

Cervical lymph node abscess with prevertebral extension into the upper mediastinum – A rare complication three weeks after resolved scarlet fever in a 3-year-Old

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1. Introduction

Scarlet fever is an acute infectious disease caused by *Streptococcus pyogenes* (Group A β -hemolytic streptococci), typically affecting children between 5 and 15 years of age [1]. It is characterized by fever, pharyngitis, a diffuse erythematous rash, and “strawberry tongue” [2]. Although the disease is generally self-limiting with appropriate antibiotic therapy, complications can still arise, ranging from mild (otitis media) to severe, including suppurative lymphadenitis, peritonsillar abscess, and, more rarely, deep neck space infections [3,4].

Deep cervical infections are a known but uncommon complication of streptococcal infections in children and carry a significant risk due to their proximity to vital structures and the potential for descending spread into the mediastinum via fascial planes [5]. Such infections may present subtly, often after initial recovery from the primary illness, and require a high index of suspicion, especially when patients present with torticollis, neck swelling, or signs of systemic toxicity [6].

In this report, we present a rare case of a 3-year-old child who developed a massive cervical lymph node abscess with necrosis and prevertebral extension into the upper mediastinum, three weeks after a clinically resolved scarlet fever infection. This case highlights the importance of early recognition and aggressive management of post-infectious complications, even when the primary illness appears fully resolved.

2. Case presentation

A previously healthy 3-year-old boy was referred from a peripheral

pediatric clinic due to progressive deterioration of his general condition. Three weeks earlier, he had been diagnosed with scarlet fever and treated on an outpatient basis with oral cefaclor. According to the parents, the child had made a full recovery and had been symptom-free until his current illness.

At admission, the child presented with a severely reduced general condition and persistent fever of 38.6 °C. Clinical examination revealed marked torticollis, tachycardia (heart rate: 155 bpm), tachypnea (respiratory rate: 38/min), and hypotension (blood pressure: 80/50 mmHg), indicating a pre-septic state. Laboratory analysis showed a C-reactive protein (CRP) of 125 mg/dL and leukocytosis with 17,000/ μ L, despite ongoing intravenous antibiotic therapy with an ampicillin/sulbactam combination initiated at the referring hospital.

Neck ultrasonography demonstrated multiple enlarged cervical lymph nodes, predominantly on the left side, measuring up to 5.0 cm in diameter. The nodes were sharply demarcated, hypoechoic, and exhibited intense, chaotic central and peripheral vascularization on color Doppler imaging. Notably, in deep cervical level V, one lymph node showed a central anechoic necrotic area with posterior enhancement, consistent with complete liquefaction and capsular thinning, suggesting an impending rupture or abscess formation.

Given the rapid clinical decline, an emergency magnetic resonance imaging (MRI) under general anesthesia was performed prior to surgical intervention. Imaging confirmed a prevertebral abscess extending from the deep cervical space into the upper mediastinum, without evidence of vascular involvement or airway compression (Figs. 1 and 2).

Urgent surgical intervention was performed under general anesthesia. This included cervical abscess drainage, partial

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lymphadenectomy, and a transoral prevertebral incision for mediastinal access. The initial transcervical approach was chosen to address the superficial cervical lymphadenitis and to provide external drainage of the deep neck abscess. However, due to the extension of the abscess into the retropharyngeal space, a transoral approach was subsequently performed to achieve direct access to the deeper and prevertebral compartments. Intraoperatively, large volumes of purulent material were evacuated both from the cervical site and the prevertebral space, and the radiologic suspicion of a spreading abscess was confirmed. The anatomical structures appeared markedly edematous and were not clearly demarcated because of the persistent infection, which further influenced the surgical decision-making. Microbiological cultures from both sites yielded *Streptococcus pyogenes* in high concentration. A tailored Penrose drain was inserted into the transcervical wound to allow continuous drainage of superficial collections and was removed on the fourth postoperative day; no drain was placed via the transoral approach to avoid contamination.

