ijcrr
Vol 03 issue 08
Category: Review
Received on:07/05/11
Revised on:26/05/11
Accepted on:05/06/11

UNILATERAL ELONGATED STYLOID PROCESS-A CASE REPORT

Asha.K[1], Vinay.M[2], Anitha.T[3], Indira.V.Ingole[1], Kalpana.T[1]

[1]Department of Anatomy, Mamatha Medical College, Khammam, Andhra pradesh
[2]Department of Pharmacology, Mamatha Medical College, Khammam, Andhra Pradesh
[3]Department of Anatomy, Chalmeda Institute of Medical Sciences, Bommakal , Karimnagar, Andhra pradesh

E-mail of corresponding author: drashavinay@gmail.com

ABSTRACT

The styloid process is a clinically important structure because of its close proximity to the maxillovertebro-pharyngeal recess. During routine osteology demonstration classes an abnormally elongated styloid process on right side of 5.4cms length was observed.The clinical implications of such an elongated styloid process and its variations in dimensions are discussed in this paper.

KEYWORDS: Skull, Styloid process (SP), Elongated styloid process (ESP), Eagle's syndrome.

INTRODUCTION

The styloid process is a thin, cylindrical, sharp osseous outgrowth from the base of petrous temporal bone anteromedial to mastoid process / between external auditory meatus and jugular foramen (infront of stylomastoid foramen). The name styloid process is derived from Greek word "stylos" meaning a pillar. The length of styloid process normally varies from 2-2.5cm [1] in adults. It has a tapering apex which is directed downwards and forwards. The SP gives attachement to three muscles ie, stylopharyngeus at its medial base, styloglossus on mid anterior and stylohyoid at anterior tip and two ligaments, stylomandibular and stylohyoid ligament. The apex of SP is connected to the ipsilateral cornu of hyoid bone via stylohyoid ligament which are embryological remnants of second bronchial arch. The apex of SP is clinically important because it is located between external and internal carotid arteries, just lateral to tonsillar fossa [2]. The facial nerve emerges from stylomastoid foramen and runs anteromedial to SP. The glossopharyngeal nerve exits through jugular foramen and curves around stylopharyngeus muscle. The vagus and accessory nerve also run medial to it. The approximation of glossopharyngeal nerve with the stylohyoid ligament is the basis for glossopharyngeal neurological symptoms seen in Eagles syndrome. "ELONGATED STYLOID PROCESS" a term used since a publication by Eagle in 1937 reports concerned findings in dentomaxillofacial and Ear-nose-throat patients.

Eagles syndrome or styalgia caused by ESP is an uncommon and underdiagnosed clinical entity. 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.

CASE REPORT

During routine osteology demonstration classes of skull for undergraduate students, an adult female skull [prominent superciliary arches, less prominent glabella, smooth muscle attachments], we found that the styloid process was abnormally lengthy as shown in figure-1. The length of SP was measured with the help of measuring tape using the inferior border of tympanic plate [just anterior to stylomastoid foramen] as the inceptive point to the tip of styloid process. The length measured was 5.4cm. This length is 2.16% longer than normal length. A bony protuberance or ossified mass with a circumferential diameter of 10mm was seen at proximal 1/3rd near the base of styloid process.

DISCUSSION

According to studies by many authors,the normal length of the styloid process varies, as follows:

- From 1.52-4.77 cm, according to Moffat et al (1977)[3]
- Less than 3 cm, according to Kaufman et al (1970)[4]
- From 2-3 cm, according to Lindeman (1985)[5]
- Less than 2.5 cm, according to Correl et al (1979), Langlais et al (1986), and Montalbetti et al (1995)[6,7,8]
- Less than 4 cm, according to Monsour and Young (1986)[9]
- According to Balcioglu (2009), the mean length of the styloid processes of the subjects reporting Eagle syndrome is reported to be 40 +/- 4.72 mm.[10]

Eagle's definition is that the normal styloid process measures between 2.5-3cms in length. An elongated styloid process occurs in about 4% of the general population. Only small percentages (between 4-10.3%) of these patients are symptomatic. So, the true incidence is about 0.16%, with a female-to-male predominance of 3:1.

