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Original Article

Endoscopic Assisted Management of Juvenile Nasopharyngeal Angiofibroma : Experience at a Tertiary Care Centre

Zeba Ahmed, Atif Hafeez Siddiqui, Iqbal A. Muhammad Khyani, Danish ur Rahim, Muhammad Umar Farooq

ABSTRACT: OBJECTIVE: To evaluate the efficacy of changing surgical trend in the management of juvenile nasopharyngeal angiofibromas (JNA) with endoscopic assisted surgery at Civil hospital Karachi. STUDY DESIGN: Descriptive study. PLACE AND DURATION OF STUDY: Department of Otorhinolaryngology-Head and Neck Surgery, Dow University of Health Sciences, Dow Medical College and Civil Hospital Karachi from, January 2002 to March 2014. PATIENTS AND METHODS: This study included 121 consecutive cases of nasopharyngeal angiofibroma over a period of 13 years. Follow up period ranges from 1month to 2years. RESULTS: All patients were male with mean age of 15.4 years. Epistaxis and nasal obstruction were the two most common presenting symptoms. Majority of the patients had stage III disease i-e 78 (64.4%), stage II disease in 23(19%) cases, stage IVa disease was presents in 16(13.2%) cases while stage I seen in 4(3.3%) patients, according to Fisch classification.Surgery was done in all patients. Endoscopic resection was adopted in 74(61.8%) patients while lateral rhinotomy was utilized in 33(27.2%) patients besides other approaches.Tumor recurrence was seen in 8% of cases. CONCLUSION: Angiofibroma usually presents in adolescent males. The triads of nasal obstruction, nasopharyngeal mass and recurrent epistaxis indicate the presence of the neoplasm. The sublabial endoscopic assisted approach is found to have better cosmetically result with removal of disease than other open approaches. Endoscopic techniques allow for excellent visualization and complete tumor resection with low morbidity.

KEY WORDS : Juvenile nasopharyngeal angiofibroma, Nasal tumors, Endoscopic sinus surgery.

INTRODUCTION : Juvenile nasopharyngeal angiofibroma (JNA) is a rare benign neoplasm of the nasopharynx that accounts for 0.5% of all head and neck tumors[1]. Although histologically benign in appearance, JNAs are locally aggressive and destructive, spreading from the nasal cavity to the nasopharynx, paranasal sinuses, orbit and skull base with even intracranial extension. Juvenile nasopharyngeal angiofibromas are highly vascular, non-encapsulated tumors affecting predominantly young males[2], though there are reports of this tumor being found in children, in the elderly, young even in pregnant women. The gender selectivity of JNA and the relatively young age at diagnosis suggest hormone-dependent development. Hormonal disorders have been reported in patients with JNA. Androgen and estrogen receptors have been identified in tumor tissue; however, a hormonal influence on JNA is controversial[1,3]. It arises from either the lateral wall or the roof of the nasopharynx esp the sphenopalatine foramen[4]. Although histologically benign in appearance, but locally aggressive and destructive. They may become life-threatening with excessive bleeding or intracranial extension[5]. The classic triad of epistaxis, unilateral nasal obstruction and a mass in the nasopharynx suggests the diagnosis of JNA and is then supplemented by imaging tests. Computed tomography (CT), magnetic resonance imaging (MRI) and endoscopic examinations are the choice to define the extent and location of the tumor for staging. We have selected Fisch classification to stage the JNA for the selection of surgical approaches. As this classification defines clearly which tumour can be resected by endonasal techniques and those that would be better tackled by more open approach[6]. Surgical removal is the most accepted mode of treatment. Surgical excision of JNA with pre-operative embolization has an advantage of much reduced blood loss during surgery. Currently, surgery appears to be the best treatment of the JNA. Other methods such as hormone therapy, radiotherapy and chemotherapy treatment modalities are now used occasionally as complementary treatments. The surgical approach can be made through open, as the transpalatal, transmaxillary, lateral rhinotomy, mid-facial degloving and Le Fort type I osteotomy. With the advent of minimally invasive techniques, endoscopic surgery has been used to treat JNA in recent years, ideal for tumors confined to the nasopharynx, nasal cavity, and sphenoid sinuses with minimal extension into the pterygopalatine fossa. The first mention of an endoscopic resection date back in 1996. Since then a number of cases were reported and all showed that endoscopic resection had a lower morbidity for the early stages of disease[7,8]. Large juvenile nasopharyngeal angiofibromas are a therapeutic challenge because of their relation to major vasculature and cranial nerves at the base of the skull, and their propensity for

Department of Otorhinolaryngology - Head and Neck Surgery, Dow University of Health Sciences, Dow Medical College and Civil Hospital Karachi - Pakistan.

recurrence. From 2000 through 2004, the lateral rhinotomy approach and its extensions, was recommended as the best method of managing angiofibroma in most patients, but with the advent of endoscopic techniques it emerges as an alternative approach to open procedures due to reduced morbidity and comparable because of recurrence rates[9]. This study presents a comparative analysis of current surgical approaches for the treatment of nasopharyngeal angiofibroma, including extension of tumors i-e stage, postoperative morbidity, complications, and recurrence rate and present our experience of endoscopic management of JNA.

