

Juvenile Nasopharyngeal Angiofibroma: Stage and Surgical Approach

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ABSTRACT

OBJECTIVE: To study various surgical approaches and the outcome of surgery in juvenile nasopharyngeal angiofibromas (JNA).

DESIGN: A descriptive study

SETTING: Department of Otorhinolaryngology - Head and Neck Surgery, Civil Hospital Karachi.

METHOD: This study included 40 consecutive cases of nasopharyngeal angiofibroma over a period of 4 years. Patients were regularly followed up for any recurrence up to 3 years.

RESULTS: Majority of our patients had stage III (72.5%) disease (Chandler's staging) i.e. extension in pterygopalatine fossa, maxillary antrum, nose and sphenoid sinuses; and infratemporal fossa in 72.5% patients, tumor was removed through lateral rhinotomy approach while Weber Fergusson in 17.5%, mid facial degloving in 7.5% and only in 2.5% patient transpalatal approach was used. Tumour recurrence were seen only in 5% of cases.

CONCLUSIONS: Angiofibromas usually present at the late stage. Surgery is the treatment of choice. Most of the tumours are excisable by a lateral rhinotomy approach, with minimal chance of recurrence.

KEY WORDS: Angiofibroma, Nasal tumors, surgical approach.

INTRODUCTION

Juvenile nasopharyngeal angiofibromas (JNA) are highly vascular, non-encapsulated tumors affecting predominantly young males¹. It arises from either the lateral wall or the roof of the nasopharynx especially the sphenopalatine foramen². These lesions are histologically benign but they may become life-threatening with excessive bleeding or intracranial extension. They occasionally invade the pterygopalatine fossa, infratemporal fossa, or middle cranial fossa³. Patients usually present at late stage of the disease². There are many classification described in literature although none is universally accepted⁴.

- Johns, 1980 – Not widely accepted
- Chandler et al, 1984 – Based on staging of nasopharyngeal cancer
- Sessions et al, 1981 – Revised by Radkowski et al 1996
- Fisch, 1983 – Revised by Andrews et al 1989

We have selected Chandler staging to stage the juvenile nasopharyngeal Angiofibroma for the selection of surgical approaches:

Stage I Tumor limited to nasopharynx

Stage II Tumor extending into nasal cavity and / or sphenoid sinus

Stage III Tumor involving the ethmoids, maxillary sinus, pterygopalatine fossa and infratemporal fossa

Stage IV Tumor extending intracranially^{5,6}.

This classification also gives us uniformity and standardization of findings as many authors have used

this classification in our region^{7,8}. Surgery is the treatment of choice. Modern imaging techniques of CT and MR Scans are the most important tools of diagnosis and are of great help in selecting the proper mode of treatment and surgical approach⁹. Involvement of the orbit, middle cranial fossa and base of the pterygoid by the primary JNA results in a higher incident of recurrent tumor¹⁰. Surgical excision of JNA with pre-operative embolization has an advantage of much reduced blood loss during surgery¹¹. Several surgical approaches have been used based on the location of the tumor, including transpalatal, transmaxillary, and lateral rhinotomy, midfacial degloving, and Le Fort type I osteotomy³. However, most of the tumors are excisable by a lateral rhinotomy approach, with less chance of recurrence². Lateral rhinotomy incision is good for lesions extending into the paranasal sinuses. Transpalatal approach provides very limited exposure and is suitable only for tumors localized to the nasopharynx⁸. This descriptive study was done to identify preoperative tumor stage which was a primary factor influencing patient prognosis and evaluate appropriate surgical decisions in order to prevent the tumor recurrence.

