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Research Article

A Prospective Study Of Challenges In The Management Of Extensive Thyroid Swelling

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ABSTRACT

OBJECTIVES- To study preoperative comorbidities patients can face due to extensive thyroid. To audit intraoperative difficulties faced by the surgeons and anaesthetists while operating extensive thyroids. To study postoperative complications and their management. To study the morbidity and mortality in treating extensive thyroid swelling. **MATERIAL & METHODS-** Prospective Interventional Study. *Inclusion Criteria*:1. All patients of age group above 18 years after getting written informed consent.2. Patient operated for extensive thyroid swelling and diagnosed as Benign or malignant tumors. *Exclusion criteria*:1. Patients of age group less than 18 years 2. Patient with untreated thyrotoxicosis 3. Patient with small thyroid swelling. Patients presenting with a Thyroid swelling were evaluated by detailed history, clinical examination, routine investigations, ThyroidFunction test, Serum Calcium, X-Ray Neck, CT Neck (plain and contrast), PFT, thyroid scan and underwent surgery in ENT OT. Bougie assisted intubation. Videolaryngoscopy assisted intubation (C-MAC). 4.Awake fibreoptic intubation were done. **RESULTS-**Patients having large thyroid swelling more than 8cmsin size were considered in our study. With a sample size of 30, we studied the preoperative clinical evaluation, investigations, difficulties and choices of intubation opted by anesthetists,challenges faced by surgeons intraop, complications dealt intraop and events faced during extubation, post op complications seen in each cases. With this study, we could summarisethe most common difficulties we faces, and the most effective ways we used to manage the same. **CONCLUSION-**Due to its large size, Thyroid swellings are usually in vicinity to a number of important structures like, carotid artery, jugular vein, vagus nerve, subclavian vessels, pleura which makes their dissection and removal difficult and has higher chances of complications with high morbidity and even mortality. USG and FNAC are usuallu used as a pre-operative diagnostic tools in thyroid swellings. Managing such extensive thyroid cases should always be a multidisciplinary approach.

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INTRODUCTION

It is estimated that nodular goiters affects 5% of the general population . The usual goiter growth ratio is estimated at 10 to 20% per year, though high individual variability in the clinical course makes it difficult to predict whether the goitres size will remain stable or whether dynamic thyroid growth will lead to its rapid progress warranting surgical intervention. Huge Goiters are extremely unusual and often result as a consequence of ignorance, neglect, lack of inadequate medical facility, fear of undergoing surgery or due to an unusually rapid growth as in malignancy. These patients pose a specific surgical challenge and need to be managed by experienced surgeons. In addition to presenting our experience with such cases, the literature is reviewed to analyze the technical difficulties, complications and the approach in managing them. Thyroidectomy for massively enlarged goiter could be technically challenging. The specific problems associated with them are difficulty in securing airway, adequate exposure, blood loss, and potential risk of injury to recurrent laryngeal nerve, oesophagus and the parathyroid gland due to distorted and displaced anatomy. Moreover there is an increased possible association of tracheomalacia, tracheal compression, retrosternal extension and skincomplications due to ulceration or infiltration by the massively enlarged goiter. The surgical approach to such cases requires careful preoperative evaluation and planning. Each case is dealt with differently and the technical difficulties both surgical and anaesthetic must be anticipated in order to minimize perioperative morbidity and mortality Intubation of these patients could be demanding due to gross tracheal deviation, compression or tracheomalacia and should be anticipated by the anaesthetists in the preanaesthetic assessment. Intubation is usually achieved in these difficult cases by flexible intubation using relatively smaller sized tube in case of severe narrowing . Awake intubation using fiberoptics and local anaes-thetics has been performed successfully in extremely difficult cases. Another difficult situation is when the stenosis is over a long segment. Successful intubation has been achieved in patients with stenosis extending from the cricoid cartilage to carina by passing an ex-tended length tube through the ste nosis with the tip at the level of carina.

Thyroidectomy for a massively enlarged goiter requires the neck to be well exposed by adequate extension achieved by placing adequate amount of sandbags under the shoulder. The incision is invariably long ex-tending even up to 40 cms at times. After reflecting the subplatysma skin flap adequate exposure is achieved by dividing the strap muscles and if need be the sternomastoid muscle. This ensures safe ligation of the superior pedicle, the middle thyroid vein and branches of inferior thyroid artery. Securing these vessels in this crowded space could be demanding as the internal jugular vein and carotid artery are compressed and displaced by the massively enlarged goiter. The use of harmonic scalpel mayfacilitate safe and speedy securing of these vessels specially when they are multiple and dilated due to partly obstructed venous outflow as in the presence of retrosternal extension. Of particular concern is also the potential risk of injury to the oesophagus due to gross distortion of the anatomy in patients with retropharyngeal and retroesophageal extension and preoperative insertion of nasogastric tube may serve as a guide to identify it. The removal of the gland may be facilitated by dividing it at the isthmus after mobilizing one lobe rather than attempting to remove it in toto. The removal of the other half would then be relatively easy due to the space created. Care is taken to preserve the para-thyroids and prevent injury to the recurrent laryngeal nerve. Use of intraoperative nerve monitoring has been reported to be very useful in these difficult cases. Apart from facilitating navigation through distorted anatomy it may lend itself as a routine adjunct to the gold standard of visual nerve identification.

