

A Comparison of Outcomes of Various Approaches for Resection of Juvenile Nasopharyngeal Angiofibroma at Our Tertiary Care Center: A Clinical Study

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Abstract: ***Background:** Nasopharyngeal angiofibroma is benign but locally aggressive, slow growing vascular tumor which primarily affects adolescent male. Traditionally, these tumors have been removed by open surgical approaches. While minimal surgical approaches are accompanied by high rates of residual or recurrent lesions, expanded external approaches may result in facial growth disturbance in children in addition to cosmetic and functional complications. Now trend changed towards endoscopic approach for limited angiofibroma extension. **Aims and Objectives:** To evaluate Age distribution, common presenting features, to decide surgical technique according to stage & to study Outcomes of various approaches. **Methods:** This is a prospective study of twenty five patients with angiofibroma without intracranial extension treated by external and endoscopic approach in our tertiary care referral center. The study duration was from July 2015 to July 2018. Twenty five patients with complete clinical data were identified and included in the study after thorough investigation. **Results:** 5(20%) out of 25 patients were operated with Trans palatal approach among which 1 patient developed palatal dehiscence. 10(40%) out of 25 patients were operated with lateral rhinotomy approach and post operatively 1 patient developed hypoesthesia of cheek. 10(40%) patients underwent Trans nasale endoscopic approach among which 1 patient developed nasal synechiae and 1 patient had recurrence. Post-operative nasal endoscopy findings and radiological findings confirmed this fact. **Conclusions:** most common affected gender is male with adolescent group. Patients of angiofibroma mostly presented with chief complain of nasal bleeding and obstruction. Transnasal endoscopic approach is preferred over external approach in early stages due to less morbidity and direct visualization of tumor with feeding vessel. 21 (84%) out of 25 patients are complete disease free without any complication.*

Keywords: Angiofibroma, transpalatal, lateral rhinotomy, transnasal endoscopic.

1. Introduction

Angiofibroma is commonest of all benign tumors of nasopharynx^[1]. It occurs mostly in adolescent males in age group ranging from 7-21 years^[2]. It is thought to be testosterone dependent^[3]. Male sex hormone activates hamartomatous nidus of vascular tissue to form angiofibroma^[4]. It arises from sphenopalatine foramen at the junction of pterygoid process of sphenoid bone and sphenoid process of palatine bone^[5]. Though benign, it is locally aggressive and can spread anteriorly to orbit through inferior orbital fissure, laterally to infratemporal fossa through pterygomaxillary fissure, posteriorly to middle cranial fossa through foramen rotundum and pterygoid canal, medially to inferior portion of sphenoid recess through the sphenopalatine foramen and to the oral cavity via greater and lesser palatine foramina.

JNA is a hyper vascular benign neoplasm known for its peculiar local aggressive spread along the pathways of least resistance. This tumor is of considerable scientific interest due to its vascularity and high incidence of recurrence. Numerous open surgical approaches have been employed traditionally, based on the tumor extensions, like Trans palatine, lateral rhinotomy, midfacial degloving, and neurosurgical approaches in cases with intracranial extension. The multiplicity of approaches developed over

the years due to inaccessibility of the lesion during surgical resection.

The adoption of endoscopes in surgery for the resection of JNA came in vogue in the late 1990 and thereafter evolved rapidly. The advent of endoscope has significantly altered the approaches of skull base surgery for management of JNA. Technological advancements, new corridors, and increased surgical experience have made endoscopic resection the modality of choice for small to medium size JNA. Principles for successful total endoscopic resection of JNA have evolved over the years allowing authors to consider endoscopy as the choice of approach for advanced tumors.

In this study, we present our experience of 25 cases of JNA, managed surgically by endoscopic endonasal, lateral rhinotomy, transpalatal approach.

Aims and objectives: To evaluate Age distribution, common presenting features, to decide surgical technique according to stage & to study Outcomes of various approaches.

2. Materials and Methods

A prospective, interventional analysis of 25 patients of JNA operated at our tertiary care center by endoscopic endonasal,

lateralrhinotomy, transpalatal approach was conducted. The period of study was from July 2015 to June 2018.

Inclusion criteria:

- FISCH stage 1 to 3.
- All diagnosed cases of JNA who underwent surgery in department of ENT, BJ medical college, Ahmedabad

Exclusion criteria:

- FISCH stage 4
- Patients who did not give consent
- Patients in whom proper follow up could not be achieved.

