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Bangladesh Journal of Otorhinolaryngology

INFORMATION FOR AUTHORS

The Bangladesh Journal of Otorhinolaryngology is published twice in a year, in the month of April and October. The Journal is the official organ of the Society of Otolaryngologists and Head Neck Surgeons of Bangladesh. It publishes original papers, research topics, case reports and review articles of different fields related to Otolaryngology. Papers submitted solely to this Journal will be published after peer review.

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a) Bennet R.G. The significance and management of the drumhead retraction pocket. The Journal of Laryngology and Otology, 1970; 84: 167-189.

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b) Groves J., Gray R.F. (editors). A Synopsis of Otolaryngology, fourth edition. Bristol : John Wright & Sons, 1986; 446-448.

Chapter in a book, edited / compiled by an author/authors.

c) Ludman H. Complications of suppurative otitis media. In : Booth J.B. (editor). Scott - Brown's Otolaryngology, fifth edition, vol. 3, London; Butterworth & Co. Ltd., 1987; 264-291.

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Standard abbreviations should be used whenever possible. The full term for the abbreviation should precede the first use of the abbreviation in the paper.

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For ethical aspects the World Medical Association's code of ethics in BMJ, 1964; 2:

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Editorial

Endoscopic Thyroid Surgery

Minimally invasive and remote access thyroidectomy using endoscopy has gained in popularity for the treatment of thyroid tumors. It has been developed to minimize surgical morbidity and to avoid or hide the visible neck scarring that is one of the drawbacks of conventional trans-cervical thyroidectomy, because neck scarring is a major concern in thyroid surgery, especially in young women. Endoscopic via cervical, axillary, anterior chest, breast, postauricular or transoral approaches has been developed over the past 20 years and has been recently refined.

Gagner first described the endoscopic subtotal parathyroidectomy with constant CO₂ gas insufflations for hyperparathyroidism in 1996 and achieved a good clinical and cosmetic result. Since then minimal access parathyroidectomy has found a role alongside conventional cervicotomy for the treatment of primary hyperparathyroidism.

Huscher and colleagues first described the complete endoscopic right thyroid lobectomy in 1997. Minimally invasive surgery using endoscopic vision is now widely employed for the treatment of thyroid diseases for cosmetic purposes. Since then several approaches to the thyroid have evolved including the cervical approach, the minimally invasive video-assisted thyroidectomy (MIVAT), the transaxillary approach and the breast or anterior chest wall approach. Each of these approaches have their own advantages and disadvantages. Videoscopic neck surgery is developing despite the fact that only potential spaces exist in the neck. These approaches are more appealing since the size of incision of that the conventional approach seems to be out of proportion compared to the small size of the tumors.

Endoscopic surgery has reduced the level of surgical "invasiveness" and results in an improved cosmetic appearance. The site of approach is the most important factor because there is an intimate relationship between the locations of the trocars in terms of the cosmetic result, invasiveness, safety and ease of use.

The cervical approach utilizes small incisions in the neck thus making it cosmetically unacceptable and cannot be used for lesions greater than 4 cm. Only patients who have small nodules with a low index of suspected malignancy are offered this endoscopic approach. The operative field is small and because the camera is near the anatomic structures, it often has to be removed for cleaning, which significantly increases the operating time.

The axillary approach makes it difficult to visualize the opposite lobe. Although sectioning the sternohyoid muscle creates a good visual space even for the contralateral region and enables the contra lateral gland of the thyroid to be resected, the operating time is extremely prolonged and the additional scar tissue causes discomfort while swallowing and neck pain as a result of adhesions. Therefore this endoscopic procedure is not indicated for thyroid nodules that extend to the contralateral thyroid lobe.

The anterior chest wall approach utilizes port access at various positions on the anterior chest wall depending on the surgeon, thus avoiding a cervical incision. The trocars are over the sternum and infraclavicularly. These are hidden by the clothes of the patient and are not visible routinely.

This technique also allows bilateral neck exploration. Hence have been able to perform total thyroidectomies with central

compartment clearance for papillary carcinoma and near-total thyroidectomies for large multinodular goiters..

The surgeries performed are hemithyroidectomy, total thyroidectomy and near- total thyroidectomies.

In differentiated thyroid cancer, surgical treatment depends on the risk group of the patient. Low-risk group patients underwent ipsilateral lobectomy and high and intermediate risk group patients underwent near total / total thyroidectomy.

The technique is safe and effective in the hands of an appropriately trained surgeon. To minimize surgical morbidity and neck scarring, minimally invasive thyroidectomy and endoscopic thyroidectomy via cervical, axillary, anterior chest, breast, postauricular or transoral approaches have been developed over the past 20 years. Among remote access approaches, the gasless transaxillary approach, bilateral axillo-breast approach, postauricular facelift approach, and transoral vestibular approach are in common use today. Each procedure has its own advantages and disadvantages. Therefore, we need to understand these advantages and limitations, and to select the appropriate method for each patient. The most significant advantage of remote access thyroidectomy is its excellent cosmesis. The complication rate is similar in patients undergoing a remote access approach and those undergoing conventional surgery if the former is performed by experienced surgeons. Operative time is significantly longer in remote access thyroidectomy.

Classification of Endoscopic Thyroidectomy

Endoscopic thyroidectomy can be classified according to the use of carbon dioxide (CO₂) gas insufflation and the site of incision.

CO₂ insufflation method

Cervical approach; Anterior chest approach; Axillary approach; Breast approach with

parasternal port; Axillo-breast approach ; Axillo-bilateral breast approach; Bilateral axillo-breast approach; Unilateral/bilateral axillo-breast approach; Transoral approach

Gasless method

Minimally invasive video-assisted thyroidectomy; Anterior chest approach; Video-assisted neck surgery; Axillary approach; Axillary approach with anterior chest port ;Single incision axillary approach Gasless unilateral axillo-breast or axillary approach.

Endoscopic thyroidectomy using a remote access approach is feasible and comparable to conventional transcervical thyroidectomy in highly selected patients; it also yields excellent cosmesis. However, it has disadvantages in terms of longer operative time, higher cost, and technical difficulty. Strict patient selection criteria are very important. We also need to understand the advantages and limitations of various types of remote access thyroidectomy.

- Minimally invasive video-assisted thyroidectomy, transaxillary, bilateral axillo-breast approach, facelift and transoral approaches are in common use today.
- Remote access thyroidectomy is feasible and comparable to conventional thyroidectomy.
- The most important advantage of remote access thyroidectomy is its excellent cosmesis.
- The various approaches have their own advantages and disadvantages.
- Strict patient selection criteria are important

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Original Article

Optic Nerve Decompression in Craniofacial Fibrous Dysplasia Involving Optic Canal: An Experience at AIIMS, New Delhi

Bashir Ahmed¹, Alok Thakkar², SM Nurul Irfan³

Abstract

Background: Gradual progression of craniofacial fibrous dysplasia frequently involves sphenoid and ethmoid bone results encasement of optic canal which leads to visual impairment to complete blindness

Methods: Retrospective study was carried out at All India Institute of Medical Sciences on hospital records of 16 cases of craniofacial fibrous dysplasia operated for optic canal involvement with or without visual impairment with an objective to discuss about the indications, suitable timing and outcome of optic nerve decompression in cases of optic canal involvement.

Results: Out of 16 cases, 56.25% were female with mean age 13.06 years. 15 patients had Idiopathic Fibrous dysplasia and 01 had Cranio-metaphyseal dysplasia. 62.5% were polyostotic and 37.5% were monostotic with 62.5% of optic neuropathy. Bilateral lesion occurred in 03 patients. Optic nerve decompression was done for curative treatment in 62.5% and for prophylactic in 37.5% cases. Post-operative visual improvement occurred in 90% patients and in no patient vision was deteriorated.

Conclusion: Prophylactic decompression can be carried out in expert hand for involvement of optic canal in craniofacial fibrous dysplasia for prevention of future visual impairment.

Keywords: Fibrous dysplasia; optic canal; optic neuropathy; optic nerve decompression;

Introduction

Fibrous dysplasia(FD) is a benign, slowly progressive bone disorder of unknown aetiology where normal bone is replaced by various degrees of fibrous tissue and

immature woven bone¹. It presents in childhood or early adolescent^{2,3} in which progression typically arrests at puberty⁴. FD is caused by somatic activating mutations in the subunit of the stimulatory G protein encoded by the gene GNAS á^{5,6}. It appears to arise from a perturbation in the mesenchymal precursor of bone, producing a defect in osteoblastic differentiation and subsequent maturation of bone⁷

It is a relatively uncommon, nonfamilial congenital disorder of bone³ and the disease usually manifest before 3rd decade of life⁸. Patient may present with involvement of

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single bone (monostotic; MFD), multiple bones (polyostotic; PFD) or McCune-Albright Syndrome(MAS). MAS has been classically defined as a triad of PFD, café-au-lait skin macules and endocrinopathies (precocious puberty, hyperthyroidism or acromegaly)⁹. Malignant change may occur as osteosarcoma or other forms of sarcoma in less than 1% of cases of FD¹⁰.

Occasionally, in young children and pre-pubertal adolescents, the lesions may grow rapidly with cortical bone expansion and displacement of adjacent structures such as the eye and the teeth. It frequently affects anterior skull base and encase optic canal. Craniofacial fibrous dysplasia may develop within bone adjacent to the optic canal, grow gradually, and compress the optic nerve leading to visual disturbances^{3,11}. Optic canal involvement causes compression of optic nerve which results progressive venous congestion and subsequent intraneural oedema¹³. The cause of both acute and gradual loss of vision in patients with fibrous dysplasia remains unclear and the pathological course is unknown.

A clinical staging had been suggested by Barrionuevo et al²², for temporal bone involvement in accordance to the progression of the disease. Stage 1: latent or asymptomatic phase, where by the management is conservative with regular follow-up. Stage 2: symptomatic phase and stage 3: stage with complications²².

There is different opinion regarding prophylactic decompression of the optic nerve. However, when visual impairment begins it tends to be progressive^{1,12} and may continue after puberty¹³. Prophylactic decompression is sometimes performed based on the assumption that the risk of future optic neuropathy outweighs the risks of the operation which include postoperative blindness^{13,14}. Use of high speed suction

drill, continuous irrigation, ultrasonic bone curette has reduced the risk of postoperative visual loss recently.

There is inadequacy of study regarding the absolute indications, timing and outcome of surgery in cases of optic canal involvement in FD. The objective of the study is to discuss about the indications, suitable timing and outcome of optic nerve decompression in cases of optic canal involvement with or without features of optic nerve compression in fibrous dysplasia in light of our experience at All India Institute of Medical Sciences, New Delhi.

Methods

Retrospective study was carried out on hospital records at All India Institute of Medical Sciences, New Delhi operated for Craniofacial Fibrous Dysplasia between 1998 to 2015. 16 patients were included in this study who were clinically diagnosed and radiologically confirmed cases having involvement of optic canal. Patients who had no features of optic nerve compression but the lesion has involved the optic canal in CT scan were also included. Diagnosis was confirmed by histopathology in all cases. Skull base FD without involvement of optic canal, unfit for general anaesthesia and unwilling for operation were excluded from this study.

All cases were evaluated by neuro-ophthalmologist for visual analysis. Visual acuity by Snellen's chart test, visual field by Goldman perimeter in cases of visual impairment (equal to or better than 1/60) and colour vision by Ishihara colour plate were carried out. Fundoscopy were done in all cases of visual impairment. High resolution CT scan with minimum 2mm thickness for optic nerve and optic canal were carried out. All patient underwent testing of all relevant endocrine axes. Musculoskeletal radiology

was considered only for suspected cases. Follow up carried out 3 monthly intervals in initial post-operative period, followed by yearly basis. During follow up craniofacial, necessary radiological and ophthalmological evaluation was recorded.

During surgery, high speed drill with suction and irrigation were used for prevention of traumatic or thermal injury to optic nerve. Debulking or shaving and optic nerve decompression through trans ethmoidal route was the mainstay of all forms of surgery. Moore's incision, Moore's with lynch extension, Lateral Rhinotomy and modification of these incisions were used in external and combined approaches according to the extension of disease.

Results

16 patients with Craniofacial FD with or without visual impairment was operated for optic canal involvement over past 18 years. In 16 patients 19 optic nerve were decompressed. Among those 09 (56.25%) were female and 07(43.75%) were male. Age ranges from 05 years to 35 years with mean age 13. 12 out of 16 (75%) were 20 years or below and 4(25%) were above 20 years of age. 15 patients had Idiopathic FD and 01 had Cranio-metaphyseal dysplasia.

In regards of bone involvement 10 were polyostotic(62.5%) and 06(37.5%) were monostotic. In PFD 01 was associated with cranio-metaphyseal dysplasia. All patient presented with mild to moderate headache, 10(62.5%) with orbital and or periorbital pain with gradual visual impairment. Clinically 10(62.5%) had decreased visual acuity, 08(50%) had features of optic neuropathy at Fundoscopy, 09(56.25%) had proptosis, 07(43.75%) had facial swelling or deformity.

01 presented with mouth breathing, widely separated eye, torsional nystagmus and nasal deformity. Presenting symptoms are given in Table-I.

Table-I
Presenting symptoms

Gradual vision loss	: 10 (62.5%)
Proptosis	: 09 (56.25%)
Craniofacial swelling /	
Facial deformity	: 07 (43.75%)
Headache/periorbital pain	: 10 (62.5)
Skeletal deformity	: 01 (6.25%)
Nasal deformity	: 01 (62.5%)

Most commonly involved bones are Ethmoid 12(75%), Sphenoid 10(62.5%), Frontal 04(25%), Maxilla 03(18.75%), Temporal 01 (6.25%) and Parietal 01(6.25%). Bilateral lesion occurred in 03(18.75%) patients; 01 of whom had cranio-metaphyseal dysplasia with skeletal Erlemeyer's Flask deformity. The Cranio- metaphyseal dysplasia disease was extensive and completely encircled the optic nerve in both side. Optic canal diameter was 1.5mm in both side. The skull bones affected are shown in table-II.

In HRCT scan, all cases had optic canal involvement but optic nerve compression were present in 13 eyes in 10 patients (62.5%). These all patients presented with gradual visual impairment from a duration of 12 weeks to 12 months. 06 patients (37.5%) had no optic nerve compression due to narrowing of optic canal in HRCT scan and they also had no clinical features of it but dysplastic foci involved the optic canal and had potential risk of optic nerve compression in future.

Table-II
Diagnosis and bone involvement

Case no	Age	Sex	Diagnosis	Bones involvement
1	12	Female	Craniofacial FD	Lt Sphenoid and Ethmoid
2	16	Female	FD Ethmoid	Ethmoid
3	34	Male	FD Lt Ethmoid	Lt Sphenoid and Ethmoid
4	15	Male	Craniofacial FD	Rt Frontal and Sphenoid
5	8	Female	Craniofacial FD	Rt Ethmoid and Sphenoid
6	20	Female	Craniofacial FD	Rt Maxilla and sphenoid
7	26	Male	Ethmoid FD	Lt Ethmoid
8	22	Male	Craniofacial FD	Rt Sphenoid, Ethmoid, Frontal, Temporal and Maxilla
9	18	Male	Ethmoid FD	Ethmoid
10	35	Male	Ethmoid FD	Ethmoid
11	12	Female	Craniofacial FD	Bilateral Frontal and Sphenoid
12	18	Female	Bilateral Craniofacial FD	Rt Ethmoid, Sphenoid, Maxilla, Frontal and Temporal
13	7	Female	Rt Ethmoid FD	Rt Ethmoid
14	13	Female	Bilateral Sphenoid FD	Bilateral Sphenoid
15	13	Female	Sphenoid FD	Rt Sphenoid
16	5	Male	Cranial metaphyseal dysplasia	Bilateral Sphenoid, Ethmoid, Temporal and Parietal

Optic nerves were decompressed in all cases. Endoscopic approach was followed in 05, External approach by Lateral Rhinotomy in 09 and combined approach in 02 cases. Image guided navigation was utilized in all 2 combined approaches. Per operative CSF leak occurred in 01 case which was immediately closed by soft tissue graft and fibrin glue. He was also managed by lumbar drain, mannitol, antibiotic and Eptoin. During post-operative period vision improved in 11/13(84.6%) cases. In no cases

vision was deteriorated in post-operative period. 01 patient had PL-ve in Lt eye preoperatively; who had no improvement of vision in post-operative period in Lt eye. In 02 patients vision was restricted up to hand movement ; they had little improvement of vision after surgery. All 06 cases who underwent prophylactic optic nerve decompression had no vision changes during post-operative period. Surgical outcome and indications are shown in Table III.