Three specific problems that are likely to be associated with massively enlarged goiter is that of skin involvement, tracheomalacia and retrosternal extension. In one of the reports with extensive involvement of skin two approaches have been employed. In one approach for a patient with a fungating lesion the dissection was initially carried out from the noninvolved side. This allowed access to the goiter on the involved side from within, gradually dissecting the entire mass together with excision of the overlying skin elliptically around it.

In another patient with an ulcerated bleeding lesion the line of incision included the entire ulcerated areainitially and then deepened to lift the skin flaps at the onset. The thyroid lobe was then mobilised from the involved side pro-gressing on to the side where skin was not involved. The wide excision of the involved skin poses a problem in skin closure. While a small segment of the defect could be closed by mobilizing the adjoining skin, larger defectsparticularly in a previously irradiated skin may require closure by mobilizing flaps like a deltopectoral flap.

Tracheomalacia is an uncommon complication in a patient undergoing thyroidectomy and occurs in 0.1 to 0.5%. The major concern is that it may cause life threatening post operative airway obstruction with the recorded mortality of 44%. Its mechanical effect usually results from com-pression by the surrounding goiter leading to softening of the tracheal cartilage. The trachea may collapse immediately following extubation or as late as 48 hours into the postoperative period. Several technique for iden-tifying tracheomalacia have been advocated. A simple and economical method of detecting tracheomalacia on the operating table is at the end of surgery before reversing residual neuromuscular blockade and extuba-tion. After thorough suctioning of the oropharynx, the cuff is deflated [10]. Tracheomalacia would result intracheal collapse over the tube preventing peritubal leak after cuff deflation. The presence of leak would exclude tracheal collapse. Intra-operative inspection of the trachea by the surgeon also may reveal tracheomalacia.

In patients at risk of developing upper airway obstruction following Tracheostomy has been reported to have been performed in 6% (59/964) of patients following thyroidectomies , the indication primarily being intra- operative tracheal deformity with narrowing (more than 50%) of tracheal circumference on radiology and gland adherence to the tracheal wall ortracheomalacia.

IMAGING USG[2]

It is sensitive for the detection of thyroid nodules, and suspicious features can be used to guide further investigation/management decisions. Ultrasound (US) has become an important diagnostic tool in the assessment of thyroid nodules. It is highly sensitive for detecting nodules, and the sonographic features of the nodules can be used to determine the need for further investigation. The British Thyroid Association (BTA) recently produced a US classification (U1–U5) of thyroid nodules to facilitate the decision-making process regarding the need to perform fine- needle aspiration cytology (FNAC) in suspicious/unequivocal cases[1].

Normal thyroid USG-

Benign characteristics-

Indeterminate features-

Malignant features-

A malignant nodule can also have an irregular shape with irregular edges Malignant lesions tend to demonstrate intra-nodular vascularity.

INTUBATION TECHNIQUES IN LARGE THYROIDS-

Ventilation after induction of general anesthesia and muscle relaxation secondary to partial or complete airway collapse by huge thyroid swelling, which can cause severe hypoxia and warrants urgent tracheal intubation which may be difficult and time consuming due todistorted anatomy. In this situation, it is prudent to secure the airway before induction of anesthesia. Awake fiberoptic intubation is ideal gold standard technique in such situation where intubation is done under direct visualization of the glottis[3].

A systematic approach to airway assessment, preoxygenation, and procedure planning using trained personnel and teamwork significantly reduces the risk of complications from intubation[4].

Oxygenation, not intubation, matters most; early use of an extraglottic airway can significantly reduce the risk of complications from prolonged hypoxemia[4].

PEEP valve and NIPPV can delay critical desaturation during multiple intubation attempts therefore even after standard measures improve oxygen saturations above 90%[5].

TYPES OF INTUBATION-

Awake intubation[4]- It provides an important opportunity to preserve spontaneous respiration in cooperative patients with a predicted difficult airway,

Upright fiberoptic-assisted intubation requires skills, and is acommon and effective approach.

1. **Video laryngoscope assisted intubation**[4]-

They provide better glottic visualization than direct laryngoscopy in both low-risk and difficult airways

2. **Gum elastic bougie assisted intubation**[4]- the addition of a gum elastic bougie to direct laryngoscopy was the most frequently used strategy to successfully address difficult airway situations. It has also been associated with significant success when combined with the video laryngoscope

3. **BLEEDING IN THYROIDECTOMY-**

Post-thyroidectomy neck hematoma represents a major concern for surgeons because it can result in severe and even life-threatening complications. In fact, postoperative hemorrhage may result in airway compression and respiratory distress, and therefore, effective hemostasisis an important goal in thyroid surgery.