Diagnosis of JNA is made by complete history, clinical examination, radiography, nasal endoscopy; and specialized imaging techniques such as arteriography, CECT NOSE AND PNS: axial and coronal view, and magnetic resonance imaging (MRI). CECT is Gold standard & investigation of choice. These techniques help to establish the exact site, extension and relation of the tumor to the adjacent structures such as blood vessels and nerves. This makes it possible to precisely stage JNA^[6].

The patients were fully informed about the details of the planned surgical procedure and complications. They were also counseled about the advantages and drawbacks of the possible alternative therapies. A written informed consent was obtained from all the patients.

Surgical Technique:

1) Transpalatal Approach:

In tonsillectomy position, a forward curved incision is made just in front of junction of hard and soft palate. Mucoperiosteum separated. Incision extended laterally and downward along pterygomandibular raphe. Nasopharynx well visualized by this approach and growth separated by blunt dissection.

2) Lateral Rhinotomy Approach

Upper end of incision starts from medial canthus running towards lateral border of nose to the upper edge of alar margin. Dissection is deepened to the level of bone and soft tissue mobilized from underlying ethmoid bone, anteromedial antral wall and nasal pyramid. This gives excellent access into nasal cavity.

3) Transnasal Endoscopic Procedure

It was performed using a coblation, an incision was placed on the anterior edge of the pyriform aperture. Freer's elevator was then used to elevate a flap in the subperiosteal plane to expose the anterolateral wall of the maxilla. The superior limit of the exposure was up to the infraorbital nerve. Care was taken not to injure the nerve during the dissection. The nasolacrimal duct was exposed and transected. The exposure of the bone medially was done posteriorly till the level of the junction of the palatine bone and the medial pterygoid plate. Laterally posterior wall of maxilla is removed till the lateral most extent of the tumor. Posterior septectomy was performed. The tumor in the nasal cavity was debulked by coblation to increase space for instrumentation. Bilateral ethmoidectomy and

sphenoidotomy was done to achieve control of the posterior most extent of the tumor.

The key principle in the endoscopic approach to juvenile angiofibroma is to expose the lesion as extensively as possible without traumatizing its surface to minimize bleeding. The resection of large volume lesions can rarely be achieved in a single bloc and it is preferable to disassemble the tumor by first removing the nasal-nasopharyngeal portion, and subsequently addressing the deepest peripheral projections.

3. Results and Observation

Age : Twenty five patients were included in the study. 15 (60%) patients were presented in 16-20 year age group, 7 (28%) patients in 10-15 years, 3 (12%) patients in 21-25 years.

Graph 1: Age Distribution

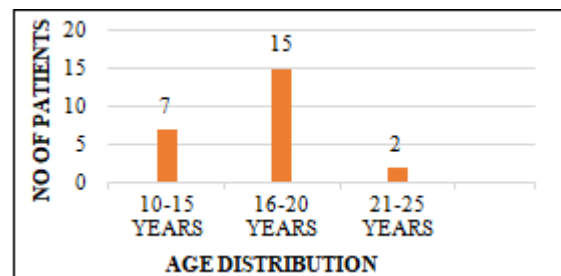
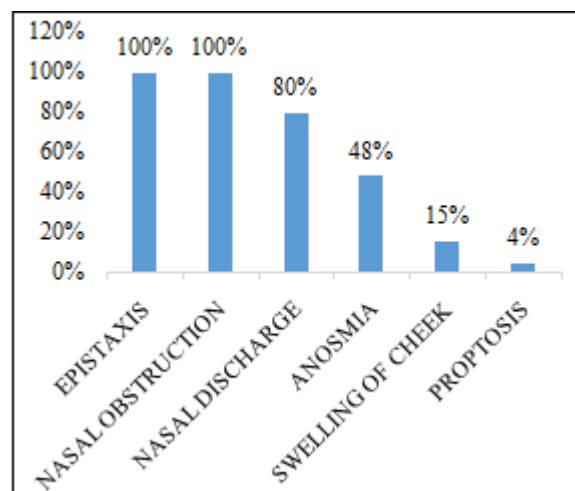


Figure 1: Showing age distribution in our study

Mean age: 16 years.

Gender: All patients were male (100%) in our study.