Table-III
Visual outcome of Surgery

Case no	Approaches of Operation	Pre-operative visual acuity	Post-operative visual acuity	Indication for operation	Fundoscopy finding
1	External	Rt- 6/6, Lt- 6/36	Rt- 6/6, Lt- 6/18	Decreased Lt VA	Nil
2	External	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
3	External	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
4	External	Rt- FC 1m, Lt- 6/6	Rt- 6/36, Lt- 6/6	Rt optic neuropathy	Pale Rt optic disk
5	Endoscopic	Hand movement(HM) 50cm Rt, 6/6 Lt	Rt- 6/36, Lt- 6/6	Rt optic neuropathy	Pale Rt optic disk
6	External	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
7	Endoscopic	Rt- 6/6, Lt- 6/36	Rt- 6/6, Lt- 6/18	Decreased Lt VA	Nil
8	Endoscopic	Rt- 6/60, Lt- 6/6	Rt- 6/36, Lt- 6/6	Rt optic neuropathy	Pale Rt optic disk
9	External	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
10	Endoscopic	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
11	External	Rt- 6/60, Lt- 6/6	Rt- 6/36, Lt- 6/6	Rt optic neuropathy	Pale Rt optic disk
12	External	Rt- PL+ve, Lt- 6/36	Rt- HM close to face, Lt- 6/18	Bilateral optic neuropathy	Bilateral pale optic disk
13	External	Rt- 6/6, Lt- 6/6	Rt- 6/6, Lt- 6/6	Prophylactic	Nil
14	Combined	Rt- 6/12, Lt- HM 3m and Counting Finger (CF) 1m	Rt- 6/9, Lt- CF 3m	Lt optic neuropathy	Pale Lt optic disk
15	Endoscopic	PL +ve Bilateral	PL +ve Bilateral (Subjective mild improved vision)	Bilateral optic neuropathy	Pale bilateral optic disk
16	Combined	PL +ve Rt, PL -ve Lt	Rt- PL +ve, Lt- PL -ve	Bilateral optic neuropathy	Pale bilateral optic disk

Discussion

FD is predominantly a disease of adolescent and early childhood. In MFD and PFD, progression of the lesions appears to taper off as the patient approaches to puberty. Although active disease is continued; symptoms into adulthood are uncommon¹⁶. Skull base FD can present from 4 years up to late age with an average age of 22 years and a female male ratio is 2:1. About 60% of which presents at below 20 years of age¹⁶. Our cases also presented at early age from 5 years and 75% of which presented below 20 years of age. There is no sex preference. MFD represents 70% of cases and most commonly affecting the ribs and femur, next common is craniofacial bones. PFD involve the long bones, skull, and cranial base. Of significance, in 50 to 100% of patients with the polyostotic form and in 10% with the

monostotic variant craniofacial involvement is present³. Sex prevalence of Female 56.25% and male 43.75% of our series correlates with series of Ricalde P et al³ but prevalence of MFD and PFD respectively 37.25% and 62.5% does not correlate; as only craniofacial FD with optic canal involvement are taken in our series.

Most commonly involved bones of skull base are ethmoid 70%: followed by sphenoid 43%, frontal 33% and Maxilla 29%¹⁶. Our patients are closer to same involvement of bones with 75% ethmoid, sphenoid 62.5%, frontal 25% and Maxilla 18.75%. FD appears to arise from a perturbation in the mesenchymal precursor of bone, producing a defect in osteoblastic differentiation and subsequent maturation of bone. Molecular biological findings have provided some insight of site of origin. One of the putative defects appears

to involve a missense mutation, which gives rise to an anomaly of intracellular signalling that produces increased cell proliferation and inappropriate cell differentiation, resulting in a disorganized fibrotic bone matrix¹. Additionally, increased interleukin-6 may also play a role in the development of fibrous dysplasia⁷.

Similar to other series, the most frequent ophthalmic sign was proptosis 62.5%, optic neuropathy 56.25%. It is recognised that compressive optic neuropathy does not always supervene, even with anatomical narrowing of the optic canal^{17,18}. It usually occurs in a chronic and progressive manner or may also manifest in an acute and impressive fashion. Visual impairment has been ascribed to a multitude of underlying pathological processes. One of these processes appears to involve progressive diminution of optic nerve venous drainage and, ultimately, retinal ischemia that develops due to optic nerve compression resulting from fibrous dysplasia-related optic canal stenosis. The arrangement of fibres within the optic nerve at the optic canal is such that the peripheral fibres run circumferentially along the periphery of the nerve, central vision may be preserved in cases in which there are peripheral visual field defects³. Other causes of ophthalmic signs include exophthalmos-induced optic nerve traction, sinus mucocoele formation, with increased intraorbital pressure, spontaneous haemorrhage, bone cyst formation, or rare vascular events¹¹.

CT scan accurately establishes the diagnosis and extent of bone involvement. Involvement of optic canals, orbital fissures, frontonasal ducts and osteomeatal complex can be best evaluated by CT scanning. CT characteristics of fibrous dysplasia, include expansion of the involved bone with heterogenous pattern of CT densities associated with scattered or confluent islands of bone formation. Exact evaluation of optic canal for canal dimension, site of foci, extent of nerve compression etc. can

be made by CT scan. Furthermore, CT scan can differentiate fibrous dysplasia from other osteodystrophies of the skull base including osteogenesis imperfecta, Paget's disease and osteopetrosis.

Ocular complications have been classified into primary and secondary processes². Primary complications include involvement of the frontal bone with proptosis; the skull base with extraocular muscle palsies and trigeminal neuralgia; the optic canal with visual loss and optic atrophy; the sphenoid bones with chiasmatal compression; and the maxillary bone with epiphora. Secondary complications comprise malignant change, ossifying fibroma formation, and development of a mucocoele²⁰.

Optic nerve involvement in FD of Sphenoid bone may be about 50% to 90%¹¹. It may vary from partial to complete encasement. Up to 76% may cause bilateral involvement. Of these bilateral cases 75% may have complete circumferential encasement and 25% partial encasement and all the canals may be patent¹⁹. In a series Cuttler and colleagues²³ shows 100% involvement optic nerve in 87 patients with more than 50% encasement in 83% cases. In our series, we found 4 patients (25%) of bilateral optic canal involvement. Optic nerve involvement is also similar to Lee et al¹¹ series of 62.5%.

The surgical treatment of fibrous dysplasia is based on two different approaches, conservative or radical. Conservative shaving or osseous contouring has been recommended by some authors. who maintained that periodic contouring could be performed until a static phase was reached, even if continued growth was observed after conservative treatment. However, interventions have become more aggressive as advances have been made in surgical techniques and now a day most authors are in favour of radical surgical therapy, which permits the complete removal of the lesion followed by immediate reconstruction²¹.

Role of optic nerve decompression in Craniofacial FD around the optic nerve in patients with normal vision is controversial as resection of dysplastic bone carries a risk of surgically induced visual loss. High risk of surgical injury in patients of sensitive compressed optic nerve is also reported²⁴. Meta-analysis by Moran et al²⁵ shows; 65% patients maintains static vision in long term follow up for surgical decompression of optic nerve in symptomatic and 87% in asymptomatic optic canal involvement. In our series, asymptomatic decompressed eyes have 100% static visual stability which is closer to Moran et al's series. It becomes possible due to modern equipment and surgeon's high expertise.

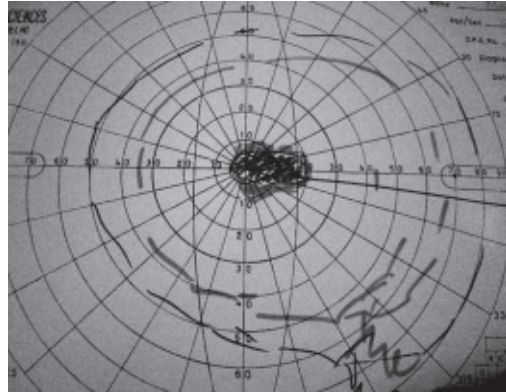
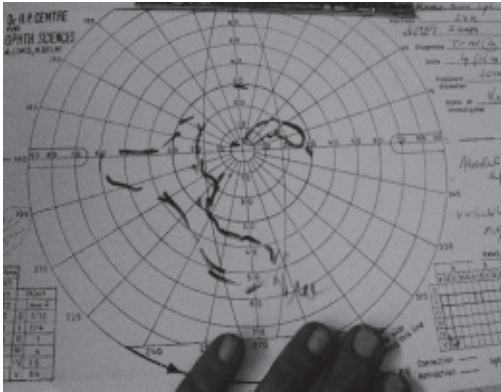
It's also a matter of debate for improvement of vision in cases of compressive optic neuropathy. Optic canal decompression surgery can be either therapeutic or prophylactic, the goal of such surgery is to maintain vision and must be balanced against the risk of postoperative visual loss. CT findings of encasement or constriction of the optic canal do not always correlate with the results of the neuro-ophthalmologic examination. Fibrous dysplasia should be managed according to the results of the clinical examination and that diagnostic imaging. All patients should be in

regular follow up for appropriate treatment. Prophylactic decompression of the optic nerve cannot be recommended on the basis of diagnostic imaging alone, since the results of such imaging do not correlate with loss of vision¹⁹.

We followed conservative approach, keeping considerations of maintenance of facial cosmetic similarity, functional improvement and maximum disease removal with the help of high speed drill, continuous irrigation and suction. We used navigator system where necessary. 19 optic nerves of 16 patients were decompressed. Among operated 16 cases no patient had any visual deterioration. Post-operative visual improvement occurred in 84.6%(11/13) optic neuropathy cases. Among this 01 had mild subjective improvement). 01 patient who had PL-ve in Lt eye; did not have any visual improvement. In cases of prophylactic surgery; no post-operative visual loss was also recorded. One of the case presented with gradual visual loss for one year. On examination, she had visual acuity in Lt eye 6/36 which improved in post-operative period up to 6/9. It indicates that decompression of optic nerve in compressive neuropathy improves the vision until preoperatively it become PL-ve.



Case-4 (CT scan shows involvement of Ethmoid, Sphenoid, temporal bones with bilateral narrowing of optic canal. Patient presented with bilateral visual impairment, proptosis and facial deformity. Post operative image shows vertical displacement of right eye).

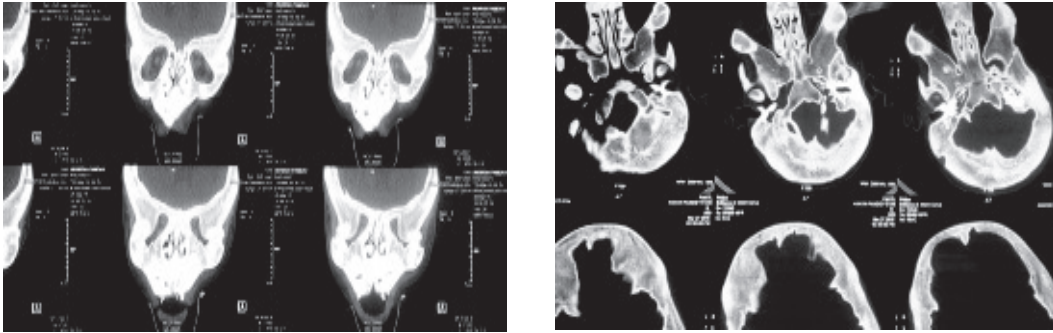


Case-4 (Absolute visual field defect in preoperative period. In post operative period visual field improved after 3 months)

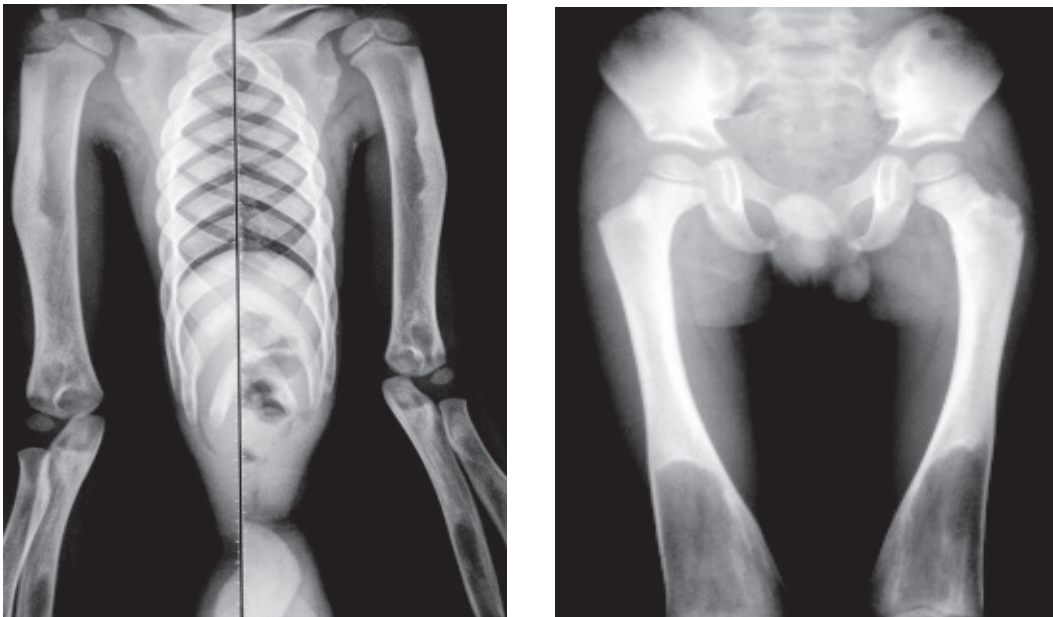
01 of our case was associated with Craniometaphyseal dysplasia which is a rare condition characterized by progressive thickening of bones in the skull and abnormalities in the limbs; metaphyseal dysplasia. Bone overgrowth in the head causes many of the signs and symptoms. Affected individuals typically have distinctive facial features; such as a wide nasal bridge, prominent forehead, wide-set eyes and a prominent jaw. Children with this condition

may have breathing or feeding problems caused by narrow nasal passages. Sclerosis of the skull may lead to asymmetry of the mandible, as well as to cranial nerve compression, that may finally result in hearing loss and facial palsy²⁵. The x-rays of individuals with craniometaphyseal dysplasia show unusual shaped long bones, particularly the large bones in the legs. The metaphyses are wider and appear less dense in people with this condition.





Case-16 (Widely separated eyes, flattening of nasal bridge and widening of nasal septum in cranio metaphyseal dysplasia. Bilateral involvement of skull base, severe compression of optic nerve at the level of optic canal. Optic canals are 1.5 mm in diameter in both sides)



Case-16 (Erlenmeyers Flask deformity of skeleton in Cranio Metaphysial dysplasia)

Conclusion

Role of optic nerve decompression in craniofacial fibrous dysplasia is controversial but timely intervention can save and improve vision. Extent of optic nerve encasement does not correlate with extent of visual impairment. All compressive optic neuropathy can be decompressed until preoperative visual acuity becomes PL-ve.

Use of modern equipment's; like high speed drill system, continuous irrigation and suction and navigating system can make precise, non-traumatic and safe decompression of optic nerve with adequate shaving and debulking of dysplastic bone for aesthetic improvement of facial deformity. Prophylactic surgical intervention by expert surgeon can prevent future impairment of vision.

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Original Article

Study of Pathological Variations of Solitary Thyroid Nodule

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Abstract

Objective: To find out the incidence of malignancy in patient with solitary thyroid nodule.

Methods: This cross-sectional study was carried out with 100 solitary thyroid nodular patients who admitted in Otolaryngology & Head-Neck Surgery Department of Sir Salimullah Medical College Mitford Hospital (SSMCMH) & Bangabondhu Sheikh Mujib Medical University (BSMMU), Dhaka, from July 2012 to December 2013, where all patients were admitted through out patient department. All patients were selected as per described criteria from the Department of Otolaryngology & Head-Neck Surgery, SSMCMH & BSMMU. Diagnosed the cases by detail history, clinical examination, investigations, analysed data presented by various tables, figures.

Results: In this study mean age of the patients of solitary thyroid nodule was 35.613.54 years and the highest frequency (38%) was within 21-30 years of age with female predominance (78%). Thyroid swelling was the common presentation in all (100%) cases, some patients also presented with other symptoms like cervical lymphadenopathy 13 (13%) cases, dysphagia 1 (1%), dyspnoea 1 (1%), hoarseness of voice 1 (1%) case & no bone metastatic found. In this series of solitary thyroid nodules constituted 73% firm, 6% hard and 11% cystic. Malignancy was found more in firm nodule 13 (72.22%). Isotopes scanning of the thyroid gland were done to see the functional status of the nodule. We found most 96 (96%) of the nodules were cold & 4 (4%) were warm nodule & no hot nodule found. In our study out of 96 cold nodular goiters we found 18 (18.75%) malignant & no malignant case found from rest of 4 warm cases. In our study, out of 89 solid nodule 72 (80.89%) were benign & 17 (19.10%) nodule were malignant and out of 11 cystic nodule 10 (90.9%) were benign & 1 (9.1%) was malignant. In this study, most of the benign & malignant nodules were predominantly solid. Study showed the malignancy is significantly ($p < 0.001$) more in solid than cystic solitary thyroid nodule. Final diagnosis in this study was on the basis of histopathological reports record. Out of 100 cases, 54 cases (54%) were proven as nodular goitre & 2% were thyroiditis in non-neoplastic lesion & in neoplastic lesion we found 26 (26%)

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was benign (follicular adenoma) and 18(18%) cases were malignant. In our study among 18 malignant cases 15(83.33%) were papillary carcinoma, 2(11.11%) were follicular carcinoma and 1(5.55%) case was medullary carcinoma. So, papillary carcinoma was more common among all thyroid malignancies in patients with solitary thyroid nodule.

Conclusion: In our series containing 18% malignancy in solitary thyroid nodule. So significant percentage of malignancy in STN is very important though it is a small nodular lesion. It is an important message to our fellows and practitioners to get appropriate medical attention for early diagnosis & proper management to reduce the morbidity and mortality.

Key words: Solitary thyroid nodule, papillary carcinoma, follicular carcinoma, medullary carcinoma.

Introduction

Thyroid gland and its enlargement are known since the time of Hippocrates. Among the endocrine organs, diseases of the thyroid gland are the most common. A good number of diseases affect the thyroid gland and almost all of them presents with nodular thyroid swelling. Nodular goiter remains a problem of enormous magnitude all over the world, although exact data on incidence and prevalence are unavailable. In our country the national prevalence rate is 10-15%, which indicates, the whole country is endemic. The endemicity varies from one place to another. The highest prevalence rate in Bangladesh is in the district of Rangpur and Jamalpur, the range varies from 21-30%. Nodular thyroid disease is more prevalent than diffuse goitre. In a report from the thyroid clinic, Bangabondhu Sheikh Mujib Medical University, Dhaka 32.67% of all thyroid patients had solitary nodules¹.

The solitary or isolated thyroid nodule may be defined as a discrete swelling in an otherwise impalpable gland. It is usually a benign lesion. It is common in clinical practice. The swelling is often noticed accidentally by the patient or drawn to her attention by a family member, neighbor, or a friend. The nodule may also be encountered as an incidental finding when a patient is examined for some unrelated disease. About

70% discrete thyroid swellings are clinically isolated. Thyroid nodules are common and are among 3-4% of the adult population in the UK and USA. They are 3-4 times more frequent in women than men. A nodule may be adenoma, cyst, multinodular goiter, thyroiditis and thyroid cancer².

