

Case Report

Eagle's Syndrome Revisited: Perioperative Strategies for Bilateral Elongated Styloid Process – A Case Report

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Citation: Rahul K. Chaudhary. (2026). Eagle's Syndrome Revisited: Perioperative Strategies for Bilateral Elongated Styloid Process – A Case Report. *Journal of Surgical Case Reports and Research*, RPC Publishers, 2(1); DOI: doi.org/10.66609/jscrr-rpc.25.00557

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Submitted: May 09, 2026

Approved: July 17, 2026

Published: August 14, 2026

Abstract

Eagle's syndrome, a rare condition characterized by symptomatic elongation (>2.5 cm) or calcification of the styloid process or stylohyoid ligament, often manifests as chronic throat pain, dysphagia, foreign body sensation, and referred otalgia or headache-yet remains underdiagnosed, with only few individuals developing symptoms. This case report highlights a classic presentation in a 37-year-old male with a 2-year history of progressive throat pain and solid-food dysphagia, where contrast-enhanced CT (CECT) neck revealed striking bilateral elongation (right: 45 mm; left: 48.6 mm). The patient underwent endoscopic bilateral styloidectomy via an intraoral tonsillar fossa approach under general anesthesia, resulting in resolution of symptoms and no recurrence at follow-up. Despite its rarity, Eagle's syndrome warrants consideration in differential diagnoses of orofacial pain, as misdiagnosis can lead to prolonged morbidity. The case illustrates the importance of multidisciplinary collaboration between otolaryngologists, anesthesiologists, and radiologists to optimize outcomes, offering a replicable model for managing similar presentations.

Keywords: eagle's syndrome; styloidectomy; otorhinolaryngology; anesthesiology

Key Clinical Message

Eagle's syndrome, though rare, should be considered in patients with chronic throat pain, dysphagia, or referred otalgia to avoid delayed diagnosis and prolonged morbidity. Contrast-enhanced CT (CECT) is the preferred imaging modality for confirming styloid process elongation or calcification, facilitating accurate surgical planning. Endoscopic intraoral styloidectomy provides a minimally invasive and highly effective treatment, often leading to immediate symptom relief and favorable outcomes. A multidisciplinary approach involving otolaryngologists, radiologists, and anesthesiologists is essential for optimal diagnosis, management, and surgical success in these cases.

Introduction

Eagle's syndrome (ES) is a rare clinical condition characterized by symptomatic elongation of the styloid process (SP) (>2.5 cm) or pathological mineralization of the stylohyoid or stylomandibular ligament complex, leading to a constellation of cervicofacial symptoms [1]. Classically, patients present with chronic throat pain, dysphagia, globus sensation, and referred otalgia, though the syndrome may also manifest as facial pain, headache, syncope, or even transient cerebral ischemia due to carotid artery compression [2,3]. Despite radiographic evidence of styloid elongation in many individuals, only a small subset becomes symptomatic, contributing to frequent misdiagnosis as temporomandibular joint disorders, trigeminal neuralgia, or atypical oropharyngeal pain [4]. The etiopathogenesis remains debated, with theories implicating post-traumatic ossification, congenital elongation, or reactive calcification due to mechanical stress [3]. Diagnosis hinges on a high index of clinical suspicion corroborated by 3D imaging-notably CT, which delineates SP morphology and rules out mimicking pathologies [5]. This case underscores the diagnostic challenges and therapeutic nuances of ES, emphasizing the role of targeted imaging and minimally invasive surgery in mitigating this underrecognized cause of debilitating cervicofacial pain.

Case Presentation

A 37-year-old male presented with a 2-year history of progressive throat pain and dysphagia, particularly with solid foods. His dull, intermittent pain radiated to the neck and was partially relieved by analgesics. Clinical examination revealed exquisite tenderness on palpation of both tonsillar fossae, raising suspicion for Eagle syndrome. High-resolution CT with 3D reconstruction confirmed the diagnosis, demonstrating markedly elongated styloid processes (right: 45 mm; left: 48.6 mm) as shown in Figure 1.



Figure 1: Arrow shows bilateral elongated styloid process

A comprehensive preoperative evaluation was performed, focusing on airway assessment given the anticipated difficult intubation due to limited neck extension and potential pharyngeal sensitivity. Standard monitors were applied, including ECG, pulse oximetry, capnography, and non-invasive blood pressure monitoring.

Premedication included intravenous midazolam (1 mg) for anxiolysis and glycopyrrolate (0.2 mg) to reduce secretions. After preoxygenation for 3 minutes, anesthesia was induced with fentanyl (2 mcg/kg) and propofol (2 mg/kg), followed by rocuronium (0.6 mg/kg) to facilitate nasotracheal intubation. The nasal cavity was prepared with topical lidocaine 2% with phenylephrine to minimize bleeding and trauma. A well-lubricated 7.0 mm cuffed endotracheal tube was gently inserted under direct vision using a fiberoptic bronchoscope, with confirmation of placement by capnography and bilateral chest auscultation.