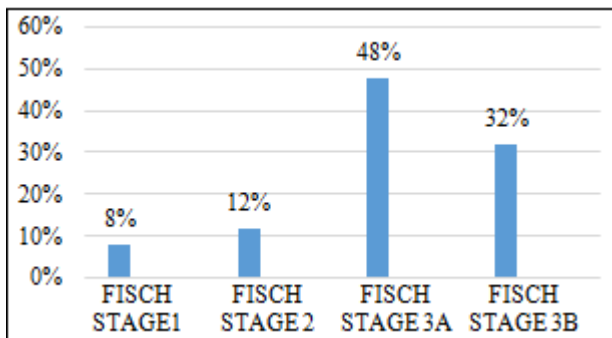
Presentation: Epistaxis and nasal obstruction were present in all patients (100%) whereas 20 (80%) patients had complain of nasal discharge. 12 (48%) patients had anosmia. Less common symptom like swelling of cheek was present in 5 (20%) patients and proptosis was present only in 1 (4%) patient.



Graph 2: Clinical Features

Figure 2: Showing clinical features presented in angiofibroma

The most frequent symptoms are nasal obstruction and epistaxis. Nasal obstruction may be bilateral despite the unilaterality of the lesion, due to nasopharyngeal extension as well as deviation of the nasal septum by the expansile lesion. Epistaxis is usually brisk and intermittent. Purulent nasal discharge and facial pain can be due to sinus drainage pathway obstruction. Advanced lesions can present with proptosis and facial swelling due to orbital and infratemporal fossa (ITF) extension, respectively. Ophthalmoplegia due to cranial nerve compromise is rare, but may complicate orbital apex and cavernous sinus invasion.



Graph 3: Patient Distribution According to Fisch Classification

Figure 3: Showing patient distribution according to fish classification

Multiple staging systems have been proposed for JNA. In this study we have used staging system proposed by fish^[6]. In our study most common stage was fish stage 3 which included 12(48%) patients while fish stage 3B had included 8(32%) patients, 3(12%) patients in stage 2 and 2(8%) patients in stage 1. These systems mainly depend on defining the extent of tumor, skull base involvement, ITF extension, and intracranial invasion.

Graph 4: Surgical Technique

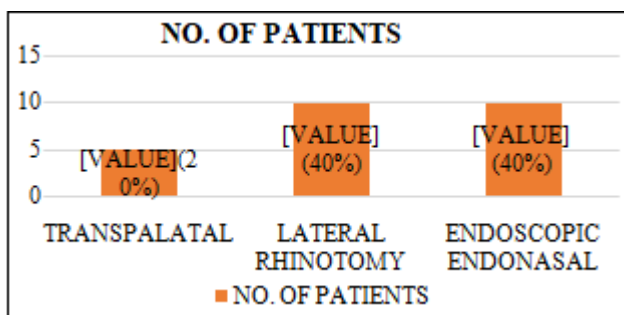
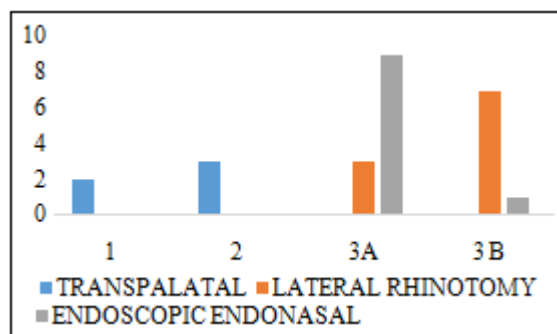


Figure 4: Showing number of patients operated with different approach

In our study 5(20%) patients were operated with transpalatal approach, 10 (40%) patients were with lateral rhinotomy and remaining 10(40%) with endoscopic endonasal approach.



Graph 5: Staging with Surgical Technique

Figure 5: Showing number of patients operated with various approach according to fish stage

In our study transpalatal approach was used for fish stage 1 and 2 while lateral rhinotomy and endoscopic endonasal approach were used for fish stage 3.



