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# The Inferior Accessory Ossicle of the Anterior Arch of the Atlas Misdiagnosed as Anterior Arch Fracture - A Case Report -

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**Study Design:** Case report.

**Objectives:** We report a very rare case of the inferior accessory ossicle of the anterior arch of the atlas misdiagnosed as anterior arch fracture.

**Summary of Literature Review:** It is necessary to know the existence of inferior accessory ossicle of the anterior arch of the atlas, even though it is extremely rare.

**Materials and Methods:** A 29-year-old woman was referred to our emergency service unit with symptoms of neck pain and scalp laceration, after being involved in a car accident. She was diagnosed as the inferior accessory ossicle of the anterior arch of the atlas, by multiple diagnostic modalities.

**Results:** The symptom of neck pain was relieved spontaneously, and her symptom has been relieved at her latest visit, as a follow up within 3 months.

**Conclusions:** It is important to be aware of cervical anatomical variants because we commonly confuse it with other pathologic conditions, such as a fracture and thus, misdiagnose the condition.

**Key Words:** Atlas, Inferior accessory ossicle, Anterior arch fracture

The rate of developing inferior accessory ossicle of the anterior arch of the atlas is extremely rare. As looking for literatures, there are some reported cases.<sup>1)</sup> In 1956 Kohler and Zimmer's described "Borderlands of the normal and early pathologic in skeletal roentgenology".<sup>2)</sup> Keats<sup>3)</sup> named the inferior accessory ossicle of the anterior arch of the atlas for the first time. It is a relatively large ossicle, roughly triangular shape with its base superiorly and located in the midline, right below the anterior arch of the atlas. This anomaly was considered as a benign variation and almost all of them are found as an incidental radiologic finding or patients can be presented with pain like symptom. However, when evaluating an acute neck trauma, it is important to be aware of this cervical anatomical variant because without it we easily make a misdiagnosis on the entity of fracture. This report discusses an extremely rare case of an anatomical variant of atlas which was misdiagnosed as an anterior arch fracture after a traffic accident.

## CASE REPORT

A 29-year-old woman was referred to our emergency service unit with neck pain and scalp laceration after being involved

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in a car accident. The result of physical examination revealed tenderness of paraspinal tissues and the spinous processes; neurological examination had no abnormality. Her initial cervical radiograph study of lateral view suggested an anterior



**Fig.1.** Lateral radiograph of cervical spine shows a well corticated bone fragment inferior to the anterior arch of atlas (black arrow)



**Fig.2.** Lateral CT at the level of C1 showing inferior accessory ossicle of the anterior arch of atlas (white arrow).

arch fracture(Fig.1). Computed tomography(CT) images demonstrated ossicle located on the middle and a well corticated bone fragment below the anterior arch of atlas with no soft tissue swelling which means a fracture(Fig. 2). Magnetic resonance image(MRI) also showed no definite evidence of hematoma or soft tissue swelling(Fig. 3). We couldn't find out any evidence of traumatic injury on whole body bone scintigraphy(WBBS)(Fig. 4). The symptom of neck pain was relieved spontaneously, and her symptom has been relieved when she had a latest visit as a follow up within 3 months.

## DISCUSSION

Accessory bones, or ossicles, are considered as normal anatomic variants.<sup>4)</sup> The information where the ossicle is and how it looks like is important for the radiologists for not being confused normal variants with demonstrations of pathological condition.<sup>3)</sup> These ossicles are particularly placed in the foot. However, the variant of inferior accessory ossicle of the anterior arch of the atlas is extremely rare.<sup>1)</sup>

The atlas has three ossification centers: And those are anterior ossification center that is composed of anterior tubercle, and two lateral centers from which the lateral masses and the posterior



**Fig.3.** T1 GD enhance MR image showing no definite evidence of hematoma and soft tissue swelling at the level of C1



**Fig.4.** Whole body bone scan showing normal finding.

specimens from the cadaver showed that osteoarthritis is related to osseous outgrowths and osteophytes of the articular surface of the median atlanto-axial joint, presence of congenitally developed free ossicle and of third occipital condyles. Particles of these osteophytes were found usually on the superior rim of the anterior arch of the atlas, but in a few cases we also found it on the inferior rim. Some osteophytes were broken off and appeared as “free” ossicles that had sharp, cut margins.<sup>7)</sup> In our case, the plain X-ray, CT and MRI images showed no definite osteoarthritic change.

Second, calcific tendinitis of the longus colli muscle or stylohyoid ligament should be differentiated. Calcific tendinitis of the longus colli muscles is an result of inflammation is cause by deposition of calcium hydroxyapatite in the superior oblique tendon fibers of the longus colli muscles. The clinical symptom is nonspecific, from acute to subacute onset of neck pain, dysphagia or odynophagia, and low grade fever and without history of trauma.<sup>1,8)</sup> Calcific tendinitis of stylohyoid ligaments is related to as Eagle’s syndrome. Eagle’s syndrome is defined as the symptomatic elongation of the styloid process or mineralization of the stylohyoid ligament complex. The symptom of calcified stylohyoid ligament is variant, from mild pain to acute neurologic referred pain and it would be confused with other cause of head and neck pain.<sup>9)</sup> The characteristic of radiographic findings of calcific tendinitis of longus colli are prevertebral soft tissue swelling and amorphous calcifications in the prevertebral

old avulsion fracture or nonunion. Regarding the origin of the ossicle, sharp and irregular margins indicates nonunion of an avulsion fracture, while ossicle has a round or oval shape with a well defined cortical margin, it suggests it is congenital. However, it is sometimes difficult to find out the exact etiology because a long-standing avulsion fracture could have smooth margins. Avulsion fracture or nonunion is associated with a traumatic event. In this case, the patient had not any traumatic events before this trauma.

In this case, the authors suspected an anterior arch fracture of atlas due to traumatic event. To avoid make a misdiagnosis further image evaluation are essential, for instance CT, MRI, or scans. Even though it is hard to have an inferior accessory ossicle congenitally, and trauma history in the same time, surgeons must keep in mind that the inferior accessory ossicle of the anterior arch of the atlas could be misdiagnosed as anterior arch fracture.

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### 환추 전궁 골절로 오진한 환추 전궁의 하부 부골

박용·김형복·전상우·이윤태·유주형·오현철·하중원·성승용·윤한국  
국민건강보험관리공단 일산병원 정형외과, 연세대학교의과대학정형외과학교실

**연구 계획:** 증례 보고

**목적:** 환추 전궁 골절로 오진한 매우 드문 환추 전궁의 하부 부골 1례를 경험하였기에 보고하고자 한다.

**선행 문헌의 요약:** 환추 전궁의 하부 부골은 매우 드물지만, 그 변이를 알고 있는 것은 중요하다.

**대상 및 방법:** 29세 여성은 자동차 사고 이후 경부 통증과 두피 열상으로 본원 응급실에 내원하였다. 여러 진단 도구를 이용하여 환추 전궁의 하부 부골의 존재를 진단받았다.

**결과:** 경부의 통증은 자연적으로 호전 되었으며, 3개월 전 마지막 추사에서 증상은 관찰되지 않았다.

**결론:** 경추의 해부학적 변이는 골절과 같은 다른 병적인 상태와 혼동하기 쉽고, 오진의 가능성이 있으므로 이에 대해 알고 있는 것은 중요하다.

**색인 단어:** 환추, 하부 부골, 환추 전궁 골절

**약칭 제목:** 환추 전궁의 하부 부골