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Aryepiglottic Fold-Predominant Supraglottitis Presenting with Paradoxical Relief of Stridor on Neck Flexion

GebreEgziabher Kassa Kebede
ethio274@gmail.com

Enat General Hospital
Behaylu Tesfamaryam Hagos
behaylu10@gmail.com

Debre Berhan University
Tsegaye Aregawei Amare
Salale University
Shimels Getaneh Woldemedhn
Debre Berhan University
Molaligne Fenta Alemu
Enat General Hospital
Rediwan Gashaw Geto
Enat General Hospital

Case Report

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Abstract

Background

Acute supraglottitis typically presents with the classic tripod position, neck extension, leaning forward, and jaw thrust, to maximize upper airway patency. Positional worsening with neck extension and paradoxical relief with flexion is exceptionally uncommon.

Case Presentation:

A 26-year-old woman with type 1 diabetes mellitus presented with progressive inspiratory stridor and drooling. Stridor worsened during neck extension but improved with flexion, and the patient positioned herself accordingly based on comfort and preference. Lateral neck radiography demonstrated marked aryepiglottic fold swelling with vallecular air space obliteration and relative epiglottic sparing. She was managed with intravenous antibiotics, with complete resolution of stridor within 48 hours.

Discussion

Unlike the classic presentation in which neck extension improves airflow, this patient exhibited paradoxical relief with flexion. We hypothesize that predominant aryepiglottic fold edema caused dynamic airway narrowing aggravated by extension, while flexion relieved tension on these structures. This illustrates how variations in inflammation distribution may produce atypical presentations. Diabetes mellitus is a recognized risk factor for severe disease requiring airway intervention.

Conclusion

Clinicians should recognize that supraglottitis can present with unusual positional symptoms. Improvement with neck flexion does not exclude the diagnosis and may reflect predominant aryepiglottic fold involvement. Early recognition and prompt treatment remain essential to prevent life-threatening airway compromise.

Introduction

Epiglottitis is an inflammatory condition primarily of the epiglottis, vallecula, arytenoid cartilage, and aryepiglottic folds [1]. a potentially life-threatening infective condition where inflammation occurs at the supraglottic structures such as epiglottis and adjacent structures such as aryepiglottic folds (AEFs) and arytenoids leading to airway obstruction [2, 3].

However, the anatomical distribution of inflammation in supraglottitis is variable. While the epiglottis is involved in over 95% of cases, isolated inflammation of the aryepiglottic folds occurs in only 1.9% of

patients [4]. This variability has important clinical implications, as the pattern of inflammation may influence both presenting symptoms and positional airway response.

This case has three key clinical implications. First, it demonstrates that the classic tripod position is not the only positional response in supraglottitis. Neck flexion, especially when patient-preferred, should raise suspicion for predominant aryepiglottic fold involvement rather than excluding the diagnosis. Second, lateral neck radiography can reveal the specific pattern of supraglottic involvement without invasive airway manipulation. Findings of aryepiglottic fold swelling with vallecular obliteration and relative epiglottic sparing should alert clinicians to possible atypical positional responses. However, a normal radiograph does not exclude the diagnosis, particularly in early or mild disease. In resource-limited settings without flexible nasopharyngoscopy, lateral neck radiography remains a practical and reliable diagnostic tool. Finally, patients' positional preferences may provide valuable diagnostic clues that challenge textbook expectations, reflecting the broader principle that patients often self-select positions optimizing airway mechanics.

Case presentation

A 26-year-old female with type 1 diabetes mellitus presented to the Emergency Department with progressive inspiratory stridor and drooling of saliva of six to eight hours duration. On arrival, the patient appeared acutely ill but was alert and oriented. Vital signs revealed tachycardia (114 bpm), normotension (101/65 mmHg), and an oral temperature of 36.9°C. Room air oxygen saturation was 95%.
Airway assessment demonstrated significant respiratory distress with audible inspiratory stridor that exhibited a striking positional dependence. The patient spontaneously positioned herself with her neck flexed, as this provided marked relief of her stridor and subjective respiratory effort. When asked to extend her neck, her stridor audibly worsened and her respiratory distress increased. The patient consistently preferred and maintained neck flexion based on her own comfort and preference. A lateral neck X-ray (Figure 1) was obtained, which demonstrated marked focal swelling and thickening of the aryepiglottic folds with near-complete obliteration of the vallecular air space, resulting in significant supraglottic airway compromise.

Complete blood count revealed leukocytosis (WBC 14,000/μL) with marked neutrophilia (92.8%). The patient was admitted to the intensive care unit, with the impression of acute epiglottitis, for close airway monitoring and management was initiated with intravenous antibiotics consisting of ceftriaxone 1g twice daily and vancomycin 1g twice daily for empiric coverage of community-acquired and resistant organisms. Continuous pulse oximetry monitoring with frequent respiratory assessments was maintained, and the patient was allowed to maintain the neck-flexed position that she found most comfortable.

Within 48 hours of initiating antibiotic therapy, the patient's stridor completely resolved and she was able to tolerate oral secretions without difficulty. The patient was discharged on a course of oral antibiotics.