Graph 6: Complications

Figure 6: Showing mass in left nasal cavity on nasal endoscopy



Figure 7: Showing post-operative nasal endoscopy

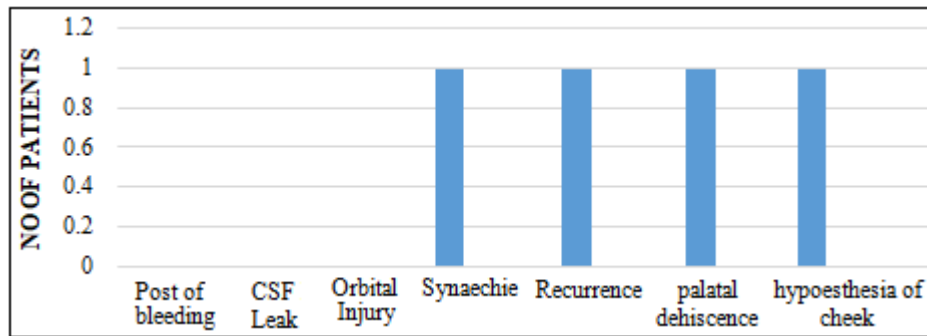


Figure 8: Showing complication post operatively by various approach in our study

5(20%) out of 25 patients were operated with Trans palatal approach among which 1 patient develop palatal dehiscence. 10(40%) out of 25 patients were operated with lateral rhinotomy approach and post operatively 1 patient developed hypoesthesia of cheek. 10(40%) patients underwent Trans nasal endoscopic approach among which 1 patient developed nasal synechia and 1 patient had recurrence.

Postoperatively the hospital stay was around 4-5 days. Prophylactic IV antibiotics were administered. Special attention was paid towards maintaining optimal oral hygiene, apart from routine postoperative care. Nasal packing was removed after 48 hours and alkaline nasal douching was advised. Initial 3 follow ups done every 10 days for a month, then monthly follow up for next 5 month. At each follow up endoscopic nasal and oral examination was done. The surveillance scan was done after one year to evaluate for any recurrence.

4. Discussion

In our study for juvenile nasopharyngeal angiofibroma most common age group was 16-20 years (mean 16 years). Age distribution in our study is comparable to previous studies where also common age was between 9 and 19 years of age.^[11]

In our study 12(48%) patients were classified in fisch stage 3a in comparison to study by Ahmed et al^[15] who reported 72.5% cases of stage 3 and Mistry^[16] et al reported 94% cases in stage 3. This can be attributed to the fact that patients of lower socio economical class attended tertiary hospital until morbidity reached to higher stage.

Epistaxis and nasal obstruction were most common complaint of all the patients which was similar to the study done by Safadi et al^[12]

1 patient had recurrence (4%) in our study which was comparable to study by Enepekides DJ et al^[13] where also recurrence rate was between 0 to 7%. And 1 patient (4%) had synaechie. External and endoscopic approaches seem to have comparable outcomes regarding tumor recurrence and residual tissue, and selecting an approach depends mainly on the surgeon's experience. Boghani et al^[14] published a systematic review focusing on outcomes of endoscopic, endoscopic-assisted, and open surgical approaches. When analyzing studies reporting on aggregate of all patients, they found that a purely endoscopic approach had significantly

fewer recurrences or residual tissue compared with both endoscopic-assisted and open approaches.

Transpalatal approach gives good exposure to nasopharynx with choana and sphenoid sinus^[17]. It gives no visible scar and post op healing is good. So this approach is used till fish stage 2. Disadvantages of this approach like limited lateral exposure, oroantral fistula, and palatal dehiscence.

Lateral rhinotomy approach is suited for growth in nasal cavity extending to paranasal sinuses, pterygopalatine fossa and medial part of infratemporal fossa^[18]. It gives better wide exposure, direct visualization of tumor and bleeding is easily controlled but facial scar was seen in all patient.

Despite the advancements in endoscopic approaches, endoscopic treatment of advanced juvenile angiofibroma with extensive skull base and Infratemporal fossa involvement should only be practiced in highly specialized centers with neurosurgeon. Advantages of this approach

- Very good exposure even for extensive tumors
- Complete excision of tumor possible due to direct under vision surgery
- Lower rate of intraoperative bleeding
- Decreased morbidity
- Better cosmetic
- Less risk of recurrence
- Reduced hospital stay

5. Conclusion

The advent of endoscopic approaches for the skull base has paved the way for minimally invasive surgeries in complex lesions. A total endoscopic approach has several obvious advantages over the open approaches that have been employed traditionally. Endoscopic endonasal is effective for extensive angiofibroma upto stage 3B as a primary surgical option over external approach.

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