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The 'Overtly Processed' Styloid Process – A Radiological Paradox

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ABSTRACT

Eagle syndrome indicates the constellation of symptoms and signs secondary to elongated styloid process. The most frequently encountered complaint amongst patients is a pain in the throat. The symptoms are classically a dull pharyngeal pain, often located around the tonsillar fauces, referring to the same sided ear, odynophagia and a foreign body sensation .The present report of our case is unique in its clinical presentation, and highlights the benefit of the application of 3D-computed tomography (3D-CT) and cross-analysis with the available literature, hoping to stress the knowledge of pathophysiology and beneficial effective treatments for this menace of the elongated process of styloid.

Keywords: Elongated styloid process, Eagel's syndrome, Styalgia ,Cone beam CT

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INTRODUCTION

Often called 'The pillar', the styloid process is derived from Stylos of the Greek text [1]. A derivative from the cranial end of the second branchial arch cartilage, the styloid process ossifies from two centres [2] Riolan's bouquet is an arrangement made up of styloglossus, stylohyoid, and stylopharyngeus muscles. Each styloid process also houses the stylohyoid and stylomandibular ligaments. [3] The syndrome named after Eagle indicates the constellation of symptoms and signs secondary to elongated styloid process. The symptoms are classically a dull pharyngeal pain, often located around the tonsillar fauces, referring to the same sided ear, odynophagia and a foreign body sensation. Although there may not be any specific findings on examination, the enlarged process can be felt in the fossa of faucial tonsils and this maneuver at times, can aggravate symptoms.[4] Radiological diagnosis of this condition is made either by X-ray Town's view, orthopantomography or CT scan. Due to its obvious advantages like being high-resolution imaging, diagnostic reliability, and risk-benefit over other modalities of investigations, the Cone-beam CT (CBCT) is a relative novice imaging and is an ideal means for the right analysis of the styloid process. The outcomes of mechanical irritation of lengthened styloid may range from simple pain in the cervical region; to compromise of circulation to the cerebrum. Pradeep Kumar et al [5] reported sudden death due to elongated styloid causing acute cardiovascular failure secondary to stimulation of sinus of the carotid. The present report of our case is unique in its clinical presentation, and highlights the benefit of the application of 3D-computed tomography (3D-CT) and cross-analysis with the available literature, hoping to stress the knowledge of pathophysiology and beneficial effective treatments for this menace of the elongated process of styloid.

Case report

Pain in both the ears with ringing sensation and irritation in the region of the throat of 6 months duration were the symptoms of a female patient aged 47 years in our present case report. Ear pain was of pricking type, continuous in nature and radiated to the neck and in front of the ear. Symptoms aggravated during chewing and movement of the neck on turning towards extreme left and right. In addition to the above, she also had vague pricking type of throat pain and ringing sensation heard intermittently during chewing, swallowing, and movement of the neck. On examination, the oral cavity, ears, and nose were clinically normal. On intraoral digital palpation, a hard bony bulge was felt over bilateral tonsillar fossa. With a high suspicion of an elongated styloid process, X-Ray Orthopantamogram was done as shown in Figure 1. A and 1. B and to our surprise, it was found that the left styloid process measured 70.74 mm, and the right styloid process measured 60.50mm.

