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Fully endoscopic resection of juvenile nasopharyngeal angiofibroma – Own experience and clinical outcomes

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ABSTRACT

Objectives: The treatment of choice in juvenile nasopharyngeal angiofibroma (JNA) is surgery – nowadays endoscopic techniques. The aim of the study was to present the results of endoscopic treatment in patients diagnosed with juvenile angiofibroma.
Materials and methods: In this retrospective case series, 10 patients with a diagnosis of JNA treated at the Department of Otolaryngology of the Medical University in Poznań from 2006 to June 2013 were included. The age of patients were between 11 and 19 years old (14.6 on average). In 9 out of 10 patients the treatment was preceded by embolization. The surgery used the endoscopic approach through one nostril and the four-handed technique.
Results: Total resection was possible in all cases. Blood loss ranged from 100 to 250 ml. Post-operative hospitalization lasted from 3 to 5 days (3.3 days on average). Recurrence was reported in one patient. The observation lasted from six months to seven years (3.55 on average).
Conclusions: Endoscopic resection of juvenile angiofibroma is safe for the patient. Moreover, if the evaluation of the tumour size and staging is correct, the ability of total removal of the tumour is very high. It is also connected with small blood loss, short hospital stay and good cosmetic effects.

1. Introduction

Juvenile angiofibroma (JNA) is a benign tumour growing on the lateral wall of the nasopharynx around the sphenopalatine foramen. This well-vascularized tumour expands and destroys the surrounding structures. It can spread towards the paranasal sinuses, the pterygopalatine and infratemporal fossa, the orbital cavity, the skull base and the cavernous sinus, which poses a threat to the health and life of the patient [1]. The tumour is relatively rare and represents about 0.5% of all head and neck cancers [2,3]. Surgical resection preceded by embolization of the vessels that supply blood to the tumour is the treatment of choice and usually includes the maxillary artery branches [4]. The treatment of these tumours has changed dramatically over the past 15 years. It has transformed from bloody surgical procedures, which were followed by numerous complications such as the presence of scars on the neck and face, facial deformities, a long period of healing and facial dysesthesia, into elegant endoscopic operations having little or minimal side effects. Also, hospitalization time has considerably reduced, which is important in the era of cost-effectiveness of treatment. The development of embolization methods [4] and endoscopic techniques [2,3,5–8] had a significant impact on this evolution. Initially, only small tumours confined to the nasopharynx and paranasal sinuses regions were qualified for endoscopic operations, which gave good results [9,10]. However, gradually the indications became more broad. Currently, endoscopic techniques are becoming the treatment of choice for all JNA without intracranial penetration [2,7,8]. The aim of the study was to present the results of endoscopic treatment in patients diagnosed with juvenile angiofibroma at the Department of Otolaryngology and Laryngological Oncology of the Medical University in Poznań.

2. Materials and methods

In Department of Otolaryngology and Laryngological Oncology in Poznan, Poland, 30 patients underwent surgery for JNA between 2000 and June 2013. The age ranged from 9 to 56 years with the mean age of 17.6. Patients were treated by open surgery (Denker's method), endoscopic assisted open approach and endoscopic approach only. The turning point was in June 2006, when endoscopy with navigation was introduced. The analysis included retrospective data from 10 patients undergoing endoscopic

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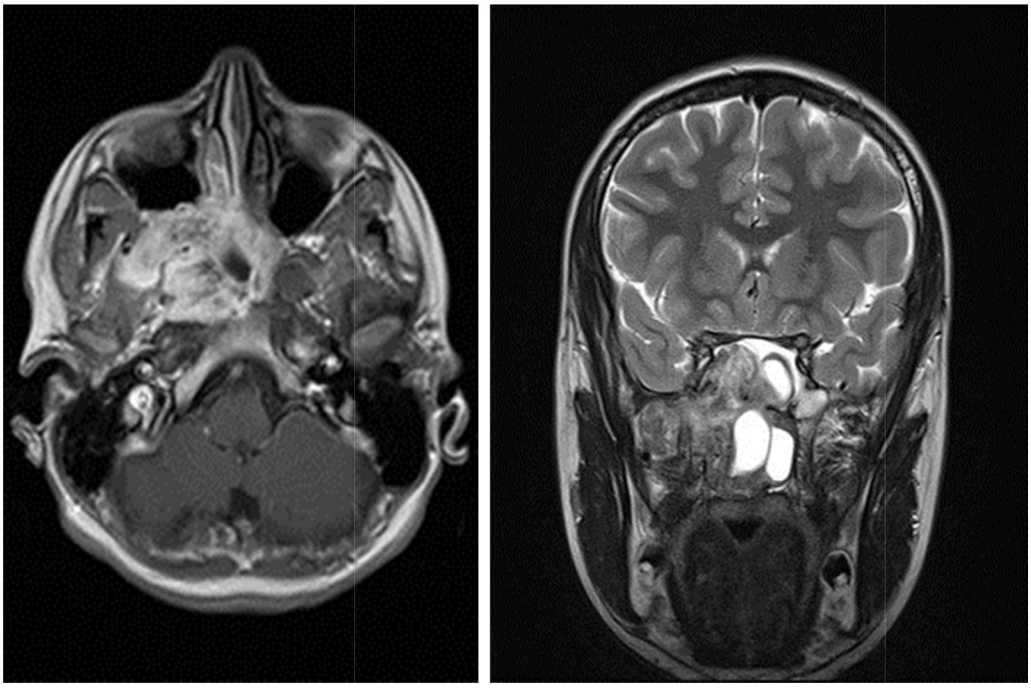