The length of the styloid process has also been studied by Wang et al,[11] Basekim et al,[12]. Savranlar et al, [13] and Jung et al,[14] from radiographs or three-dimension computed tomography. Data on the osteometric values of the styloid process are scanty. Thot et al reported that the length of the left side styloid ranged from 0.7 to 1.6 cm, and on the right side, from 0.8 to 2.4 cm. The average lengths for the left and right styloids were 1.52 cm and 1.59 cm, respectively, in Indian subjects [15]. Jung et al suggested that the styloid process should be considered to be elongated, when its length exceeds 45 mm [14]. Keur et al stated that, if the length of the process or the mineralised part of ligaments which appeared in radiography was 30 mm or more, this could be considered an elongated styloid process [16]. Thot et al stressed that length in isolation is not a risk factor, but that its combination with increased acuity in deviation from the norm, both anteriorly and medially, makes the elongated styloid process the sole cause of Eagle's syndrome [15].

The styloid process, stylohyoid ligament and lesser horn of the hyoid bone are derived from Reichert's cartilage, which arises from the second branchial arch. According to other authors, the cause for ESP was as follows: Eagle (1937-1948), it was post surgical trauma with reactive hyperplasia [17]. Lentini (1975), it was due to persistence of the mesenchymal elements (Reichert cartilage residues) of styloid process

[18]. Epifanio (1962), due to endocrine disorders in women at menopause, accompanied by the ossification of ligaments elsewhere (eg, iliolumbar, thyrohyoid) [19]. Gokce C et al , due to ectopic calcification (EC), especially in patients with abnormal calcium (Ca), phosphorus (P), and vitamin D metabolism (as in end-stage renal disease) [20].

The cause of elongation of the styloid process has not been fully elucidated. Several theories have been proposed by Steinmann [21].

1. Congenital elongation of the process due to persistence of a cartilaginous anlage in the stylohyale.
2. Calcification of the stylohyoid ligament giving the appearance of an elongated styloid process.
3. Growth of osseous tissue at the insertion of the stylohyoid ligament.

The third theory is based on histological evidence of metaplastic changes to the subperiosteal cells in the vicinity of the ligaments insertion. Regardless of the pathophysiology of elongation, the result is a rigid, abnormally long structure that can cause pain or discomfort by one or several mechanisms.

An elongated styloid process or ossified stylohyoid ligament is not symptomatic in all cases. Only 4-8% cases are accompanied with symptoms [22]. Those vary from dysphagia, foreign body sensation, throat pain, ipsilateral otalgia, facial pain, pain radiating to maxillary and orbital region, headache, neck pain during rotation, pain during tongue extension, facial and carotid pain. It should be differentiated from other causes which mimic these symptoms like cervical spondolysis, cervical osteophytes[23], and anomolous fourth part of vertebral artery [24]

The first who described a case of stylohyoid ligament ossification seems to be Manchetti of Padua back of 1652 [25]. Diagnosis can be done by bimanual palpation of tonsillar fossa, which exacerbates the pain and relieved by local anaesthetics (normal styloid process is not normally palpable). It is further confirmed by panoramic radiography studies and CT.

Treatment includes appropriate choice of therapy for symptomatic cases and depends on pain intensity or dysphagia and it can be conservative or invasive. These include anti-inflammatory and corticosteroid drugs. If the Symptomatology persists then surgical treatment could be helpful by excision of elongated styloid process.

CONCLUSION

In this case, the length of styloid process of 5.4cms is clinically important and would have caused eagle's syndrome. The cause of such elongation would be calcification of stylohyoid chain and the osseous protuberance at proximal1/3rd of the base might represent the site of unification between the apex of process and the ossified section of stylohyoid ligament. This article reviews the clinical importance of ESP and was reported for consistent terminology in anatomy and anthropology.

REFERENCES

1. Eagle WW. Elongated styloid process: further observations and a new syndrome. Arch Otolaryngol 1948; 47:630-40.
2. Hollinshead WH. Anatomy for Surgeons. The Head and Neck, 3rd ed., Vol. 1. Philadelphia, JB Lippincott Co. 1982; 365
3. Moffat DA, Ramsden RT, Shaw HJ. The styloid process syndrome: aetiological factors and surgical management. J Laryngol Otol. Apr 1977;91(4):279-294.
4. Kaufman SM, Elzay RP, Irish EF. Styloid process variation. Radiologic and clinical study. Arch Otolaryngol. May 1970;91(5):460-3.