The importance of solitary thyroid nodule lies in the significant risk of malignancy compared with other thyroid swelling. Many studies have been published on the risk of malignancy in patients with thyroid nodules; these studies show that the risk of malignancy is low, approximately 5%, unless the patient has an underlying risk factor, such as a history of external neck irradiation³. If imaging investigations shows the nodule to be truly solitary, then the likelihood of it being malignant increases to about 5-20%⁴, of which papillary carcinoma comprises about 80%, follicular carcinoma 10% and medullary carcinoma 5%⁵, but in another study it showed papillary carcinoma comprises about 60% and follicular carcinoma 18%⁶.

Screening of large numbers of patients previously unsuspected of having goiter suggests that the incidence of the isolated thyroid nodule in the general population may be of the order of 4-7%⁷. A thyroid nodule larger than 1 cm in diameter is usually palpable. However, the detection of a nodule by palpation also depends on its location

within the thyroid gland, on the structure of the patient's neck and on the experience of the examiner.

It has been estimated that palpable thyroid nodules are present in 4-7% of the population, but when examined by ultrasound, as many as 50–70% of subjects with no history of thyroid disease have been found to have incidentally discovered thyroid nodules, many of which are not palpable⁸. In addition, nodular thyroid disease is more common in the elderly, a population subgroup, which is steadily increasing⁹.

Laboratory investigations other than FNAC have limited role in finding out the nature of thyroid swelling. Isotope scan can demonstrate the functioning capacity of the nodule but cannot predict the histopathological character¹⁰.

Fine needle aspiration cytology (FNAC) is considered as the most reliable test for the diagnosis of thyroid nodules¹¹. Many investigators have tried to point out few ultrasonographic features in order to identify those lesions, which are at a higher risk of malignancy, especially in non-palpable thyroid nodules¹². Pre-operative assessment of thyroid nodules is generally performed by radio-nuclide scanning and fine needle aspiration (FNA). FNA biopsy is described as the most preferred test that has improved selection of patients for thyroid surgery. Several studies have concluded that the risk of thyroid cancer is less with multiple nodules than with solitary nodules^{13, 14} but other studies have not found any difference in risk¹⁵. It is becoming increasingly clear that high-resolution ultrasonography is better than physical examination⁹ or other imaging techniques¹⁶ in detecting thyroid nodules.

This study has been carried out to find out the relative frequency of pathological types, incidence of malignancy in solitary thyroid nodule and its age & sex variation. This study also carried out to review the existing

protocol for the management of solitary thyroid nodules in our country and to assess the accuracy of the available diagnostic modalities for appropriate selection of patients

Methods

This cross-sectional study was carried out with 100 solitary thyroid nodular patients who admitted in Otolaryngology & Head-Neck surgery ward of Sir Salimullah Medical College Mitford Hospital & BSMMU, Dhaka, from July 2011 to December 2012. All patients were admitted from Out Patient Department.

A detailed history was taken (including family history & history of exposure of radiation) and thorough physical examinations including general examinations, examinations of ear, nose, throat, thyroid gland, neck, hand signs, eye signs and systemic examinations were carried out. All patients were analyzed in various aspects like age, sex, occupation, mode of presentation. Routine investigations like Blood, Urine, CXR, and ECG were done. Special investigations like thyroid function test- serum T3, T4, TSH done. To detect single or multiple nodules, solid or cystic condition of nodules- USG of thyroid gland done. Pre-operative FNAC of thyroid gland done to detect benign or malignant condition. X-ray neck both view done to see retrosternal extension of gland, position of trachea, patency of airway. Thyroid scan done to see functional status of gland like cold, warm & hot nodule. FNAC findings were recorded & then after surgery histopathology reports were recorded & FNAC findings were compared with histopathological reports.

Data were processed and analyzed by using computer based programmed SPSS-16 (Statistical Package for Social Sciences). The quantitative data were analyzed by mean, standard deviation. The qualitative data were analyzed by Pearson Chi-square (χ^2) test with 95% confidence interval to make inference.

Results

Table-I
Clinical presentation of cases of solitary thyroid nodule

Sign and symptoms	Frequency	Percentage
Swelling in front of neck	100	100
Palpable cervical lymph nodes	13	13
Dysphagia	01	01
Dyspnoea	01	01
Hoarseness of voice	01	01
Bone pain	00	00

Table-II
Involvement of site of solitary nodule in the thyroid gland

Site	Frequency	Percentage
Right lobe	56	56.0
Left lobe	38	38.0
Both lobe	04	04.0
Isthmus with adjacent lobe	02	02.0
Total	100	100.0

Table-III
Distribution of cases according to the histopathology report & the time elapsed after the nodule has developed

Duration of nodule development	Histopathological findings			
	Benignn (%)	Malignantn (%)	Total	P value
< 1 yr	10(12.19)	06(33.33)	16(16)	0.01 ^S
1-2 yrs	14(17.07)	10(55.56)	24(24)	
2-5 yrs	34(41.46)	02(11.11)	36(36)	
> 5 yrs	24(29.26)	00(00)	24(24)	
Total	82(100)	18(100)	100(100)	

$\chi^2 = 11.14$, Values in parentheses are percentages

Table-IV
Relation of thyroid scans with histopathological findings

Histopathological study	Thyroid scan	
	Cold	Warm
Benign	78(81.25)	4(100)
Malignant	18(18.75)	00(00)
Total	96(100)	4(100)

Values in parentheses are percentages

Table-V
Association of histopathological findings with the consistency of STN

Consistency	Histopathological findings		Total	χ ² (P value)
	Benignn(%)	Malignant n(%)		
Soft	08(9.75)	00(00)	08(08)	0.81(0.37 ^{ns})
Cystic	10(12.19)	01(5.55)	11(11)	0.16(0.34 ^{ns})
Firm	62(75.61)	13(72.22)	75(75)	0.04(0.99 ^{ns})
Hard	02(2.43)	04(22.22)	06(06)	8.26(0.009 ^s)
Total	82(100)	18(100)	100(100)	

Table-VI
Fine needle aspiration cytological variations of solitary thyroid nodules

Diagnosis	Number	Percentage	
Non neoplastic	Colloid nodule	46	46
	Thyroiditis	02	02
	Colloid degeneration	6	6
Neoplastic	Cellular Follicular lesion	30	30
	Papillary carcinoma	13	13
	Medullary carcinoma	01	01
	Suspicious	02	02
Total	100	100	

Table-VII
Histopathological variations of solitary thyroid nodules

Diagnosis	Number	Percentage		
Non neoplastic	Nodular goiter	54	54	
	Thyroiditis	02	02	
Neoplastic	Benign	Follicular adenoma	26	26
	Malignant	Papillary carcinoma	15	15
		Follicular carcinoma	02	02
		Medullary carcinoma	01	01
Total	100	100		

Table-VIII
Results of FNAC & corresponding final histopathology

FNAC findings	Total	Final histopathological findings		P value
		Benign	Malignant	
Malignant cell Absent	84(84)	80(97.56)	04(22.22)	<0.001 ^s
Malignant cell present	16(16)	02(2.43)	14(88.88)	
Total	100(100)	82(100)	18(100)	

χ² = 56.85, Values in parentheses are percentages.

Table-IX
Histopathological findings of the study subjects. (n=100)

Histopathological findings	Frequency	Percent
Benign	82	82.0
Malignant	18	18.0
Total	100	100.0

Table-X
Pattern of malignancy in solitary thyroid nodule according to histopathology

Type of malignancy	No of cases	Percent
Papillary carcinoma	15	83.33
Follicular carcinoma	02	11.11
Medullary carcinoma	01	5.55
Total	18	100

Table-XI
Distribution of final benign & malignant lesion in according to preoperative solid & cystic findings.

Histopathological findings	USG findings		Total	P value
	Cystic	Solid		
Malignant	01(09.1)	17(19.10)	18(18)	<0.001 ^S
Benign	10(90.9)	72(80.89)	82(82)	
Total	11(100)	89(100)	100(100)	

$\chi^2 = 23.92$, Values in parentheses are percentages.

Discussion

All solitary nodules are not a single clinical entity. So it is very difficult to comments regarding the nature of solitary nodule purely on the basis of clinical ground. But hoarseness of voice, hard irregular nodule, palpable cervical lymph node, extreme of age, male sex are always suspicious for malignancy in solitary thyroid nodule¹⁶⁻²⁰. Regarding presenting complaints we have found that all of the patients with neck swelling presents within variable durations. Some patient also presented with other symptoms like cervical lymphadenopathy 13(13%) cases, dysphagia 1(1%), dyspnoea 1(1%), hoarseness of voice 1(1%) case & no bone metastatic found. Among 18 malignant cases 10(55.56%) cases presented within 2 years but out of 82 benign cases only 14(17.07%) cases presented within 2 years. It is well supported by others

studies^{21,22}. Where duration of swelling prior to the presentation was from 6 months to 3 yrs¹⁷. Nodular goiter with large swelling may be associated with difficulty in respiration or rarely in deglutition which is due to pressure on trachea or oesophagus²³.

In this series we have seen that nodules were found more in right lobe than left. There is yet no reported predilection for any specific site and no reason has been put forward for such a predilection. Similar findings were noted by many authors^{24,25}. We found 56 nodules in right lobe, 38 nodules in left lobe, 4 nodules in both lobes and 2 nodules in the junctional region between isthmus and one lobe.

Firm nodules are the commonest form of solitary thyroid nodule. In this series of solitary thyroid nodules constituted 73% firm, 6% hard and 11% cystic. Malignancy was found more in firm nodule 13(72.22%). Islam

et al. 2009, found majority of the nodules were firm (72.03%), others were hard (16.95%) and cystic (11.02%). Malignant lesion was more common in hard nodule (70%).) Here hardness of nodule was due to malignancy and inflammatory conditions. Among 6 hard nodules, 4 were diagnosed as malignancy and 2 were diagnosed histopathologically as thyroiditis. So hardness is not conclusive but an important indication for malignancy. Hardness and irregularity, due to calcification, may simulate carcinoma⁶.

Investigations are essential to establish preoperative physical, function status and cytopathological nature of solitary nodule of thyroid²⁶.

All patients of this study have done thyroid hormone profile and show value within normal limit. Isotopes scanning of the thyroid gland were done to see the functional status of the nodule. We found most 96(96%) of the nodules were cold & 4(4%) were warm nodule & no hot nodule found. In our study out of 96 cold nodular goiters we found 18(18.75%) malignant & no malignant case found from rest of 4 warm cases. In a study showed that on thyroid scan out of 40 patients (80%) having cold nodule & 10 patients (20%) had hot nodule²⁷. Most of the nodules were cold (66.10%) among them 25.6% cases were malignant, followed by warm (30.5%) and hot (3.3%)²⁸.

Fine needle aspiration cytology (FNAC) is a very important, highly sensitive and minimally invasive preoperative diagnostic tool²³. According to a study FNAC is a gold standard for preoperative assessment of thyroid nodules. Early and accurate diagnosis reduces surgical intervention, morbidity and mortality²⁹. In our study of FNAC of STN we found colloid nodule 46%, thyroiditis 2%, colloid degeneration 6%,

cellular follicular lesion 30%, papillary carcinoma 13%, medullary carcinoma 1% & non conclusive 2%. On FNAC majority of STN were benign with being more common¹⁷. FNAC can not distinguish between follicular adenoma and follicular carcinoma. In our study sensitivity & specificity of FNAC was 77.77% & 97% respectively. Where other study showed sensitivity and specificity of FNAC was 90% and 100%, respectively²⁹. Basharat R et al. 2011, showed sensitivity & specificity of FNAC 80% & 97.7% respectively in her study. So FNAC is an important pre-operative diagnostic tool for STN.

Final diagnosis in this study was on the basis of histopathological reports record. Out of 100 cases, 54 cases (54%) were proven as nodular goitre & 2% were thyroiditis in non-neoplastic lesion & in neoplastic lesion we found 26(26%) was benign (follicular adenoma) and 18(18%) cases were malignant. In our study among 18 malignant cases 15(83.33%) were papillary carcinoma, 2(11.11%) were follicular carcinoma and 1(5.55%) case was medullary carcinoma. In a study 13.9% of patients of STN was found to be malignant³⁰. A study showed that 13.33% of STN were found to have malignant lesions & 86.67% were benign³¹. Papillary carcinoma was the most common malignancy (50%) found in his study. Male patients with solitary thyroid nodule showed a higher incidence of malignancy (17.65%) as compared to females (11.63%). In our study we found frequency of malignancy in case of male was 27.3% & in case of female 15.4%. Venkatachalapathy et al. 2012, found the incidence of malignancy in their series in STN was 18%. Islam et al. 2009, in their study found 18.65% of STN to be malignant & out of them 16 (72.72%) cases were papillary carcinoma, 4 (18.18%) cases were follicular carcinoma and 2(9.1%) cases were

medullary carcinoma. It showed a clear predominance of papillary over follicular and medullary carcinoma. According to Watkinson (2000), frequency of papillary carcinoma is 80% and follicular carcinoma is 10%. Some study showed that papillary carcinoma comprises about 60% of all thyroid cancer³² and follicular carcinoma comprises 18% of all malignant thyroid neoplasm⁶. So, papillary carcinoma was more common among all thyroid malignancies in patients with solitary thyroid nodule.

Ultrasonography is used to establish physical characteristics of nodule like the size, echo-structure (solid or cystic), shape and number of nodule(s), and extranodular thyroid tissue. In our study of ultrasonography we found 89(89%) nodules were solid, 11(11%) were cystic. In our study, out of 89 solid nodule 72(80.89%) were benign & 17(19.10%) nodule were malignant and out of 11 cystic nodule 10(90.9%) were benign & 1 (9.1%) was malignant. In our study, most of the benign & malignant nodules were predominantly solid. Study showed the malignancy is significantly ($p < 0.001$) more in solid than cystic solitary thyroid nodule. Our study correspond with a study where he showed of cystic thyroid lesions, 4% were simple cysts, 82% were degenerating benign adenomas or colloid nodules and 14% were malignant compared with 23% of solid lesions that were malignant³³. Cathy Crenshaw Doheny also mentioned In a web journal found that a solid thyroid nodule is more likely than a cystic nodule to be malignant³⁴. More than 90% of all solid nodules, however, are benign. A study showed 9% incidence of malignancy in solid nodules & no malignancy in cystic nodules³⁵. Whereas other found incidence of carcinoma in cystic lesion $< 2\%$ ³⁶.

As this study had been carried out over a limited period of time with a limited number of patients, it could not have been large enough to be of reasonable precision. All the facts and figures mentioned here may considerably vary from those of large series covering wide range of time, but still then, as the cases of this study were collected from tertiary level hospitals in our country, this study had some credentials in reflecting the facts regarding distribution and type of malignancy in solitary thyroid nodules.

Conclusion

We have observed worldwide malignancy in STN ranging from 16-30%³⁷. We found in our series containing 18% malignancy in solitary thyroid nodule. So significant percentage of malignancy in STN is very important though it is a small nodular lesion. As small lesion of STN sometimes is overlooked so it is an important message to our fellows and practitioners to get appropriate medical attention for early diagnosis & proper management to reduce the morbidity and mortality.

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Original Article

Pattern of Neck Node Metastasis in Laryngeal Carcinoma

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Abstract

Background: Cancer continues to be a major health problem despite advances in medical technology for its diagnosis and treatment. Cancer of the larynx is the eleventh most common cancer in the world. Carcinoma larynx is a multifactorial disease. Smoking, betel-nut, betel-leaf chewing habit and drinking alcohol are the most important factors associated with carcinoma larynx.

Objective: To detect the rate and level of cervical lymph node metastasis in laryngeal carcinoma.

Methods: Detailed information was obtained in each cases according to protocol. Complete history was taken from accompanying attendants. Thorough clinical examination was done. All the information's were recorded in the fixed protocol. Patients were randomly assigned to one of three groups by card sampling. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using updated computerized program SPSS-19.

Results: Out of 50 cases the mean average age was found 58.5 ± 11.9 years with range from 39 to 78 years. Majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma. More than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis and 4(8.0%) had cough. Majority (42.0%) patients were found N_0 followed by 15(30.0%) N_1 , 13(26.0%) N_2 and 1(2.0%) N_3 of neck node. Majority (42.0%) patients was found in stage T3 followed by 7(14.0%) in stage T1, 18(36.0%) in stage T2 and 4(8.0%) in stage T4. Majority (56.0%) patients was found in level-II of neck nodes followed by 12(24.0%) level III, 4(8.0%) level IV, 3(6.0%) level II+III, 2(4.0%) level III+IV and 1(2.0%) level III+IV+V of neck nodes.

Conclusion: Laryngeal carcinoma is a common clinical entity in otolaryngology practice. Male were more predominant and the highest age group was 51-60 years. In our study most common Laryngeal carcinoma was supraglottic in nature. T3 was the commonest stage of involvement. Common clinical presentation was difficulty in swallowing and hoarseness of voice. N_0 and N_1 was the most common pattern of neck node metastasis. In our series majority of them were in level II.

