An unusual localization of intraosseus Schwannoma: mandibular localization and new pathogenetic prospectives.

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Introduction
Schwannoma rarely presents as an intraosseous mass, comprising less than 1% of all bone tumors with a strong predilection for the mandible. No definitive hypothesis has been yet proposed to explain this condition. We report a new case with an unusual clinical presentation and interesting pathological findings which may allow us to propose an explication about the pathogenesis of such lesions.

Materials and methods
The patient C.M., 40 years old, came to our attention on August 2008, with a secondary nerve pain symptoms of the right third trigeminal branch. This symptomatology had occurred by three months, and it was also associated to tooth mobility of 4.5 and 4.7. The patient also referred in the last month a profile deformation of the inferior jaw on the right side, with increasement of the nerve pain and dysesthesia of the lower third of the face. The kind of the pain made us suspect the presence of an intraosseous Schwannoma.
assuming that it was related to a secondary disease. The intraoral examination pointed out the profile deformation of the symphysis area and flattening of the right inferior fornix (Fig. 1).

The patient performed a routine screening, like OPT that showed an area similar to “ground glass” on the right mandibular body, extended up from the premolar region and to the ipsilateral molar. The radiological examination pointed out not only the volumetric deformation of the right part of the mandible, but also the disappearance of the mandibular canal and the root resorption of 45 and 47, that confirmed the tooth mobility and the pain symptoms during chewing acts (Fig. 2).

Except for the mandibular profile deformation and for the tooth mobility, no other sign was present. The patient underwent, in local anaesthesia, the teeth extractions (45, 47) and removal of the lesion, that presented as solid and bleeding mass, and extremely attached to the neuro-vascular bundle which was preserved during the surgery (figs. 3-4-5). The histological examination of the removed lesion confirmed the diagnosis of intra-osseous Schwannoma.

The post operative course was free from any complications.

Fig. 1: Pre-operative OPT.

Fig. 2: Intra-oral view.

Fig. 3-4: Intra-operative view.

Fig. 5: Anatomical piece.
Results

The clinical and radiological follow up after three months since the surgery showed the residual bone cavity and the disappearance of the pain, but with the residual little hypoestesia at the right lower lip with sporadic sign of paresthesia.

The clinical and radiological follow up after one year since the surgery, using OPT, showed an improvement especially of bone formation (Fig. 6) especially, and we ascertained the disappearance of paresthesia.

The tumor was a Schwannoma which showed a biphasic histomorphological pattern with spindle shaped cells arranged in compact interwining fascicles (Antoni A areas) or stellate cells loosely arranged in a myxoid stroma (Antoni B areas) (Fig. 7A, 7B). A marked preponderance of Antoni A areas sometimes containing cells with a high nuclear/cytoplasmatic ratio, hyaline vessels and stromal calcifications were evident Fig. (7C, 7D). Immunohistochemically the Schwannoma labelled with antibodies to S-100, Vimentin, Osteopontin and

Fig. 6: Post-operative OPT.

Fig. 7A: The Ematoxiline-eosine coloration shows the tumor histological characteristics of benignity and the pattern compatible with the Schwannoma diagnosis (H&B; 40X).

Fig. 7B: The diagnosis is confirmed by the immunohistochemical coloration positivity of the S-100 protein (20X).

Fig. 7C: Osteopontine immunohistochemical coloration: it is notable the positivity around the the calcified areas (20X).

Fig. 7D: Osteonectin immunohistochemical coloration: it is notable the positivity around the the calcified areas (20X).
Osteonectin (Fig. 7E, 7F). CD34 positives cells was found in Antoni B areas. Proliferative index was <1%. Formalin-fixed, paraffin embedded tissue sections obtained after appropriate sampling of the surgically removed mass were evaluated by Hematoxylin and eosin (H&E) and immunohistochemical stains. Antibodies and protocols for immunohistochemistry are listed in Table I. All procedures were carried out at room temperature. Negative control sections for immunohistochemistry were processed without the primary antibody. Proliferative index was evaluated using the antibody anti-Ki-67 (Dako, MIB-1) and counting 1000 nuclei at high power field.

**Discussion and Conclusion**

Origin of Schwannomas from the mandibular nerve has been sometimes demonstrated, however the tumor showed presence of calcification and expression of proteins such as osteopontin and osteonectin which play a role in ossification, also in the cranial district, that is in structures originating from cephalic neural crests. In the head and the neck, the neural crest also yields cells that form craniofacial cartilages, bones, dermis, adipose tissue, vascular smooth muscle cells and telencephalic meninges. Calcification in Schwannomas are often observed among “Ancient” changes in other districts, but in the skull it appear clearly as a different finding, probably linked to the particular nature of Schwann cells derived from cephalic neural crest cells. Moreover, data as the expression of osteopontin are believed distinctive feature of other schwannian cell tumors such as the granular cell tumor. Such data might explain the prevalence of mandibular location among the rare intraosseous schwannomas and might mean that the calcified schwannoma of the skull is similar to an hamartomatous lesion.

**Riassunto**

Gli Schwannoma sono tumori relativamente benigni; quelli intraossei sono rari e corrispondono a meno del 1% di tutti i tumori ossei, con forte predilezione per la mandibola. Gli Autori descrivono il caso clinico di un uomo di anni 40, che riferiva da circa tre mesi una sin-

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**Table I - Antibodies and protocols for immunohistochemistry**

<table>
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<th>Antigen/Clone</th>
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tomatologia di tipo nevralgico secondaria, a carico della terza branca trigeminal destra, con segni clinici subiettivi di vacillamento dentario del 45 e 47. Il paziente inoltre, da un mese presentava anche una deformazione del profilo emimandibolare destro con incremento della sintomatologia nevralgica e comparsa di segni diastetici a carico del terzo inferiore della faccia. L’OPT dimostrava la presenza di un’area tipo “ground glass” in corrispondenza della zona parasinfisaria e del corpo emimandibolare destro con scomparsa del canale mandibolare, rizalisi del 45 e 47. In anestesia loco-regionale il paziente è stato sottoposto ad avulsione del 45 e 47, asportazione della lesione, con preservazione del fascio vascolo-nervoso, al quale la lesione era fortemente adesiva. L’esame istologico dava diagnosi di Schwannoma intraosseo. Lo scopo del lavoro è quello di dare una ulteriore spiegazione sull’eziopatogenesi dello Schwannoma, partendo da dati rilevati dagli Autori, come l’espressione dell’osteopontina, che si crede abbiano caratteristiche distinctive di altre cellule tumorali schwanniane come tumore a cellule granulare. Questi dati potrebbero spiegare la prevalenza della localizzazione mandibolare tra i rari Schwannomi intraossei e potrebbe significare che lo Schwannoma calcificato del cranio è simile ad una lesione amartromatosa.

References