Studies have shown that only approximately 20% of hematomas occur between 6 and 24 h postoperatively,and virtually no hematomas occur afterwards. life-threatening hematoma can also be prevented by avoiding tight reapproximation of the strap muscles[6].

Intraoperative ligation of blood vessels can be done in multiple ways. Conventional techniques include clamp, tie, and cut methods, with or without cautery. Some use monopolarcautery; however, this causes a significant amount of heat dispersion and puts adjacent structures at risk for injury. Bipolar cautery is more pinpoint and allows less dispersion of heat.

Surgicel helps to form a hemostatic clot but no difference noted in occurrence of hematoma with conventional technique.A meta-analysis of patients with drain and without drain found no difference in hematoma, reoperation rate, or seroma as assessed by postoperative ultrasound[7]

4. **OTHER INTRA-OPERATIVE COMPLICATIONS OF LARGE THYROIDECTOMY-**

Recurrent laryngeal nerve injury-

Due to distorted anatomy in large thyroids, finding the right plane while operating is difficult task. Hence, RLN localisation according to routine surgical landmarks cannot be relied upon. This results in quiet often completing the surgery without being sure of identifying RLN. Asa result, there is going to be more chances of injuring the nerve and patient having cordpalsies post op.

Even after identifying the nerve, separating it from the huge goitre is a teadious task to do. Possibilities of perineural arterial woozes are more. Which gives a bloody field to the surgeons, forcing them to use bipolar cautery more often than not near the nerve, resulting in heat associated injury to nerve. Giving rise to transient of permanent nerve palsy post op.

5. **Post thyroidectomy Hypocalcemia-**

Hypocalcemia is one of the major complications of thyroidectomy due to the small size of theparathyroid glands (PGs), their proximity and firm adherence to the thyroid, and the risk of compromising their blood flow during surgery. Despite the expertise of surgeons, postsurgical hypocalcemia remains a prevalent complication in patients undergoing total thyroidectomy and / or central lymph node dissection, causing high postoperative morbidity and compromising the quality of life and increasing costs to the health system[8].

Neurological signs-

Chvostek´s sign consists on the momentarily contraction of the ipsilateral side of the face (nose or lips) when the facial nerve is tapped at the angle of the jaw (the masseter muscle).

Trousseau´s sign is considered more sensitive than Chvostek´s sign. It consists on the spasm of the hand and forearm due to the occlusion of the brachial artery when a blood pressure cuff is placed on the arm and inflated to 10 mm Hg above the systolic pressure during at least 2 minutes.

The mechanism of hypoparathyroidism after thyroidectomy is not entirely understood, but the manipulation of the PGs producing transient parathyroid insufficiency or reversible ischemia is commonly cited [9,10].

MATERIALS & METHODS

Ethics committee approval number- IEC/OUT/47/2018

Study design: Prospective Interventional Study.

Sample size: 30

Study Population: Patient presenting with extensive thyroid swelling

Inclusion Criteria:

1. All patients of age group above 18 years after getting written informed consent.
2. Patient operated for extensive thyroid swelling and diagnosed as Benign or malignant tumors.

Exclusion criteria:

1. Patients of age group less than 18 years
2. Patient with untreated thyrotoxicosis
3. Patient with small thyroid swelling.

METHODOLOGY:

Prospective study

Patients presenting to the outpatient department with a Thyroid swelling were evaluated by detailed history, clinical examination, routine investigations, Thyroid Function test, Serum Calcium, X-Ray Neck (Fig.1), CT Neck (plain and contrast ,Fig2,3), PFT (Pulmonary function test), thyroid scan and underwent DATA RECORDING: All data obtained was recorded in a pre-designed case record form.

DATA ANALYSIS: The data obtained from all the case records of patients wereentered into a worksheet based program- MS Excel. Relevant deductions based on the data were presented using bar charts & diagrams.

Pre-OP Assessment Of Large Thyroids

Clinical examination of neck is done & various signs seen to rule out extensive thyroid swellings Retrosternal extension, palpating the lower border of the swelling (**Pemberton's tes**t) engorged neck veins on raising both the arms above head (Fig.1)

Pre-OP investigations like Xray neck & CTscan of Neck & chest (Figure 3 & 4) were done to see the extent of thyroid swelling- **trachea pushed laterally- expecting difficult intubation,** X-ray neck, showing scabbard's trachea- possibility of tracheomalacia (Figure 2).

Methods We Used In Case Of Difficult Intubations-

1. Bougie assisted intubation-
2. Videolaryngoscopy assisted intubation (C-MAC)-
3. Awake fibreoptic intubation-
    a. Preop Lignocaine nebulisation (Fig.20)
    b. Supralaryngeal block (Fig.21)
    c. Sedation+anxiolytics= Dextromethorphane/ Fentanyl (Fig.22)
    d. Fibreoptic bronchoscopic guided intubation (Fig.23)
4. Preop Lignocaine nebulisation-
5. Supralaryngeal block-

Surgical steps showing thyroidectomy: Modified Kocher's Incision, Raising of subplatysmal flap, Achieving adequate exposure & thyroid lobe mobilized, Blunt dissection done around thyroid lobe, Superior thyroid vessels ligated (Figure5) ,ligating the middle thyroid vein(Figure6), Huge thyroid Both the lobes delivered from its retrosternal extent(Figure8), RecurrentLaryngealNerveidentified (Figure6,7).