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Introduction

Laryngeal carcinoma is the most common head and neck cancer worldwide¹. It constitutes 0.2% to 1.3% among all malignancies². In UK it has an incidence of 2.9 per 10,000 people³. Laryngeal cancer is more common in male than in women.³

About 40% of all laryngeal cancer in UK and 30% in north America are supraglottic. Conversely in North America 60% laryngeal carcinoma are glottic and in France it is about 61%.⁴

But in our subcontinent supraglottic carcinoma outnumbers glottic carcinoma. In India supraglottic carcinoma is about 57%, glottic carcinoma 39%, subglottic carcinoma is only about 6%.²

In Bangladeshi study it is found that out of 50 histopathologically proven laryngeal carcinoma 60% laryngeal carcinoma patients presented with regional metastases to the cervical nodes. Highest cases among laryngeal carcinoma were supraglottic carcinoma (72.0%) which also showed the highest rate of lymph node metastases (72.2%).⁵

Smoking, alcohol consumption, chewing tobacco, genetic factors, occupational factors, vitamin deficiency is the well known causative factors of laryngeal carcinoma.⁶ Male are predominant and common age of presentation over 40 years.⁴

Laryngeal carcinoma has high rate of cure in certain sub sites and early stage, may reach over 85% and overall exceeds 50%. Most of the failures in the treatment of laryngeal cancer are due to the delay in diagnosis can contribute to the presentation with later stage diseases and difficulty in eradicating the loco regional disease.⁷

A common phenomenon to all malignancy is their ability to metastasize. Patho-

physiology of this phenomenon has been the subject of much research & investigation.^{2,8}

Some tumours have the propensity to extensive local invasion without metastasis, whereas others metastasize early in their development.^{3,9}

With the exception of distant metastasis, the presence of cervical lymph node metastasis is the single most adverse independent prognostic factor in laryngeal carcinoma.^{4,10}

The highest incidence of cervical lymph node metastasis is associated with supraglottic carcinoma in comparison to glottic and subglottic carcinoma. Cases with bilateral neck nodes are uncommon. Supraglottic larynx is one of the most common primary site for bilateral neck nodes metastasis.^{3,11}

A single ipsilateral cervical lymph node metastasis decreases survival by 50% than that of the patients without metastasis. Nodal metastasis are also associated with a high rate of regional recurrence.¹²

So, early treatment of the primary tumour as well as lymph nodes is essential for good locoregional control & reduction of distant metastasis & improved survival.

Historically, case can be identified by taking comprehensive history & detail clinical examination. However, further evaluation by fine needle aspiration cytology (FNAC), imaging studies, endoscopy & biopsy is required for confirmative diagnosis and effective management.

This prospective study is designed to find out the pattern of neck node metastasis associated with laryngeal carcinoma and their clinical staging. Laryngeal cancer like all other head and neck cancer are best

treated by multidisciplinary approach. Neck node metastasis dictates clinical staging and treatment of the disease. Selective neck dissection is commonly performed for the management of the node negative patients. Positive neck node disease is also treated by comprehensive neck dissection. The major goal of the treatment of cancer of the larynx is to maximize the cure rate while neck dissection ensures survivality and better prognosis of the patients.

Methodology

The prospective cross-sectional clinical study was carried out in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka from March 2016 to September 2016. All patients of diagnosed as laryngeal carcinoma with neck metastasis were taken as sampling population. Patients/attendance was briefed about the study and consent was taken. Brief history was taken included with symptoms and risk factors. Relevant physical examination, 12 lead ECG was done on admission and routinely thereafter. Blood glucose level ≤ 11.0 mmol/l or 198 mg/dl was considered as admission hyperglycemia. Baseline investigations including-cardiac biomarkers, serum creatinine, lipid profile and echocardiography were done for each patient. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using updated computerized program SPSS-19.

Result

The mean age was found 58.5 ± 11.9 years with range from 39 to 78 years. Male were found 39(78.0%) and female were 11(22.0%). Male female ratio was 3.5:1.

Table I

Distribution of the study patients with neck node metastasis according to site of laryngel involvement (n=50)

Site of laryngel involvement	Frequency	Percentage
Supraglottis	35	70.0
Glottis	13	26.0
Subglottis	02	04.0

Majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma (Table-I)

Table II

Distribution of the study patients according to presenting complaints (n=50)

Presenting complaints	Frequency	Percentage
Difficulty in swallowing	39	78.0
Hoarseness of voice	17	34.0
Discomfort in throat	12	24.0
Earache	10	20.0
Hemoptysis	06	12.0
Cough	04	08.0
Stridor	03	06.0

More than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis, 4(8.0%) had cough and 03(06.0%) had stridor (Table-II).

Table III

Distribution of the study patients according to primary tumour (n=50)

Site of laryngel involvement	Stage of primary tumor	Percentage
Supraglottic (n=35)		
T1	05	14.29
T2	13	37.14
T3	14	40.00
T4	03	8.57
Glottic (n=13)		
T1	03	23.08
T2	04	30.77
T3	05	38.46
T4	01	7.69
Subglottic (n=2)		
T1	00	0.0
T2	01	50.0
T3	01	50.0
T4	00	0.0

Out of 35 Supraglottic common primary tumor was T3 14(40%), T2 was 13(37.14%), T1 was 05(14.29%). Out of 13 Glottic, among them majority was found T3 which was 05(38.46%), T2 was found 04(30.77%), T1 was 03(23.08%) and T4 was 1(7.69%). Two patients was found subglottic, among 01(50%) was T2 and 01(50%) was T3 (Table-III).

Table IV

Distribution of the study patients according to status of neck nodes involvement (n=50)

Site of laryngel involvement	No. of status of neck node	Percentage
Supraglottic (n=35)		
N ₀	07	20.00
N1	15	42.86
N2	12	34.29
N3	01	02.86
Glottic (n=13)		
N ₀	11	84.62
N1	02	15.38
N2	00	0.00
N3	00	0.00
Subglottic (n=2)		
N ₀	01	50.0
N1	01	50.0
N2	00	00
N3	00	00

Majority 35 patients had supraglottic carcinoma among them 15(42.86%) had N1. Thirteen patients had glottic carcinoma among them 11(84.62%) had N₀. Two patients had subglottic carcinoma among them 1(50.0%) had N0 and 1(50.0%) had N1 (Table-IV).

Table V

Distribution of the study patients according to levels of neck node involvement (n=50)

Levels of neck node	Right side n(%)	Left side n(%)	Total
Supraglottic (n=35)			
Level II	13(35.14)	03(23.08)	16
Level III	05(13.51)	04(30.77)	09
Level IV	05(13.51)	02(15.38)	07
Level VI	02(5.41)	01(7.69)	03
Glottic (n=13)			
Level III	05(13.51)	02(15.38)	07
Level IV	04(10.81)	01(7.69)	05
Level VI	01(2.70)	00	01
Subglottic (n=2)			
Level IV	01(2.70)	00	01
Level VI	01(2.70)	00	01

Out of 35 supraglottic, among them majority (35.14%) patients was found in level II of neck nodes in right side and 23.08% was found left side, 13.51% level III of neck node was found in right side and 30.77% was found in left side. Five (13.51%) level IV of neck node was found in right side and 15.38% in left side. Out of 13 glottis, among them 05(13.51%) level III neck node was found in right side and 02(15.38%) was found in left side. Two patients had found subglottic level IV and level VI both are right side (Table-V).

Table VI
Distribution of the study patients according to tumor stage (n=50)

Stage of tumor	Frequency	Percentage
Stage I	07	14.0
Stage II	18	36.0
Stage III	21	42.0
Stage IV	04	8.0

Majority (42.0%) patients was found in stage III followed by 18(36.0%) in stage II, 7(14.0%) in stage I and 4(8.0%) in stage IV (Table-VI).

Discussion

This prospective clinical study was performed in 50 patients having carcinoma of larynx with cervical neck node metastasis in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka.

In this current study it was observed that majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma. In study of Koirala and Sharma¹³ Supraglottic larynx was the commonest subsite in 36/46 (78.2%), followed by glottis and subglottis respectively. Akmansu et al.¹⁴ have reported the incidence of supraglottic cancer to be 73.9%, followed

by 13% transglottic and 13% glottic in laryngeal cancers in Turkish population. Similarly, Jaimanti and Naresh¹⁵ in a 10 year follow up of patients suffering from carcinoma larynx, found the incidence of supraglottic carcinoma was 55.94% of all laryngeal cancers followed by glottis (17.3%), transglottic (13.04%) and subglottis (3.62%). Ahsan et al.⁵ showed among 36 supraglottis cases, 26 (72.2%) cases showed metastasis. Out of 13 glottis cases, metastasis was found in 4 (30.8%) cases. In Kaur et al.¹⁶ study, transglottic malignancies constituted 66% (33 cases) of the total 50 cases, while supraglottic malignancies constituted 24% (12 cases) and glottis malignancies constituted 10% (5 cases). Anicin and Zargi¹⁷ study the most common localisation of the primary tumours was glottic (48%), followed by supraglottic, transglottic and subglottic tumours in 41%, 8% and 3%, respectively.

In this study observed that more than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis, 4(8.0%) had cough and 03(06.0%) had stridor. It was compared in Kaur et al.¹⁶ which revealed that hoarseness of voice was the most common symptom (100%) in both glottis and transglottic malignancies whereas difficulty in swallowing was the most common symptom (66.7%) in the case of supraglottic malignancies. 48.5% (16 cases) cases of transglottic malignancy presented with a mass in the neck as compared to 41.7% (5 cases) cases of supraglottic malignancies. Thus the overall incidence of nodal metastases in our series was 42% (21 cases).

It is well known that supraglottis is the commonest site of laryngeal carcinoma in subcontinent.⁶ The result of this study also

coincides with this fact. Here 72% patients presented with supraglottic carcinoma, 26% with glottic and 2% with subglottic carcinoma. Supraglottic carcinoma is characterized by higher prevalence of regional metastases compared with carcinoma of other laryngeal sites.^{18,19} In Ahsan et al.⁵ study 26(72.2%) out of 36 supraglottic cases presented with metastatic neck node. On the other hand, only 4(30.7%) patients among the 13 glottic carcinoma cases presented with neck node. No neck node was found in the only case of subglottic carcinoma. This result goes in line with the study done by Kirchner²⁰ where 65% supraglottic tumour had cervical metastases and 25% glottic tumour and none of the subglottic tumour had cervical metastases.

In present study showed that out of 35 supraglottic common primary tumor was T3 14(40%), T2 was 13(37.14%), T1 was 05(14.29%). Out of 13 Glottic, among them majority was found T3 which was 05(38.46%), T2 was found 04(30.77%), T1 was 03(23.08%) and T4 was 1(7.69%). Two patients was found subglottic, among 01(50%) was T2 and 01(50%) was T3. Koirala and Sharma¹³ found their study out of total 31 patients of T3 stage, 28 had supraglottic malignancy. Albeit, neck node metastasis is mainly a 'supraglottic issue'. In fact, because of the profuse lymphatic network of the supraglottic larynx, carcinomas of this area metastasize frequently to the cervical lymph nodes, and failure of treatment is usually a result of metastasis rather than local disease.^{21,22} The incidence of patients with clinically positive lymph nodes at the time of diagnosis is 23-50% for all supraglottic sites and stages combined.^{23,24} A substantial number of those patients with clinically negative necks are found to have histologic disease, as demonstrated when neck dissection is performed, or, if left untreated, they convert

to clinically positive necks.²⁵ In supra-glottic cancers, the probability of cervical metastasis and the probability of delayed contralateral metastasis increase in direct proportion to the size of the primary lesion (i.e., the T stage).^{15,26} Lindberg²¹ reported impressive overall metastatic rates with various supraglottic carcinomas: 63% of T1, 70% of T2, 79% of T3, and 73% of T4 cases metastasized.

In this series it was observed that majority 35 patients had supraglottic carcinoma among them 15 (42.86%) had N1. Thirteen patients had glottic carcinoma among them 11(84.62%) had N₀. Two patients had subglottic carcinoma among them 1(50.0%) had N0 and 1(50.0%) had N1. In study of Ahsan et al.⁵ showed N₀ was found 20(40.0%) cases followed by N1 and N2 which were 15(30.0%) cases and 13(26.0%) cases respectively. Kaur et al.¹⁶ study 58% (29 cases) were found to be N₀ stage – constituted by 58.3% of the supraglottic lesions, 100% of the glottis lesions and 51.5% of the transglottic lesions. On the other hand, 42% (21 cases) were found to have a clinically positive neck at the time of presentation - 47.6% being in N 2 stage, 38.1% in N~ stage and only 14.3% being in N 3 stage. Anicin and Zargi¹⁷ study the regional in-field recurrence rate after selective neck dissections in postoperatively irradiated N2b and N1 cases was 12.5% and 8.3%, respectively.

The highest incidence of malignant cervical lymph node is associated with supraglottic tumour compared to glottic and subglottic carcinoma of larynx.³ The frequency distribution of supraglottic and glottic carcinoma has got wide geographical variation.²⁷ In Indian²⁸ subcontinent, supraglottic area is the commonest site of origin which is about 57% and in UK²⁷ it is about 40%. On the other hand Glottis is the

commonest site in North America (60%) and France (61%).⁴ Subglottic carcinoma is rare and least frequent type all over the world with a 5% or less in different series.⁴ Like Indian subcontinent, supraglottic carcinoma is the top among the laryngeal carcinomas in Bangladesh.⁶ In two different previous studies in Bangladesh, supraglottic cancer was found in 67%⁶, and 70% cases. Since the chance of regional metastases is more in supraglottic carcinoma and it is the commonest among the laryngeal carcinomas in Bangladesh, metastatic lymph nodes in laryngeal carcinoma is also common in Bangladesh.

In our study it was observed that out of 35 supraglottic, among them majority (35.14%) patients was found in level II of neck nodes in right side and 23.08% was found left side, 13.51% level III of neck node was found in right side and 30.77% was found in left side. Five (13.51%) level IV of neck node was found in right side and 15.38% in left side. Out of 13 glottis, among them 05(13.51%) level III neck node was found in right side and 02(15.38%) was found in left side. Two patients had found subglottic level IV and level VI both are right side. In study of Ahsan et al.⁵ showed most frequently involved levels of the neck were level II (56.7%) and level III (33.3%). Regarding the level of neck involvement, supraglottic larynx drains mainly to upper deep cervical nodes - level II and level III. But in palpable neck diseases, all 5 levels can be involved.⁴ Ahsan et al.⁵ reported level II nodes were involved in 16 out of 30 cases (53.3%), followed by level III where 7 out of 30 cases (25%) involved. Level IV involved in 2(6.67%) patients. No patient had isolated level I involvement in this study and level V was involved in one patient where multiple levels were involved. Overall 5 patients presented with multiple levels involvement and all 5 had supraglottic

carcinoma. These findings correlate with other international studies. In one study in Italy Luca et al.¹⁹ showed that level II and III were most frequently affected node in laryngeal cancer with a prevalence of 82% and 41% respectively. In that study it has been also observed that isolated metastases were found only at level II and III. In study of Kaur et al.¹⁶ showed out of the 21 cases with cervical nodal metastases at the time of presentation, levels II and III were found to be involved in 85.7% (18 cases) whereas multiple levels were involved in 71.4% (15 cases).

In our present study it was observed that majority (42.0%) patients was found in stage III followed by 18(36.0%) in stage II, 7(14.0%) in stage I and 4(8.0%) in stage IV. Koirala and Sharma¹³ study showed majority of the patients were of T3 stage 31/46 (67.4%) followed by T2 (7), T1 (6) and T4 (2) respectively. Pinilla et al.²⁹ carried out a retrospective study on 430 patients of carcinoma larynx from 1983 to 1993 in Spain. In their study, 58% of patients were of glottic origin while 42% were of supraglottic origin. T3 stage was the most common category (36%) followed by T4 (35%), T2 (23%) and T1 (6%). There was a direct correlation of tumor size with presence of histological neck node involvement. However Akmansu et al.¹⁴ and Suo et al.³⁰ reported no significant correlation to exist between T and N stages in laryngeal cancers. Ahsan et al.⁵ study observed in stage T1, the involvement of neck nodes was 14.3% cases. However stage T2, stage T3 and stage T4 were 41.2%, 81.8% and 100.0% respectively. TNM staging was done in all patients. Out of 50 patients, 7(14.0%) patients presented with T1 stage, 17(34.0%) patients in T2 stage, 22(44.0%) patients in T3 and only 4(8.0%) patients in T4 stage. Regarding neck node staging, 20(40.0%) patients presented

without palpable neck node which means N0. Among the neck node positive patients, 15(30.0%) presented as N1, 13(26.0%) as N2 and only 2(4.0%) patients presented as N3. No patient was found with distant metastases, so all were M0. These features are also similar to some extent with the study of Wenjue et al.³¹, where 6.0% patients presented as T1, 31.0% as T2, 38.0% as T3 and 25.0% as T4. Relation between T stage of laryngeal carcinoma and neck node metastases was also evaluated in this study. The metastatic rate according to the T stage of the disease reflects that the frequency of lymph node metastases increased with the advancing T stage of the laryngeal carcinoma. Metastatic rate at T1 was 14.3%, at T2 it was 41.2%, at T3 81.8% and at T4 it was 100.0%.

Conclusion

Laryngeal carcinoma is a common clinical entity in otolaryngology practice. Male were more predominant and the highest age group was 51-60 years. In our study most common Laryngeal carcinoma was supraglottic in nature. T3 was the commonest stage of involvement. Common clinical presentation was difficulty in swallowing and hoarseness of voice. N₀ and N1 was the most common pattern of neck node metastasis. In our series majority of them were in level II.

Early detection and management yield better prognosis. Special emphasis on neck node metastasis in carcinoma larynx is an important determining factor in treatment modality as well as meaningful outcomes after definitive treatment.

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Original Article

Aetiological factors of hoarseness of voice in patients attending in a district level hospital

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Abstract

Background: Information about causes or related factors involving voice change was studied mainly in central tertiary level hospitals previously, not in hospital in peripheral districts in Bangladesh.

Objective: To find out and evaluate the aetiological factors of hoarseness of voice irrespective of age and sex.

Setting: Pabna medical college, a 250 bedded hospital in Bangladesh.

Methods: This was a cross sectional, non- randomized and longitudinal study conducted from 1st august 2011 to July 2017. All the patients with history of hoarseness underwent clinical examination, routine as well as special investigation to find the diagnosis. The final results were analyzed by simple manual analysis with frequency and percentage using SPSS program in 2017.

Results: There were total 200 patients included in the study. Among them the age groups of 21 – 30 years and 31 – 40 years were mainly suffer from hoarseness. Similarly, among 200 patients 144 (72%) were males whereas 56 (28%) were females with male to female ratio of 2.5:1. The most common cause as per the distribution was acute laryngitis with frequency of 34% followed by acid peptic laryngitis, 25.5%, neoplasms of larynx 12%, whereas tuberculosis of larynx, intubation granuloma, trauma was very few.