PATIENTS AND METHODS : It was a descriptive study conducted at the Department of ENT-Head & Neck Surgery, DUHS, DMC and Civil Hospital Karachi from January 2002 to March 2014. All young males with recurrent epistaxis and progressive nasal obstruction with a suspescion of angiofibroma were included. The subjects were assessed according to a set protocol which included detailed history, clinical examination, routine /special investigations such as CT scans Nose and PNS with contrast to asses the extent of the tumor. Standard protocol for the management of Angiofibroma was initiated .Angiography and preoperative embolization was done in majority of cases and surgery was performed within 24 hours of embolization. Different surgical procedures and postoperative complications were recorded with a follow up period from one month to two years. All those young males who were presented with recurrent epistaxis and progressive nasal obstruction along with enhancing mass on CT scan up to stage IVa (according to Fisch classification) were included, stage IV b disease and those who have received treatment somewhere else were excluded from the study.

RESULTS : Total of 121 young males were included between the age of 5-32 years. Majority were between age of 14-17years (n-111) with a mean age of 15.4 years. Youngest patient was 5 years. Majority of patients presented with more than one symptom. Epistaxis in 121 patients (100%) and nasal obstruction in 118 patients (97.5%) were the two most common presenting symptoms. All patients had enhancing nasopharyngeal mass on CT Scan.The staging according to the findings of imaging studies are shown in Fig-1. Majority of the patients had stage III disease i-e 78 (64.46%), stage II disease in 23(19%) cases, stage IVa disease was presents in 16(13.22%) cases while stage I seen in 4(3.3%) patients. Angiography with emblization done in 118 patients showing supply of ipsilateral Internal maxillary artery as the only feeding vessel in 56 (46.28%) patients, bilateral Internal maxillary artery in 11 (9.09 %), Internal maxillary artery with Ascending pharyngeal artery in 41 (33.88%) while 10 (8.26%) cases were receiving branches from Internal maxillary, Ascending pharyngeal and Ophthalmic arteries. Different surgical approaches were used for the removal of tumor between the years 2002-2008 and 2009-2014 as dipicted in Fig-2. Lateral rhinotomy was utilized in 33 patients (27.27%), in 10 cases (8.26%) Weber Furgusson approach was used. Mid facial degloving was performed in 3 cases (2%), transpalatal approach in one (1%) case and endoscopic technique was adopted in 74(61.15%) patients (Sublabial endoscopic assisted approach in 70 patients while per nasal endoscopic resection done in 4 cases). Compared with the conventional surgery group, the endoscopic group had less intraoperative blood loss (mean 325 vs. 950 mL) and lesser operative time (mean 2 hrs.vs 3.5 hrs). Patients were discharged after 3-5 days (mean 4 days) and 5-9 days (mean 7 days) after the endoscopic and open surgical procedures respectively. Post operative complications were shown in Table-1. Nasal crusting was the most common complication in both the groups 72% vs. 69%.Post

Complications	No. of Cases conventional surgery=47	%	No.of cases Endoscpic technique=74	%
Nasal Crusting	34	72.34	47	63.51
Facial Numbness	27	57.44	15	20.27
Temporary Anosmia	11	23.4	9	12.16
Haemorrhage	4	8.51	3	4

Table-1 : Post operative complications.

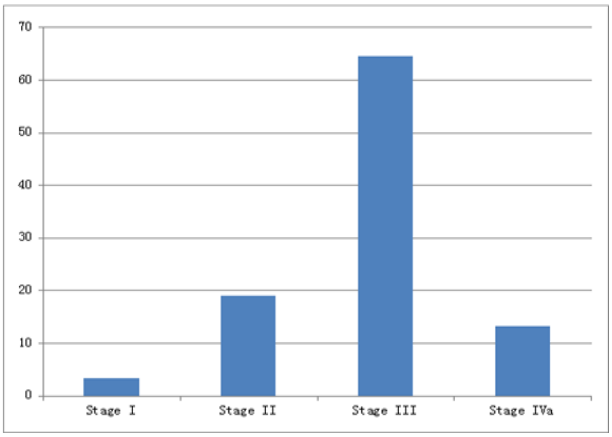

Figure-1. Tumor Stages (According to Fisch classification) on the basis of findings an imaging.

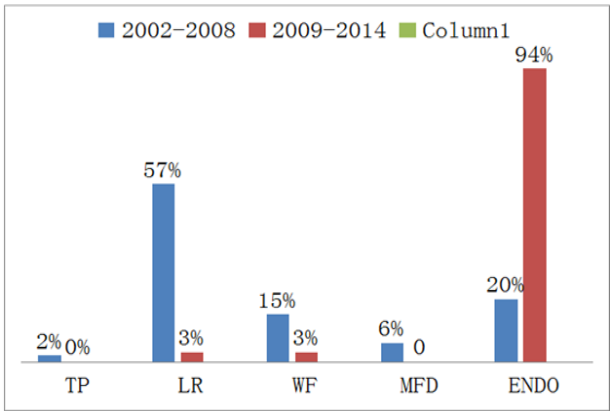

Figure-2. Different surgical opproacles used for removel of tumor 2002-2008 & 2009-2014. T.P Transpolated, LR-Lateral rhinotomy, WF-Weber Furrgusons, MFD-Med facial degloving, ENDO-Endoscopic.

operative follow up ranges from one month to two years. 95 (78.5%) patients were living disease free, 9 (8%) had recurrence, while 17 (15%) patients were lost to follow up.

