ORIGINAL ARTICLE

Per-Operative Bleeding in Juvenile Nasopharyngeal Angiofibroma after Pre-Operative Embolization Per-Operative Bleeding in Juvenile Nasopharyngeal Angiofibroma

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ABSTRACT

Background: Juvenile nasopharyngeal angiofibroma (JNA) is very rare and benign neoplasm of vascular system.It occurs almost in complete nasopharynx of teenageboys. The place of JNA origin is still debatable.
Aim: To study the mean per-operative bleeding in juvenile nasopharyngeal angiofibromas with preopembolization.
Methods: This descriptive cases series was conducted at Department of ENT, Lahore General Hospital, Lahore for 6 months. A total of 35 cases were included in this study. Embolization was done 23 hours before surgery and gel foam (spongeston) was used for embolization. The amount of per-operative bleeding was recorded on proforma. Per operative bleeding was recorded as per operational definition.
Results: All patients were male, aged between 15 and 25 years with mean age of 18.69±3.46 years. 15 patients (42.8%) were presented as stage I to II and 20 patients (57.2%) were presented as stage III. 17 patients (48.6%) were having size of tumour between 2-4 cm and 18 patients (51.4%) were having tumour size between 5-6 cm. Mean amount of per-operative bleeding (mL) was 748.56±204.89. Mean size of tumour was 5.03±2.05 cm.
Conclusion: In conclusion, mean per-operative bleeding in juvenile nasopharyngeal angiofibromas with pre-operative embolization was 748.56±204.89mL.
Keywords: Juvenile nasopharyngeal angiofibroma, Pre-operative embolization, Per-operative bleeding

INTRODUCTION

Angiofibromas develop because of complicated mixture of fibrous stroma and blood vessels. The JNA typicallydevelops in men and compared to women and is more common in in young age, especially in teenage. This age is time when there is more hormonal changes occur and this cause an increase in thedoubtthat the sexual hormones may have significant effect on development of JNA. JNA can be present in about 0.05% out of all head &neck tumours[1,2]. It can be ranged from 0.05–0.5% of all head &neck tumors. The annual incidence of JNA is around 1:150,000.However,the rate is slightly higher in India and Egypt as compared to the rate of JNA in Europe and USA[3].

Among the men who have fair skin color and red hair, the risk of JNA is more higher[4]. It is normally thought considered that the anatomical origin of JNA can be present or grow in the superior region of the spheno-palatine foramen, in postero-lateral wall of nasal cavity. But, Lloyd et al., conducted a study and concluded, on the basis of computed tomography scans and magnetic resonance imaging, that the anatomical position for growth of JNA is pterygo-palatal fossa[5]. In maximum number of cases, the JNA obtainsthe blood supply by internal maxillary artery, the branch of an external carotid artery. So it is proposed that this tumorgrows from the vascular plexus[6]. In few selective cases, the feeders from the internal carotid artery might also be exist[7].

Received on 03-01-2020
Accepted on 28-05-2020

Massive bleeding from tumour during surgery because of vascularity of tumour and postoperative recurrence are potential problems of management[8,9]..

Surgical resection is the main choice of treatment for JNA. Modern imaging technique including computed tomography and magnetic resonance imaging are the most significanttechniques to diagnose. These tools have great significance in selection of appropriate approach for treatment and surgical technique. Surgical excision of JNA with pre-operative embolization is being practiced at many centers.[10] Wilms et al., reported 86.7% per-operative less blood loss. It is a relatively new technique[11].

Whether it helps to reduce bleeding is still controversial. Leong reported that the mean per-operative blood loss was 1709±2025 mL while the mean per-operative blood loss was 1449 mL of 39 patients who had pre-operative embolization.[12]The rational of this study is to calculate the amount of per-operative bleeding after effective embolization. Local study is not available. This study may be helpful in assessing the utilization of pre-operative embolization in our patients.

The objective of the study was to study the mean per-operative bleeding in juvenile nasopharyngeal angiofibromas with pre-operative embolization.

MATERIAL AND METHODS

This Descriptive cases series was conducted at Department of ENT, Lahore General Hospital, Lahore for 6 months i.e. from October 2014 to April 2015. Sample size of n=35 patients was estimated by using 95% confidence

level, d=0.12 taking expected mean per-operative bleeding i.e. 1449±1125 after excision of nasopharyngeal angiofibroma[12]. All the patients were recruited by using Non-probability, consecutive sampling technique.

Patients aged 15 - 25 years of both genders diagnosed with juvenile nasopharyngeal angiofibroma were included. Juvenile nasopharyngeal angiofibroma was defined as morphologically characterized by architecturally irregular vessels ranging from capillary and sinusoidal type vessels set in variable amount of fibrous stroma. It is diagnosed by histopathology on the presence of all of the above mentioned findings. Patients having disorders of haemostasis (PT >18, APTT >34, INR >1.5) were excluded from the study. After the clearance of ethical committee, 35 cases of juvenile nasopharyngeal angiofibroma were included. Informed consent was obtained. Embolization was done 24 hours before surgery and gel foam (spongeston) was used for embolization. Personal data age, sex, address and amount of per-operative bleeding was recorded as a total blood loss during surgery. The measurement of blood loss by swab (sponge) and suction apparatus (in ml) made during the operation. The weight difference in used and new sponge was measured. 1mg was considered as 1ml of blood. Per-operative embolization defined as the blockage of the vascular supply to a tumour. The blockage is performed via an endovascular approach. It is done 24 hours before surgery and used gel foam for embolization.

Data analysis: All the information collected was entered in SPSS version 15 and analyzed. Descriptive statistics was applied. Mean and standard deviations were calculated for numerical data like age, amount of per-operative bleeding.