Conclusion: There was etiological variation in hoarseness ranging from simple laryngitis to malignancies. So it is important not to ignore the hoarseness and precise history, examination and investigations should be done.

Key words: hoarseness, laryngitis;

Introduction

Hoarseness is the term often used by common people to describe changes in their voice quality. Actually the human voice is

an extraordinary attainment, which is capable of conveying not only complex thought but also subtle emotion¹. At every child birth the most singularly and universally awaited sign of life is the infant's cry. The cry signals a fulfilled physiological capability required for the infant's survival. Probably no other human organ system need work so immediately and effectively after birth². "Although the voice is not visible to the eyes during speech production but its absence or malfunction is obvious". Hoarseness is the

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term used to describe a change in normal voice quality. It is non-specific term, similar to patient's complaint of dizziness when describing symptoms from lightheadedness to true vertigo. Hoarseness may imply breathiness, roughness, voice breaks or unnatural changes in pitch. Term dysphonia is used by laryngologists to describe abnormal voice quality. Complaints of hoarseness may represent serious disease, therefore, should not be ignored³. In the words of Chevalier Jackson "Hoarseness is a symptom of utmost significance and calls for a separate consideration as a subject because of the frequency of its occurrence as a distant signal of malignancy and other conditions"⁴.

The causes of hoarseness are determined after obtaining a detailed medical history of the circumstances preceding the onset of hoarseness and performing a thorough physical examination. The latter may include visualization of the vocal cords, possibly indirect laryngoscopy, flexible nasendoscopy or videolaryngoscopy. In the absence of an upper respiratory tract infection, any patient with hoarseness persisting for more than two weeks requires a complete evaluation. When the patient has a history of tobacco use, cancer of the head and neck must be considered and ruled out. Voice abuse is one of the most common causes of hoarseness and can lead to other vocal pathologies such as vocal nodules. Good vocal hygiene can prevent and treat some pathologies, and voice therapy is a cornerstone of management in some cases of hoarseness^{5,6,7}.

If one has hoarseness for more than 3 weeks, it could be a sign of laryngeal cancer. This is one of the most common symptoms. But many other things can cause a hoarse voice. One of the most common causes is acute laryngitis. This usually happens due to a cold, a chest infection or over use of the voice, such as shouting or screaming. Smoking can also cause hoarseness because it irritates the throat lining (mucous

membranes). Other special causes that usually under rated for hoarseness includes acid reflux, post nasal drip, allergies, thyroid problems and laryngeal injury⁸.

Many people develop hoarseness as they get older. Acid reflux is acid leaking from your stomach up into your oesophagus. It can cause hoarseness, as stomach acid comes back up the oesophagus and irritates the larynx. Post nasal drip means mucus dripping from the back of your nose down into your throat. This can happen in cold, allergy or smoking. It produces cough and a hoarse voice⁹.

Psychological factors may be a predisposing, precipitating or perpetuating agent in cases of voice disorder. Sudden loss of voice may be caused by conversion reaction. Muscle tension dysphonia is a common cause of hoarseness. It may also co-exist with other voice disorder. This condition results from an imbalance of the synergist and antagonist muscles affecting vocal fold position. Puberphonia is a condition in male where normal change of the pitch of voice at puberty is hampered or delayed. Patient may have double voice. Presbylaryngis is age related change in the voice where the vocal becomes stiffened, bowed and atrophic-looking^{7,9,10}. But these physiological and psychological voice changing factors were not included in this series.

The well-known risk factors for voice disorders are female, age (40-59yrs), vocal abuse, high vocal demand, extraoesophageal reflux, chemical exposures, smoking, frequent cold / sinus infection. Women are more prone to develop functional voice disorders because of vulnerabilities such as stress, anxiety, depression and coping with negative emotions. Professional voice users like singers, teachers, actors, politicians, announcers, call centres/ telephone workers are more at risk of developing occupational voice disorders¹³

Methods

This is a cross sectional, non- randomized and longitudinal study conducted from August 2011 to July 2017 in department of otorhinolaryngology of Pabna Medical College Hospital, Bangladesh. All the patients who presented with history of hoarseness were included in the study. The detailed history, clinical examination, routine as well as special investigation (flexible nasopharyngolaryngoscopy and direct laryngoscopy) was performed to find the diagnosis. In this hospital there was no facility of video laryngoscopy or flexible nasopharyngoscopy. So the patients were sent to Dhaka or Rajshahi for this endoscopic procedure.

Physiological, psychological, surgical conditions (i.e. thyroidectomy) or conditions outside the neck (i.e. RLN palsy due to lung or thoracic oesophageal malignancy) was excluded from study.

The final results were analyzed by SPSS 11.5 software.

Results

There were total 200 patients included in the study. Among them the age groups of 21 – 30 years and 31 – 40 years were mainly suffer from hoarseness as shown in table 1.

Table-I
Age distribution of patients (n=200)

Age (years)	Number of patients (%)
0 -10	2 (1%)
11 – 20	18 (9%)
21 -30	68 (34%)
31 -40	62 (31%)
41 – 50	28 (14%)
51 – 60	17 (8.5%)
>60	15 (7.5%)

Similarly, among 200 patients 144 (72%) were males whereas 56 (28%) were females with male to female ratio of approximately 2.5:1 as shown in table 2. The table 3 showed the distribution of hoarseness as per etiology. Among them, the most common cause was acid peptic laryngitis with frequency of 37.8% whereas tuberculosis of larynx, papillary carcinoma of thyroid and papilloma of vocal cord accounts for only 0.4% each.

Table II
Sex distribution of patients (n=200)

Sex	Number of patients (%)
Male	144 (72%)
Female	56 (28%)

Table III
Clinical features

Sl. no	Presentation	No. of cases
1	Change of voice	200
2	Cough	33
3	Fever	44
4	Vocal fatigue	18
5	Irritation/Sore throat	36
6	Weight loss	22
7	Painful vocalization	10
8	Dysphagia	8
9	Neck mass	4
10	Painful Swallowing	7
11	URTI	21
12	Heart burn/vomiting	70
13	Respiratory distress	11
14	Haemoptysis	3
15	Stridor	3

Table V
Occupation of the patients

Name of the occupation	No of patients (n=200)	Percentage (%)
Teacher	08	04
Student	40	20
Manual labour	24	12
Housewife	36	18
Service	24	12
Singer	04	02
Others	48	24

Table VI
Distribution of patients according to etiology (n=200)

Etiological factors	Number (%)
1. Inflammatory	
Acute laryngitis	68 (34%)
a. Chronic non specific laryngitis	
Acid peptic laryngitis	51 (25.5%)
Chronic simple laryngitis	28 (14%)
Vocal cord nodule	10 (5%)
Reinke's edema	3 (1.5%)
Vocal cord polyp	6 (3%)
b. Chronic specific laryngitis	
Tuberculosis of larynx	2 (1%)
2. Neoplastic	
Carcinoma larynx	14 (7%)
Carcinoma Hypopharynx	8 (4%)
Papillary carcinoma thyroid	1 (0.5%)
Papilloma of vocal cord	1 (0.5%)
3. Neurological	5 (2.5%)
4. Laryngeal trauma	1 (0.5%)
5. Endocrinal	
Hypothyroidism	1 (0.5%)
Intubation granuloma	1 (0.5%)

Discussion

In this series, the frequency of hoarseness in age group ranged from 21 – 40 years was 65% which is similar to study performed by Smit and Leewen et al⁹, Woodson and Blitzer et al¹⁰, Ramazan and Tarazi et al¹¹, but differs from the study performed by Baitha S, Raizada RM et al¹² in which maximum number of patients with hoarseness falls within 5 -15 years. The maximum number of patients with hoarseness in our study was within productive age group because they were mostly involved in voice abuse and also more concerned regarding their problem.

In our study, the male: female ratio was 2.6:1, like that of study performed by Woodson GE et al¹⁰, Baitha S et al,^{9,12} Saeed M and Ramazan¹¹ Kumar H et al¹³ but in contrast with study performed by Khan FA, Jawaid I¹⁴ which showed almost equal number of male to female ratio. Such a huge difference between male and female in our study could be because of male dominated society and they involved in smoking, alcoholism, exposure to pollutant and voice abuse whereas female from rural areas are unaware of their health problem.

In this study, the frequency of acid peptic laryngitis was 25.5% which contrast with the study performed by Banjara H and Varsha M et al¹⁵ which showed only 1.81%. Such higher frequency in this study could be because most of the patients suffer from gastro-esophageal reflux disease.

Likewise, the frequency of acute laryngitis was 34.6% in our study which is comparable to study performed by Baith S et al^{9,16} and Baitha S et al¹² but contrast with the study performed by Woodson GE et al¹⁰.

The frequency of chronic simple laryngitis was 14% in this study which is similar to other studies¹³⁻¹⁶. The frequency of vocal nodule, Reinke's edema and vocal polyp was 5%,

1.5% and 3% respectively. Our findings were different from other studies which showed somehow higher or lower frequencies of these diseases^{9, 17}.

In the present series, the frequency of laryngeal tuberculosis was only 1% which was much lower than the study performed by Woodson and Ramazan et al^{10,11} and Iqbal K et al¹⁶. The reason could be because of more prevalence but early diagnosis and treatment of pulmonary tuberculosis in south east Asia¹⁷.

The neoplastic and neurological cause reported to be 12% and 2.5% here. The frequencies were lower than other different studies^{9,12,18}.

In our study, the frequency of intubation granuloma was 0.5%, only 1 case was found. The results were comparable to study performed by Smit CE et al⁹ but very lower than the other studies¹⁸⁻²². The lower frequency in our study could be timely elective tracheostomy of needy patients.

The hypothyroidism was 0.5% in our study like that of Mohsin A²¹ and Ramazan HH¹¹ but differ from Ahmed and Hussain et al²² which showed 83.3%. It could be in our place the prevalence of hypothyroidism is not so high.

Conclusion

There was variation in etiologies in hoarseness ranging from simple laryngitis to malignancies. So it is important not to ignore the hoarseness and precise history, examination and investigations should be done.

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Original Article

Outcome of Myringoplasty in Underlay Technique

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Abstract

Background: Myringoplasty is one of the surgical techniques for the management of chronic suppurative otitis media with permanent perforation of tympanic membrane. It is defined as simple surgical repair of tympanic membrane perforation without doing ossicular reconstruction.

Objective: To determine the success rate of myringoplasty and to examine whether the hearing improvement is a potential indication for surgery.

Methods: This study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, Shaheed Suhrawardy Medical College Hospital from January 2017 to December 2017 and 100 patients who underwent myringoplasty in this period were analyzed. About 100 patients with dry central tympanic membrane perforations of various size were included in this study.

Results: Myringoplasty was performed in 100 patients. Male were (45%) and females were (55%). Twenty one (7%) of them belonged to age group of 10-20 years, 31 (31%) were in the age range of 21-33 years, 38(38%) were the age range 31-40 years while 24 (24%) aged between 41-50 years with mean age of $26.32 \pm S.D 9.59$ years. Overall success rate of graft uptake was noted in 88 (88%) out of 100 cases.

Conclusion: Myringoplasty is a safe surgical procedure in achieving intact tympanic membrane and to improve the hearing loss. Therefore, underlay technique being technically simple should be preferred, but the ultimate decision about the technique to be employed depends on the surgeons preference and the site of perforation.

Key Word: Myringoplasty, underley technique.

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Introduction

Myringoplasty, an operation performed to repair or reconstruct the tympanic membrane¹ was introduced by Berthold² and was further developed by Wullstein³ and Zollner.⁴ It is also known as tympanoplasty type I, where peroperatively middle ear structures are exposed and are checked for functional integrity.⁵ The otological surgeons have cultivated various effective techniques of myringoplasty over past 40 years in an attempt to achieve perfection by improving the result of the procedure.

Several factors may affect the outcome of myringoplasty, such as the site and size of the perforation, technique (underlay versus overlay), approach (endaural versus postaural), experience of the surgeon, condition of the other ear, type of used graft, age of the patient, and condition of the operated ear.⁶

There are a wide range of techniques of myringoplasty that are described in the literature and these include the underlay technique,⁷ overlay technique,⁸ "Gelfilm Sandwich" technique,⁹ "Swinging Door" technique,¹⁰ tipple "C" technique,¹¹ double breasting technique,¹² fascial pegging technique,¹³ anterosuperior anchoring technique,¹⁴ and laser assisted "spot welding" technique.¹⁵ The two most common techniques for positioning the graft relative to the remnant of both the tympanic membrane and the tympanic annulus are the "underlay" and the "overlay" techniques.¹⁶ The former is widely used and is relatively simple to perform as the graft is placed entirely medial to the remaining drum (or annulus) and manubrium of malleus. This technique is ideal to repair small and easily visualized perforations, blunting and lateralization of the graft are avoided, the drum heals at the correct level relative to the annulus and the ossicles and it is quick and easy to perform. On the other hand, its disadvantages are that the middle ear space is reduced and adhesions may occur leading to medialization or atelectasis, there is increased failure because of a limited bed size for the graft supplying poor vascularity, exposure of the middle ear is relatively limited and it is not the ideal technique for perforations extending into the anterior annulus since placement of the graft is difficult.¹⁷ In contrast, the overlay technique is more challenging and typically reserved for total perforations, anterior perforations,

or failed underlay surgery.¹⁸ In the overlay technique, the graft is placed lateral to the annulus and any remaining fibrous middle layer, after the squamous layer has been carefully removed from the tympanic membrane remnant and the ear canal. In this technique, there is an excellent visualization of the anterior meatal recess, which is important in cases of anterior perforations reaching the anterior annulus. In addition, the healing rate is high because the drum is essentially replaced intact and the middle ear space is not reduced. The most serious disadvantages are blunting of the anterior meatal recess and the lateralization of the graft; moreover, this technique is more laborious and has a longer healing time.¹⁷ The purpose of this study is to see the efficacy of myringoplasty graft take up and improvement in hearing.

Methods

This study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, Shaheed Suhrawardy Medical College Hospital from January 2017 to December 2017. A total of 100 patients with dry central tympanic membrane perforations of various sizes were included in this study. A thorough history and clinical examination of ear, nose and throat was carried out. Ears examination under microscope, tuning fork tests, radiological test, laboratory investigation, and hearing function test (pure tone audiometry) were also performed. The patients were advised to avoid straining, coughing, and forceful nose blowing postoperatively. All of them were called for follow-up at 2 weeks, 4 weeks, and then at monthly interval for first 6 months. A proforma was used to collect the data such as age, gender, perforation size and location, conductive loss present or absent, surgical approach, technique, postsurgical results, and complications.

Results**Table-I**
Age distribution of the patients

Age in years	No. of Patients	Percentage (%)	Mean±SD
11-20	7	7.0	33.17±9.21
21-30	31	31.0	
31-40	38	38.0	
41-50	24	24.0	

Table II
Sex distribution of the patients

Sex	No. of Patients	Percentage (%)
Male	45	45.0
Female	55	55.0

Table III
Distribution of perforation size and site

	No. of patients	Percentage
Size		
Small	31	31.0
Medium	39	39.0
Subtotal	30	30.0
Site		
Anterior	36	36.0
Posterior	35	35.0
Subtotal	29	29.0

Table IV
Success rate of graft uptake

Graft uptake	No. of Patients	Percentage (%)
Graft uptake	88	88.0
Graft failure	12	12.0

Table V
Hearing improvement

	No. of Patients	Percentage (%)
Improvement	77	77.0
No improvement	23	23.0

Discussion

Myringoplasty or tympanoplasty type 1 is the surgical procedure in which the reconstructive process is limited to repairing tympanic membrane perforation. The main objective of myringoplasty has traditionally been the closure of tympanic perforation to prevent chronic infections and to make the ear safe.¹⁹ Consequently the 2nd objective is to improve the hearing loss which resulted due to perforation of tympanic membrane. There are various techniques of myringoplasty with their own corresponding results. However, still there is no consensus about the optimal technique, which is often employed on the basis of surgeon's preference and skills.²⁰

In this prospective study, 100 patients were considered. They underwent myringoplasty technique with temporalis fascia graft after taking relevant history, clinical examination and investigation.

In this study, lowest and highest age of patients at presentation was 11 and 48 years respectively with a mean age of 26.32 years. Patient's age has generally considered as influencing surgical outcome. This findings with the well agreement of Joshi et al.²¹

In this study observed 88% success rate in terms of closure of perforation similar to those reported in literature by Joshi et al.²¹, Crovetto De La Torre et al.²² and Mishra et al.²³

The results of this study were better than Ashfaq et al.²⁴ who reported a graft uptake

rate of 73% with underlay technique in 105 cases and Khan and Khan²⁵ who reported 77.5% graft success rate in 94 cases using the same technique. These were also better than Fadl²⁶ who had 85.4% success with underlay technique series and 66.7% success in the overlay technique.

The results were comparable to Gupta²⁷ who had 86.6% success in his overlay technique series and Wang and Lin²⁸ who achieved an 82.1% and an 85% take rate with the overlay and the underlay techniques, respectively.

Glasscock²⁹ have reported a 91% success rate using the overlay technique and a 96% success rate with the underlay technique in a total of 273 ears. Sheehy and Anderson³⁰ have reported a 97% take rate in 472 overlay myringoplasty surgeries. The results achieved by Glasscock,²⁹ and Sheehy and Anderson³⁰ were better than those of the present study.

This figure falls within wide range of successful closure of the perforation described in the literature (66%-91%).³¹⁻³³ Similarly, Lassaletta³⁴ noted that outcomes of surgery are not related to age at operation, duration, mechanism, size and location of perforation or the condition of opposite ear.

This study shows the improvement in the hearing was achieved in 77% among the successfully operated cases. Lee et al and Palva and Ransay stated that the improvement similar to our study.^{35,36} So, still there is no consensus over the prognostic factors of myringoplasty. Protocols vary from institution to institution and surgeon to surgeon. Therefore, there is a great need of such a work which can help to set the uniform definitive criteria in predicting the optimal outcomes of myringoplasty.