Anesthesia was maintained with isoflurane (1-1.2 MAC) in a 50:50 oxygen-air mixture, supplemented with intermittent fentanyl boluses (0.5 mcg/kg) for analgesia. Neuromuscular blockade was maintained with rocuronium and monitored using train-of-four stimulation. The patient was positioned supine with neck extension facilitated by a shoulder roll. Hemodynamic stability was maintained throughout, with particular attention to avoiding carotid sinus stimulation during surgical manipulation near the styloid processes.

The surgical team performed bilateral tonsillectomy via the dissection and snare technique, followed by meticulous exposure of the elongated styloid processes. Using Cottle's elevator and angled curettes, the styloids were carefully degloved and resected at their base. Hemostasis was achieved with bipolar cautery and vicryl sutures.

At the conclusion of surgery, neuromuscular blockade was reversed with neostigmine (2.5 mg) and glycopyrrolate (0.4 mg). The patient was extubated awake and transferred to recovery in stable condition. Postoperative analgesia was managed with intravenous paracetamol and tramadol. At 3-month follow-up, the patient reported complete resolution of symptoms with no complications. This case highlights the importance of meticulous anesthetic planning and execution in Eagle syndrome surgery, particularly regarding airway management and hemodynamic stability during styloid manipulation. The successful outcome demonstrates the value of a coordinated multidisciplinary approach to this challenging condition.

Discussion

Eagle's syndrome presents a unique convergence of embryology, anatomy, and clinical medicine. The styloid process, derived from Reichert's cartilage of the second pharyngeal arch, typically measures 20-30 mm in adults. However, when ossification extends beyond 30 mm—as seen in this patient's remarkable 45-48.6 mm bilateral elongation—it transitions from an anatomical variant to a source of debilitating symptoms [1]. The pathogenesis remains unclear, with theories ranging from post-traumatic reactive hyperplasia to genetic predisposition [2,3]. In this case, the absence of trauma history suggests developmental or genetic factors. The symptom complex—chronic throat pain radiating to the neck with dysphagia—exemplifies classic Eagle's syndrome. Murtagh's pathophysiological model explains these manifestations through neural compression (glossopharyngeal nerve impingement causing dysphagia and throat pain), vascular irritation (carotid sheath involvement leading to neck radiation), and insertional tendinitis (chronic inflammation at stylohyoid attachment sites) [4].

Diagnostically, this case adhered to the gold standard of CT with 3D reconstruction, which precisely mapped the styloid's relationship to neurovascular structures [5]. The tonsillar fossa palpation test, which reproduced pain, further confirmed the diagnosis. The intraoral surgical approach was chosen for its distinct advantages, beginning with careful anesthetic planning to optimize safety and access [6]. Nasotracheal intubation, performed using fiberoptic guidance, secured the airway while maximizing pharyngeal exposure—a critical consideration given the anatomical constraints of the elongated styloid processes. The surgical strategy included initial tonsillectomy to create working space, followed by subperiosteal dissection using angled

instruments like the Cottle's elevator to navigate the skull base while protecting neurovascular structures. Hemostasis was achieved through bipolar cautery and vicryl sutures, minimizing bleeding risks in this vascularized field [6].

From an anesthetic perspective, this case required specialized considerations beyond routine airway management. Fiberoptic-assisted nasal intubation avoided dangerous manipulation of the styloid region during conventional laryngoscopy [7]. Continuous hemodynamic monitoring allowed precise titration of anesthetic depth to prevent carotid sinus reflex activation during styloid manipulation. Postoperatively, a multimodal analgesic regimen-combining local anesthetic infiltration with systemic analgesia-ensured patient comfort while promoting early recovery. This comprehensive approach to surgical technique and anesthetic management was instrumental in achieving an excellent outcome in this challenging case of Eagle's syndrome.

This case underscores Eagle's syndrome as a diagnostic challenge requiring high clinical suspicion and multidisciplinary collaboration. The successful intraoral surgical approach, aided by precise imaging and anesthetic planning, highlights its efficacy with minimal morbidity. Future research should explore genetic predispositions, optimal pain management, and long-term surgical outcomes. The integration of embryology, advanced imaging, and refined techniques provides a model for managing complex craniofacial pathologies.

Acknowledgments: The authors are thankful to the Department of Maxillofacial Surgery for providing the needful information. We express our gratitude to the patient's family members for their co-operation.

Conflicts of Interest: The authors declare no conflicts of interest.

Funding: No funding.

Ethical approval: No required.

Consent: No required.

Author Contributions: All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Conceptualization: Rahul Kumar Chaudhary.

Manuscript Preparation: Rahul Kumar Chaudhary.

Manuscript Editing: Rahul Kumar Chaudhary.

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