Lateral rhinotomy – revisited

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Abstract

The lateral rhinotomy approach is one of the most commonly used techniques for exploration of the difficult sinonasal masses. Though endoscopic advances have progressed rapidly since last few years, but the excellent exposure provided by the lateral rhinotomy approach makes it suitable for resection of sinonasal masses with extensive spread. Our study is an attempt to establish the different spectra of pathologies encountered in the sinonasal region, which were removed by the lateral rhinotomy approach and to establish its importance in the context of modern rhinological surgeries.

Keywords Sinonasal mass · Lateral rhinotomy

Introduction

The effectiveness of surgery for diseases of the paranasal sinuses has been established since many years, but only those techniques have proved to be effective that has withstood the test of time. Lateral rhinotomy approach is one such technique that has been popularized by rhinologists since last century. It is originally ascribed to Moure, who described it in 1902, however this was first described in 1848 by Michaux [1]. Various modifications of the lateral rhinotomy approach are mentioned in literature like the lip splitting or the glabellar extension. Though recently endoscopic sinus surgery had been used extensively for removal of sinonasal pathologies, but the role of lateral rhinotomy approach can never be undermined because of the exposure it provides.

We present here our experience of 25 cases of sinonasal and nasopharyngeal pathologies with varying degree of extensions that has been removed by lateral rhinotomy approach.

Aims and objectives

The principal aims and objectives of our study were:

- a) Clinicopathological study of various sinonasal masses removed by lateral rhinotomy approach
- b) To establish the importance of lateral rhinotomy approach in contemporary rhinological surgeries

Materials and methods

The study was conducted in the department of Otorhinolaryngology and Head and Neck surgery at Calcutta National Medical College and Hospital, Kolkata between March 2004 to October 2006. 25 patients were included in the study of which 16 patients were males and 9 patients were females. The age range was between 5 years to 58 years with the median age of presentation being 28 years.

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The patients presented with variable manifestations like nasal obstruction, epistaxis, blood stained nasal discharge, swelling in the faciomaxillary region, epiphora, proptosis and diplopia.

History was taken regarding the mode of onset, progression of symptoms, duration, any aggravating factors if present or any other relevant associated symptoms.

After meticulous history taking, each of the patients were subjected to clinical examination following a standard protocol. The mass, if externally visible was examined for its shape, size, surface, consistency, tenderness or any evidence of sinus. This was accompanied by examination of nasal cavity using anterior rhinoscopy, posterior rhinoscopy and rigid 0° nasal endoscopy.

The investigation protocol that we followed comprised of:

- Routine haematological and biochemical evaluation.
- Radio imaging by X ray PNS (OM view), CT scan with contrast of the nose and paranasal sinus region and MRI with Gadolinium contrast whenever indicated.
- Histopathological evaluation was done routinely by taking biopsy under endoscopic guidance except in those cases where history and clinical examination suggested juvenile nasopharyngeal angiofibroma. Considering the possibility of fungal granuloma, few specimens were sent in normal saline/ KOH for fungal stains.

Provisional diagnosis was made by compiling the data of clinical examination, radiological evaluation and histopathological examination. This was followed by surgical excision of the mass following the lateral rhinotomy approach.

The operations were done under general hypotensive anesthesia with orotracheal intubation. The patients were placed in 15° head up position. After antiseptic dressing and draping, eyes were protected by temporary tarsorrhaphy. The incision was made midway between medial canthus and bridge of the nose at the upper border of the pupil. It was extended down the nasomaxillary groove to reach upto the level of ala and extended upto the columella. After securing appropriate hemostasis, the nasal mucosa was incised and part of the bony pyriform aperture was removed as required. The mass was identified and its extensions delineated. This was followed by dissecting the plane between the tumour and the bones. The mass was removed either en masse where possible or in pieces. The wound was closed in layers with 3/0 vicryl and 3/0 monofilament silk. ANS packing in all cases and PNS packing wherever required was done, which was removed after 48–72 hours.

The mass after surgical excision was sent for histopathological evaluation and immunohistochemistry whenever needed. Subsequently the final diagnosis was made.