CAPTIONS FOR FIGURES

Figure 1: Pemberton's test engorged neck veins on raising both the arms above head

Figure 2: X-ray neck, showing scabbard's trachea- possibility of tracheomalacia postop

Fig 3: trachea pushed laterally- expecting difficult intubation

Fig4.. Figure 4: CT scan Neck & chest showing Retrosternal extension of thyroid abutting arch of Aorta

Fig 5: Superior thyroid vessels ligated

Fig6 : ligating the middle thyroid vein

Fig 7: Left Recurrent Laryngeal Nerve identified

Fig 8: Huge thyroid B/L lobes delivered from its retrosternal extent

Figure 1

Figure 2:

Fig 3

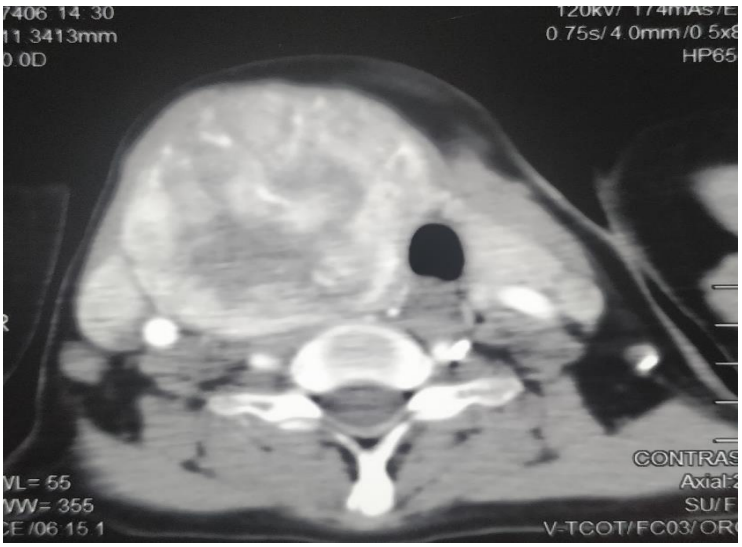


Figure 4

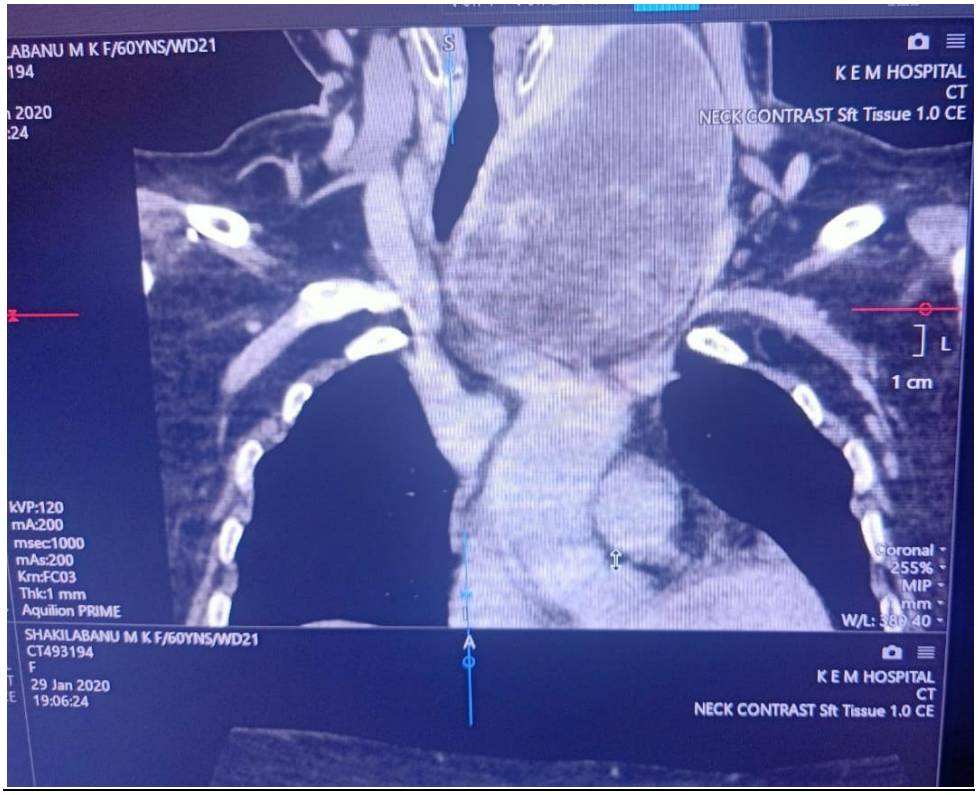


Figure 5

