

The clinical significance of an elongated styloid process

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Abstract

In living persons, the elongated styloid process may produce characteristic head and neck pain syndromes, commonly known as Eagle's syndrome. An awareness of this syndrome is important to all health practitioners involved in the diagnosis and treatment of neck and head pain. This article reviews the clinical importance of the elongated styloid process.

INTRODUCTION

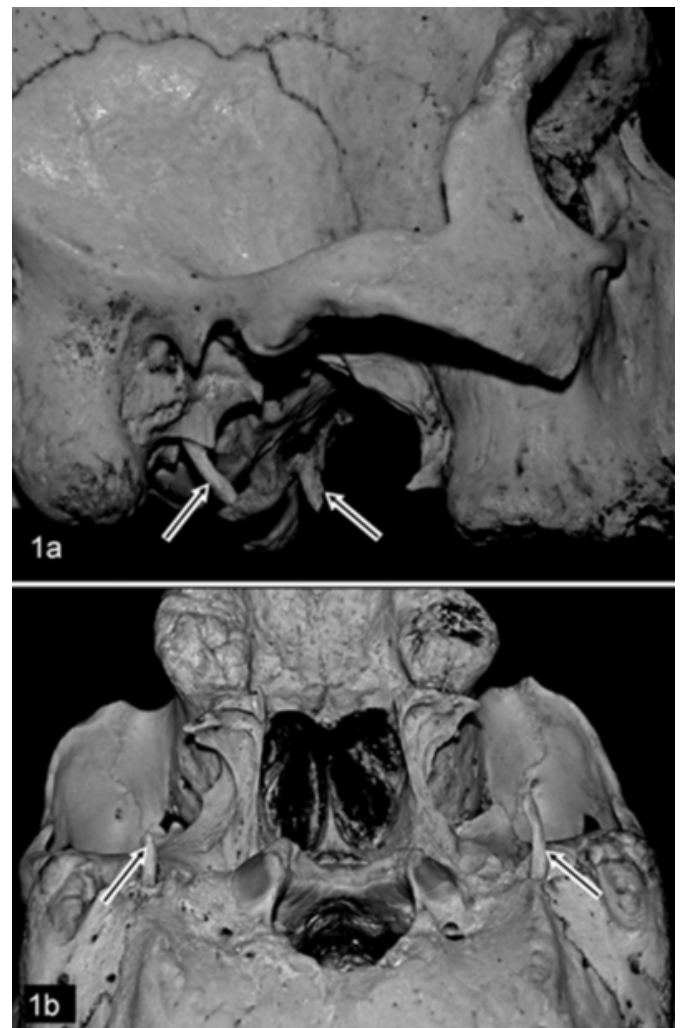
During routine cadaver dissections in teaching sessions at the University of the West Indies, we have been encountering more cases of elongated styloid processes. In living persons, the elongated styloid process may produce characteristic head and neck pain syndromes, commonly known as Eagle's syndrome. An awareness of this syndrome is important to all health practitioners involved in the diagnosis and treatment of neck and head pain. This article reviews the clinical importance of the elongated styloid process.

DISCUSSION

The styloid process (Fig. 1) is a slender pointed projection of bone just beneath the external auditory meatus that normally measures between 2cm₁ and 3cm_{2,3} in adults. It arises from the inferior surface of the temporal bone at the junction of its petrous and tympanic portions.

Figure 1

Figure 1: Lateral (Fig. 1a) and inferior (Fig. 1b) views of a normal adult male skull. Arrows indicate styloid processes measuring 11mm on the right and 17mm on the left.