5. Lindeman P. The elongated styloid process as a cause of throat discomfort. Four case reports. J Laryngol Otol. May 1985;99(5):505-8.
6. Correl R, Jensen J, Taylor J et al. Mineralization of the stylohyoid-stylomandibular ligament complex: A radiographic incidence study. Oral Surg Oral Med Oral Pathol. 1979;48:286–291.
7. Langlais RP, Miles DA, Van Dis ML. Elongated and mineralized stylohyoid ligament complex: a proposed classification and report of a case of Eagle's syndrome. Oral Surg Oral Med Oral Pathol. May 1986;61(5):527-32.
8. Montalbetti L, Ferrandi D, Pergami P, et al. Elongated styloid process and Eagle's syndrome. Cephalalgia. Apr 1995;15(2):80-93.
9. Monsour PA, Young WG. Variability of the styloid process and stylohyoid ligament in panoramic radiographs. Oral Surg Oral Med Oral Pathol. May 1986;61(5):522-6.
10. Balcioglu HA, Kilic C, Akyol M, Ozan H, Kokten G. Length of the styloidprocess and anatomical implications for Eagle's syndrome. Folia Morphol (Warsz). Nov 2009;68:265-70.
11. Wang Z, Liu Q, Cui Y, Gao Q, Liu L. [Clinical evaluation of the styloid process by plain radiographs and three-dimensional computed tomography]. Lin Chuang Er Bi Yan Hou Ke Za Zhi 2006; 20:60-3.
12. Basekim CC, Mutlu H, Gungor A, et al. Evaluation of styloid process by three-dimensional computed tomography. Eur Radiol 2005; 15:134-9
13. Savranlar A, Uzun L, Ugur MB, Ozer T. Three-dimensional CT of Eagle's syndrome. Diagn Interv Radiol 2005; 11:206-9.
14. Jung T, Tschernitschek H, Hippen H, Schneider B, BorchersL. Elongated styloid process: when is it really elongated?Dentomaxillofac Radiol 2004; 33:119-24.
15. Thot B, Revel S, Mohandas R, Rao AV, Kumar A. Eagle' syndrome. Anatomy of the styloid process. Indian J Dent Res 2000; 11:65-70
16. Keur JJ, Campbell JP, McCarthy JF, Ralph WJ. The clinical significance of the elongated styloid process. Oral Surg Oral Med Oral Pathol 1986; 61:399-404.
17. Eagle W. Elongated styloid process: Further observation and a new syndrome. Arch Otolaryngol. 1948;47:630–640.
18. Lentini A. Gli aspetti clinici e radiologici delle anomalie dell'apparato stilo-joideo. Radiol Med. 1975;61:337-3640.
19. Epifanio G. Processi stiloidei lunghi e ossificazione della catena stiloidea. Rad Prat. 1962;12:127-132.
20. Gokce C, Sisman Y, Sipahioglu M. Styloid Process Elongation or Eagle's Syndrome: Is There Any Role for EctopicCalcification?. Eur J Dent. Jul 2008;2:224-8.
21. Steinmann EP. Styloid syndrome in absence of an elongated process. Acta Otolaryngol 1968; 66:347-56.
22. Eagle W. Elongated styloid process. Report of two cases. Arch Otolaryngol. 1937;25:584–587.
23. Zeliha U, Sebnem O, Gorkem E, Asim A, Patel B: Elongated Styloid Process and Cervical Spondylosis. Clinical Medicine: Case Reports 2008 , I:57-64.
24. Johnson CP, Scraggs M, How T, Burns J: A necropsy and histomorphometric study of abnormalities in the course of the vertebral artery associated with ossified Stylohyoid ligaments. J Clin Pathol 1995 , 48:637-640.
25. Lengele BG, Dhem AJ: Length of the styloid process of the temporal bone. Arch Otolaryngol Head Neck Surg 1988 , 114:1003-1006.

Figure-1: Lateral view of skull showing right Elongated Styloid Process (ESP)