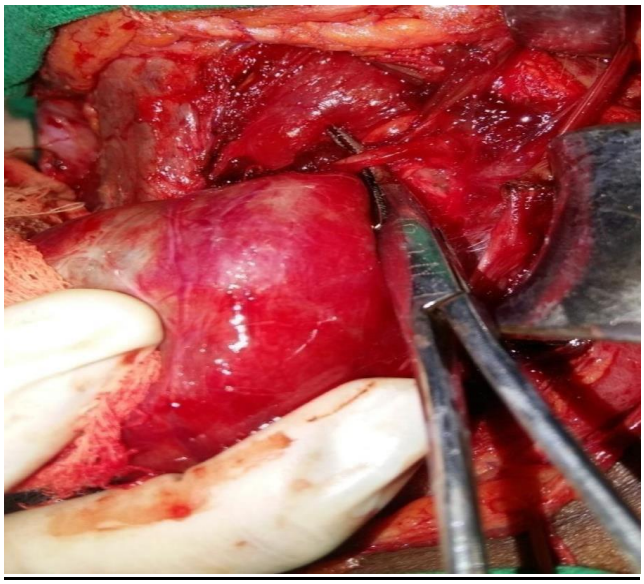


Figure 6

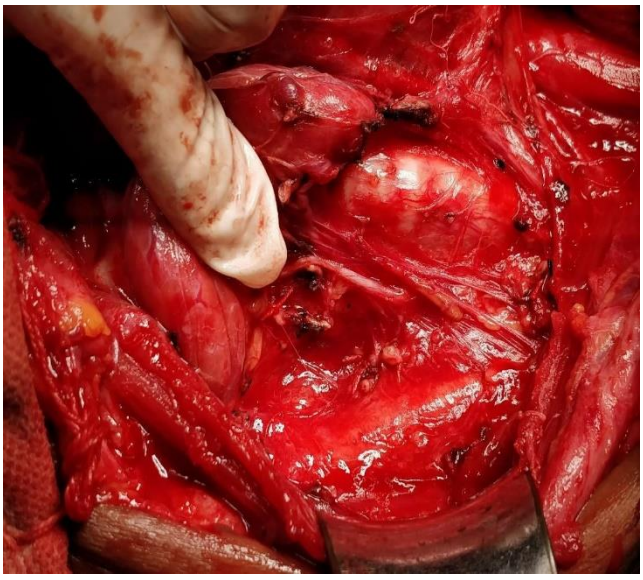


Figure 7

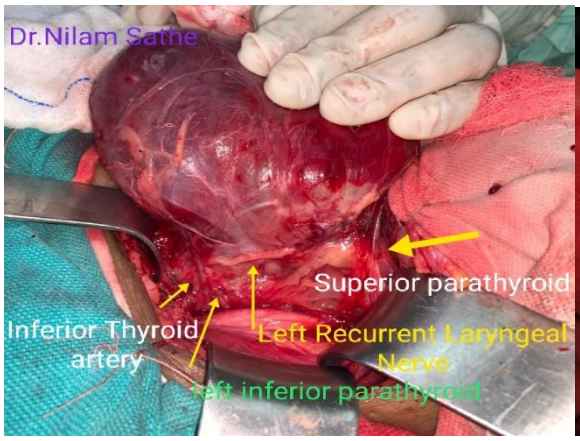
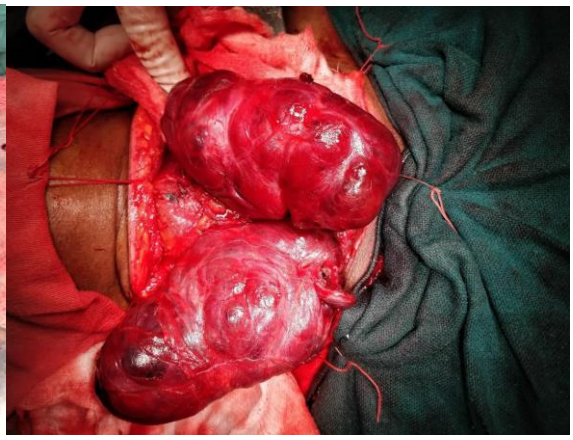


Figure 8



Pembertons_sign by Inferior_border_of_thyroid

Table-1	Berry's sign		
Positive	36.67%	6.67%	43.33%
Association	56.67% inferior border of thyroid	43.33%	100.00%
Pemberton's test	Non-Palpable	Palpable	Grand Total
Negative	20.00%	36.67%	56.67%
Grand Total			

compression symptoms	Absent	Present	Grand Total
Dysphagia	1		1
Dysphagia, Syncope		1	1
Dyspnoea	5	2	7
Dyspnoea, Dysphagia	1		1
Dyspnoea, Hoarseness	1		1
Dyspnoea, Hoarseness, Syncope, Orthopnea	1		1
Hoarseness	2	2	4
none	11	3	14
Grand Total	22	8	30