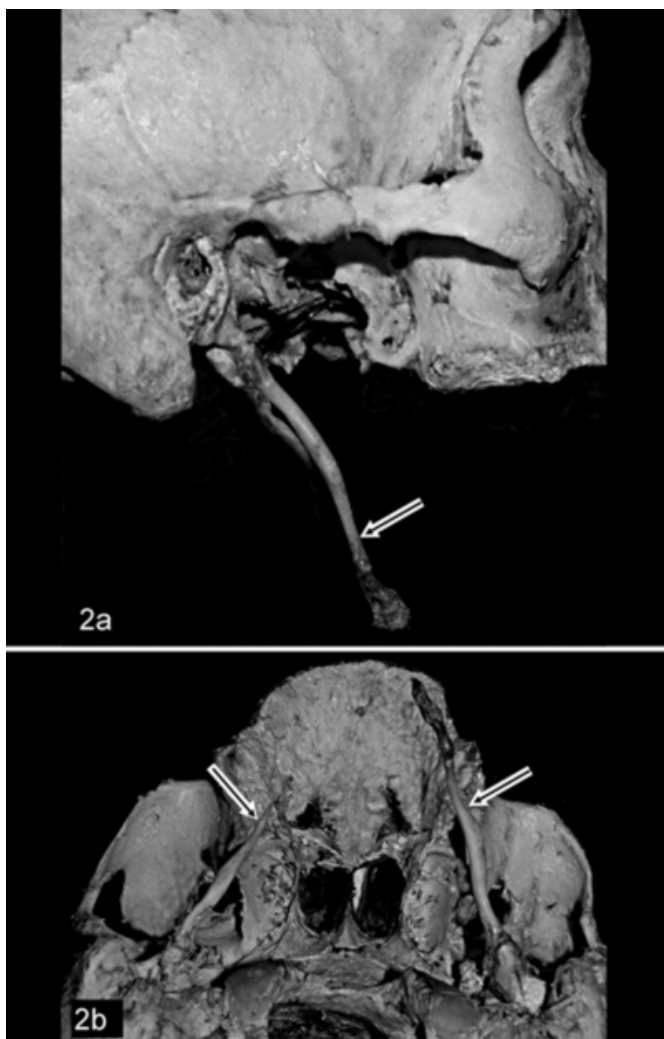


The styloid process tapers anteriorly and inferiorly to an

apex from which several ligaments (stylohyoid and stylomandibular) and muscles (styloglossus, stylohyoid and stylopharyngeus) originate. The stylohyoid ligament that attaches to the lesser cornu of the hyoid bone may occasionally become ossified, resulting in an elongated styloid process (Fig. 2). It has been suggested that this may occur as a result of reactive metaplasia after local trauma⁴, calcification and loss of pliability with the ageing process⁵ or as congenital variant without an inciting cause.¹

Figure 2

Figure 2: Lateral (Fig. 2a) and Inferior (Fig. 2b) views of an adult male skull with elongated styloid processes (indicated by arrows) measuring 38mm on the right and 52mm on the left.



Most patients with elongated styloid processes are asymptomatic and are identified incidentally at imaging or are detected at post-mortem examination. It has been estimated that approximately 4-10% of people with an elongated styloid process will have symptoms.^{7,8} Although there is no gender predilection for elongated styloid

processes, the symptoms tend to be commoner in women over 40 years of age.^{1,9} The length of the styloid process has not been shown to bear any relation to the presence or severity of symptoms.^{1,7}

The otolaryngologist, Watt Eagle, was the first to describe the clinical sequelae that accompany the elongated styloid process in a series of 200 patients.⁶ The constellation of associated symptoms has now become commonly known as Eagle's syndrome. In his original report, two patterns of clinical presentation were described.

The first pattern occurs several years after tonsillectomy.^{10,11} The patients usually experience a sensation of a pharyngeal foreign body, dysphagia and dull pharyngeal pain radiating to the ear, especially on rotation of the neck or protrusion of the tongue.^{7,11,12,13,14} Eagle believed that this was due to scar tissue in the tonsillar fossa that incorporated branches of the glossopharyngeal nerve.⁶ The symptoms may also arise when the scar tissue incorporates the nearby cranial nerves V, VII, X and/or XI.^{1,2,14,15} These patients tend to have worsened symptoms during physical examination when the physician palpates the tonsillar bed.

The second presentation, also known as the carotid artery syndrome, is not associated with tonsillectomy. It is believed to be due to direct mechanical irritation of sympathetic nerves that accompany the internal and/or external carotid arteries within the carotid sheath.^{7,14} Some patients give a history of head or neck trauma that may have caused inflammatory changes at the area or deposition of excess granulation tissue during healing of sub-clinical fractures.^{11,14,16} Direct irritation produces pain that is referred along the distribution of the vessels involved.^{1,9} If the external carotid artery is affected, the patient may experience pain in the neck that radiates to the eye, ear, mandible, soft palate and nose. In the case of impingement upon the internal carotid artery, the symptoms are parietal headaches and pain along the distribution of the ophthalmic artery.^{1,16}

Physicians should maintain a high index of suspicion to make this diagnosis in patients with suggestive symptoms. The normal styloid process is impalpable, but an elongated styloid process may be palpable in the tonsillar fossa on physical examination. The patient may notice that their symptoms are exacerbated with palpation but relieved with local infusion of local anaesthetic into the tonsillar fossa.