Conclusions

Myringoplasty is a safe and effective technique to improve the quality of life of

patients, avoiding continuous infections and allowing them contact with water. It is our belief that to achieve the best results a well-trained ear surgeon must be familiar with both underlay and overlay techniques, which should be employed based on the site of perforation, and the surgeon's preference.

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Original Article

Hearing status before and after Stapes surgery in otosclerotic patients

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Abstract

Background: Otosclerosis is a disease of the otic capsule that is characterized by resorption and redeposition of bony tissue. Stapes surgery has established its position as the primary treatment of conductive hearing loss in otosclerosis. It is anticipated that the hearing level of approximately 90% of patients should improve after surgery.

Objective: To evaluate the hearing status of an otosclerotic patient and compare their pre-operative and postoperative hearing status.

Methods: In this prospective study, 34 patients with otosclerosis from head-Neck Surgery department of Sir Salimullah Medical College & Mitford Hospital, Bangladesh ENT Hospital, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Period from January 2008 to December 2008. The patients were examined and hearing assessment after admission into the hospital pre-operatively and in the post operative period.

Results: In this study most of the cases were age group 21-30 years (50%), male (64-71%), middle socio economic condition (67-71%), rural (58-82%), primary educated (35-29%).

It was observed that most common symptom was progressive deafness, duration of hearing loss was 2-5 years, pre-operative conductive type of hearing loss (50-55 dB). It was also observed that after surgery, hearing status were improved in 82.35% cases, the most of the patients were within 21-30 years age group.

Conclusion: Stapedotomy obtaining closure of the air-bone gap to within 10dB of the pre-operative bone conduction level in 90% of their patients. So, it is superior to other procedures.

Key words: Otosclerosis, conductive hearing loss. A-B gap, Stapedotomy.

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Introduction

Otosclerosis is a familial and genetically determined process inherited as an autosomal dominant Penetrance. It is a disease of the otic capsule that is characterized by resorption and redeposition of bony tissue¹.

Otosclerosis was first described in 1861 by J. Toynbee². The characteristic lesion of otosclerosis first causes fixation of the anterior portion of the foot plate (fistulae ante

fenestram) and then total ankylosis of the stapes resulting in conductive hearing loss.

It is the most common etiology of conductive hearing loss in 15-50 years old patients with intact tympanic membrane³. A higher incidence of the disease in families and homozygotic twins⁴. Women are frequently affected by this pathology than men in at a 2:1 ratio⁵.

Stapes surgery has established its position as the primary treatment of conductive hearing loss in otosclerosis⁶. Stapes surgery gained its actual definition in the 1950s with the stapedectomy operation proposed by Rosen⁷ in 1953 and the stapedotomy operation introduced by Shea⁸. Adequate bone conduction is a fundamental prerequisite for a successful outcome of a subsequent operation for Otosclerotic disease. Surgery may be inadvisable in cases in which there is pre-existing bone conduction deficit⁹. Complications following stapes surgery are rare¹⁰.

The techniques used for stapes surgery have evolved gradually over four decades, with multiple variable to contend with including fenestration size and technique, graft material, prosthesis diameter and design, tendon repair, pathological severity and surgical expertise.

Regardless of the technique, it is anticipated that the hearing level of approximately 90% of patients should improve after surgery and that less than 1% of patients should have severe sensorineural hearing impairment following surgery.

Results

Table I
Age of patients (n-34)

Age	11-20 years	21-30 years	31-40 years	41-50 years
Number of patients	2	17	13	2
Percentage	5.88%	50%	38.23%	5.88%

Most common age group were 21-30 years (50%). This table shows 22 (64.71%) patients were male.

Objectives

1. To evaluate the hearing status of as otosclerotic patient at the time of presentation.
2. Comparison between pre operative and post operative hearing level.

Methods

Type of study: Prospective study.

Number of cases: 34

Study population: Patients admitted in the hospital with Otosclerosis for stapes surgery.

Duration of study: January 2008 to december 2008.

Places of study: Department of Otolaryngology and Head-Neck Surgery in Sir Salimullah Medical & Mitford Hospital, Dhaka, Bangladesh ENT Hospital , Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka.

Inclusion Criteria:

- Air bone gap was not less than 20 dB.
- Air conduction loss was not more than 70dB.
- Bone conduction loss was not more than 30dB.

Exclusion criteria- patients dropped out from follow up.

Data collection method: By questionnaire, clinical examination and audiological investigations.

Data analysis: By computer and manual calculator.

Table II
Common symptoms of patients (n=34)

Symptoms	No of patients	Percentage
1. Progressive Deafness	34	100%
2. Tinnitus	4	11.76%
3. Vertigo	08	23.53%
4. Paracusis willisii	32	94.12%

Most common symptom was progressive Deafness.

Table III
Duration of Hearing loss

Duration of Hearing loss	No. of patients	Percentage
Less than 1 year	4	11.76%
1-2 years	10	29.41%
2-5 years	12	35.29%
5 years to 10 years	8	23.53%

Most common duration of hearing loss was 2-5 years (35.29%)

Table IV
Hearing status before surgery

Age in yrs	No. of patients	Mean AC	Mean BC	AB gap
11-20	2	45dB	15dB	30dB
21-30	17	50dB	20dB	30dB
31-40	13	55dB	20dB	35dB
41-50	2	65dB	25dB	40dB

Most of the patients had conductive type of hearing loss in between 50-55 dB.

Table V
Complications of Surgery

Name of complications	No. of patients	Percentage
1. Facial Nerve palsy	01	2.94%
2. Perilymph Fistula	0	0
3. Dead ear	0	0
4. Tinnitus	0	0
5. Significant Vertigo	0	0
6. Chorda tympani nerve injury (teste disturbance)	03	8.82%
7. Tympanic Membrane Perforation	0	2.94%
8. Infection	0	0

Most common complication was chorda tympani nerve injury (8.82%)

Table VI
Hearing status after surgery

Age in yrs	No. of patients	Mean AC	Mean BC	AB gap
11-20	2	45dB	15dB	30dB
21-30	17	50dB	20dB	30dB
31-40	13	55dB	20dB	35dB
41-50	2	65dB	25dB	40dB

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8. Infection	0	0

Most common complication was chorda tympani nerve injury (8.82%)

Table VI
Hearing status after surgery

Age in yrs	No. of patients	Mean AC	Mean BC	AB gap
11-20	2	25dB	15dB	10dB
21-30	12	25dB	15dB	10dB
	02	25dB	20dB	05dB
	03	50dB	20dB	30dB
31-40	10	30dB	15dB	15dB
	03	55dB	20dB	35dB
41-50	02	40dB	25dB	15dB

Table shows hearing status were improved in 28 cases (82%.35%).

Table VII*Comparison between pre-operative and post-operative hearing status.*

Age in yrs	No. of patients	Mean AC	Mean BC	AB gap
11-20	2	25dB	15dB	10dB
21-30	12	25dB	15dB	10dB
	02	25dB	20dB	05dB
	03	50dB	20dB	30dB
31-40	10	30dB	30dB	15dB
	03	55dB	55dB	35dB
41-50	02	40dB	40dB	15dB

Table shows hearing status were improved in 28 cases (82%.35%).

Table VIII*Comparison between preoperative and postoperative Hearing status*

Age in years	No. of patients	Preoperative AB gap	AB gap Post Operative	Hearing surgery status after	Percentage
11-20	2	30dB	10dB	Improved	5.88%
21-30	12	30dB	10dB	Improved	38.29%
	02	30dB	05dB	Improved	5.88%
	03	30dB	30dB	Not Improved	8.82%
31-40	10	35dB	15dB	Improved	35.29%
	03	35dB	35dB	Not Improved	8.82%
41-50	02	40dB	15dB	Improved	5.88%

Hearing status improvd in most of the patients within age of 21-30 years.

Table IX*Hearing results in patients with otosclerosis treated by stapedotomy*

Parameter	Preoperative	Postoperative	Improvement
Air conduction	52.5dB	32.21dB	20.29 dB
Bone conduction	20dB	16.76dB	3.24dB
Air bone gap	32.5	15.44dB	17.06 dB

Discussion

In the series most common age group was 3rd decade. The next common group was 4th decade. This is supported by Gray and Smyth. The sex ratio varies from series to

series. But our finding is almost similar to Lid and Cao.

In the present series the common symptoms were progressive hearing loss (100%), tinnitus (11.76%) and vertigo (23.53%). This

is supported by most of authors like Katjenmayer, Smyth and Gray^{2,5,11}.

The paracusis Willisii was noticed by most of the patients (32) this finding is similar to most authors (Ozgirgin)⁶. Here 12 patients (35.29%) had hearing loss of 2-5 years duration and 8 patients (23.53%) had hearing loss of 5-10 years duration.

In this series one patient (2.94%) had facial palsy which was transient in nature and taste disturbance occurred in 3 cases due to injuries to chorda tympani nerve. Li and fisch observed similar type of injuries^{4,12}.

Analysis of the audiological results showed that most study patients achieved considerable auditory gain after surgical operation. The presented data demonstrates a major improvement of air bone gap in younger patients. Among the improvement, the largest improvement was of 25 dB and least improvement was of 20dB.

Hearing gain was obtained in 28 cases that is about 20-25 dB and no gain was recorded in 6 cases. Improvement was 82.35% where as no improvement was 17.65%. There was no reported case of deterioration of hearing in this study. This findings correlates with the findings of MH Baradaranfar and P Dabirmoghaddam, Mahfuz Z and Lokman S, Song HM, Choi SJ and Lee KS¹³. None of the patients complained of significant vertigo and tinnitus in post operative follow up. This indicates that hearing status was improved after stapes surgery in otosclerotic patients.

Conclusion

There has been much debate regarding results of total stapedectomy vs. partial stapedectomy vs. stapedotomy. Recent stapedotomy technique (with fewer complications) and thus there has been a recent shift toward this procedure. Most consider stapedotomy to be technically easier to perform with less potential damage to the vestibule. So, it is superior to other procedures.

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Original Article

Pediatric Differentiated Thyroid Carcinoma: Outcome in Response to Initial Treatment

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Abstract

Introduction: Though the differentiated thyroid carcinoma in children is a common pediatric endocrine malignancy, its prognosis is excellent with a proper initial treatment.

Objectives: This is to evaluate the initial treatment pattern for a good prognosis with long-term outcome in pediatric DTC patients.

Methods: This study is a prospective one done in BSMMU during a period of 10 years in 52 post operative pediatric DTC patients after excluding the follow-up missing patients. These patients are yet in a regular follow-up were outcome evaluated with clinical, pathological & imaging studies.

Results: All the patients got initial treatment of total thyroidectomy. About half of the group had underwent neck dissection along with total thyroidectomy. Forty six patients had taken 131-I therapy. The survival is 100%.

Conclusion: The life expectancy for children with DTC is excellent. However, many patients experience adverse effects from thyroid surgery, resulting in life long complications.

Keywords: Differentiated thyroid carcinoma (DTC), Papillary thyroid carcinoma (PTC), Follicular thyroid carcinoma (FTC), Lymph node dissection (Neck Dissection).

Introduction

Differentiated thyroid carcinoma (DTC), which comprises papillary thyroid carcinoma (PTC) and follicular thyroid carcinoma (FTC),

is a rare disease during childhood. However, DTC is the most common pediatric endocrine malignancy and its incidence is increasing¹⁻³. The prognosis in children has

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been reported to be excellent with 15 years survival rates greater than 95%³.

The biological behavior of the two carcinomas differ significantly where papillary thyroid carcinoma is known to frequently metastasizes to regional lymph nodes, where follicular thyroid carcinoma more frequently metastasizes to distant organs such as the lung, bone and brain. Pathogenesis of differentiated thyroid carcinoma is multifactorial with both genetic and environmental factors playing an important role⁴ For unknown reasons it was found to be 2-4 times more common in women⁵ Previous exposure to ionizing radiation including external irradiation of the neck would increase the incidence of cancer especially the papillary type.

Distant metastasis at the time of diagnosis is the most important prognostic factor for both papillary and follicular thyroid carcinomas⁶ Extra thyroidal extension and lymph node metastasis are important prognostic factors for papillary thyroid carcinoma while the grade of invasiveness and carcinoma differentiation are important to evaluate the biological behavior of follicular thyroid cancer⁷.

The initial treatment for children with DTC generally consists of a (near) total thyroidectomy with or without lymph node dissection, although for patients with minimally invasive PTC and lacking other adverse risk factors, a less aggressive treatment has recently been recommended^{8,9}

In most cases, surgery followed by ablation therapy with radioactive iodine (¹³¹I) to destroy residual tumor foci and to facilitate disease monitoring by follow-up scan and measurement of serum thyroglobulin¹⁰.

Aims & objectives

The objectives of this study were to evaluate the clinical and pathological characteristics,

response to initial treatment pattern, and long-term outcome of post operative DTC in prepubertal, pubertal, and post-pubertal patients i.e. pediatric patients.

Methods

This prospective study was conducted at Bangabandhu Sheikh Mujib Medical University, Dhaka, during, the period of January 2009 to December, 2018. Patients of DTC, age less than 18 years, admitted in the Department of Otolaryngology & Head-Neck surgery of this university and underwent surgery in this period of 10 years, were included in the study .

The data obtained from the medical file of each patient included the following: possible predisposing factors, e.g, hashimoto thyroiditis, familial DTC (first degree relative with DTC); previous exposure to external irradiation; presenting complaint and clinical findings; FNA cytology results; imaging, e.g, cervical US(ultrasonogram), computed tomography (CT) scan of neck and chest or magnetic resonance imaging (MRI) from diagnosis throughout follow-up from initial treatment (extent of operation. Operative findings, ¹³¹I dose) were recorded. Follow up given monthly for 6 months. Every three months for one year and then yearly.

Results

As shown in the study flow chart (Fig.1) 69 patients with pediatric DTC were identified and treated in our center, the ages ranging from 07 years to 18 years. Overall survival is yet 100% after a median follow-up of 4.5 years (range 0.3-10 years). Of the 69 survivors, 52 (75.4%) given informed consent and are included in this study. Among this study group 08 are male and 44 are female. Male; Female ratio is 15.38: 84.62. Median age at diagnosis is 14.3 years. At initial diagnosis, histologically confirmed

cervical lymph node metastases were found in 19 patients (36.54%) No distant metastasis found at diagnosis or in follow-up.

Total thyroidectomy was performed in all patients. In 32 patients (61.5%) the total thyroidectomy was performed as a single procedure. In the remaining 20 patients (38.5%), a diagnostic hemithyroidectomy was performed, followed by a completion thyroidectomy.

Lymph node dissection (Neck Dissection) was performed as part of initial therapy in 27 patients (51.91%) of which 19 (36.54%) were found positive for metastasis. These patients were underwent lateral neck dissection including levels II-IV±V on one or both sides of the neck (Table-1)

Forty seven patients underwent 131-I ablation therapy after surgery. Five patient did not receive 131-I therapy due to consultant's choice.

As shown in Table-2, post operative transient and permanent hypothyroidism were observed in 15(28.85%) and 2(3.85%) respectively. Both transient and permanent hypothyroidism occurred more often in patients who underwent a lymph node dissection. Unilateral RLN (Recurrent Laryngeal Nerve) injury occurred in 6 patients(11.59%). Bilateral RLN injury occurred only in a 13-years old patient who had treated with a total Thyroidectomy, a central compartment dissection and a bilateral Lymph node dissection. RLN injury occurred more often in patients with tumors staged T3-T4 compared with stage T1-T2(P<.001) and in patients with lymph node involvement (P<.001). The frequency of surgical complications did not differ between initial surgery performed before or during the last decade.

Table-I
Baseline Characteristics

Variable		All Patients (n=52)	0-10 yrs	11-14 yrs	15-18 yrs	P Value
Sex,n(%)	Male	8(15.38)	2(40)	4(22.2)	5(17.24)	.005
	Female	44(84.62)	3(60)	14(77.8)	24(82.76)	
Age at diagnosis,yr Median(range)	14.5(5-18)	8.5(5-10)	13.0(11.1-14)	17.2(15-18)	n.a	
Histopathology, n(%)	Papillary	40(76.92)	4(80)	14(77.77)	25(86.2)	.351
	Follicular	12(23.08)	1(20)	4(22.23)	4(13.8)	
Primary tumor size, cm Median (range)	2.5(1-5)	1.8(1-4.5)	2.9(1-5)	2.5(1-5)	.173	
Localization,n(%)	Unilateral	31(59.61)	3(60)	11(61.11)	18(62.06)	.364
	Bilateral	16(30.76)	1(20)	4(22.22)	7(24.13)	
	Other ^b					
	Isthmus	4(7.69)	1(20)	2(11.11)	4(13.79)	
	Thyroglossal duct	1(1.92)	0	1(5.55)	0	
Surgery,n(%)	Total thyroidectomy	52(100)	5(100)	18(100)	29(100)	n.a
Lymph node dissection	None	25(48.07)	3(60)	8(44.44)	14(48.27)	.045
	Central LND	02(3.84)	1(20)	1(5.55)	0	
	LND incl.	25(48.07)	1(20)	9(50)	15(51.72)	
	Lateral levels					

Abbreviation: LND lymph node dissection: n.a., not applicable.

^a Differences tested between the three age groups.

^b Summarized as one variable for statistical testing.

Table II
Surgical Complications

Group	Hypoparathyroidism, n (%)				Recurrent Laryngeal Nerve Injury, n (%)				
	None	Transient	Permanent	Unknown	None	Left	Right	Bilateral	Unknown
All Patients(n=52)	31(59.6)	15(28.85)	2(3.85)	4(7.69)	36(69.2)	3(5.77)	3(5.77)	1(1.92)	9(17.3)
T1-T2(n=33)	21(63.63)	11(33.33)	1(3.03)	0	28(84.84)	1(3.03)	1(3.03)	0	3(9.09)
T3-T4(n=19)	10(52.63)	4(21.05)	1(5.26)	4(21.05)	8(42.1)	2(10.52)	2(10.52)	1(5.26)	6(31.57)
No LND (n=25)	17(68)	7(28)	1(4)	0	19(76)	1(4)	1(4)	0	4(16)
LND(n=21)	10(47.6)	7(33.3)	0	4(19.04)	15(71.4)	2(9.5)	1(4.76)	0	3(14.28)
LND Unknown (n=6)	4(66.66)	1(16.66)	1(16.66)	0	2(33.3)	0	1(16.66)	1(16.66)	2(33.33)

Abbreviation: LND- lymph node dissection (Neck Dissection).

