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Case Report

Juvenile angiolipoma in the subtemporal region, zygomatic, and pterygomaxillary fossa treated by microwave ablation – A case study and literature review

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ABSTRACT

Background: Angiolipomas are benign mesenchymal tumors that infrequently affect the head-and-neck region and can appear with infiltrating and non-infiltrating forms. Surgical excision is the treatment of choice; however, there are other alternatives to manage this condition whose consideration is quite useful to evaluate per each particular case.

Case Description: An 11-year-old girl was diagnosed with non-infiltrating angiolipoma in the subtemporal region, the zygomatic, and pterygomaxillary fossa; she had a history of having undergone surgery on two previous occasions with a failed resection attempt due to the high vascularization of the injury and significant transoperative bleeding. The condition was managed with minimally invasive techniques through microwave ablation, requiring two sessions, achieving very satisfactory results both esthetically and in the final size of the lesion.

Conclusion: The microwave ablation technique may turn out to be a very useful tool for the management of lesions with high vascularization such as angiolipoma. This technique offers a new possibility for initial management, both independent of and complementary to other management techniques for other lesions at the base of the skull and/or facial massif regions.

Keywords: Angiolipoma, Lipoma, Microwave ablation

INTRODUCTION

Angiolipomas are benign mesenchymal tumors that infrequently affect the head-and-neck region and can appear with infiltrating and non-infiltrating forms. Surgical excision is the treatment of choice; however, there are other alternatives to manage this condition whose consideration is quite useful to evaluate per each particular case. We describe a case of non-infiltrating angiolipoma involving the subtemporal region, the zygomatic fossa, and the pterygomaxillary region on the right side. The effect of its volume deformed bone structures and adjacent soft tissues, with noticeable facial deformity. The patient underwent treatment on two occasions, with a failed attempt at surgical resection with a maxillofacial operation due to a high degree of vascularity

and intraoperative bleeding. Given the history of high vascularization, it was decided to manage the tumor ablation using ultrasound-guided microwaves. This required the patient to undergo two ablation sessions to achieve acceptable results, both esthetic and in terms of tumor volume.

CASE STUDY

An 11-year-old female patient had a progressive increase in volume in the cheek region on the right side. This condition was noticed by the mother of the patient at the age of 10 years and was accompanied by mild local pain on palpation and with chewing, as well as with limited opening of the mandible. The patient was initially seen by the department which twice performed the maxillofacial operation which involved a failed resection attempt due to high bleeding liability. Procedures involved performing a linear suprazygomatic incision, vertical on the right side, 1 cm in front of the tragus, achieving a biopsy for histopathological study and where angiolipoma was reported.

Magnetic resonance studies were evaluated where, when a considerable extension of the lesion is observed, from the zygomatic fossa to the pterygomaxillary, with displacement of the masseter muscle [Figure 1]. It was decided to perform two surgeries with the approach through the same scar from the previous procedures.

The first procedure involved a suprazygomatic incision where a biopsy was taken for histopathological study and ablation of the suprazygomatic portion of the lesion was realized [Figure 2]. The second intervention was performed with a transoral approach, achieving ablation of the zygomatic and pterygomaxillary fossa regions of the lesion. In both surgeries, to avoid damage to the trigeminal and facial nerve, ultrasound was used as a navigation tool, making sure that the tip of the antenna was always in the center of the tumor (intracapsular) and thus avoiding heating or puncture damage to these structures. The ablation technique was used repeatedly on at least four occasions in each surgery, with different vectors of no more than 1 min of ablation each; care was taken not to exceed 90°C.

DISCUSSION

Angiolipomas as histological variants of lipoma are benign mesenchymal tumors composed of mature lipocytes and blood vessels.[2,5] They show an important vascularity, which is composed of capillary-type vessels being more prominent in the periphery and often containing scattered fibrin thrombi.[8,11]

Angiolipomas most commonly affect young male patients, accounting for approximately 6–17% of all lipomas.[3,5,11] They arise more frequently in the trunk and extremities,[5] although they are also commonly seen in the spine, gastrointestinal tract, and bones,[11] but infrequently affecting the head-and-neck region.[5,11]

Based on the studies performed, angiolipomas can be divided into two types, infiltrating and non-infiltrating.[6] Those of the non-infiltrating type are the most common and are usually present in pubescent patients. The non-infiltrating type can occur in multiple sites in 79% of cases, and their most important histological characteristic is that they are encapsulated. Those of the infiltrating type usually appear in patients over 30 years of age and histologically are non-encapsulated lesions.[3,13,14]

The diagnosis of angiolipoma is based on both clinical and histopathological examination. Ultrasonography, magnetic resonance imaging, and fine-needle aspiration cytology can be useful in the diagnosis of angiolipoma.[5,13]

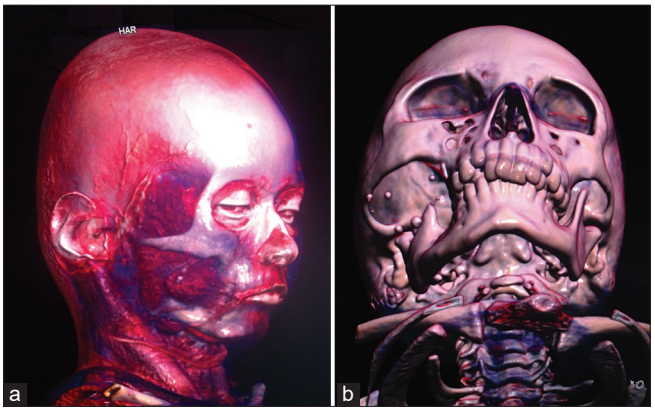

Figure 1: 3D-Volume Rendering of tomography study reconstruction. (a) Anterolateral view with image of soft tissue, a transspatial tumor is demonstrated in the right subtemporal region with extension to the zygomatic and pterygomaxillary fossae, deep in the masseter muscle. (b) Anteroinferior view with bone image: Facial asymmetry is demonstrated with increased width of the zygomatic fossa, anterior displacement, and thinning of the right zygomatic process. As with remodeling of the mandibular ramus, there is no alteration of the cortical bone.