Discussion

The larynx is anatomically divided into three regions: the supraglottis (composed of the epiglottis, aryepiglottic folds, and arytenoids), the glottis (vocal cords), and the subglottis [5]. While the term epiglottitis is commonly used, supraglottitis is the more anatomically accurate designation, as inflammation frequently extends beyond the epiglottis to involve multiple supraglottic structures [6,7]. Evidence from a large case-control study indicates that the epiglottis is involved in over 95% of cases, occurring with equal frequency as an isolated finding and in combination with the aryepiglottic folds or arytenoid cartilage. In contrast, isolated inflammation of the aryepiglottic folds is rare, appearing in only 1.9% of cases [4]. The high distensibility of the submucosal connective tissue in these areas facilitates rapid edema formation, and given that these structures sit immediately superior to the narrow glottic opening, such swelling carries a high risk of life-threatening airway obstruction [6–8].

The classic tripod position in supraglottitis, leaning forward on outstretched arms with neck extension and jaw thrust, improves dyspnea through several mechanisms. The arm support fixes and lifts the shoulder girdle, improving the length-tension relationship of accessory muscles attached between the ribs and the upper limb [9]. The position compresses abdominal contents and pushes the diaphragm upward, restoring its normal dome-shaped appearance and optimizing its length-tension relationship [10,11]. Neck extension further facilitates airway patency by moving the inflamed epiglottis and supraglottic structures anteriorly, thereby opening the narrowed airway [9].

The physiological understanding of how positioning affects breathing in respiratory distress is often informed by studies of chronic obstructive pulmonary disease, which demonstrate that leaning forward improves the length-tension relationship of accessory muscles and optimizes diaphragmatic function [10–12]. However, the acute, dynamic airway obstruction in supraglottitis is fundamentally different. In our patient, the paradoxical worsening of stridor with neck extension and relief with flexion is best explained by the specific anatomy of her inflammation. As the aryepiglottic folds form the lateral boundaries of the laryngeal inlet, their marked edema, combined with relative epiglottic sparing, created a situation where passive neck extension likely increased tension on these swollen folds. This tension may have drawn them medially, further compromising an already narrowed glottic aperture. Conversely, the neck flexion adopted by the patient for comfort likely relaxed this tension, allowing the edematous folds to fall laterally and partially relieve the airway obstruction. This patient's spontaneous adoption of a flexed position, based on her own comfort and symptom relief, provides compelling clinical support for this physiological rationale.

This case also highlights the critical role of underlying comorbidities. Patients with diabetes mellitus are recognized to be at a significantly higher risk for severe supraglottitis. A landmark retrospective review of 96 patients by Katori and Tsukuda identified diabetes mellitus as one of the key factors strongly associated with the need for airway intervention, alongside symptoms like stridor and rapid clinical progression [13]. The altered immune state and impaired tissue perfusion associated with diabetes may predispose patients to more aggressive and rapidly progressive infections of the supraglottic airway,

increasing the likelihood of complications. This evidence underscores the importance of a low threshold for intensive monitoring and early, aggressive management in diabetic patients presenting with supraglottitis, even when clinical signs are atypical.

This case has several important clinical implications. First, it demonstrates that the classic tripod position is not the only possible positional response in supraglottitis. While neck flexion is not a sign that excludes the diagnosis, its presence, particularly when combined with the patient's preference for this posture, should raise suspicion for predominant aryepiglottic fold involvement. This is a crucial observation because an atypical positional response could otherwise be misinterpreted as a less concerning condition. Second, this case highlights the diagnostic value of lateral neck radiography, which can reveal the specific pattern of supraglottic involvement and guide clinical suspicion. The finding of aryepiglottic fold swelling with vallecular air space obliteration and relative epiglottic sparing should alert clinicians to the possibility of such atypical positional responses.

Limitations

This case report has several limitations. First, microbiological confirmation of the causative organism was not obtained, as blood cultures and throat swabs were not performed. Second, formal objective measures of airway compromise, such as peak flow measurements or quantitative stridor scoring, were not documented. Third, the assessment of positional changes in stridor was based on clinical observation rather than standardized protocols. Finally, as a single case report, these findings cannot be generalized without further systematic study

Conclusion

This case describes a rare presentation of acute supraglottitis with predominant aryepiglottic fold involvement, characterized by improvement of stridor with neck flexion, a positional response opposite to the classical neck extension associated with the tripod position. The patient's spontaneous adoption of neck flexion provided an important clue to the underlying anatomy. This atypical response may be explained by disproportionate aryepiglottic fold edema causing dynamic airway narrowing exacerbated by neck extension, while flexion relieves tension on these structures and improves patency. Clinicians should recognize that atypical supraglottitis presentations occur and consider the diagnosis even when classic signs are absent, as adult supraglottitis often presents more variably than pediatric cases. In resource-limited settings without advanced airway visualization, lateral neck radiography is invaluable for identifying aryepiglottic fold-predominant disease and guiding management, though clinical suspicion should remain high even with negative imaging. Early recognition, prompt airway assessment, and timely antimicrobial therapy remain essential to prevent life-threatening airway compromise, particularly in diabetic patients who are at higher risk for severe disease requiring airway intervention.

