

Anatomical, Clinical and Radiographic Characteristics of Styloid Syndrome (Eagle Syndrome): a Case Report

Características Anatómicas, Clínicas y Radiográficas del Síndrome Estiloide (Síndrome de Eagle): un Caso Clínico

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SUMMARY: Styloid syndrome is characterized by an elongated styloid process or calcification of the stylomandibular and stylohyoid ligament. This study describes a case of a 65-year-old woman who presented to the Stomatology Clinic, University of Marília with temporomandibular joint pain, ear ringing and a reduced ability to open the mouth. Panoramic and posteroanterior digital radiographs showed bilateral elongation of the styloid processes, especially of the right side, whose length extended beyond the mandible angle. The diagnosis was confirmed with the association of clinical data and image examinations. The treatment options for styloid Syndrome include clinical follow-up, surgical removal of the styloid process or fracture of the elongated process. The case was managed by providing prosthetic rehabilitation and clinical follow-up, observing the level of discomfort and the benefit that could be achieved by the therapy, and avoiding surgical intervention.

KEY WORDS: Eagle syndrome; Elongated styloid process syndrome; Temporal bone.

INTRODUCTION

The styloid process, located anterior to the stylomastoid foramen, originates in the second brachial arch, namely from the proximal surface of the Reichert's cartilage. It is a slender cylindrical bony projection, with a sharp end and of variable length that projects downward and forward from the inferior surface of the petrous part of the temporal bone, and is attached to the lesser cornu of the hyoid bone by the styloid-hyoid ligament. The temporal bone, easily observed on the side view of the skull, consists of five parts: squamous, tympanic, petrous, mastoid and styloid. Therefore, the styloid process was described as an anatomical accident of the external surface of the skull, on the petrous part of the temporal bone. This process provides attachment to three muscles: styloglossus, stylopharyngeus and stylohyoid and also to the stylomandibular ligament (Gray, 1988).

In addition to the aforementioned description, it should be noted that the styloid process is located between the internal and external carotid arteries, divisions of the common carotid artery, located in the anterior triangle of the neck.

The normal length of the styloid process is of

approximately 25mm, as described by Eagle (1937), hence any length exceeding that size would be considered elongated. However, some authors consider the styloid process elongated if the length is more than 30 mm. Studies performed by anatomists have proven that 2% to 4% of the overall population have either an elongated or a calcified styloid process (Keur *et al.*, 1986; Milner *et al.*, 1996).

The main symptoms of classic styloid syndrome include: reduced ability to open the mouth, increased salivation, a foreign-body sensation and pain in the pharynx, and tinnitus. However, an elongated styloid process (Fig. 1) or calcified styloid ligament usually does not cause characteristic symptoms (Guo *et al.*, 1997).

The etiology of this syndrome remains unknown, but many authors describe the involvement of traumas, such as tonsillectomy, which generally affects women between their 20's and 30's (Neville *et al.*, 2009).

Styloid syndrome, also referred to as stylohyoid syndrome, is supposedly caused by the ossification of traces

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of cartilage in the stylohyoid complex, which may or may not present symptoms and is detected through clinical and radiographic examinations (Slavin, 2002).

Therefore, according to the literature review, the images most commonly used for diagnosis are the lateral and posteroanterior views of the skull, oblique and lateral views of the mandible, and panoramic radiographs (Stafne & Hollinshead, 1962).

The treatment options for styloid syndrome include clinical follow-up, in cases with mild symptoms and the surgical removal of the styloid process in more severe cases, which can be performed through intraoral or extraoral access (Bafaqeeh, 2000).

CASE REPORT

A female leucodermic patient, 65 years of age, approached the Stomatology Clinic, University of Marília with complaints of temporomandibular joint pain, auditory symptoms such as tinnitus, and a reduced ability to open the mouth. Her physical examination showed no apparent surface abnormalities. In the clinical examination of the mouth it was observed that some of the patient's teeth were missing in the upper and lower arches, and she wore an unsatisfactory removable partial denture on both arches. Digital panoramic and posteroanterior skull radiographs were obtained to make a probable diagnosis (Figs. 2 and 3). The radiographic evaluations showed a bilateral elongation of the styloid processes, especially on the right side, which was longer and segmented. Both elongated sides extended down the mandible angle. Thus, together with the help of observed clinical findings and the radiographic examinations, styloid syndrome (elongation of the styloid process) was proposed as the diagnosis. The management adopted in this case was indication of prosthetic rehabilitation with new partial removable dentures for both arches, without the need for surgery, considering the patient's age, the low-complexity of the symptoms, and the report for type 2 diabetes mellitus and arterial hypertension on her anamnesis.

