Introduction

Traumatic neuromas are a non-neoplastic, proliferative process in which an injured or severed nerve attempts to regenerate. This process results in an unorganized collection of neural, glial, and connective tissue fibers on the proximal end of the injured nerve (1, 2, and Image 1). These lesions typically present 1 to 12 months after transection, but have been reported up to 10 years after the original injury (2, 3).

Traumatic neuromas have been described within the medical literature for centuries and most early accounts involve cases related to amputation of an extremity (4). Traumatic neuromas involving the head and neck are less common, but have been described following various surgical procedures and have involved a variety of nerves (5, 6, 7, 8, 9).

Accurate identification of traumatic neuromas in the clinical context of prior malignancy is important in order to make the distinction between a benign neuroma and localized recurrence or perineural spread of tumor. CT characteristics of traumatic neuromas following neck dissection include a nodule with a radiolucent center and peripherally dense rim. Most important is the characteristic of an intact layer of overlying fat that remains stable over time (10).

The purpose of this report is to describe the MR appearance of a traumatic neuroma of the mandibular division of the trigeminal nerve and to review the imaging literature describing traumatic neuromas of the head and neck. Proper identification of traumatic neuromas based on clinical history, physical exam, and imaging studies is important in order to avoid potentially morbid tumor resection of an otherwise benign entity.

Case

A 66-year-old Asian female presented in 2003 for follow-up regarding a history of squamous cell carcinoma of the left retromolar trigone. She had undergone a left hemi-mandibulectomy, left maxilllectomy, left partial palatectomy, and partial ethmoidectomy followed by radiation therapy with curative treatment in 2002.

She was followed to evaluate for local recurrence with clinical evaluation, CT, and MRI imaging studies. No evidence for recurrent tumor was noted during this time period. Several PET scans performed during this time to evaluate for metastatic disease displayed no tracer uptake. Over the last several years, the patient had occasional complaints of left-sided otalgia and was intermittently treated for recurrent serous otitis media with associated mastoid effusion.

In order to further evaluate these obstructive symptoms an MRI was performed on 6/08 (Image 2C). This revealed an enhancing mass in the foramen ovale that extended beneath the skull base into the infratemporal fossa. Comparison of this image to MR images in January 2005 (Image 2A) and March 2006 (Image 2B) showed a stable lesion of V3 in the area just inferior to the foramen ovale. This was likely the site of transection during the ablative surgery. A left-sided mastoid effusion was also noted to be stable over the period of several years. The patient's symptoms responded well to non-surgical management and she has since had resolution of her left-sided otalgia with no other signs of tumor recurrence.

Discussion

The natural history of traumatic neuromas involves no malignant potential with slow growth. If asymptomatic, they require no surgical intervention (5). Therefore, following malignant tumor resection it is important to differentiate these lesions from local recurrence, new primary lesions, or perineural tumor extension.

The clinical scenario displayed by this patient (otalgia, recurrent SOM, and associated mastoid effusion) was concerning for local recurrence or a new primary lesion. Based on the MR imaging studies gathered over a three year period that included a stable imaging pattern in the area of concern, imaging characteristics consistent with a neuroma and the clinical context of resolving symptoms with conservative treatment, the diagnosis of traumatic neuroma was made.

To our knowledge, ours is the first report of a traumatic neuroma involving the mandibular division of the trigeminal nerve within the foramen ovale. It is likely that the nerve was transected in the course of the surgical resection and was then formed through a reactive process that slowly developed into a mass detectable via MR imaging over the next several years.

Existing literature has helped to establish the increased sensitivity that MR has over CT in detecting perineural spread of tumor (10, 11). Consistent with the increased resolution for soft tissue with MR imaging, characteristics associated with gadolinium-enhanced MR include the ability to detect abnormal enhancement of nerves prior to noticeable nerve enlargement. Also, MR is able to distinguish the infiltration of the normal fat by perineural tissue as they exit the skull base better and earlier than CT. Both these characteristics, in combination with the expected location of post-surgical changes and lack of interval change in the lesions over time make the diagnosis of traumatic neuroma.

Conclusion

- Traumatic neuromas are uncommon in the head and neck.
- They present a diagnostic and therapeutic challenge in the context of prior or possibly recurrent malignancy.
- Gadolinium-enhanced MR images offer some advantages in the identification of a neuroma in the skull base due to lack of innate contrast.
- Characteristics, in combination with the appropriate clinical context, include proper identification of homogeneous perineural fat and slow or no interval size changes over months to years.

References