Postoperatively, the child was intubated and managed in the pediatric intensive care unit (ICU). Daily irrigation through the transcervical

drain was carried out to prevent re-accumulation of purulent material, lower the bacterial load, and thereby support healing in combination with systemic antibiotic therapy. On postoperative day 3, the patient was successfully extubated following clinical stabilization and a marked decline in inflammatory markers. The drainage systems were removed on postoperative day 4, with significant clinical improvement, including restored neck mobility and normalization of general condition.

3. Discussion

Acute torticollis in children is a common presenting symptom in pediatric emergency care. It can have a broad differential diagnosis, ranging from benign musculoskeletal causes to life-threatening deep neck infections or spinal involvement [7]. In this case, the child initially presented with a painful torticollis and signs of systemic deterioration. Based on clinical examination alone, the condition was initially assumed to be a localized cervical lymph node abscess. However, cross-sectional imaging revealed a significantly more extensive disease process with prevertebral abscess formation and mediastinal extension—a potentially

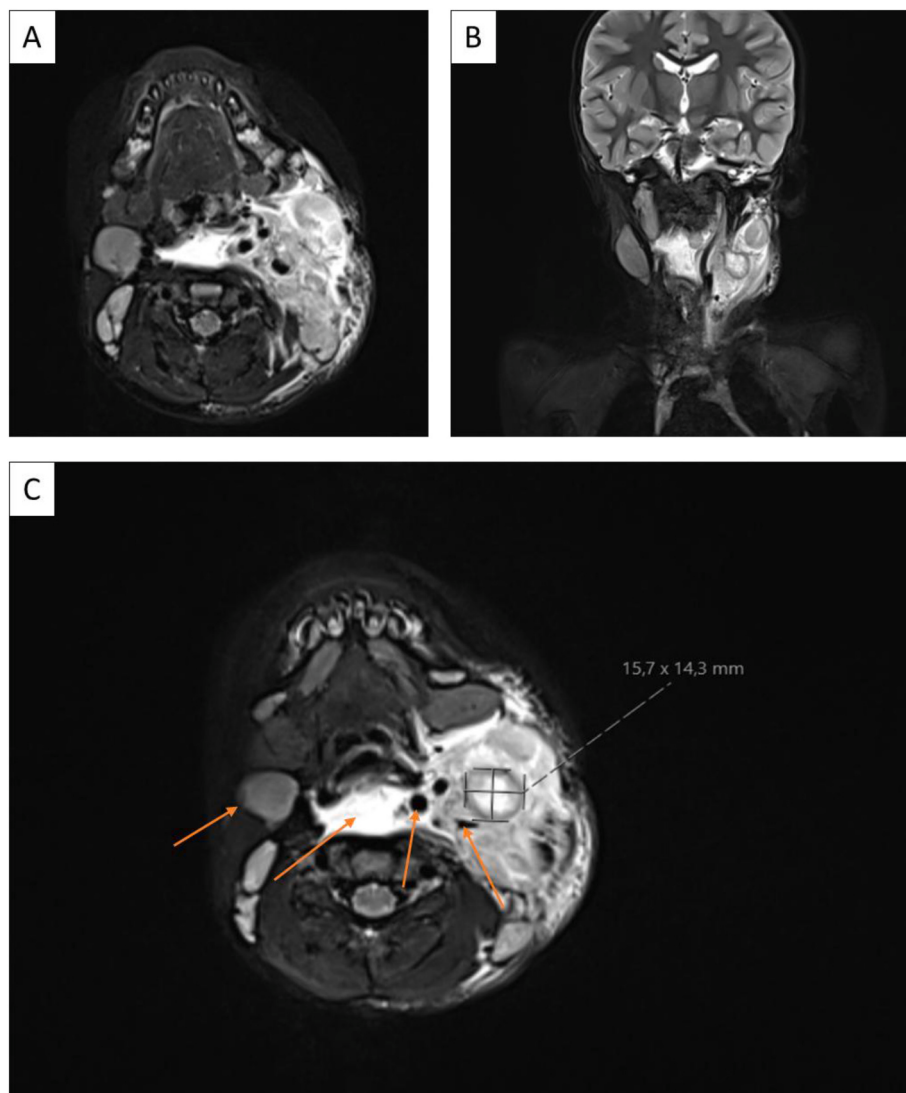


Fig. 1. MRI findings of the cervical and prevertebral abscess. **A** Axial T1-weighted contrast-enhanced sequence shows a deep left-sided cervical process involving multiple levels, with infiltration of the carotid sheath and displacement of adjacent vascular and neural structures. **B** Coronal T1-weighted contrast-enhanced sequence image demonstrates the cranio-caudal extension of the abscess and reveals pronounced bilateral cervical