DISCUSSION : Juvenile nasopharyngeal angiofibroma is a rare tumour of the head and neck with very specific characteristics: adolescent males, pterygomaxillary fossa widening, specific and intense vascularisation. Although the use of non-surgical therapies is described in the literature, surgery is currently considered the ideal treatment for juvenile angiofibroma. 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 face[5]. Over the years the access route for the treatment of JNA has been modified with the aim of developing techniques with lower morbidity and lower incidence of recurrence. Recently, the endoscopic approach has emerged as a surgical option for treating these tumors[7] In present study, surgery was done in all patients. Conventional surgery was utilized in 47 patients (41%) while endoscopic resection was adopted in 78(64.4%) patients. Conventional surgical approaches were also utilized by other surgeons for large angiofibromas and found them effective[10,11]. Many surgeons analysed that patients who underwent lateral rhinotomy for the removal of stage I, II, III and IVa tumors can successfully be treated using the endoscopic approach[12,13,14]. During the last decade, an endoscopic technique has been extensively adopted as a valid alternative to external approaches in the management of small-intermediate size juvenile angiofibromas[9]. The first surgical step when the surgeon approaches a JNA endoscopically is to expose the tumor as extensively as possible through a middle turbinectomy, ethmoidectomy, wide antrostomy and sphenoidotomy, and resection of the posterior third of the nasal septum, which enhances the exposure of the nasopharyngeal portion of the lesion. The posterior wall of the maxillary sinus has to be resected as far lateral as dictated by the lateral extension of the lesion into the pterygopalatine and/or infratemporal fossae. For JNA largely involving the infratemporal fossa, the surgeon can improve lateral exposure through a so-called Sturmann-Canfield maxillectomy, which provides resection of the anteromedial corner of the maxillary sinus[9]. An endoscopically assisted antral window approach through the anterior wall of the maxillary sinus, as proposed in the literature may be considered a possible alternative[15]. In present study endoscopic assisted sublabial approach or antral window approach was used for stage II, III and for IVa tumors in 74 patients while per nasal endoscopic resection done in 4 cases. Endoscopic assisted sublabial approach was found to be cosmetically good, minimally invasive and with less morbidity. Same approach was used by Khalifa for stage III tumors[16]. Mann used laser in endoscopic assisted sublabial approach and with the help of image-guided navigation system safely excised large extracranial JNA with diminished blood loss and facial deformity[12]. Nasal endoscopic surgery has disadvantage as it requires a bloodless operating field - because any amount of blood may prevent a good visualization and thus preclude the surgical approach. It is suggested that in limited lesions of angiofibroma, the option of a transnasal endoscopic approach could be cautiously considered by experienced surgeons[17]. Endoscopic surgery has a very important advantage, which is the fact that it preserves both the anatomy and physiology of the nose, and the prior tumor embolization contributes to a better identification of structures during surgery, without considerable hemorrhage, thus making the procedure easier. Pre-operative angiography and embolisation 24-72 hours preceding the operation is recommended to reduce peri-operative haemorrhage[18]. In present study 118 patients underwent preoperative embolization. Approximately 325 mL intraoperative blood loss seen in patients with endoscopic sinus surgery. This finding is almost similar to the observations by Nicolai[19], Fyrmpas[20] and Gupta[21]. Other advantages include less surgical time, less hospitalization days, absence of visible scars, avoids complications such as epiphora, dysesthesia, trismus, and craniofacial deformities[22]. Patients were discharged from hospital after 4 days (mean),which is comparable to the other studies[20,22,23]. In our study, postoperative nasal crusting was the most annoying problem in both the groups 72.34% vs 63.51% same observed by Tosun et al.11 Recurrence rate reflects the advanced stage of the tumors. A major risk factor for recurrence was tumor involvement of the cranial base[24]. In present study, recurrence seen in 9 patients (8%)[3], were operated through conventional surgery and 6 through endoscopic approach. Mann et al in a retrospective study found a recurrence rate of 6.6% in 15 patients with stages I and II disease[12], Another study showed 10.5% (2/19) recurrence rate in the group of patients treated via traditional approaches[18]. The incidence of recurrence had no correlation with the age of the patient, duration of symptoms, peri-operative treatment or surgical approaches but strongly correlated with tumour stage[22,25].

CONCLUSION : The endoscopic assisted approach is, undoubtedly a sound alternative, as it is less aggressive for the patient, it causes less morbidity, minimum bleeding, less operative time and less postoperative complications. It is a safe and effective treatment modality due to the lack of external scars, minimal bone resection, low blood loss and low recurrence rate.

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