PATIENTS AND METHODS

It was a descriptive study of 40 cases of Angiofibroma who were operated in the Dept of ENT and Head & Neck Surgery, Civil Hospital Karachi from January

2000 to November 2004. We included all younger males who presented with repeated epistaxis and progressive nasal obstruction along with enhancing mass in nasopharynx on CT and / or MRI, only upto stage III disease based on Chandler classification. We excluded stage IV disease and all those cases who received treatment somewhere else. We have selected Chandler staging to stage the juvenile nasopharyngeal Angiofibroma for the selection of surgical approaches. This classification also gives us uniformity and standardization of findings as many authors have used this classification in our region. Personal data, clinical features, tumor extension, investigations, imaging studies, different surgical approaches and postoperative complications, follow up time and presence and extent of tumor recurrence were recorded on a pre-designed proforma. Follow up of patients was done up to 3 years i.e. first at 3 months, and then every 6 months up to 3 years. During follow up, each symptomatic patient had a new CT scan or MRI to determine the presence of recurrent tumor.

RESULTS

All patients were male with an age range of 10- 20 yrs (39) cases except one was 50yrs old. Epistaxis in 40 patients (100%) and nasal obstruction in 35 patients (87.5%) were the two most common presenting symptoms. All patients had nasopharyngeal mass while 32 (80%) were anemic. Majority of our patients had stage III (72%) disease (Chandler's staging), Stage II disease were seen in 25% cases while Stage I disease only in 3% cases **Figure I**. On angiography, feeding vessels observed are shown in **(Table I)**. Unilateral internal maxillary artery in 20 (50%) cases, bilateral internal maxillary artery in 4 (10%), internal maxillary artery with ascending pharyngeal artery in 14 (35%) while only 2 (5%) cases were receiving vessels from internal maxillary artery, ascending pharyngeal artery and ophthalmic artery. Different surgical approaches were used for removal of tumor **(Figure II)**. Twenty nine patients (72.5%) operated through lateral rhinotomy approach **(Figure III a)**, while 7 cases (17.5%) through Weber Furgusson approach **(Figure III b)**, mid facial degloving used in 3 cases (7.5%) and transpalatal approach in 1 (2.5%) case. Postoperative complications include nasal crusting in 20 (50%) cases, facial numbness in 15 (37.5%) cases and temporary anosmia in 05 (12.5%) cases **(Table II)**. Post operative follow up to 3 years, only 2 (05%) patients had recurrence while 32 (80%) patients were living disease free and 6 (15%) patients were lost to follow up.

FIGURE I: TUMOR STAGE

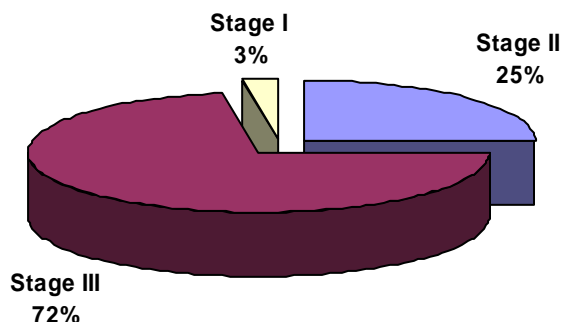


TABLE I: ANGIOGRAPHY

Feeding Vessels	No. of Patients	%
Unilateral IMA alone	20	50
Bilateral IMA	04	10
IMA + APA	14	35
IMA + APA + Ophthalmic Artery	02	5

IMA Internal maxillary artery
 APA Ascending pharyngeal artery

FIGURE II: SURGICAL APPROACHES

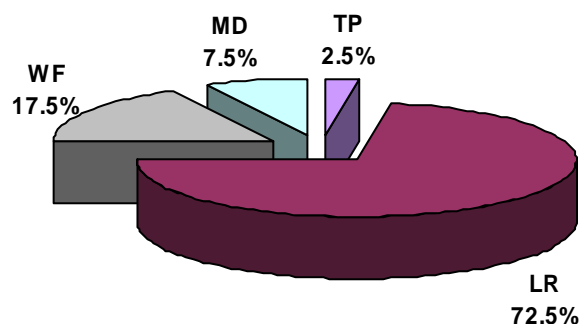


FIGURE III: EXCISION OF MASS THROUGH DIFFERENT SURGICAL APPROACHES



(Fig: a) Lateral rhinotomy approach



(Fig: b) Extended lateral rhinotomy approach

**TABLE II:
POST OPERATIVE COMPLICATIONS**

Complications	No. of Patients	%
Nasal Crusting	20	50
Facial Numbness	15	37.5
Temporary Anosmia	05	12.5