lymphadenopathy. **C** Axial contrast-enhanced MRI of the neck demonstrating a well-defined abscess cavity (cross-hairs, measuring 15.7×14.3 mm). From left to right, the arrows indicate: (1) a contralateral cervical lymph node, (2) the prevertebral space containing fluid and showing associated compression of the adjacent pharyngeal space, (3) the internal carotid artery, and (4) the compressed internal jugular vein.

life-threatening complication.

Torticollis in the setting of infection should always raise suspicion for deep neck space involvement, particularly when accompanied by systemic signs such as fever, tachycardia, or elevated inflammatory markers. Although torticollis is often attributed to muscular spasm or lymphadenitis, it may also indicate irritation of the prevertebral fascia or even spinal involvement, especially if there is restricted range of motion, neurological deficits, or pain on passive movement [8]. In this context, torticollis may serve as a clinical red flag and should prompt further imaging if the cause is not clearly localized or the patient

deteriorates under conservative therapy.

In our case, the prevertebral abscess was not suspected based on clinical examination, including pharyngoscopy, nor was it detected on initial cervical ultrasound. The child's hemodynamic instability and rising inflammatory markers despite intravenous antibiotics suggested a deeper-seated infection. Although sepsis was considered as part of the differential diagnosis, the clinical presentation with neck swelling, restricted movement, and ultrasound findings, was more consistent with a deep neck space abscess. MRI was critical in identifying the full extent of the pathology, including mediastinal involvement. MRI is superior to