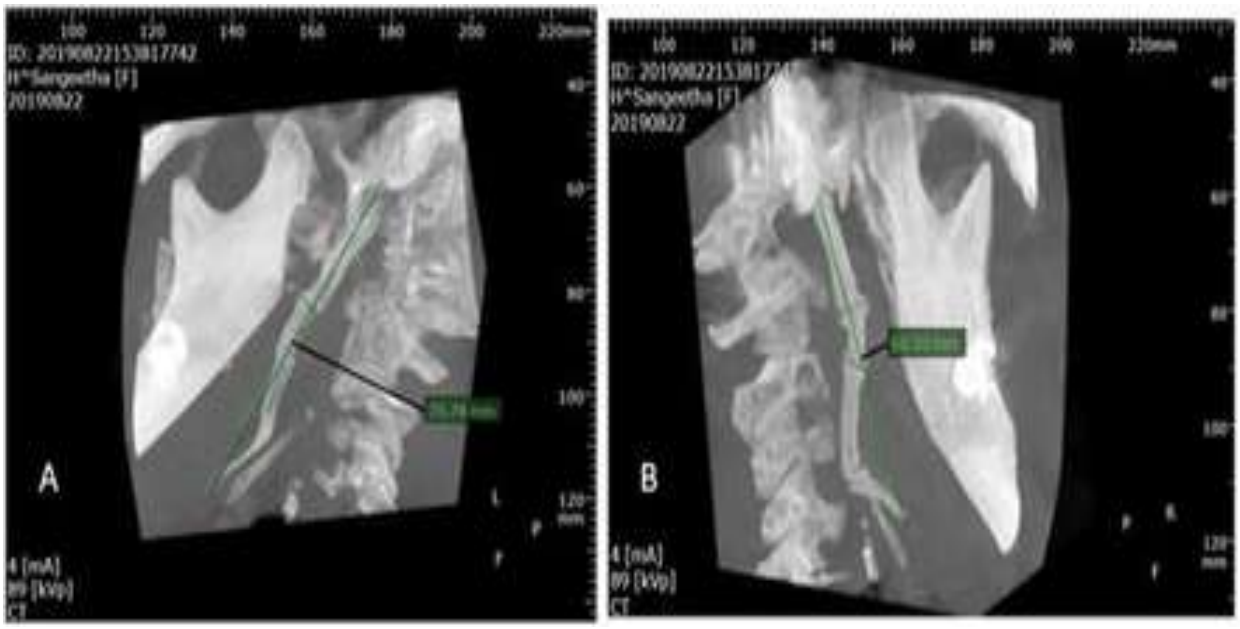

Figure 1. A and 1. B: X-Ray Orthopantamogram was shown in figure and to our surprise, it was found that the left styloid process measured 70.74 mm, and the right styloid process measured 60.50mm

Further, to confirm the diagnosis, a Cone Beam Computed Tomography (CBCT) imaging was done for the analysis of both the right and left styloid process. CBCT was performed with Kavo 3d OP Pro with FOV (Field Of View) of 8x15 cm. Data were acquired as volume acquisition and reconstructed in multiple planes. The length of each portion of the styloid bone was separately studied. As shown in Figure 2.A the left styloid process shows three short portions suggestive of segmented type (Type III According to Langlais et al. 1986) 1st segment measuring 38.75mm, 2nd segment measuring 16.47mm, 3rd segment measuring 19.38mm. Thus, the cumulative length of the left styloid was 74.60 mm. Image 2.B shows the right styloid process with five short portions suggestive of segmented type. (Type III, According to Langlais et al. 1986) 1st segment measuring 21.35 mm, 2nd segment measuring 10.67mm, 3rd segment measuring 20.46mm, 4th segment measuring 7.1mm, 5th segment measuring 6.24mm. Thus, the cumulative length of the right styloid was 65.82mm. On both sides, the processes of styloid show knobby or scalloped outline, partial or complete calcification seen in some areas, with varying degrees of central radiolucency suggestive of a nodular complex pattern of calcification. Ironically the lengths of these processes were alarmingly large this patient responded well to symptomatic treatment and has been following up for 10 months and has no symptoms.