DISCUSSION

Several factors are critical when choosing the surgical approach to JNA, adequate exposure of the tumor, ability to control bleeding, prevention of postoperative facial deformity and avoidance of interference with growth of the face³. Various surgical approaches have been recommended for excision of JNA, each having its own merits and demerits. The lateral rhinotomy approach has the advantage of access to the nose, maxillary antrum, ethmoids and nasopharynx. However it leaves an external scar and removal of nasal and facial bones in prepubertal boys could lead to facial asymmetry⁷. Persistent nasal crusting, facial paresthesia, lacrimal apparatus injury are also seen in this approach^{6,10,12}. In our study we have chosen this approach in 72.5% cases for stage III disease. Same approach was used by Azam et al in Karachi⁸ and Tosun et al in Turkey¹² for the same stage. There are less chances of recurrence in this approach². Similarly midfacial degloving approach provides good exposure to the maxillary antrum, nose, pterygopalatine fossa and infratemporal fossa. This approach is an excellent alternative to lateral rhinotomy as it gives good exposure and, because of the use of a sub labial incision, there will be no deforming scar on face¹⁰ but needs extensive removal of bones from the anterior, posterior, medial and lateral walls of maxillary antrum⁵. We have used this approach in 7.5% cases only, because

of the chances of the development of facial asymmetry. Mid facial degloving approach was selected in majority of patients with advanced disease by Cansiz et al¹. Transpalatine route is an easy approach, provides access to the nasopharynx, sphenoid, sphenopalatine foramen and posterior nares. It avoids external scar and does not effect the facial growth. While palate dehiscence may occur, oronasal fistula is a more common side effect. However, it does not provide exposure of antrum and infratemporal fossa. More over, it has been feared that scarring and subsequent shortening of palate could occur especially if the incision is placed directly over the junction of soft and hard palate⁷. We have used transpalatine approach in 2.5% cases who presented with stage I & stage II disease. Several workers have recommended this approach for earlier stages of JNA with the lesion occupying the nasopharynx, sphenoid, sphenopalatine foramen and posterior nares^{10, 12, 13}. Nowadays, the use of endoscopic surgery for resection of JNA is growing¹⁴. Many surgeons recommend this procedure for tumors extension into infratemporal fossa with or without cheek or extension posterior to pterygoid plate as they believe less bleeding and fewer days of hospitalization and postoperative complications are benefits of this procedure¹⁵⁻¹⁷. Scholtz et al. introduced this approach for those with extension to the nasal cavity, the nasopharynx, the pterygopalatine fossa, the ethmoids and the sphenoid and maxillary sinus. Out of 12 cases with angiofibroma, he used this approach for 7 of them, and reported no recurrence among those 7 cases¹⁸. Also Onerci et al. reported no recurrence for tumors extension into infratemporal fossa¹⁹. In review of 15 patients with angiofibroma that were endoscopically resected by Nicolai et al. one patient showed evidence of recurrence involving a small lesion with no lateral extension¹⁵. Nowadays many studies imply with the efficiency of preoperative embolization, resulting in less bleeding during surgery^{7, 20} which was also used in almost all of our cases. It has been reported that preoperative embolization followed by KTP laser assisted endoscopic excision of JNA is superior to radical approaches²¹. In summary the benefit of preoperative embolization is a relatively safe technique that is effective in reducing intraoperative bleeding and improving surgical results²².

CONCLUSION

Nasopharyngeal angiofibroma is not uncommon in our region. Surgery remains the effective primary mode of treatment. Lateral Rhinotomy approach affords excellent exposure for complete removal of extensive angiofibromas and may be combined with a lip splitting incision to give additional lateral exposure when

necessary to minimize the recurrence. Lateral Rhinotomy & its variations remain the workhorse of anterior skull base surgery.

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