

Eagle Syndrome Presenting as Persistent Tinnitus Mimicking Temporomandibular Joint Dysfunction

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To the Editor,

Eagle syndrome (ES) is a clinical condition characterized by elongation of the styloid process (>30 mm) or calcification of the stylohyoid ligament, resulting in mechanical compression of adjacent neurovascular structures (1,2). Although its prevalence ranges from 4% to 7.3%, only a minority of patients are symptomatic (3,4). Common symptoms include dysphagia, foreign body sensation, cervicofacial pain, and tinnitus (5). In rare cases, compression of the internal carotid artery may lead to neurological manifestations such as vertigo and syncope (6).

We present a 40-year-old man admitted with a one-year history of left-sided tinnitus and morning-predominant headaches. His medical history included cervical disc herniation surgery in May 2024. He had been using a hard night splint for bruxism without significant improvement.

Physical examination revealed a maximum mouth opening of 50 mm without deviation. A click was detected in the left temporomandibular joint (TMJ), accompanied by malocclusion and parafunctional activity. Postural assessment showed forward head posture, with tenderness present in the temporal, masseter, and left

trapezius muscles. Pain intensity was 9/10 on the visual analog scale (VAS).

Based on these findings, TMJ dysfunction was diagnosed, and a conservative rehabilitation program, including cervical and jaw isometric exercises, postural training, and heat therapy, was initiated. Although pain improved significantly (VAS: 9 to 3), tinnitus persisted. The patient was referred to the otorhinolaryngology department, where contrast-enhanced MRI of the ear and audiometry results were normal. Therefore, ES was suspected, and three-dimensional computed tomography was performed, revealing elongation of the styloid process (43.3 mm) and calcification of the stylohyoid ligament (Figure 1).

As surgical intervention was not indicated, bilateral ultrasound-guided botulinum toxin injections were administered to the masseter muscles. The safe zone of each masseter muscle was delineated by ultrasonography, and a total of 20 international units of botulinum toxin per muscle was injected at three sites arranged in a triangular configuration, with approximately 1 cm between injection points, using a 31-gauge insulin syringe. At follow-up, there was a significant reduction in both pain and tinnitus.



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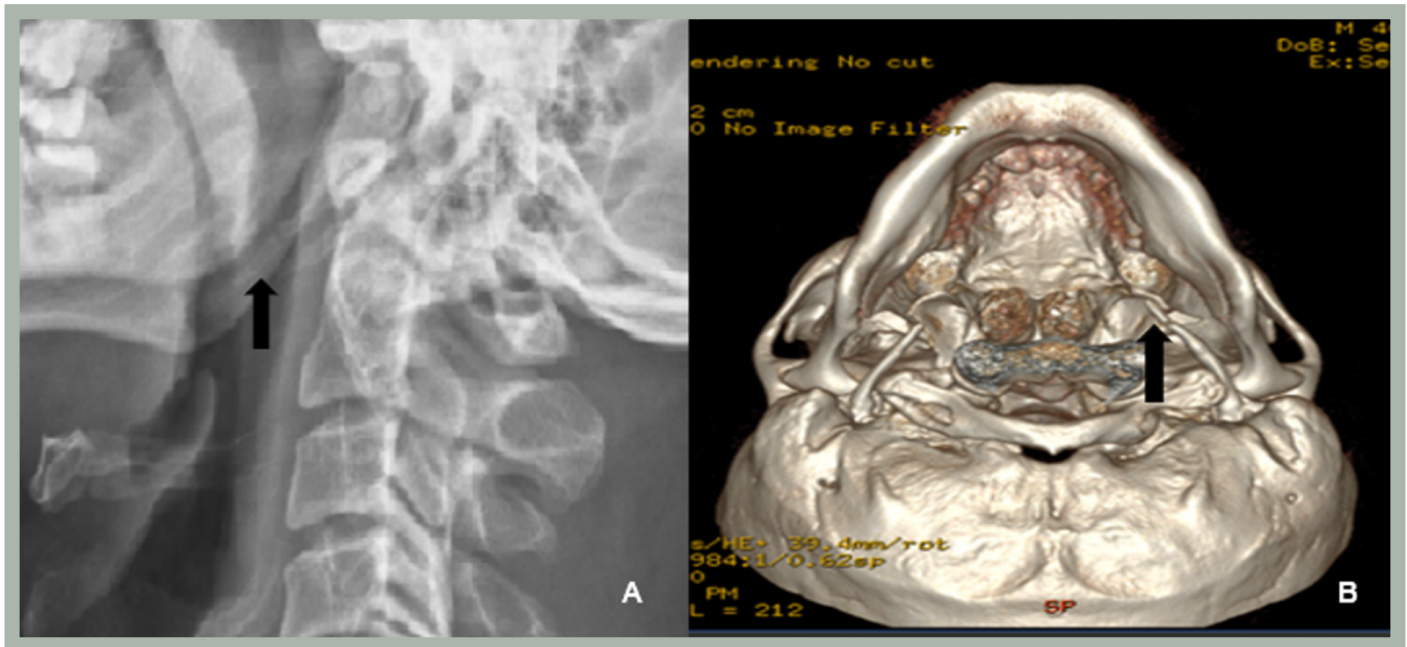


Figure 1. Prolonged styloid process shown in cervical lateral X-ray (A) and three-dimensional computed tomography (B)

ES is an important but often overlooked cause of cervicofacial pain and tinnitus and may mimic TMJ dysfunction and myofascial pain syndromes (7,8). Current treatment strategies range from conservative management to surgical intervention. Conservative approaches include analgesics, anti-inflammatory medications, physical therapy, and local injections (e.g., anesthetic or corticosteroid infiltration), which may provide temporary or partial symptom relief (9). Surgical styloidectomy, performed via intraoral or external approaches, is generally considered the most definitive treatment and has been associated with high rates of symptom resolution in appropriately selected patients (10,11,12).

Injection-based therapies have also been described in the literature as adjunctive or alternative options, particularly for patients who are not surgical candidates. For instance, local anesthetic and steroid injections targeting the stylohyoid region have demonstrated symptomatic improvement in case reports (9). However, evidence regarding the use of botulinum toxin in ES is limited, and its role remains unclear. In this case, the botulinum toxin injection was primarily directed at the masseter muscles, suggesting that the observed clinical improvement may be attributable to modulation of coexisting myofascial pain and parafunctional activity rather than to direct treatment of the elongated styloid process.

Botulinum toxin is known to reduce muscle hyperactivity, decrease nociceptive input, and improve pain associated with myofascial dysfunction. Therefore, it is plausible that alleviation of secondary muscular tension contributed

to the reduction in both pain and tinnitus in this patient (13). Nevertheless, this effect should be interpreted with caution, as spontaneous symptom fluctuations or a placebo response cannot be excluded, and causal inference cannot be established from a single case.

This case highlights the importance of considering ES in patients with persistent tinnitus and atypical facial pain that is resistant to conventional therapy. It underscores the potential contribution of concomitant myofascial components to symptom generation. Early diagnosis and a multidisciplinary approach are essential to improve outcomes and prevent unnecessary treatments.

Ethics

Informed Consent: Written informed consent was obtained from the patient for participation in this report and for the publication of clinical data and images.

Footnotes

Authorship Contributions

Surgical and Medical Practices: T.K., Concept: T.K., A.Y., K.Ç., E.Y., Design: T.K., A.Y., E.Y., Data Collection or Processing: T.K., A.Y., K.Ç., Analysis or Interpretation: T.K., E.Y., Literature Search: T.K., K.Ç., Writing: T.K., K.Ç., E.Y.

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