Kocher's test and different compressive symptoms-

Table-2	Kocher's test		
compression symptoms	**Negative**	**Positive**	**Grand Total**
Dysphagia	1		1
Dysphagia, Syncope		1	1
Dyspnoea	1	6	7
Dyspnoea, Dysphagia		1	1
Dyspnoea, Hoarseness		1	1
Dyspnoea, Hoarseness, Syncope, Orthopnea	1		1
Hoarseness	2	2	4
none	11	3	14
Grand Total	**16**	**14**	**30**

Vocal cord status versus compressive symptoms-

Dyspnoea and vocal cord palsies-

Table 3	Cord palsies		
compressive complaints	**Left vocal cord palsy**	**Right vocal cord palsy**	**Grand Total**
Dyspnoea	1	1	2
none	1	2	3
Grand Total	**2**	**3**	**5**

RESULTS

1. Age distribution of our patients- maximum peak at 41-50 years age.Two outstanding cases in the range of. 10-20 years
2. Complaints due to large size of the thyroid swelling- Most of our patients had only neck swelling as their main complaint. But among the compressive symptoms, dyspnoea was the major complaint. 10 of our patients complained of dyspnoea.
3. Except 3 patients, rest all were in euthyroidic state. But these 3 patients were also managed medically to correct their thyroid status and then taken up for surgery.
4. 11 patients were hypothyroidic and on suppliments. 2 of them were hyperthyroidic and on antithyroid medication.
5. 29 cases had no relevant thyroid history but 1 patient showed mother having similar disease but not significant as medullary carcinoma was ruled out.
6. Thyroid mass dimensions-
    1. Vertical length from clinical examination v/s cephalocaudal length from CT scan- Most of the values were clustered around 8-10cms and 8-10.5cms in clinical examination and CT scan measurements. With extreme values of 14 and 15cms in 2 cases. Mean value of clinical examination was 9.33cms Mean value of CT scan measurements was 9.53cms Vertical length measurement and CT scan measurements matched in most of the cases and hence complimented each other.
    2. Horizontal width from clinical examination v/s lateral extent breadth

from CT scan- Most of the values were clustered around 5-8.3cms and 5-10cms in clinical examination and CT scan measurements. With extreme values of 15 and 16cms in 2 cases. Mean value of clinical examination was 6.82cms Mean value of CT scan measurements was 7.09cms. Clinical width measurement and CT scan measurements matched less compared to verticalmeasurements in most of the cases. Reason being paratracheal and below SCM extensions.

7. Association of pemberton's test with palpable inferior border of the thyroid- Pemberton's positive and inferior border being not palpable were almost 37% of 43% being positive. 37% of 57% pemberton's negative test cases had lower border palpable. Showing a significant relationship between these two. Berry's sign and different compressive symptoms- (Pembertons_sign by Inferior_border_of_thyroid
8. Kocher's test and different compressive symptoms- Dyspnoea and kocher's look very associated as 6 of our dyspnoeic people gave kocher'spositive.
9. Vocal cord status versus compressive symptoms-
10. We have compared it with benign and malignant characteristics of USG and correspondingdifficult dissection whether corelated of not. There were 16 cases with difficulty in dissecting thyroid intraop 21 cases showed cystic changes in USG, in them 8 were difficult to find plane and 13 were easy for dissection;15 cases showed increased vascularity in USG, in them 10 were difficult to find plane and 5 were easy to dissect. This shows that thyroid with increased vascularity has difficulty in finding plane. 7 of our cases showed microcalcification, among them 6 were having difficulty in finding plane.
11. Almost all the patients whose all 4 parathyroids were preserved, none of them had hypocalcemia. Patient with 1 or 2 parathyroid glands left intact were more complained of hypocalcemia.
12. Most of our cases were measuring from 251-500 cc in volume. 17 to be precise. 16 of total 30 cases suffered intraop blood loss of 500 to 750ml10 cases had 750 to 1000ml blood loss. 3 cases had more than 1000ml of blood loss
13. 11 cases were multinodular goitre with Bethesda grade 2 and only 3 cases were papillary and1 case was Bethesda category 6
14. 65% of the cases were intubated by fibreoptic bronchoscope assisted. 45% cases had fibreoptic bronchoscope assisted intubation.
15. 90% of patients having tracheomalacia had difficulty in their immediate post op extubation. (Tracheomalacia by Difficulty_in_extubation_)
16. Only 2 of our cases went into tetani.

DISCUSSION

William Halstead has stated that "the extirpation of the thyroid gland for goiter typifies betterthan any operation the supreme triumph of the surgeon's art". The massive thyroid glands may be benign or malignant in nature.

Large goiters cause multiple airway issues that may complicate surgery. First, the trachea may be deviated by the large gland making intubation challenging. Another problem with the airway is that these patients cannot be easily tracheotomized if the patient develops respiratory compromise because the thyroid typically covers the trachea along the entire cervical portion.

Longstanding airway compression from goiters may also lead to tracheomalacia. This can be a serious, even life threatening, issue in the postoperative patient. Ideally, we should identify which patients have tracheomalacia as a result of longstanding compression prior to undertaking any thyroid surgery. The dynamic

evaluation by fibreoptic bronchoscopy, would exhibit either inspiratory or expiratory collapse of the airway depending on whether the segment is extra or intra-thoracic respectively. However, the symptoms and findings may not manifest until after the thyroid gland is removed. This is because fibrous attachments from the thyroid gland to the trachea may help maintain airway patency during the breathing cycle. This external scaffolding is lost with thyroidectomy allowing the trachea to collapse. Addressing this tracheomalacia presents interesting challenges.