Outcome

At the time of the last evaluation, the survival was 100%. At this time point, 41 patients (78.85%) were disease-free. Outcome is similar in all age groups ($P=0.103$, data not shown). In 11 patients there is persistent disease or recurrence. Four patients (7.7%) have persistent disease, are classified as such based on a detectable Tg level. Six patients (11.54%) developed recurrence within 3.9 to 8 years after initial treatment. Of the five patients who had not been treated with ^{131}I after total thyroidectomy, one (1.9%) developed a recurrence of disease in the neck. Outcome did not differ between patients with PTC and FTC or between the three age groups.

Discussion

The recently proposed ATA risk of recurrence stratification system aimed to define the likelihood of recurrent or persistent disease after initial surgery in pediatric DTC and to identify the patients who would benefit from RAI treatment. In the present study, we demonstrated that the application of risk-stratification systems according to post-operative findings as well as the response to initial therapy, may facilitate predicting the disease course and outcome. The ATA risk-stratification system categorizes pediatric patients into three risk groups according to regional LN and distant metastasis staging

by using the tumor node classification system¹¹. However, it does not encompass all of the tumor characteristics necessary for accurate assessment of the prognosis after the diagnosis of DTC. In young children the relatively small thyroid nodule volume and its changes with age make it an unreliable prognostic criterion¹². The cumulative therapeutic ^{131}I activity during initial treatment and follow-up in our series was relatively high. Given the good survival rate, it can be questioned whether children could just as well be treated with lower therapeutic activities, as suggested by recent guidelines^{7,8}. It is our opinion that the administration of ^{131}I should be considered very carefully in pediatric patients to prevent possible early and late adverse effects^{13,14}. This especially the case in children with low-risk DTC because no benefit of ^{131}I ablation therapy has been shown in adults with low-risk disease¹⁵. High ^{131}I activities should be reserved for children with metastatic disease, as advocated earlier by Verburg et al¹⁶.

Strength and limitations

The major strength of our study is that the entire series was followed up at a single center by the same expert multidisciplinary team from diagnosis to the last visit. Thus all aspects of initial management were quite uniform, including extent of surgery, RAI

treatment, the degree of TSH suppression, and the rigorous surveillance protocol. The main limitations of our study are the relatively small series and relatively short follow-up period making it imperative that we continue to exercise caution and avoid generalizations when dealing with each individual case.

Conclusion

The life expectancy for children with DTC is excellent. However, many patients experience adverse effects from thyroid surgery, resulting in life long complications.

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Original Article

Performance of CT Scan in diagnosis of Sinonasal mass

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Abstract

Objective: To establish CT scan as a sensitive modality in the diagnosis of sinonasal mass by correlating with the findings of histopathological examination.

Methods: This cross sectional study was conducted in Dhaka Medical College Hospital (DMCH) from 01/07/2013 to 30/06/2014. A total of 32 cases were studied.

Results: In this study male and female ratio was 1.4:1. So, the incidence of sinonasal mass slightly higher in male (59.3%) compared to the female (40.6%). Incidence of malignant tumour was found more in age group above 60 years. Out of 32 patients, 6 patients (18.7%) were diagnosed histopathologically as infective, 7 patients (21.8%) were benign and 19 patients (59%) had malignant sinonasal mass.

Conclusion: Computed tomography (CT) scan examination of the sinonasal mass correlate well in most of the cases with histopathological results. It is therefore can be concluded that CT examination of nose and paranasal sinuses is a useful modality in the evaluation of sinonasal mass.

Key words: CT scan, Sinonasal malignancy, nose and paranasal sinus;

Introduction

Plain sinus films do not allow adequate evaluation of the sinonasal masses because of overlapping of structures, resolution and other limitations. So they are inaccurate in high percentage of patients and have been supplemented by CT imaging.¹

The purpose of CT imaging of nose and paranasal sinuses is to confirm the diagnosis, localize the disease, characterize the extent of pathology and describe any anatomical variations.

As a general rule, malignant tumours destroy bone, whereas benign processes cause

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thickening or remodeling of adjacent bone.² Bone changes are depicted better with computed tomography. All malignant tumours may not destroy bone, however the true value of CT scanning is its ability to detect bone erosion.³

Extensions of the tumour into the intracranial cavity, orbit, pterygomaxillary fossa or into the soft tissues of the face is easily demonstrated on CT. The accuracy of CT in determining tumour spread to these areas is on the order of 85%.⁴

In spite of these properties, it is not always possible to distinguish tumour from mucosal oedema secondary to sinus obstruction by the lesion on CT. In addition, CT can not always clearly determine whether the tumour has invaded the periorbita (important for planning need for orbital exenteration).⁵

Methods

It was a cross sectional study. This prospective study was carried out in the department of Radiology and Imaging in collaboration with department of ENT of DMCH, Dhaka, during the period of July 2013 to June 2014. A total of 32 patients were included in this study.

Inclusion criteria:

- Clinically suspected patients of sinonasal growth in all age groups and both sexes.
- Patients suspected as sinonasal growth by plain X-ray.

CT Examination Technique

All CT examination were performed with 64 slice spiral CTscan machine (HITACHI) , both non-contrast and contrast axial scan and coronal reconstruction were performed with following parameters. Patient position: Supine position (axial section), Section thickness: 3mm, Slice interval: 0mm, KVP: 125, mAS: 80-160, Image display: Field of

view: 14cm, Window width: +2000, Window level: -200

Demographic and clinical variables: Age of the patient , Sex of the patient

Clinical features e.g. Nasal blockage, epistaxis, headache, proptosis, eyeache, watering from eye, gradual swelling of face, discharge from eye, pain in the frontal region, neck pain, fever etc.

Imaging variable

CT Scan findings- CT scan diagnosis of different maxillary growth, density of the lesion, site of origin, unilateral or bilateral sinus involvement, character of enhancement of lesion, bone destruction and spread to other organs.

Histopathological comparison

The postoperative resected tissues were examined histopathologically in the respective pathology department and then collected reports were compared with CT scan findings.

Data Collection Procedure

The aims of study were explained to the patients and informed written consent was taken. Data were collected by face to face interview, from history sheet, CT scan and pathological findings of the patients. All the data were recorded in a pre-designed structured data collection sheet.

Data Analysis

All the data were checked and compiled after collection. The data were analyzed with the help of Statistical Package for Social Sciences (SPSS) software programmed. An analysis plan has developed keeping in view with the objectives of the study. For the validity of the study outcome sensitivity, specificity, accuracy, positive and negative predictive values were calculated after

confirmation of histopathological diagnosis. For significance of differences chi-square test were done where applicable. Statistical significance was set at $P < 0.05$ and confidence interval was set at 95% level.

Results

This study included 32 patients who were suspected case of sinonasal mass subsequently confined by CT scan and histopathology.

Age and Sex distribution

The age range from 10 years to 75 years and the mean age (\pm SD) was 35.2 ± 21.3 years in male and 37.0 ± 23.1 years in female. Overall mean age (\pm SD) was 35.94 ± 21.3 years. Highest incidence of found between 10-19 years of age group.

Age group and histopathological relation

Out of 32 patients 13 were below the age group 20 years (40.6%), 7 cases were within 20-40 years age group (21.83%), 4 cases were within 41-60 years age group (12.53%) and 8 patients were above the age group 60 years (25%). Below 20 years out of 13 patients CT diagnosis were 3 were infective, 3 were benign and 6 were malignant mass. Whereas histopathology showed 6 cases were infective, 4 cases were benign and 4 cases were malignant tumour. Within 20-40 years age group out of 7 patients CT scan showed 1 case was infective, 4 cases were benign and 2 cases were malignant mass.

Among 4 cases age within 40-60 years CT diagnosis showed 1 case was infective, 1 case was benign and 2 cases were malignant masses.

Out of 8 patients above 60 years of age, all the 8 cases were diagnosed as malignant masses by both CT and histopathology. Infective and benign lesion in this age group was found zero.

Sex group and histopathological relation

Out of 32 patients 19 were male (59.3%) and 13 were female (40.6%). In this study male and female ratio was 1.4:1. Out of 19 male patients histopathology showed 5 patients positive for infective, 4 patients positive for benign and 10 patients were found malignant lesion.

Out of 13 female patients histopathologically positive- 1 cases were infective, 3 cases were benign and 9 cases were malignant sinonasal growth.

Again out of 19 male patients CT examination revealed that 5 patients were infective, 5 patients were positive for benign and 9 patients were malignant lesion.

Out of 13 female patients CT examination found 2 were infective, 3 cases were benign and 8 cases were malignant sinonasal mass.

Distribution of clinical presentation and histopathological diagnosis:

The most common symptoms associated with sinonasal growth was nasal blockage which was observed in 24 (80%) patients, out of 24 cases 9 were infective, 9 were benign and 6 were malignant lesion. 12 patients (40%) had epistaxis, among them 6 cases were infective, 4 cases were benign and 2 were malignant lesions. Proptosis noted in 9 patients (30%) out of which 2 patients histopathologically proved infective, 3 were benign and 4 were malignant maxillary sinus lesion. Eyeache was in 12 patients (40%) out of which 6 were found infective, 3 were benign and 3 patients were malignant sinonasal mass. Gradual swelling of face in 6 patients (20%), out of which histopathology shows 1 was inflammatory, 1 was benign and 4 were malignant cases. The results of CT scan and histopathological correlation in the following table shows there was significant correlation.

Comparison of CT diagnosis and Histopathological diagnosis:

Out of 32 patients of sinonasal mass 5 patients were diagnosed as infective mass by CT scan whereas histopathology showed 6 cases were infective and 9 patients were diagnosed as benign mass by CT scan whereas histopathological report confirmed that 7 cases were benign and 1 case was infective lesion and 1 malignant lesion. Total 18 patients were diagnosed as malignant tumour by CT scan whereas histopathology showed 19 cases were malignant. Correlation between CT diagnosis and histopathological diagnosis are represented by the following table.

Table-I
Comparison between CT diagnosis and histopathological diagnosis.

	Histopathological diagnosis			Total
	Infective mass	Benign tumour	Malignant tumour	
CT diagnosis				
Infective mass	05	00	00	05
Benign tumour	00	07	02	09
Malignant tumour	01	00	17	18
Total	06	07	19	32

Distribution of sensitivity and specificity of CT scan for sinonasal mass

Table-II
Infective mass.

Diagnostic tool		Histopathology report			Sensitivity	Specificity
		Positive	Negative	Total		
CT Scan	Positive	05	00	05	83.0%	100%
	Negative	01	26	27		
Total		06	26	32		

TP (True positive) = 5, FP (False positive) =0

TN (True negative) =26, FN (False negative) =1

Positive predictive value = 100%, Negative predictive value = 96% Accuracy rate = 96%

A. Infective mass:

Out of 32 patients 5 cases were diagnosed as infective mass by CT scan and confirmed by histopathological examination; they are true positive and 9 cases were diagnosed as benign but among them 1 case was infective; it was false negative. All 5 patients diagnosed by CT scan as infective mass were also diagnosed histopathologically as infective mass, so there was no false positive. 26 patients were found negative by both of CT and histopathology; these 26 were true negative.

B) Benign mass

Out of 32 patients 9 patients were diagnosed as benign mass both by CT. But 7 cases were diagnosed as benign by histopathologically; they are true positive and 2 cases were diagnosed by CT as benign mass but histopathologically it was negative; it was false negative. Among CT positive for benign lesion no case was diagnosed by histopathology as negative so there was no false negative and 23 cases were found negative by both of CT and histopathology. These were true negative and shown in the Table-III.

Table- III
Benign mass

Diagnostic tool		Histopathology report			Sensitivity	Specificity
		Positive	Negative	Total		
CT Scan	Positive	07	02	09	100%	92%
	Negative	00	23	23		
Total		07	25	32		

Positive predictive value = 78%, Negative predictive value = 100%, Accuracy rate = 93.33%

Table-IV
Malignant mass

Diagnostic tool		Histopathology report			Sensitivity	Specificity
		Positive	Negative	Total		
CT Scan	Positive	18	00	18	94%	100 %
	Negative	01	13	14		
Total		19	13	32		

Positive predictive value = 94%, Negative predictive value = 100%, Accuracy rate = 96%

C) Malignant mass

Out of 32 patients 18 cases were positive by both of CT and histopathology; these 18 cases were true positive. No patient was positive by CT but was negative in histopathology; it was false positive. One (1) case was negative by CT but was positive histopathologically i.e. that was false negative. Remaining 13 patients were negative by both of CT and histopathology; they were true negative. The results of CT were correlated with histopathology are given in the following Table-IV.

Discussion

Plain radiograph has limited role in detecting extension and bony involvement of sinonasal lesion.⁶ Besides being expensive, MRI cannot provide detailed information regarding bony destruction or remodeling.⁷ The study was carried out to determine the usefulness of CT scan in the diagnosis of sinonasal mass compared with histopathological study. Most tumours originated in the

maxillary and in the ethmoidal sinus⁸. Sphenoid sinus is divided into right and left parts by a bony septum⁹. Few tumors arise from here.

This cross-sectional study was carried out with the aim to establish the usefulness of the CT scan in preoperative evaluation of sinonasal mass and their histopathological correlation of postoperative resected tissues along with its test of validity by calculating sensitivity, specificity, accuracy and positive predictive value respectively.

In this study concern about the age the highest incidence of disease was found below 20 years of age group (40%) and infective lesion of the maxillary antrum is more common in below 20 years of age. This study also showed malignant tumour most common in the people over 60 years of age. Regarding maxillary antral mass the age range 10-80 years in male and female age range 34 - 75 years.¹⁰ The age range of my study which is almost similar to the study of Hone et al.^{xxx}

In this study 32 patients were divided into 4 group on the basis of age. The age of the subjects in this study was range from 10-74 years. The mean age (\pm SD) was 35.2 \pm 21.3 years in male and 37.0 \pm 23.1 years in female. Overall mean age (\pm SD) was 35.94 \pm 21.3 years.

The highest incidence of disease was found in between 10-19 years of age group (40%) and lowest in between 41-60 years (13.33%). The infective lesions of the nose and paranasal sinuses are more common in the age group below 20 years. Malignant lesions were found more common over 60 years of age.

Out of 32 patients, symptoms included nasal blockage (80%), epistaxis (40%), proptosis (30%), eyeache (40%) and gradual facial swelling (20%). According to the Hone et al. (1995) commonest presentation of sinonasal mass where nasal obstruction, epistaxis facial swelling which is similar to this study.

Concern about the sex, out of 19 male patients 5 had infective mass, 4 were benign tumour and rest 10 patients had malignant mass in the paranasal sinuses. On the contrary out of 13 female patient's histopathological reports evident that 2 were infective, 3 cases were benign and 8 patients were malignant sinonasal mass. In this study male patient preponderance with maxillary growth 60% than those of female patients 40%. Whereas other study identified 40 patients with malignant tumour and there were 30 male and 13 female and my study showed 19 were male and 13 were female which has similarity to my study.¹⁰

In this study it was found that 32 patients with malignant tumours³. There were 19 males, mean age 50 years range (10-80 years) and 13 females, mean age 59 years, range (34-75 years). Commonest presentations were nasal obstruction,

epistaxis, eyeache, proptosis and facial swelling. The maxilla was the site of origin in 18 patients.

In case of infective mass, our study showed sensitivity 83%, specificity 100%, positive predictive value 100%, negative predictive value 96% and accuracy 96% study showed sensitivity 100%, specificity 95.83%, positive predictive value 85.71% and negative predictive value 100%, accuracy 96.6% in case of infective lesion in the nose and paranasal sinuses, which is similar to my study.¹⁰

In case of benign mass, my study showed sensitivity 100%, specificity 92%, positive predictive value 78%, negative predictive value 100% and accuracy is 93%. This study showed sensitivity 85.5%, specificity 95.45%, positive predictive value 87.5%, negative predictive value 95.45% and accuracy 93.3%, which is similar to my study.¹⁰

In the malignant mass, my study showed sensitivity 94%, specificity 100%, positive predictive value 94%, negative predictive value 100% and accuracy 96%. Hone et al (1995) showed, Sensitivity 87.5%, specificity 92.86%, positive predictive value 93.33% and negative predictive value 86.67% and accuracy 90% which is similar to my study.

The correlation between CT scan and histopathology in patients with sinonasal mass was observed in this study, p value is based on Chi-square test which reveals significant correlation between the two modalities.

Summary

Computed tomography (CT) scan is very effective and sensitive diagnostic imaging modality in the diagnosis and evaluation of sinonasal mass.

- Out of 32 patients, 6 patients (18.7%) were diagnosed histopathologically as

infective, 7 patients (21.8%) were benign and 19 patients (59%) had malignant sinonasal mass.

- The validity of CT scan in case of infective mass of the sinonasal area by calculating sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 83%, 100%, 100%, 96%, 96% respectively.
 - The validity of CT scan in case of benign tumour by calculating sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 100%, 92%, 78%, 100% and 93% respectively.
 - Similarly the validity of CT scan were studied in case of malignant lesion by calculating sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 94%, 100%, 94%, 100%, 96% respectively.
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Conclusion

Computed tomography (CT) scan of the sinonasal mass correlate well in most of the cases with histopathological results. It is therefore can be concluded that CT examination of nose and paranasal sinus is a useful modality in the evaluation of sinonasal mass.

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Original Article

Pharyngocutaneous Fistula- Frequency and Risk Factors

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Abstract

Setting: Study was conducted in the Department of Otolaryngology and Head-Neck surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh from 2006 to 2017.

Objectives: To find out the frequency, risk factors, and its effect on the management of pharyngocutaneous fistula (PCF).