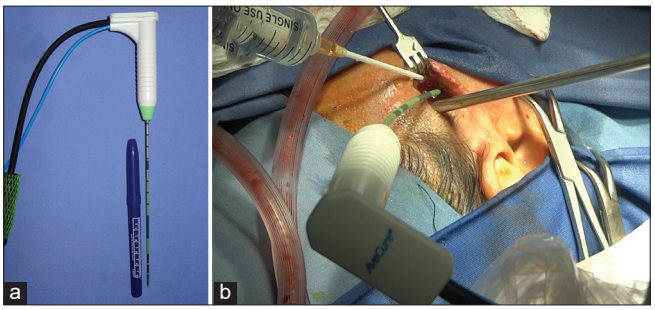

Figure 2. (a) Ablation antenna used in the treatment of the patient (14.5 gauge; MedWaves). (b) Surgical procedure in which the introduction of the ablation antenna toward the pterygomaxillary region can be visualized.

Treatment for non-infiltrating angiolipoma is enucleation, while for infiltrating angiolipoma a wide excision should be performed to include surrounding normal tissue. In cases of recurrence or inadequate resection, radiotherapy should be pursued;[7] however, other treatment alternatives are considered in the literature for both histological types, such as the use of a CO_2 laser, liposuction, or a KTP laser (Potassium Titanium Phosphate) --- even interferon alpha can be used in a successful fashion in infiltrating angiolipoma.[1,5,10,13] Per the following, new treatment options have been put into practice: Microwave thermal ablation where the authors have already reported the management of a series of cases with intracranial lesions, and the skull base with very favorable results for certain types of lesions, in particular the angiolipoma shown in this case.[12] The histological effects already observed and reported of this type of ablation in some tumors focus on the subtle loss of chromatin in the nucleus of the cell. This involves destruction of the cell membrane, which leads to a uniform cell death of the tissue exposed to thermal effects.[4,9]

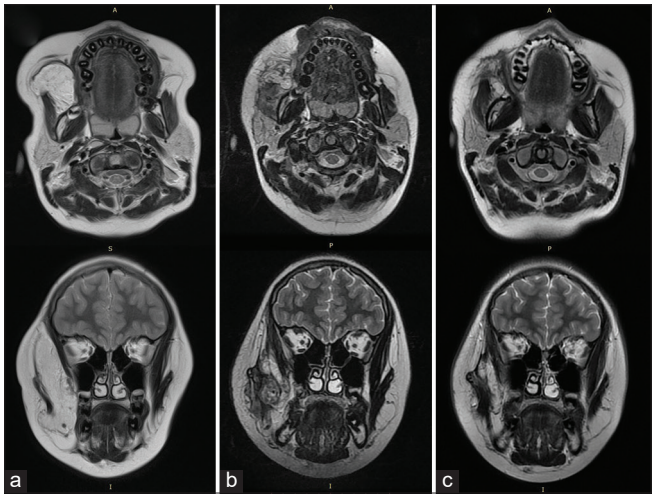

Figure 3: T2-enhanced magnetic resonance images in the axial and coronal sections, where the changes were observed during the care of the ablation, are shown here sequentially. (a) A basal study shows a lesion with intensity similar to that of fatty tissue in the right masticatory space that displaces the masseter muscle. This lesion extends toward the zygomatic and pterygomaxillary fossa regions, involving an increase in the volume of said area prior to ablation. (b) Control study 5 months after ablation (c) Same sequences 1 year and 9 months after ablation: Note the decreased volume of the tumor and the presence of hypointense fibrous scar tissue.

Figure 4: Image showing the secondary facial changes due to tumor growth in its pre-operative stage (on the left) and the esthetic results 3 years after microwave ablation of the tumor (on the right).

It is our judgment that the thermal effect of the microwave ablation shows two important phases: (1) The damage caused by hyperthermia, which generates an inflammatory process with a higher peak between 72 h and 7 days after ablation, with the consequent progressive decrease in edema and swelling and (2) in the medium term a second phase, characterized by a progressive reduction in the volume of the lesion (the latter, as shown by the evolution both in facial aspects and in magnetic resonance images [Figures 3 and 4 respectively]), which we wanted to name as the "microwave effect."

In general, recurrences are very rare. The exception is for infiltrating angiolipoma, which has a recurrence rate of 35–50%.[13] On the other hand, there is no evidence that angiolipomas undergo malignant transformation due to the lack of atypia, pleomorphism, or mitotic figures in the angiomatous or adipose tissue.[14]

CONCLUSION

The subtemporal, pterygomaxillary, and facial region is an area that is also the responsibility of neurosurgery as part of skull base surgery.

Management of highly vascularized lesions that jeopardize this area with conventional techniques involve a high possibility of damage to structures, such as to the temporomandibular joints, to temporal muscle and trigeminal and facial nerves, as well as involving blood loss. Microwave ablation is a new technique in neurosurgery which is already used by the authors in the treatment of intracranial tumors and of the skull base. Patients with these types of conditions could benefit from avoiding many of the aforementioned complications, considering a minimally invasive technique which can be applied repeatedly such as in the present case.

In the case of other types of extracranial lesions, new studies are necessary to further demonstrate the effects generated by this type of ablation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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