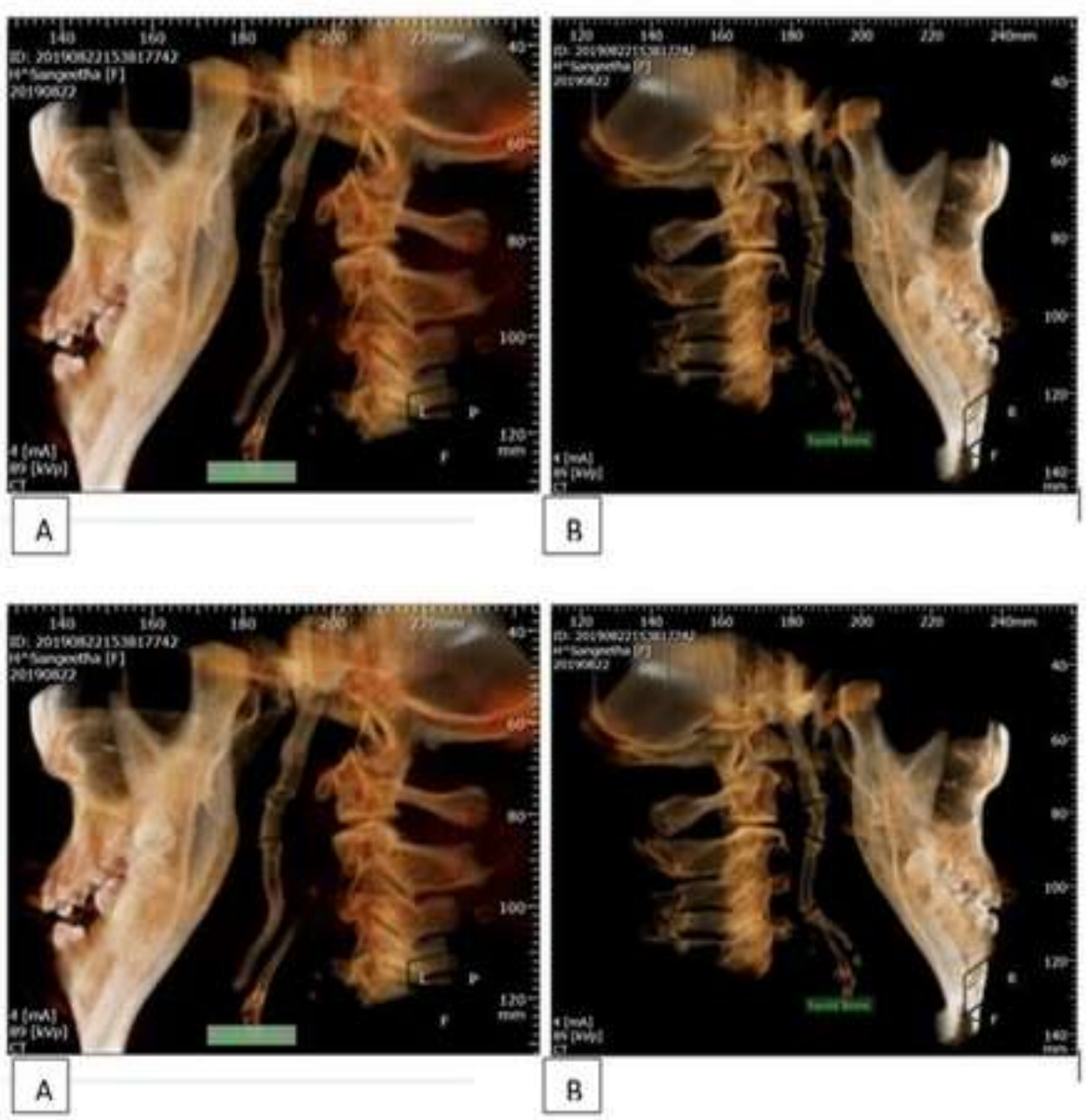

Figure 2: A: the left styloid process shows three short portions suggestive of segmented type (Type III According to Langlais et al. 1986) cumulative length of the left styloid was 74.60 mm.

Figure 2.B: shows the right styloid process with five short portions suggestive of segmented type. (Type III, According to Langlais et al. 1986) cumulative length of the right styloid was 65.82mm

DISCUSSION:

Stretching from the hyoid to tympanomastoid area, the stylohyoid element is having four segments that is superior to inferior, Tympanohyal - a base, Stylohyal - a major segment, Ceratohyal - the stylohyoid ligament and Hypohyal which forms the minor horn of the hyoid bone.[3] The length of the styloid process as 2.5 cms was reported by Eagle et al [6] and it may be symptomatic if the length is more than 4cms.[7] The longest recorded elongated styloid process in a symptomatic patient is around 6.5 cm.[8] In our case report, in relation to the left

styloid process, the first segment originates from the lower surface of the temporal bone till the occlusal plane of the upper posterior teeth. From here the second segment starts and ends up to the level of the upper border of mandibular bone. The third segment is from the upper border to the lower border of the mandible. In relation to the right styloid process, the first segment originates from the inferior surface of the temporal bone till the occlusal plane of upper posterior teeth. From here second portion starts and ends till the upper border of the mandible. The third portion is from the upper border of the mandible to the inferior border of the mandible, from here the fourth segment starts and ends in relation to the hyoid bone. The fifth segment is small and is also in relation to the hyoid bone. As per the available sources, this is perhaps the maiden case report showing a surprising radiological finding involving the styloid process.

The most frequently encountered complaint amongst patients is a pain in the throat [9,10]. According to Beder, 3D CT was the most sought after modality to assess the morphology of the styloid process. [8] Some of the conventional therapies for alleviating the symptoms were directed towards reducing inflammation, employing benzodiazepines, inducing comfort by application of warmth along with at times, injection of local anesthetics with steroid at the site and manual splitting of the elongated styloid process. [9] The effects of non-interventional modalities like oral medications used for seizures or mood elevators, were not long-lasting. Ghosh insisted that surgery was the best way to induce relief to the patient in the form of resection of the elongated styloid process by an intraoral or extraoral approach. [11] Watt W Eagle was the first to describe the intraoral styloidectomy [6] It involves conventional tonsillectomy and approach to styloid by dividing the superior constrictor muscle. Working in between the internal and external carotid artery, for resection of the styloid process is associated with the risk of uncontrolled bleeding and even death on the table, hence this approach is not preferred by many. The extraoral approach was described by Caldwell and Loeser in which cervical incision is done at the level of hyoid and then the styloid process is approached and excised after dissecting the tissue planes. Though this route provides good exposure, it is more invasive and results in a visible scar along with the risk of greater auricular paresthesia.[12] In Eagle syndrome, symptoms can improve by medical management but are unlikely to disappear completely. Eagle syndrome will not cause other medical conditions and is not a progressive condition. In this case, likely to be the maiden of its kind, although the radiological findings surprised us, the clinical findings were paradoxically not so alarming. Hence, a judicial step towards conservative management was taken to successfully manage this case.

CONCLUSION:

With the appropriate and systematic evaluation by history, physical examination and with the aid of imaging the abnormal styloid process can be made out. Many other conditions are to be excluded to avoid misdiagnosing of the elongated styloid process. Imaging in cases surmising Eagle syndrome is recommended to confirm the diagnosis. When symptoms and radiological signs are not correlating, the paradox is better dealt with by proceeding with the medical line of treatment. Wherein indicated, employing advanced imaging modalities such as Cone Beam Computed Tomography should be used in order to avoid spurious diagnosis. Surgery should be reserved only for intractable cases with undue morbidity keeping in mind the risks of life-threatening complications owing to the presence of intimately related neurovascular structures, the damage to which may also cause mortality.

Patient Consent: Informed and written consent was obtained from the patient that the data including the investigations from this case would be used for the purpose of scientific presentation and publication.

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