Methods: Observational, Cross Sectional study. Number of laryngectomized patients 249.

Results: Total PCF developed 48 (19.27%). Irradiated patients with multiple co-morbidities had more chance to develop PCF.

Conclusion: High incidence of pharyngocutaneous fistula mostly due to advanced stage of disease, various levels of surgical expertise and post irradiated patients with multiple comorbidities.

Key Words: Pharyngocutaneous Fistula (PCF), Laryngectomy, Pectoralis Major Myocutaneous Flap (PMMC)

Introduction

Pharyngocutaneous Fistula (PCF) is the communication between the pharynx and cervical skin around the surgical incision or,

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less commonly in the stoma of the tracheostomy.¹

Head and neck cancers account for approximately 4% of all cancers in the United States. These cancers are more than twice as common among men as they are among women. Head and neck cancers are also diagnosed more often among people over age 50 than they are among younger people².

Researchers estimated that more than 65,000 men and women in this country would be diagnosed with head and neck cancers in 2017 Carcinoma Larynx is the one of the important components of Head- Neck Cancer. Total Laryngectomy still the treatment of choice for the advanced laryngeal cancer.

High frequency also observed in Bangladesh.

This is a type of salivary fistula. The salivary amylase of this fistula may cause injury to neck vessels and injury to major neck vessels may leads to catastrophic complication like carotid blowout.

As long as Pharyngocutaneous fistula is there, patients need to feed through Nasogastric feeding tube. Maintenance of Nasogastric tube and feeding through it for longer period is troublesome for patient, family and physician.

Most of the Pharyngocutaneous fistulas are usually healed spontaneously by giving careful conservative treatment. Primary patients without radiotherapy heals early. But in irradiated patients take longer time to heal. Healing also disturbed by comorbidities of patient. Positive margins are very notorious for fistula formation. Anaemia, hypoalbuminemia, electrolyte imbalances are commoner comorbidities. Hypothyroidism is also common in postirradiated patients. Blood transfusion may give very good outcome in selected patients.

Surgery also required for some patient when Pharyngocutaneous fistulas not healed spontaneously. Repaired with Deltopectoral flap or Pectoralis major myocutaneous flap usually required. Free flap can also be used for surgical repair.

A very systematic comprehensive management is required to prevent Pharyngocutaneous fistula and to treat Pharyngocutaneous fistula.

Pharyngocutaneous fistula is the most common debilitating complication after total laryngectomy. This complication rarely may arise from extensive Thyroid Surgery for very advanced Thyroid disease with extrathyroid

extension. Pharyngocutaneous fistula (PCF) may also develop as a sequel of long term complication of tracheostomy.³

Survey for Pharyngocutaneous fistula (PCF) should be done meticulously. Suspicion of development of Pharyngocutaneous fistula (PCF) was suspected by detection of its atypical smell from wound which is developed by necrosis and putrefaction of organic materials. It is manifested by local erythema, wound swelling or increased neck drain output. Local temperature is usually raised. Wound Amylase concentration is higher in biochemical study. Radiological assessment was done by fistulogram/CT fistulogram.

It appears around 4th to 10th postoperative day.

The reported incidence of PCF is widely varied, from 3.6 to 65%.⁴

Pharyngocutaneous fistula leads to increased morbidity, delay in starting subsequent treatment, prolong hospitalization and raised treatment costs.

Objectives

To find out the frequency and risk factors pharyngocutaneous fistula (PCF).

To learn the preventive strategy and other techniques to avoid PCF

Methods

This is an Observational, Cross- Sectional study which is conducted in the Department of Otolaryngology and Head-Neck surgery of Bangabandhu Sheikh Mujib Medical University (BSMMU), Duration of study was 12 years, from 2006 to 2017.

All patients treated with Total laryngectomy for advanced laryngeal carcinoma and Total Thyroidectomy for advanced thyroid disease with extrathyroidal extension has been included in this study. Patients with thyroid

disease but no extrathyroidal extension was excluded from this study

Variables

Variables are usually categorized into modifiable, possibly modifiable, non-modifiable groups by many experts.

Modifiable- Surgical technique, Positive margin, Reconstruction, smoking, alcoholism

Possibly modifiable- Perioperative Anaemia, Hypo-albuminaemia, Hypothyroidism, Electrolyte Imbalance

Non modifiable-Radiotherapy, Tracheostomy, Tumour Stage, Age, Sex, Tumour site and subsites, Neck dissection, Co-morbidity-DM, COPD, IHD, CKD.

Results

All patients with total Laryngectomy for advanced laryngeal carcinoma and Total Thyroidectomy for advanced thyroid disease with extra- thyroidal extension has been studied in the time period. Total number of patient-249. Total PCF developed-48(19.277%)

Table I
Non Modifiable Variable

Non-Modifiable Variables		
Age	18 (<55 yrs)	30 (>55 yrs)
Sex	36 male	12 Female
Radiotherapy (RT)	28 with RT	20 without RT
Tracheostomy	30 with Tracheostomy	18 without Tracheostomy
Tumour site	Supraglottis-26, Glottis-12	Medial wall of Pyriform fossa-5
	Subglottis-2	Thyroid-3
Tumour Stage of Larynx and Hypopharynx	T ₄ -39	T ₃ -9
Neck Dissection	Comprehensive-26	Selective-22
Co-morbidities	41with Co-morbidities	7-without Co-morbidities

Table II
Possibly Modifiable Variables

Possibly Modifiable	Present	Absent
Anaemia	19	29
Hypoalbuminaemia	10	38
Hypothyroidism	18	30
Electrolyte imbalance	6	42

Table III
Modifiable Variables

Modifiable Variable	Yes	No
T-closure	5	-
I-closure	43	-
Positive margin	7	42
PMMC in RT patient	15	33
Smoking	42	6
Alcoholism	5	43

Discussion

Total number of patients studied in this period of 12 (twelve) years (2006-2017) of time which was 249, total PCF developed in 48 patients. This is 19.277% in this series. The reported incidence in various publications are widely ranged. It is about 3.6% to 65%. It varies from centre to centre. Top ranking Head-Neck Cancer Centre showed their Post laryngectomy PCF rate is very low.²

Appearance of PCF from 4th to 10th postoperative day. Some centre reports that commonly it is one or two days earlier or later, which is almost similar to our study.^{2,3}

Patients older than 55 years were associated with poor healing. Age related cut off point, here 55 years has been determined in ATA

guideline, though it is thyroid based.³ In laryngeal malignancy there is no age related cut off point in guidelines. Usually after 40 years, all organs function decreases 1% by a year. So it is pertinent that in old age decreasing the capabilities to heal.⁴

Male are more affected than female. In this study, male patients are more. Male are more smoker which leads to non-healing wound. Females are also sufferer of PCF. As because in our country females are usual victim of anaemia and hypoalbuminaemia.^{5,6}

Patients with the history of smoking have developed PCF. Probably, poor healing due to impairment of oxygen carrying capacity by haemoglobin in smoker.⁷ Operation related complications are more in smoker. In this study, 42 PCF participants were smoker. This reflects the common etiological association of carcinoma larynx.

Patients with the history of alcoholism more prone to PCF which is attributable to longer time to heal in alcoholics.^{3, 8} 5 alcoholics were present among 48 participants in this study. It reflects the pattern of personal habit in the community.

41 participants were suffering from co morbidities. Diabetes delays healing capacity and more prone to infection. So, diabetic patients are more sufferer of PCF formation.⁹

Out of 48 PCF participants 28 patients was irradiated and 20 patients was primary. Radiation are usually associated with PCF formation. This findings are common in other studies also. Radiotherapy causes various types of local and systemic changes in irradiated patients. It reduces vascularity by periarteritis, endarteritis and fibrosis. It reduces immunity. Which all are related with fistula formation.¹⁰

19 participants were anaemic and 10 patients were suffering from hypoalbuminaemia. Though anaemia may be corrected

preoperatively by blood transfusion, there is not usual recommendation to infuse albumin preoperatively. Optimum haemoglobin and albumin level are essential for wound healing. So, anaemia disturbs healing, Hypoalbumineamia interrupts healing. Low BMI patients more related with PCF formation.^{8,11}

Any sort of metabolic disorder has detrimental effects on healing. In this series 18 participants were suffering from Hypothyroidism. It delays healing, which leads to PCF formation.⁹

6 patients were suffering from electrolyte imbalance. It is associated with fistula formation. It has negative impact on wound healing.

Cardiorespiratory status and renal status has delays healing.¹⁰

Presence of combination of multiple comorbidities in Laryngectomy patient usually leads to PCF formation. 7 patients were suffering from multiple comorbidities.

In this series, most of participants were in advanced stage. In our socio-economic setup, patients usually presents with advanced stage of disease. In any disease, early stage management very effective, curative. In advanced stage surgery, difficult to achieve clear margin excision. Effective reconstructions are also troublesome in limited resource centre after surgery. So, more advanced tumour, more chance of fistula formation and recurrence.¹²

Usually medial wall pyriform fossa lesion were included in this study. Pyriform fossa are more related with fistula formation. Probably this is due to that this sites are more prone to tumour dissemination. In Trachiestomised patient more chance of fistula formation. Longer preoperative time for laryngectomy after tracheostomy more chance of fistula formation.¹³

Gastro-oesophageal reflux disease (GORD) has negative impact on wound healing after upper aerodigestive tract surgery.¹⁴

Time of oral feeding is an important issue. One week is the optimum time to start oral feeding in primary cases and 2 weeks is the optimum time for postirradiated patients in our setup. Too early oral feeding related to more PCF formation.¹⁵

Surgical technique is an important issue in PCF formation. Meticulous surgical technique is essential for good outcome, good healing. Positive surgical margin is the most important determinant for fistula formation and non-healing tendency.^{12, 16}

Type of closure of neopharynx may be related with proper healing i.e. PCF formation. In this series, I-type closure were mostly done, which was 43 out of 48. In irradiated patients, Pectoralis Major Myocutaneous Flap (PMMC) usually uses to prevent PCF formation.¹⁷ In this series, in 15 patients with PMMC were developed PCF. In initial period of this series, this concepts of use of PMMC during laryngectomy in irradiated patients was not adopted. Some patients developed fistula in spite of using PMMC. The development of PCF with PMMC may be multifactorial.^{18, 19.}

Conclusion

Postlaryngectomy pharyngocutaneous fistula is one of the commonest morbidity after major Head-Neck Surgery. High occurrence of pharyngocutaneous fistula mostly due to advanced stage of disease, various levels of surgical expertise and post irradiated patients with multiple comorbidities. Some of this may be preventable by taking adequate measure.

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Original Article

Study of Recurrent Laryngeal Nerve Paralysis Following Thyroidectomy

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Introduction

Goitre is a common thyroid disease in most part of the world. Among different etiology, colloid nodule, multinodular goitre, benign thyroid cyst, papillary carcinoma, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, lymphoma are most common.¹ On the basis of histopathological report, among benign goitre nodular colloid goitre was 52%, follicular adenoma was 24% and auto-immune thyroiditis was 6% and among the malignancies papillary carcinoma was 66.66%, follicular carcinoma was 22.22% and anaplastic carcinoma was 11.11%.^{2,20} Thyroidectomy is widely practiced surgical procedures to treat different type of thyroid disorder and considered as a safe procedure in well

equipped center. There are some complications following thyroid surgery can be life threatening.^{2,3} Complications such as bleeding, hypoparathyroidism and Recurrent Laryngeal Nerve Injury (RLNI) represent nearly half of all the complications of thyroid surgery.^{4,15}

One of the most feared complications of thyroid surgery is the recurrent laryngeal nerve (RLN) injury.^{4,15} RLN injury results from severing, clamping or stretching of the nerve due to inadequate anatomical knowledge, lack of surgical skill and experience, distorted anatomy as in cancer and large multinodular goiter.⁵

Review of literature revealed that the prevalence of RLN palsy varies from centre to centre depending upon the level of experience in thyroid surgery and nature of surgery.⁶ The exact incidence of recurrent laryngeal nerve injury varies widely.⁷ There is some controversy in whether the identification of RLN during surgical procedure will affect the incidence of nerve damage or not.⁵

Nerve identification has decreased the rate of nerve injury during thyroidectomy.^{8,20} In order to improve our quality of thyroid surgery we have undertaken a study using Recurrent nerve visualization technique to determine the incidence of RLN injury in our practice.

Methods

This was a cross sectional study done in Bangabandhu Sheikh Muzib Medical

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University (BSMMU) in the dept. of Otolaryngology during the period from July 2015 to June 2017. All adult patients irrespective of age and sex that were treated surgically by total or hemi thyroidectomy were enrolled into this study after taking informed written consent. Patient with previous thyroid surgery were excluded from this study. Thyroid gland status and pre operative diagnosis was done clinically, biochemically and histopathologically by fine needle aspiration cytology (FNAC). All surgical procedures were under taken by same surgical team in BSMMU.

Data collection done by predesigned questionnaire. All surgical procedure performed during the period of study were evaluated and post operative different variant of recurrent laryngeal nerve palsy were recorded.

Data analysis was performed by using SPSS version 21.

Results

This study included 60 cases among which 20 (33.33%) were male and 40 (66.66%) were female with male to female ratio of 1:2. Mean age was 45.5 yrs. with standard deviation was 8.5 yrs. There were different indications of thyroid surgery are multi nodular goiter (50%), solitary thyroid nodule(25%), carcinoma thyroid gland(25%). Some were treated by total thyroidectomy (45) and some were treated by hemithyroidectomy (15).

Table-I
Distribution of age and sex

Patients characteristics (n=60)	
Age (mean+SD)	45.5+7.5
Sex (m/F)	20/40

Table -II
Different type of surgery

Type of surgery	Number
Total thyroidectomy	45
Hemithyroidectomy	15

Table -III
Different thyroid disorders

Indication	Frequency	Percent
Multi nodular goitre (MNG)	30	50%
Carcinoma of thyroid gland	15	25%
Solitary thyroid nodule	15	25%

Table -IV
Types of RLN paralysis

Type	Number
Temporary paralysis	2
Permanent paralysis	0

Identification of rec. laryngeal nerve was done in all cases (100%). Variation of RLN were not found in this study. The overall frequency of RLN injury was unilateral especially in rt. side and found in 2 cases (3.33%). It was confirmed by Fiber optic laryngoscopy(FOL). In both cases, paralysis was temporary because those patients developed full functions of paralyzed vocal cord after having conservative treatment for six weeks.

Discussion

There are many post-operative complications of thyroidectomy, among which RLN injury is are of the most frequent. In most of the cases, it cannot be recognized during surgery.

In our study, overall frequency of RLN injury was found to be 3.33% in 2 cases. Injury was noticed immediately after operation by

developing change of voice especially in those patients who underwent total thyroidectomy for ca. thyroid. It was confirmed by Fiber optic laryngoscopy(FOL). In both cases, paralysis was temporary because those patients developed full functions of paralyzed vocal cord after having conservative treatment for six weeks.

In the study of outcomes and complication of thyroid surgery among Sudanese patient, among 1351 thyroidectomies, Saadeldin A. Idris et al. of observed incidence of rec. laryngeal nerve injury was 1.9 (26 cases) of which the incidence of transient unilateral RLN paralysis was 1.2%. Permanent RLA paralysis was 0.5%, transient bilateral RLN palsy was 0.2 %.²

Wagner et al. have shown in their study over 1026 patient that the incidence of transient and permanent RLN paralysis was 5.9% and 2.4% respectively.⁷

Jatzko et al shown in their study over 803 patients that incidence of transient and permanent RLN paralysis was 3.6% and 0.5% respectively.⁸

Sosa et al have shown in their study over 5860 cases that incidence of permanent RLN paralysis was 0.8% and they did not record any transient RLN palsy.⁹

Rosato et al shown their study over 14.93 in their longitudinal analysis of multi centric study that incidence of transient and permanent RLN palsy was 2.0% and 1.0% respectively.¹

Goncalves et al shown in their study over 1020 patient that incidence of transient and permanent RLN palsy was 1.4% and 0.4% respectively.¹⁰

Mishra et al shown in their study that incidence of RLN injuries were ranging between 0.0% - 13%.¹¹

Jamski J et al had shown in their study on recurrent laryngeal nerve injury following thyroid surgery over 2323 cases from 1994 to 1997 that post operative RLN palsy of different grade was 8.9% among which 1.7% was permanent.

Jung H et al studied over 909 cases on recurrent laryngeal nerve paralysis after thyroidectomy and they shown 92.6% benign goiter and that post operative RLN palsy was 1.7% which was permanent.¹³

Hazem M.Zakaria et al had shown in their study on recurrent laryngeal nerve injury in thyroid surgery over 340 cases from 1990 to 2005 in King Fahd Hospital that post operative unilateral RLN palsy was 3.2% among which 0.3% was permanent and that post operative bilateral RLN palsy was 0.58% and all were transient.¹⁵

Alimoglu O et al studied over 581 cases on recurrent laryngeal nerve paralysis after thyroid surgery and shown female(79%) predominated over male(21%). They also shown 29 patients developed that post operative RLN palsy and among which 5 patient developed permanent palsy.¹⁴

Jesus Herrenz Gonzalez et al studied on complications following thyroid surgery over 335 patients and shown 2.3% unilateral palsy.¹⁷

MD Michel B.Flynn et al had shown in their study on local complication after surgical resection for thyroid carcinoma, 1% RLN palsy over 91 patient .¹⁸

Saadeldin A. Idris et al studied over 82 cases on recurrent laryngeal nerve injury during thyroid surgery and shown female(84.15%) predominated over male(15.85%) and overall frequency of RLN injury was 1.2%.¹⁹

Some factors like extension disease, extension of surgery, surgeons experience, amount of per operative bleeding, use of

diathermy can influence the injury to recurrent laryngeal nerve.¹⁹

Conclusion

This study proved that surgical exposure of RLN, prevent unwanted trauma to nerve and thereby reduce incidence of vocal cord paralysis. So, we advocate for routine identification and dissection of RLN to reduce its injury to a minimum.

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