Abstract

Eagle’s syndrome is characterised by an elongated styloid process and/or calcification of the stylohyoid ligament, which interferes with adjacent anatomical structures, giving rise to pain especially in the neck and throat area, as well as facial pain, otalgia and other symptoms that might not be associated with the oral and maxillofacial complex. These symptoms complicate the diagnosis, since it can be confused with other conditions; therefore, the differential diagnosis is vital. The following article presents a case of a patient with several signs and symptoms of Eagle’s syndrome for which CBCT images were essential in the differential diagnosis.

Introduction

The diagnosis of oropharyngeal pain is very complex owing to the great variety of anatomical structures found in that area. Eagle’s syndrome is named after Watt W. Eagle, who first described it in 1937 in patients with oropharyngeal and cervical pain after a tonsillectomy and with an elongated styloid process visible in radiographs.1

The size considered normal varies according to several studies (Table 1). The majority of studies agree on an estimated measure of between 2.5 and 3.0 cm.2–5 Around 4% of the population have an elongated...
styloid process, yet only 10.3% of them exhibit symptoms. It is more common in women (1:3 ratio) and occurrence increases after the age of 40.3–7

_Aetiology_

Aetiologically, patients are classified into those who have undergone tonsillectomy and those who have not had their tonsils surgically removed but with the same symptoms. Other theories exist, but the following are the most significant:1,4,7,10–12

_Congenital origin:_ due to the persistence of a cartilaginous element connected to the temporal bone

_Meta- or post-traumatic origin:_ originates from partial or total calcification of the stylohyoid ligament

_Anatomical origin:_ where the theory of ossification is related to mandibular growth, due primarily to the proximity between the first and second pharyngeal arches and second due to the functional stimulation of the stylohyoid ligament derived from poor mandibular positioning, which generates ossification of this structure.

_Pathophysiology_

As previously mentioned, the majority of patients are asymptomatic, and there is no relation between the size of the styloid process and the symptoms. The symptoms can vary from mild to severe, depending on the degree of adaptation and proximity to the surrounding structures.

The most important surrounding structures are as follows:4

_Medially:_ internal carotid artery, internal jugular vein, glossopharyngeal nerve, hypoglossal nerve and vagus nerve

_Laterally:_ external carotid artery

_Posteriorly:_ facial nerve and glossopharyngeal nerve.

<table>
<thead>
<tr>
<th>Study</th>
<th>Measurement</th>
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<tbody>
<tr>
<td>Moffat</td>
<td>1.52–4.77 cm</td>
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<tr>
<td>Kaufman</td>
<td>&lt; 3 cm</td>
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<tr>
<td>Correl et al.</td>
<td>&lt; 2.5 cm</td>
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<td>Lindeman</td>
<td>2–3 cm</td>
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<tr>
<td>Langlais et al.</td>
<td>&lt; 2.5 cm</td>
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<td>Monsour &amp; Young</td>
<td>&lt; 4 cm</td>
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<tr>
<td>Montalbetti et al.</td>
<td>&lt; 2.5 cm</td>
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Table 1. The size considered normal varies according to several studies.
The symptoms will depend on the area of contact with the styloid process. In general, symptoms have been described as pain and feeling of a foreign object on the neck, pharyngeal pain, dysphagia, otalgia, temporomandibular joint pain and pain irradiated to the superior structures. Also, paraesthesia of the hand, pain in the temporal area with photopsia and hypacusis, vertigo, carotidynia, tinnitus, dysphonia, limited mouth opening, taste alteration and ptyalism have been reported. The majority of the symptoms are present during normal physiological movements, such as chewing, biting, speaking, opening the mouth, yawning, coughing and turning the head.

**Diagnosis**

The diagnosis is based primarily on clinical signs and symptoms and an immunological analysis. Owing to the great variety of symptoms, it is necessary to have a differential diagnosis, which could include the following:

- Temporomandibular dysfunction
- Laryngo-pharyngeal dysesthesia
- Chronic tonsillo-pharyngitis
- Hyoid bursitis
- Sluder syndrome
- Ernest syndrome
- Pseudo-stylohyoid syndrome
- Glossopharyngeal neuralgia
- Trigeminal neuralgia
- Migraine
- Sphenopalatine neuralgia
- Cervical arthritis
- Temporal arthritis
- Impacted molars
- Otitis
- Salivary gland disorders
- Tumours.

**Imaging diagnosis**

The evolution of techniques used for the diagnosis has been rapid and ongoing. In many of the previous studies, transcranial and lateral radiographs were used at 20–30 degree angles extending to the neck and even a panoramic radiograph as the method of choice to evaluate the styloid process. However, all of these techniques produce a magnified image and/or distortion and for this reason cannot be considered 100% accurate when measuring structures. Because of this, the method chosen for the present study was CBCT, given its characteristics of less radiation and high accuracy, and the excellence and precision of the associated software.

**Treatment**

The initial treatment is infiltration of analgesics and local corticosteroids, with favourable and significant results in decreasing pain. If this treatment fails, surgical resection is indicated.

**Clinical case**

A 50-year-old female patient attended for a consultation after having seen several specialists. Several radiographic examinations had been performed, the most important of which were a lateral cranial radiograph, an anteroposterior radiograph and a head CT scan, in search of vascular problems, tumours, haem-
case report

CBCT in diagnosis

orrhages or anatomical variance. The doctors who had been consulted before included a general medical practitioner, otolaryngologist, maxillofacial surgeon and neurosurgeon.

The patient’s symptoms included pain in the neck, cheeks, temporomandibular joint and upper back, as well as tinnitus and hearing loss, and constant vertigo, worsened with changing posture, while walking or with head movement. Another symptom reported was sporadic nausea. She had been treated with analgesics, anti-inflammatories, muscle relaxants and ear irrigation. Unfortunately, there was no favourable progress.

Taking into consideration the symptoms described, we obtained a CBCT scan, as well as CT images and 3-D reconstructions. The length of the structures was evident even without measuring. In order to determine the exact size, we took measurements of both styloid processes, and found a length of 51.32 mm for the right styloid process and 48.35 mm for the left.

Once the exact size of the structures had been established, based on the severity of the symptoms and consultation with the maxillofacial surgeon, we decided to proceed to surgical resection. For this, we produced stereolithographic models to verify not only the size, but also the shape and direction of both styloid processes. Owing to the size and location of the styloid processes and taking into consideration the surrounding structures at risk, the group of surgeons decided to perform the surgery extra-orally. A second CT was taken to evaluate the results.

After having part of the styloid process removed, the patient began a favourable recovery. A month after the surgery, the symptoms had resolved almost completely.

Editorial note: A list of references is available from the publisher.

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