Most of the patients had asymptomatic convalescence in the immediate post operative period. Follow up was done after 2 weeks, 1 month, 2 months, 6 months and 1 year to assess long term complications if any. There was no evidence of recurrence in any of the cases.

Results and analysis

The outcome of our study can be analyzed with respect to various parameters.

Out of 25 patients submitted to our study, 16 were males and 9 were females. Most of the patients were in the age group of 20 – 30 years (40%), followed by 30 – 40 years and 40 – 50 years (20% each). The overall age distribution of our study is mentioned below (Table 1). Most of the patients belonged to the low socio economic background, mainly from the rural district belt (21 patients) and merely 4 patients belonged to the urban areas.

Nasal obstruction was the commonest symptom (100%) followed by epistaxis (80%) and nasal discharge (68%). The symptomatology is depicted in the following table. (Table 2)

After removal of the mass by the operative intervention as mentioned previously, the mass was sent for histopathological examination and if required immunohistochemistry was done.

The grand chart of the final diagnosis is further divided into neoplastic and non neoplastic groups. The neoplastic group is further divided into tumours of vascular origin, fibro osseous origin, epithelial origin and neurogenic origin. Inflammatory pathologies were not considered, as the lateral rhinotomy approach could not be justified in those cases. (Table 3 and Pie chart)

Significant per operative haemorrhage was encountered specifically in cases of juvenile nasopharyngeal angiofibroma. However, no other complications were encountered in the immediate post operative period, but we did encounter some important complications worth mentioning in the late post operative follow up.

Pie chart showing various pathological entities

1- Fungal granuloma 2- Vascular lesions. 3- Fibro osseous lesions. 4- Epithelial lesions 5- Neurogenic Lesions

Table 1

Age group(in years)	No of pts	males	females	Rural / urban
0–10	1	1	0	1/0
10–20	3	2	1	3/0
20–30	10	6	4	8/2
30–40	5	4	1	4/1
40–50	5	3	2	4/1
50–60	1	0	1	1/0
Total	n= 25	16	9	21/4

Table 2

Symptoms	No of cases (n=25)	(%)
Nasal obstruction	25	100
Epistaxis	20	80
Nasal discharge (blood stained)	17	68
Facio-maxillary swelling	12	48
Proptosis and diplopia	6	24
Epiphora	2	8

Table 3

Neoplastic / non neoplastic	Cell of origin	Histopathology	No of cases(n=25)	(%)
Non neoplastic	Fungal granuloma	–	5	20
Neoplastic	Vascular	Angiofibroma	9	36
		Hemangiopericytoma	1	4
	Fibro osseous	Fibrous dysplasia	2	8
		Ossifying fibroma	1	4
	Epithelial	Inverted papilloma	3	12
		Adenoid cystic ca	1	4
		Adenocarcinoma	2	8
	Neurogenic	Neurofibroma	1	4

Nasal crusting (three cases) and facial paraesthesia (three cases) were the most common complications. Epiphora was encountered in two cases and ugly scar was noted in one case only. The various complications are summarized as follows.

Discussion

Sinonasal masses are known for their notorious behavior and subtle clinical manifestations. Unfortunately, these are also the disease entities very often encountered by the otolaryngologists. Our aim was to study the clinicopathological behavior of various sinonasal masses and to establish the efficacy of the lateral rhinotomy approach in contemporary rhinological surgeries.

To begin with, among the non malignant cases, fungal mass was encountered in 5 cases. The disease commonly affects patients with a poor immune status or with metabolic disease like diabetes mellitus. The clinical features and the radiological findings may mimic malignancy and a high

degree of clinical suspicion is required to arrive at a provisional diagnosis (Fig. 1). Complete removal of the mass followed by systemic antifungal therapy was the suitable treatment advocated in each case.

Benign tumours of vascular origin were the most common tumours encountered in our study. Both benign and malignant variants were encountered. Juvenile nasopharyngeal angiofibroma was most common, accounting for 36% of cases. Among the malignant variants, hemangiopericytoma was encountered in a single case accounting for 4 % of the cases.