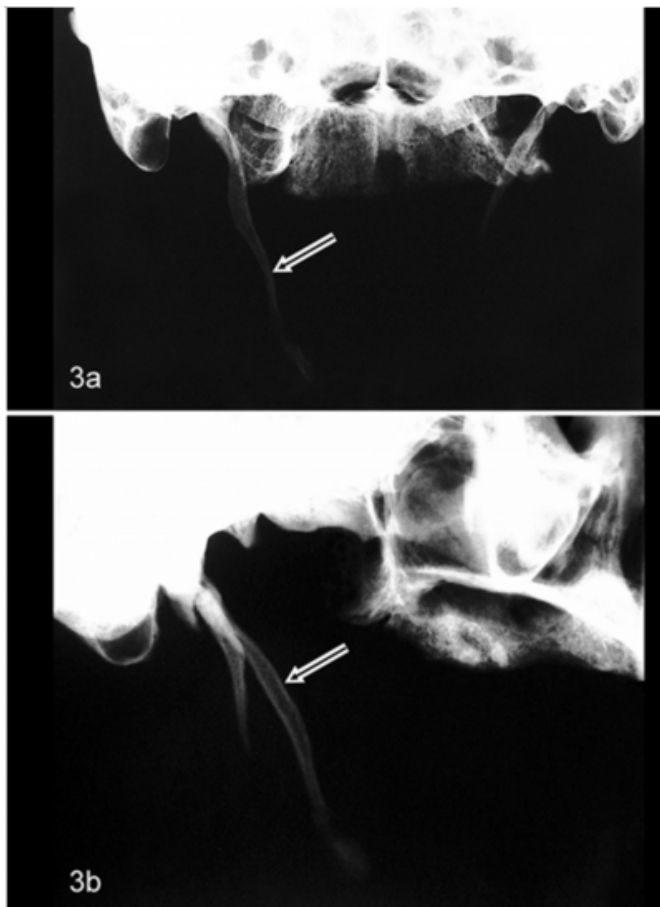
^{7,8,17}

The diagnoses can be ascertained with imaging. Plain

radiographs are the commonest modality chosen.^{7,9,18} Lateral views are the best to show the length of the styloid process, but antero-posterior views (Fig. 3) are also needed to determine whether there is bilateral involvement and the presence of lateral deviation.⁷ A threshold length of 3cm is accepted as abnormal by current conventions.^{7,9} Computed tomography scans have been used in difficult cases to supplement diagnosis.⁷

Figure 3

Figure 3: Plain radiographs of the skull depicted in Fig. 2 seen in the anterior-posterior view (fig. 3a) and lateral views (Fig. 3b). Styloid process indicated by arrows.



Patients diagnosed with elongated styloid process syndromes can be treated medically with oral analgesics and injections of steroids with local anesthetic into the tonsillar fossa.^{7,12,17} But the response to treatment is quite unpredictable. Operative intervention may be necessary, but is usually reserved for persons who fail medical management or have severe and rapidly progressive complaints.^{7,17}

Operative treatment involves surgical excision of the process.^{18,19} Because there is a high concentration of important neurovascular structures surrounding the styloid

process, styloidectomy is accompanied by a high rate of morbidity. The patients are at risk for iatrogenic injury to the carotid arteries, severance of the facial nerve, osteomyelitis, and deep cervical infection.¹⁹

Eagle initially described styloidectomy by the intra-oral route where a trans-pharyngeal approach was used to extract the styloid process.^{1,19} It requires that the mouth be forced open to afford access.¹⁹ There is no external scarring with this approach, but it is limited by poor visibility due to difficult access.^{1,7,13,19} This approach is accompanied by a high risk of damage to the internal and external carotid arteries, iatrogenic glossopharyngeal nerve injury and a high risk of deep space neck infection.^{1,7,13,19}

Styloidectomy can also be performed by the extra-oral approach through an incision that extends from the mastoid process along the sternocleidomastoid to the level of the hyoid then up across the neck to the midline of the chin.^{1,7,9,17} This approach is aesthetically less pleasing, but it affords better exposure and brings less morbidity.^{7,13,19}

Regardless of the approach, the ligaments and musculature arising from the styloid process are severed at the origins. This compromises hyoid stability that is important to deglutination and other oral functions. Upsetting the delicate balance of the supra- and infra-hyoid muscles may also impair the stability and motion of the temporomandibular joint, possibly leading to relapse of the patient's original musculoskeletal symptoms.

SUMMARY

An elongated styloid process may produce a variety of head and neck pain syndromes. Physicians should be aware of these syndromes and maintain a low index of suspicion in order to make this diagnosis in patients with suggestive symptoms.

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