There are multiple hemodynamic changes that occur with giant goiters. Usually these occur when there is substantial substernal extension because the gland and all upper mediastinal structures are compressed between the rigid sternal bone and the spine in a finite space. The gland may thus cause compression of the neck and upper mediastinal vessels causing venous outflow obstruction and superior vena cava syndrome. Superior vena cava syndrome may also cause thrombosis in the vena cava. Dyspnoea may be caused by decompensated right sided congestive heart failure, pleural effusion and pulmonary hypoperfusion caused by compression of the pulmonary arteries. There have even been numerous reports of cerebrovascular insufficiency and stroke from goiters either by direct compression of the carotid arteries or by "thyrocervical steal" caused by increased thyroid blood flow. In these cases, thyroidectomy was curative of the ischemic events.

Incidences of intraoperative complications are higher in patients with large goiters when compared to patients with smaller thyroid glands. These complications include higher rates of transient and permanent vocal cord paralyses as well as temporary and permanent hypocalcemia from parathyroid gland injury. Neurologic injury (Neuropraxia) from large benign thyroid disease has been reported as well. These include phrenic nerve palsies, Horner's syndrome and recurrent laryngeal nerve palsies. In these rare reports, the nerves may return to function following thyroidectomy.

Another consideration that must be made in patients with giant goiters is their proclivity towards poor nutritional status. The thyroid in these patients may either be compressing the esophagus directly via posterior extension or indirectly via crico-tracheal compression posteriorly. Often, it is the resultant dysphagia which leads patients to presentation. Poorly coordinated swallow may result and may persist beyond thyroidectomy and thus the operating surgeon should be mindful of the possibility of persistent dysphagia following surgery. The operating surgeon should also be mindful of the patient's nutritional status pre-operatively as this may lead to poor wound healing. This malnutrition can have multiple effects on the endocrine function of the thyroid gland. Additionally, malnutrition can lead to low protein states causing multiple endocrine abnormalities including decreased levels of thyroid hormone and even increased thyroid size. Overall, the technical aspects of surgical management of large goiters are similar to those of the more common smaller goiter variety; however there are many unique issues that arise as a result of the glands size. Surgeons who undertake these cases should be mindful of all of the potential pitfalls and special considerations that confound these interesting cases. The surgeon should also be skilled routine thyroid surgery as well as procedures which may be required based on operative findings. Hence this retrospective study aims to address perioperative management of large goiters, the cause of which maybe benign or malignant.

1. Our cases were mostly aged from 30 to 60 years.
2. According to Q.V. Le et al., giant thyroid tumors[13], in which common symptoms are dysphagia, dyspnea, orthopnea and cough, hence in my study I have taken dyspnea, dysphagia, hoarseness, syncope and orthopnea. Among which dyspnea was the most common compressive symptoms seen.

3. Thyroid functionality – most of our patients were in euthyroidic state.
4. There was no significant past history or family history except few of our pts were on thyroid suppliments.
5. Mean value of horizontal width and vertical length were almost similar compared to CT measurements of thyroid swelling.
6. We found good association between Pemberton's sign and inferior border of thyroid being clinical palpable with p=0.0069. So, patients whose inferior border of thyroid was not palpable they showed engorgement of neck veins and facial flushing after elevating their both upper limbs above head level.
7. Kocher's test- The test is started by asking the patient to extend the neck, followed by asking the patient to take heavy deep breaths through the mouth continuously. After that, the examining physician compresses the swelling from the sides. The test is positive if there is the presence of stridor when the lateral lobes are pushed posteromedially with fingers[12].
8. We have compared the cases in which we found difficulty in finding plane and theusg characteristics of such patients. We found that USG which showed increased vascularity and malignant findings had difficulty in finding plane, conversely cases with benign characteristics in USG had easy finding plane irrespective of the size of the gland.
9. Post op cases which had all 4 parathyroid glands identified had no hypocalcemia and cases who had only 1 or 2 parathyroid gland was identified showed more transient hypocalcemia post op.
10. We found good association between retrosternal extension of thyroid and relative difficulty in delivering them from below sternal area. Out of 15 cases which had retrosternal extention cases, 50% of them were difficult to deliver and other 50% had no difficulty at all.
11. Most of the cases chosen came under 251-500cc in volume.
12. According to mejia MG et al., most common complications in patients undergoing thyroidectomy being hypoparathyroidism, with a prevalence of 10 to 46% causing transient hypocalcemia[11]. In our study, 36.66% of our case showed hypocalcemia postop.
13. According to **Jing Liu et al.,** the mean estimated blood loss (EBL) was 112 ± 17 mL (N=56)[16]. Which were not large thyroids like us. The mean weight in their case was 60mg. In our study the mean blood loss was 600ml and the mean volume of thyroids was 450ml which showed that increase in size of the thyroid had direct relation with the amount of intraop blood loss.
14. According to Divya Srivastava et al., for intubation in their case report of large long standing retrosternal thyroid, they chose fibre optic brochoscopic assisted intubation with armored tube. Xylometazoline was instilled in both the nostrils for vasoconstriction of nasal passage to facilitate passage of fiberoptic bronchoscope (FOB) without mucosal injury. The patient's airway was anesthetized by applicationof lignocaine 2% jelly in the nostrils, lignocaine viscous 2% gargles, 4 ml of lignocaine 4% nebulization, and lignocaine spray (10%). Oxygen was administeredvia oxymask at a rate of 5 L/min. Patient was administered 2 mg midazolam and 60 mcg fentanyl i.v. to allay anxiety and for mild sedation. FOB was loaded with a 6.0 mm armored endotracheal tube[14]. We used similar technique in 20 cases. Rest of the cases we used, C-mac guided intubation. We used normal PVC endotracheal tube in 14 cases and flexometallic armored tube in 16 cases.
15. According to Dushyant Tripathi et al., On completion of surgery lidocaine hydrochloride 2% (without preservative)