Nasopharyngeal angiofibroma is a fairly common benign vascular neoplasm to be encountered in our country, with an incidence definitely higher than that reported in the western countries [2, 3].

This tumour, originating from the periosteum of the vault of nasopharynx, predominantly affects the male adolescents in the age range of 7–21 years or 7–29 years as reported in various series [4, 5, 6]. In our series the average age of

Fig. 1 CT scan of nose and paranasal sinus (with contrast) in axial plane showing heterogeneously enhancing mass causing destruction of the medial wall of maxillary antrum, anterior extension in the nasal cavity and posterior extension into the nasopharynx, suggestive of fungal granuloma.

Fig. 2 CT scan of nose and paranasal sinus (with contrast) in axial plane showing heterogeneously enhancing lesion in the left pterygopalatine fossa with anterior bowing of posterior wall of maxillary antrum suggestive of Holman-Miller sign in Juvenile nasopharyngeal angiofibroma.

Fig. 3 Clinical photograph of a 9 year old child clinically diagnosed with sino nasal mass of left side.

Fig. 4 CT scan of nose and paranasal sinus (with contrast) in axial plane showing hyperdense mass causing expansion and deformity of both the maxillary antrum with left side involved more than the right side- suggestive of fibro osseous lesion.

presentation was 16.8 years which correlates with the epidemiological pattern of the disease. Out of 9 cases of JNA, 3 (33.3%) were revision cases. Transpalatal approach was used in all these three cases, but subsequently the patient had recurrence after 6–8 months of primary surgery (mean – 7.3 months). In 3 cases, there was significant extension into the pterygopalatine fossa with further encroachment into the infratemporal fossa through the pterygomaxillary fissure (Fig. 2). Lateral rhinotomy approach was well justified in all these cases due to the excellent exposure it provides. In a similar study done by Mehra et al in 1989, transpalatal rhinotomy was accompanied by lateral rhinotomy in three out of twenty two cases. This approach was done in the cases where the tumour had extended into the nasal cavity, ethmoids, maxillary antrum, cheek and medial half of orbit. [7] None of the cases had any recurrence even after 1 year of follow up.

The single case of hemangiopericytoma in our study is also worth mentioning. The patient was diagnosed as adult onset hypophosphatemic osteomalacia until he was referred to the ENT OPD with epistaxis. Massive extension of the mass demanded removal by the lateral rhinotomy approach. Post operative excision biopsy was suggestive of sinonasal haemangiopericytoma. The final diagnosis of oncogenic hypophosphatemic osteomalacia due to sinonasal haemangiopericytoma was thus made. Histologically, there is perivascular hyalinization reflecting the presumed origin in the pericyte. [8] Vimentin and CD 34 are important immunohistochemical markers. [1] It is not clear why

the sinonasal haemangiopericytoma has a lower metastatic potential than other axial skeletal lesions having more sarcomatous behaviour. [1] Hence this particular case in our study needs mention due to its utmost rarity.

Fibro osseous lesions of the sinonasal tract include variety of neoplastic and non neoplastic entities. Fibrous dysplasia, ossifying fibroma and cementifying fibroma occur with special predilection in the sinonasal region. In our series, we encountered 3 such cases, comprising of 12 % of the series. One of the patient was a 4-year-old child, confirmed histopathologically as ossifying fibroma Wenig et al in a series as published in 1995 reported the youngest age as 5 years, though cases were also mentioned belonging to the fourth and sixth decade [9]. Fibrous dysplasia, on the other hand, is a poorly demarcated osseous expansion covered by a thin piece of bones (Fig. 3 & Fig. 4). Both the patients in our series, diagnosed as fibrous dysplasia, were young males in the second decade, which correlates with the epidemiology of the age incidence. Fu YS, Perzin KH in 1974 and Damjanov et al in 1978 suggested that aggressive growth and the tendency to recur is age related and usually occurs in the younger age group. [10,11]

Inverted papilloma, also called transitional cell papilloma was encountered in 3 cases in our series. It is a unique neoplasm characterized by its tendency to destroy bone, recurrence after removal and association with malignancy. The male: female ratio is 3:1 to 10:1 in various series with peak age incidence in the sixth decade. Lyngdoh et al re-

ported mean age of 52.3 years with M:F ratio of 3.3:1. [12] All the patients in our series were males in the late 4th and 5th decade. Intact basement membrane with microcyst was the characteristic histopathological finding [1]. Malignant transformation was not noted in any of the cases in one year of follow up.