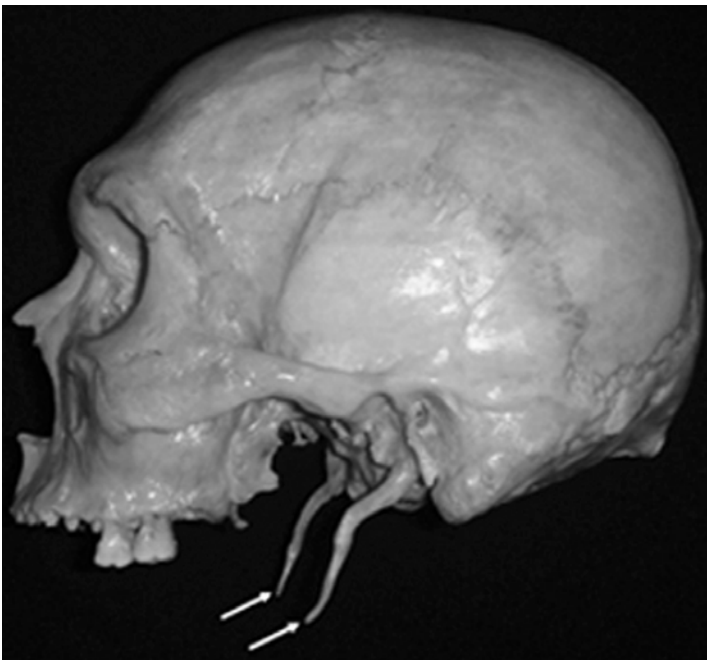


Fig. 1. Dry skull with bilateral elongated styloid processes (arrows).



Fig. 2. Plain arrows indicate the bilaterally elongated styloid process and the dotted arrow indicates the segmentation on the right side.



Fig. 3. Arrows indicate an elongated styloid process in the posteroanterior radiograph.

DISCUSSION

The normal size of the styloid process can vary considerably, with reports in the literature stating lengths from 15 mm to 40 mm. However, in 1937 Eagle described that styloid processes with lengths of over 25 mm should be considered elongated. Cadaver studies show that 2% to 4% of the overall population has an elongated styloid process or calcified styloid ligament (Keur *et al.*; Murtagh *et al.*, 2001).

Guo *et al.* observed that unilateral ossification of the styloid ligament is the most frequent. Leite *et al.* (1988) on the other hand, reported that there is no predominance of unilateral over bilateral ossification, as there was no significant difference between the studied skulls.

As to the prevalence in the overall population, Grossman & Tarsitano (1977) reported that the syndrome usually affects adults, with no difference between sexes. However, Neville *et al.* observed that the syndrome affects mostly women in their 20s and 30s.

The symptoms usually involve a limited ability to open the mouth, increased salivation, a foreign-body sensation, and tinnitus. Nevertheless, most patients with radiographic evidence of an elongated styloid process or ligament ossification do not show any characteristic symptoms, and many symptomatic patients also do not have any trauma history (e.g. tonsillectomy) (Lira *et al.*, 2005).

The elongated styloid process can be observed through radiographic examinations, such as lateral and posteroanterior skull radiographs, but Alvares & Tavano (2002) and Whaites (2009) defined that the panoramic radiograph is the most commonly used radiographic exam for diagnosing the syndrome, because it is an easy, low-radiation examination. Furthermore, in confirmed cases in which the recommended treatment involves surgery, tomography can be used as the radiological examination.

The diagnosis for styloid syndrome consists of an association between the clinical history, physical examination and complementary examinations. The treatment should be decided taking the particularities of each case into consideration, patients with mild symptoms should receive a conservative treatment while severe cases should consider having surgical interventions (Baugh & Stocks, 1993; Bafaqeeh).

Styloid syndrome is a rare condition, which can be diagnosed by associating clinical information and radiographic examinations together. Its treatment success depends on making a correct diagnosis and considering the symptoms to choose between a conservative or surgical treatment. In this particular case, the patient achieved relief through symptomatic treatment, prosthetic rehabilitation and subsequent clinical follow up without the need of any surgical intervention.

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RESUMEN: El síndrome estiloide (Síndrome de Eagle) se caracteriza por un proceso estiloide alargado o calcifica-

ción de los ligamentos estilohioideo y estilomandibular. Este estudio describe el caso de una mujer de 65 años de edad que concurrió a la Clínica Estomatológica de la Universidad de Marília con dolor de la articulación temporomandibular, zumbido en los oídos y una disminución de la capacidad de abrir la boca. Las radiografías digitales panorámica y posteroanterior mostraron alargamiento bilateral de los procesos estiloides, especialmente del lado derecho, cuya longitud se extendió más allá del ángulo de la mandíbula. El diagnóstico se confirmó con la asociación de los datos clínicos y los exámenes de imagen. Las opciones de tratamiento para el síndrome estiloides incluyen el seguimiento clínico, la extirpación quirúrgica del proceso estiloides o la fractura del proceso alargado. El caso fue tratado con rehabilitación protésica y seguimiento clínico, observando el nivel de molestia y el beneficio que se podría lograr mediante la terapia, evitando la intervención quirúrgica.

PALABRAS CLAVE: Síndrome de Eagle; Síndrome del proceso estiloides alargado; Hueso temporal.

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