesion infiltrating carotid sheath contents.
10	M	51	Throat pain, difficult chewing	CECT	Buccogingival mass infiltrating parapharyngeal space & carotid sheath.
11	M	56	Neck ear & throat pain	CEMR	Parotitis due to ductal obstruction.
12	F	27	Throat pain, ear ache	CT	Dentigerous cyst, lower right 3 <sup>rd</sup> molar tooth.
13	F	29	Throat pain, jaw pain	USG	Prominent submandibular lymph node.
14	F	27	Pain on chewing, Throat pain	CT	Osteochondroma mandible.
15	F	50	throat pain,odynophagia	CT	Submandibular gland sialadenitis and lithiasis.
16	F	27	Throat pain, halitosis odynophagia	CT	Tonsilolith.
17	M	13	Throat dryness, open mouth sleeping	X RAY	Prominent Adenoids.
18	M	41	Neck pain, radicular pain	CEMRI	Nerve sheath tumour, neurofibroma C7-T1 (Left )
19	M	60	Neck pain Dysphagia, Tinnitus	CEMRI	CP Angle Schwannoma involving jugular foramen.
20	M	41	Throat pain difficulty in walking ,headache	CEMRI	CECT schwannoma/meningioma CP Angle cistern.
21	M	53	Throat pain, tinnitus, Headache, gait disturbance	CEMRI	CP angle meningioma extending into internal auditory meatus and jugular foramen.
22	M	39	Headache, neck pain	CEMRI	Meningioma/schwannoma of jugular

					region.
23	M	53	Vertigo, odynophagia	CEMRI	Intraaxial Schwannoma at brainstem.
24	F	33	Throat pain, warmth, Odynophagia.	USG	Thyroiditis.
25	F	49	Throat pain, hoarse voice	USG	Left Thyroid nodules, TIRADS 4, Left lower cervical lymphadenopathy.
26	M	61	Throat pain, hoarse voice	CECT	Left thyroid nodule TIRADS 4.
27	F	55	Throat pain, dysphagia thyroid nodule (goiterous)	USG	Thyroid nodule (goiterous) TIRADS2
28	F	58	Throat pain, dysphagia hoarseness of voice.	CECT	Left superior Parathyroid adenoma.
29	M	49	Voice strain, throat pain	CT Virtual Endoscopy	Laryngeal Polyp.
30	M	43	Throat pain, cough	Laryngoscopy USG	Vocal nodule.
31	M	36	Throat pain, cough	Laryngoscopy CT endoscopy	Subglottic nodules.
32	M	65	Hoarse voice, throat pain	CECT	Vocal cord asymmetry.
33	F	46	Sore throat, strained voice	Laryngoscopy	Vocal cord retention cyst.
<b>S. No.</b>	<b>Sex</b>	<b>Age</b>	<b>Complain</b>	<b>Modality</b>	<b>Findings</b>
34	M	45	Throat pain, hoarse voice, breathlessness	CECT	Glottic, Infraglottic Laryngeal malignancy.
35	M	61	Hoarse voice, throat discomfort	CECT	Laryngeal malignancy involving the vocal cord.
36	F	12	throat pain crepitus in cervical region	CT	Pneumomediastinum, Air in parapharyngeal space.
37	M	46	Throat and neck pain.	CT	Air in retropharyngeal space.
38	F	61	Throat pain, cough and shoulder pain	CT	Pneumomediastinum+ Old Cavity foci in lung.
39	M	43	Throat pain, neck crepitus	X RAY	Pneumomediastinum, Air in parapharyngealspace, subcutaneous emphysema.
40	M	27	Throat pain and reflux	X R Ba swallow	Achalasia Cardia.
41	M	80	Throat pain and vomiting	X R Ba swallow	Rat tail narrowing of contrast column, CECT malignant.
42	F	66	Throat pain, reflux	XR Ba swallow	Concentric esophageal narrowing, Malignant lesion.
43	F	75	Vomiting, reflux, weight loss, Throat pain	CECT	CECT, Oesophageal Malignancy.
44	F	49	Throat, odynophagia	XR Ba swallow	Circumferential esophageal narrowing, Scleroderma.
45	M	74	Throat pain, Dyspepsia	CECT	Paraesophageal hernia
46	M	70	Throat pain, odynophagia	CECT	Sliding hiatus hernia.
47	F	40	Dysphagia, pain throat	XR Baswallow	Oesophageal web.
48	M	44	Throat and sharp ear pain	MRI	Vessel loops in pontine cistern impressing nerve.
49	M	52	Neck pain, sharp throat pain	MRI	Vascular loops in CP Angle cistern impressing 9 <sup>th</sup> nerve
50	M	57	Throat pain, jaw & ear pain	MRI	Vascular loops in Left jugular foramen region.
51	F	37	Ear, throat sharp pain	MRI	PICA loop overlying/ crossing 9 <sup>th</sup> nerve.

Abbreviations. CT-Computerized Tomography, 3DMDCT-3 Dimensional CT.CECT-Contrast enhanced CT.X R Ba swallow-X ray Barium swallow. CEMRI-Contrast enhanced MRI Magnetic resonance imaging.

## Discussion

Imaging has brought about a change in perspective over investigating trivial symptoms such as sore throat. It proves cost effective when diagnosis is made and treatment executed. Complex anatomy of throat, its musculature, neurovascular bundles, thyroid and parathyroid glands, parotid and submandibular glands, lymph node chain and osseocartilaginous structures exhibit a bevy of pathologies to be evaluated by systematic and customized approach towards history taking, complaints, local examination, and imaging protocol. We came across non serious conditions like stygia and reflux esophagitis requiring simple treatment to serious issues like tumours of head and neck requiring a pride of super-specialists to handle. Use of endoscopy and X Ray Barium studies for diagnosis of superficial mucosal and end luminal lesions was conclusive in entities like pharyngoesophagitis and laryngeal nodules and paved way for further imaging available in our institution helping us reach a definitive diagnosis. We also came across a few rare entities like masses and vascular loops crossing nerves in posterior cranial fossa through MRI. Functional assessment of vocal cords by ultrasound was carried out to depict vocal nodules or vocal cord asymmetry in patients with voice strain. Pharyngolaryngeal pathologies suspected on endoscopy were confirmed on CECT.

Entities like Muscle Tension Dystonia due to voice overuse could not be evaluated at our institution due to unavailability of Functional MRI.

## Conclusion

A common complaint of throat pain is usually subjected to neglect initially, followed by medication, use of antibiotics, throat gargles, steam inhalation and multitude of therapeutics, failure of which resulted into imaging and further workup. Our study has established that radiological imaging modes are accurate in establishing diagnosis of entities not previously thought of, and treatment course is planned accordingly.

One must precisely follow a systematic protocol of history and clinical examination, followed by medication and investigations carried out till the patient reaches the Radiology department for procedures. A careful and cost effective choice of imaging modality X Ray, Endoscopy, ultrasound, CECT, CEMRI is customized for each patient for quick conclusive results and prevention of unnecessary exposure to radiation. This study proves the value of imaging as one step further to clinical workup and life- saving in expediting management of tumor lesions. This was a retrospective study with limited data collection. The number of cases was relatively small. Entities like Muscle Tension Dystonia due to voice overuse could not be evaluated at our institution due to unavailability of Functional MRI.

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