Two cases of adenocarcinoma and one case of adenoid cystic carcinoma was encountered in our series. Adenocarcinoma have an epidemiological association with hardwood industry, furniture making and leather work [13]. Histologically, they are best classified as low grade and high grade. The high grade carries a dismal prognosis in contrast to the low grade, which is eminently curable in 90 % of the patients [14].

Our cases were low grade malignancies with the expected epidemiological pattern of age and sex.

Adenoid cystic carcinoma occur with almost the same frequency as adenocarcinoma. These tumours may show neural invasion and are more likely to express distant metastasis than regional metastasis, although the most likely cause of death is relentless local invasion at the skull base [15].

We encountered a single case of neurofibroma in our series. Though neurofibroma of the head neck region is not uncommon, but neurofibroma arising from the paranasal sinus is a very rare entity mentioned in the medical literature. [16] Perzin et al examined 6 cases of neurofibroma, 2 cases of neurilemmoma and 4 cases of malignant schwannoma in his reported series of 4300 specimens which highlights the rarity of these tumours [17].

After discussion of the various clinicopathological aspects of the disease entities we encountered, a brief description of the complications is worth mentioning.

In our series, the overall complication rate was 36%. Excessive nasal crusting and facial paresthesia were the most common complications encountered (3 cases each); followed by epiphora and ugly scarring (2 cases and 1 case respectively). Delank et al reported an overall complication rate of 38.7% in his series with endonasal crusting, hyposaesthesia, olfactory dysfunction and epiphora being the predominant complications [18]. In another series by Hussain et al, a modification of the lateral rhinotomy approach was mentioned that takes account of the nasal aesthetic subunits by placing the incision between the dorsal and side wall nasal subunits with inferior extension along the alar groove [19]. This modification provided a better cosmetic outcome with no complain related to the incision being recorded. The lateral rhinotomy procedure, while known to interrupt nasal valve supports, has not been previously reported to adversely affect nasal airway function. This appears to be the result of concomitant resection of the functionally dominant inferior turbinate [20].

Lateral rhinotomy approach gives an excellent exposure of not only the nasal cavity, nasopharynx, and the maxillary- ethmoid region, but also the skull base, pterygopalatine fossa and infratemporal fossa. Tumours of the

sinonasal region may vary from a benign nasopharyngeal angiofibroma to high grade malignancies. Entities like nasopharyngeal angiofibroma do not destroy the bone but spread by distortion and displacement of the bony segments and hence needs adequate exposure for removal. We do believe that lateral rhinotomy approach provides an excellent exposure and hence eases the surgeon's job. Though the endoscopic sinus surgery is more cosmetic, but exposure provided by the same cannot match the lateral rhinotomy approach. Moreover, approach to the pterygopalatine fossa and the infratemporal fossa is virtually impossible by the endoscopic route.

Thus considering the results, neither the rate of complications nor the cosmetic outcome is critical. Moreover, the benefits of this approach definitely outweigh the disadvantages. Hence, the lateral rhinotomy approach is one of the most potent armamentarium for an otorhinolaryngologist to enter into the difficult terrain of sinonasal region.

Conclusion

Literature encompassing the various clinicopathological entities removed by the lateral rhinotomy approach are rare and few. We have attempted to highlight the benefit of the lateral rhinotomy approach in removing the sinonasal and nasopharyngeal masses. A brief description of the various pathological entities as well as the complications we encountered in our study have also been mentioned. Larger lesions and spread of the tumour beyond the confines of certain anatomical areas may limit the use of endoscope. The endoscopic approach is hence not suitable considering the above limitations. This article thus is an attempt to establish the efficacy of this age old surgical approach even in the midst of various advances of endoscopic surgeries.

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