Fig. 1. Juvenile angiofibroma penetrating into the pterygopalatine and infratemporal fossa (MRI before the surgery, IIC according to Radkowski scale).

surgery exclusively due to juvenile angiofibroma in the years June 2006–2013. The therapy involved only boys from the age of 11 to 19 years old (14.8 on average). In all cases, the final histopathological examination revealed juvenile angiofibroma. The tumour size was measured based on magnetic resonance imaging according to the Radkowski's classification (Fig. 1) [12]. The preoperative preparation included the following tests: neuronavigation imaging studies, angiography with embolization performed 4 days before the surgery and nasal endoscopy. Embolization was carried out in 9 out of 10 patients (Fig. 2). Patients characteristics are shown in Table 1.

3. Surgical approach

The surgery used the approach through one or two nostrils and the four-handed technique. Endoscopic resection in IA and IB tumours involved the removal of the middle turbinated bone, front and back ethmoidectomy and wide meatal antrostomy, which revealed the posterior wall of the maxillary sinus. This allowed total resection of the tumour together with its attachment around the sphenopalatine foramen. In 5 out of 7 cases, the inferior turbinated bone was also resected in order to obtain the appropriate access to the tumour. In patients with tumours penetrating into the pterygopalatine and infratemporal fossa (patient 4 and 7), the resection covered the posterior wall of the maxillary sinus and the fragment of the posterior part of the nasal septum; thus the entire tumour was exposed. The resection also involved the subperiosteal attachment around the inferior wall of the sphenoid sinus and the ceiling of the nasopharynx (Fig. 3). Bleeding from the maxillary artery was supplied by means of bipolar and monopolar coagulation. Nasal tamponade was held 24–48 h after the surgery. In two cases, tamponade was removed 24 h after the procedure, while in eight cases after 48 h.

4. Results

Total resection was possible in all cases. Blood loss ranged from 100 to 250 ml. No patient required blood transfusion in the perioperative period. Hospitalization after the surgery lasted from 3 to 5 days (3.3 days on average). Recurrence was observed in one patient (patient 8). This patient did not undergo embolization before the surgery. Diagnosis of juvenile angiofibroma was suspected intraoperatively. It was impossible to perform nasal endoscopy before the surgery due to the patient's lack of compliance. A CT (computer tomography) scan did not reveal bone destruction. The patient had no complaints of nasal bleeding prior to the surgery. The lesion was limited to the nasal cavity. Recurrence was reported during the follow-up, 12 months after the first treatment. Endoscopic resection was carried out after embolization. The place of tumour attachment was controlled, which resulted in full recovery. Medial maxillectomy and the removal of the posterior wall of the frontal sinus allowed for good visualization of the lateral border of the tumour during endoscopic surgery of IIB and IIC tumours. The resection of tumours that entered the infratemporal fossa did not require the use of the second nostril and the transseptal access. There were no complications in patients with small tumours IA, IB, IIA. Also, the post-operative care and healing of the nasal cavity were remarkable. Excessive drying out was reported in patients with large angiofibroma IIB and IIC, which required endoscopic cleaning of the surgical cavities. One patient required surgical cleaning under general anaesthesia due to headache that appeared two weeks after the surgery. Apart from that, the study group showed no complications. The observation period is from 6 months to 6 years. The protocol of postoperative control includes MRI (magnetic resonance imaging) performed every year and nasal endoscopy carried out every 3 months. The symptoms of nasal obstruction or nasal bleeding are indications for immediate imaging diagnostics and follow-up endoscopy of the nose and paranasal sinuses.

5. Discussion

Imaging techniques (CT, MRI) allow for precise determination of the juvenile angiofibroma spread. In addition, they were used to develop the appropriate classification depending on the tumour size. The extent of tumour spread beyond the nasopharynx is a common feature of all classifications. The classification introduced