1mg.kg-1 IV was given and patient was reversed with neostigmine, and glycopyrrolate in the doses of 2.5 mg and 0.4 mg respectively and extubation was done. On direct laryngoscopy movement of both vocal cords was normal. Immediately after extubation patient developed strider in spite of mobile vocal cords. Anticipating tracheomalacia we planned bronchoscopy on spontaneous respiration to confirm diagnosis & found that anterior wall of tracheawas collapsed against the posterior wall at the level of 2nd & 3rd tracheal cartilage. Immediate reintubation was done with 7.5 mm ID cuffed ETT and emergency tracheostomy was performed. Patient was extubated post tracheostomy after thorough oropharyngeal and tracheostomy suction. Decannulation of tracheostomy was done after three weeks[15]. In our study, we had 10 cases with tracheomalacia, out of which 9 cases has post extubation stridor, 5 needed reintubation and 1 needed tracheostomy.

16. According to Koladave et al., A total of 196 case notes out of the 210 thyroidectomies performed within the study period could be retrieved for analysis. Twenty patients (10.2%) required ICU admission for various indications. Sixteen of the admissions were elective based on recognition of the need immediately after extubation in the theatre, while the remaining 4 patients were emergency admissions transferred from the post-surgical ward at variable periods within the first 24-hours post-operatively. The most common reason for ICU admission was recurrent laryngeal nerve (RLN) palsy, which occurred in 13 patients (6.6%)[12,13]. In our study, 10 out of 30 patients were admitted in ICU of either observation or extended intubation due to tracheomalacia. Our study had only giant thyroid into consideration. Hence we had almost 33.33% ICU postop care compared to Koladave et al., which was a study of all sizes of thyroidectomies.
17. A total of 35 patients included of them most were female. Male & female ratio is 1:7.5. Minimum age was 15 years and maximum aged patient was 63 years old. Maximum Sample were in 26-35 age group. Multinodular goitre is the top most cause

    25 (71.45%) for total thyroidectomy. Next common indication was papillary carcinoma thyroid 5 (14.28%). In this study 3 patient developed hypo calcaemic tetany in the Group-A where parathyroid was identified and 7 patients developed tetany in Group-B where parathyroid is not identified. 10 patients developed hypo calcaemic tetany among which 4 patients developed over or clinical and 6 patients developed sub-clinical or latent tetany (n=35). In our study, we had 2 cases of tetany, who showed positive Chvostek's sign and carpopedal spasms. But both the cases weretransient and were treated with Calcium gluconate IV loading and maintenance dose with Oral Calcium and Vit D3 supplements for a month.

CONCLUSION

- Extensive thyroids, irrespective of them being benign or malignant, their perioperative management and its complications remain the same.
- Due to its large size, they are usually in vicinity to a number of important structures like, carotid artery, jugular vein, vagus nerve, subclavian vessels, pleura which makes their dissection and removal difficult and has higher chances of complications with high morbidity and even mortality.
- USG and FNAC are usuallu used as a pre operative diagnostic tools in thyroid swellings, but in these large thyroids it is a prerequisite to do a pre-op CT scan to know the extent,relationto its surrounding sections and to plan the surgery accordingly
- It is important to have a good team of anaesthetists, with preoperative planning

and preparation to deal with any intraoperative complication. And plan choosing the appropriate technique of intubation, intra operative monitoring and even manage a difficult extubation.

- It is a challenge for the operating surgeon to get these cases disease free without morbidity and mortality.
- Post op requirement of managing dysphagia, dyspnea and post op speech therapy, kashima's procedure according to the complications should be anticipated.
- Managing such extensive thyroid cases should always be a multidisciplinary approach involving not just ENT surgeons, but also Cardiothoracic surgeons, GI surgeons, endocrinologists, speech therapist and anesthetists to provide best of the available treatmentof these patients.

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