Abbreviations

AEF: Aryepiglottic Fold

Hib: Haemophilus influenzae type B

ICU: Intensive Care Unit

IV: Intravenous

WBC: White Blood Cell

Declarations

Ethical Approval and Consent to participate: NA.

Consent for publication: Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Author's contribution:

GKK Conceptualization, literature search, investigation, formal analysis, writing–original draft

TAA: Formal analysis, literature search, critical revision, writing–review & editing

MFA, RGG: Patient Care**,** data acquisition, writing–review & editing.

SGW: literature search, critical revision, writing–review & editing.

BTH: Patient Care, Conceptualization, literature Search, formal analysis, writing–original draft

All authors approved the final version and agree to be accountable for all aspects of the work.

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Figures

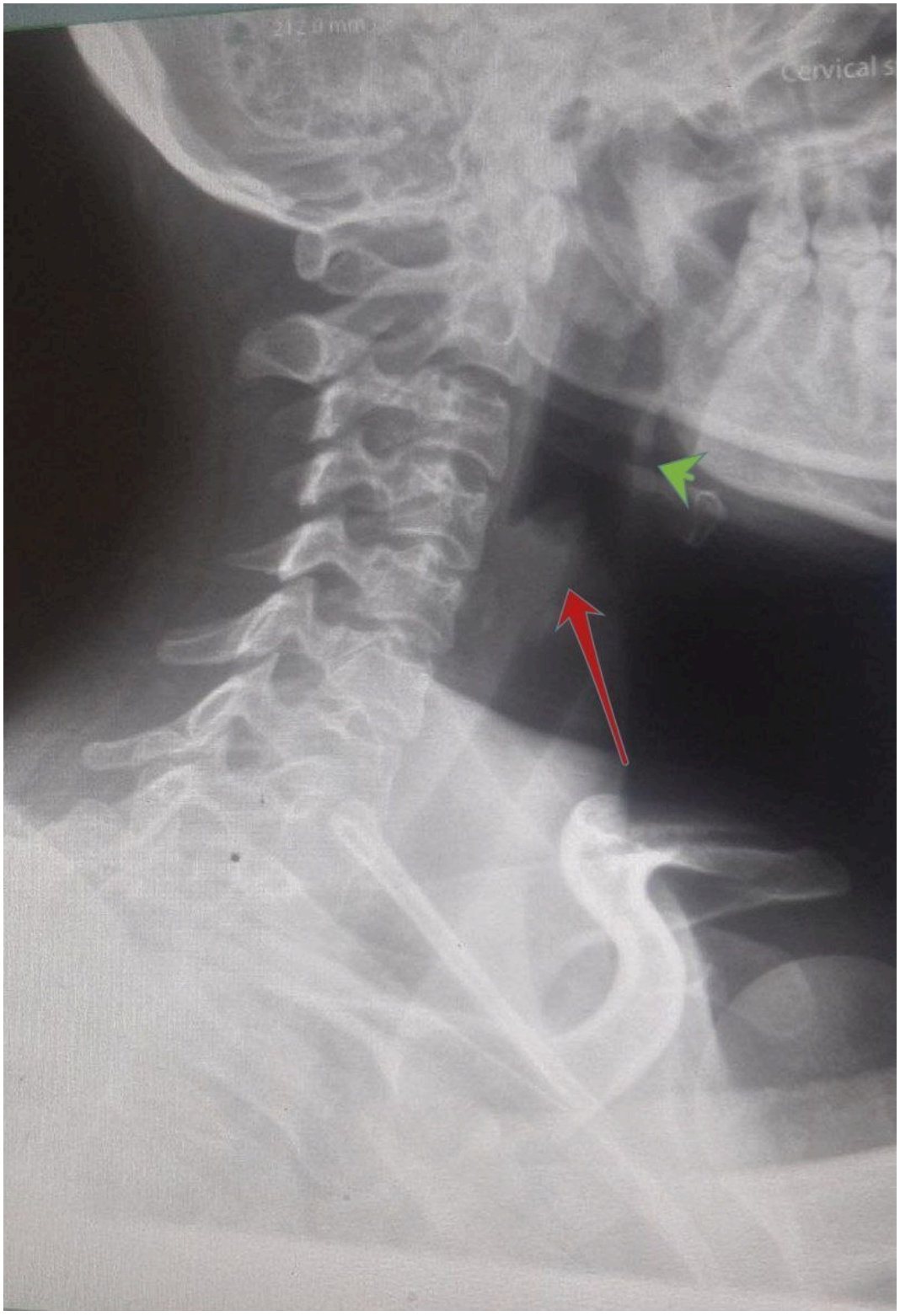


Figure 1

Lateral neck X-ray demonstrates marked focal swelling and thickening of the aryepiglottic folds with near complete obliteration of the vallecular air space (red arrow), resulting in significant supraglottic airway compromise. Note the sparing of the epiglottic tip, which remains thin and normal in caliber (green arrowhead).