RESULTS

All patients were male, aged between 15 and 25 years with a mean age of 18.69±3.46 years. about 15 patients (42.8%) were presented as stage I to II and 20 patients (57.2%) were presented as stage III. 17 patients (48.6%) were having size of tumour between 2-4 cm and 18 patients (51.4%) were having tumour size between 5-6 cm. Mean amount of per-operative bleeding (mL) was 748.56±204.89. Mean size of tumourwas 5.03±2.05 cm. Stratification with regard to age, tumour size (cm) and stage of tumour was carried out and per-operative bleeding was significantly higher with stage III as compared to stage I & II and tumor size 5-9 cm than 2-4 cm.

Table-1: Characteristics of patients

Age (Year)	18.69 ± 3.46
15-20	24 (68.6%)
21-25	11 (31.4%)
Gender	
Male	35 (100%)
Female	0 (0%)
Stage of tumor	
I and II	15 (42.8%)
III	20 (57.2%)
Size of tumor (cm)	5.03 ± 2.05
2-4	17 (48.6%)
5-9	18 (51.4%)
Amount of per-operative bleeding (mL)	748.56 ± 204.89

Table-2: Stratification with regard to effect modifiers

		Per-op bleeding (mL)	P value
Age (years)	15-20	704.17±185.28	0.07
	21-25	845.45±220.74	
Tumor size (cm)	2-4	664.71±157.88	0.02
	5-9	827.78±216.40	
Stage of tumor	I & II	641.67±144.33	0.01
	III	804.35±212.08	

DISCUSSION

Complete removal of JNA tumor through surgery is the preferred way of treatment. Owing to their vascularity, the major risk of surgery is excessive blood loss. Therefore, pre-operative embolization of blood supply to tumor via internal maxillary artery, is normally done. In several cases, the tumor shrinks significantly after embolization while the per-operative blood loss is significantly reduced. As tumour grows enlarge, it needs more blood from multiple branches of external carotid artery and bilateral embolization might be essential. In the presence of erosion of the skull base, the blood supply may be received viainternal carotid artery. Embolization of the influence from internal carotid artery is not applicable owing to the probable severe complications[13].

There are several surgical treatments available for JNA removal. The customary open methodsusually need facial cut& osteotomies with unpredictable outcomes on the skeleton of emerging adolescent. Complications & morbidity after open surgical techniqueare well-documented in literature, including cerebrospinal fluid leakage, haemorrhage, hypoesthesia & diplopia[14]. Tumor that extend in the middle fossa, base of the skull& orbit needs wide-field exposure, accumulativesurgical complications and morbidity, which can avertthe complete removal of the tumor. So, few researcher suggested that the patients treated with major intra-cranial or skull-base extension having preoperative or postoperative radio-therapy for "un-resectable" disease (30-46 Gy), estimatingcomparable control rates in favor of surgery alone[15].

However Mendenhall et al.,did a case for radio-therapy, some noticeable points must be consider.[16] First of all, as declared in a review by McAfee and his team, gigantictumor or disease is less respondent to the radio-therapy alone while it may need to conduct a surgical debulking before radio-therapy.[15]This is because, typically patients of intracranial extension have immensetumor which usually need surgical excision, one single way to treat JNA must be choose, if achievable. Secondly, as the JNA is a benign disease, slow growth, but locally hostile tumours, local control is adequate, if done via surgery only. Thirdly, the Mendenhall and his team compared the radio-therapygroupmainlywith the open surgerygroup[16].

Actually, the only surgical sequence with momentous numbs of endoscopy, where the morbidity outline & control rates were tremendous was also from the “University of Pittsburgh Medical Center”.[17] In conclusion, the exposure to radiation transfers exceptional risks of development of delayed cancer, cataract, thyroid dysfunction& otologic illness[18]. Asthe patients are already exposed to the surgical hazards of tumour debulking, it might beideal to finish the surgery and preventthe patients from furtherhazardsthat

may occur due toradioactivity exposure.In our study, the amount of per-operative blood loss was 748.56±204.89mL.

Twu et al.,[19] demonstrated that the average surgical blood loss was reduced when preoperative embolization was performed. Significantly reduced intraoperative blood loss facilitated the ongoing surgical procedures, reduced complications associated with blood transfusions, and made it possible to resect the tumor via less aggressive procedures, such as transnasal endoscopic surgery. The complications of transarterial embolization include technical failure, escape of the emboli into the ophthalmic artery or intracranial circulation, analphylactic reaction to the contrast media, infection at the puncture site, hematoma and bleeding. A careful angiographic technique can minimize these complications since they are frequently caused by technical inadequacies.[20]

The main aim of the surgery is for complete resection of the tumor with minimal loss of blood and fewer complications. Because of intraoperative hemorrhage, the absence of the true tumour capsule, potential of submucosal tumor extension, and complexity of the cranial base anatomy, successful resection requires good surgical exposure and delicate techniques. Several surgical approaches have been advocated by different researchers, including the transpalatal approach, transantral approach, lateral rhinotomy with medial maxillectomy, midfacial degloving, the transzygomatic approach, the maxillary swing, and craniofacial resection.[21, 22] The main procedures in our series were lateral rhinotomy and transpalatal approaches, all of which are suitable for early stage tumors. These procedures provided good exposure of the lesion and did not cause cosmetic problems.

CONCLUSION

In conclusion, mean per-operative bleeding in juvenile nasopharyngeal angiofibromas with pre-operative embolization was 748.56±204.89mL. Pre-operative embolization of the external carotid branches seems to assistthe removal of high grade tumours.

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