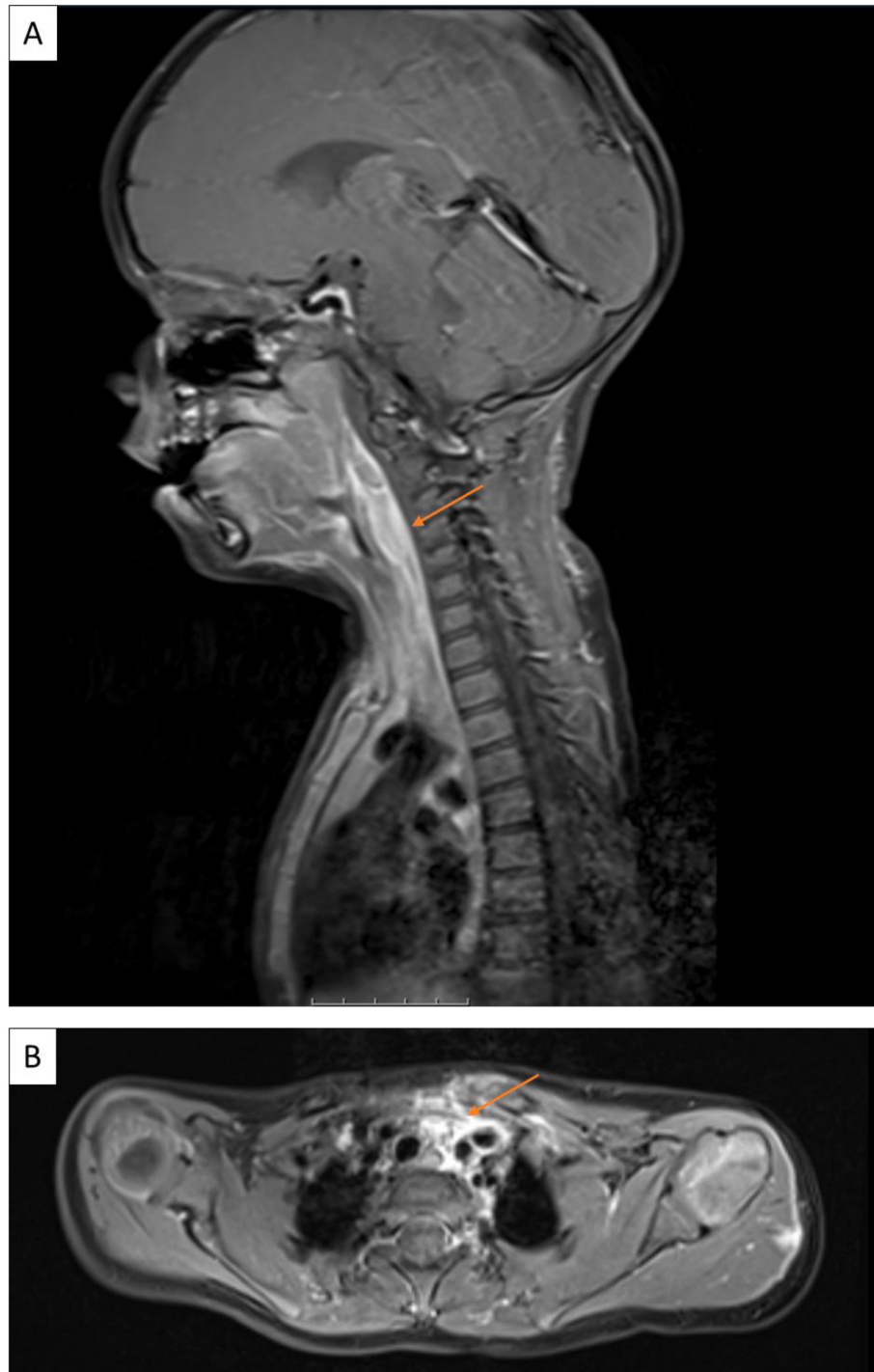


Fig. 2. A Sagittal T1-weighted contrast-enhanced sequence MRI image showing a prevertebral abscess extending along the retropharyngeal space, with significant compression of the posterior pharyngeal wall and narrowing of the airway. B Sagittal T1-weighted contrast-enhanced sequence MRI image demonstrating caudal extension of the abscess fluid along the vascular-neural sheath into the upper mediastinum.

computed tomography (CT) in soft tissue resolution and especially valuable in detecting prevertebral and spinal involvement, epidural abscesses, or early osteomyelitis [9]. In the diagnosis of pediatric lateral neck abscesses, recent studies report ultrasound sensitivities ranging from 53 % to 69.5 %, with a positive predictive value around 96 %, indicating that while a positive ultrasound finding is highly reliable, negative findings may not safely exclude an abscess.

In contrast, CT offers higher sensitivities (68 %–95.5 %) but with more variable specificity, ranging from 18 % to 80 % [10,11]. Given these diagnostic limitations, MRI has emerged as a valuable adjunct. Recent pediatric data demonstrate high diagnostic accuracy, with sensitivities ranging from 96 % to 99 %, specificities between 77 % and 89 %, and negative predictive values up to 98 %, clearly outperforming CT in differentiating true abscesses from surrounding cellulitis or edema [12,13].

Typical imaging features include a T2-hyperintense, centrally non-enhancing fluid collection, surrounded by rim enhancement on post-contrast T1-weighted images and restricted diffusion (low Apparent Diffusion Coefficient (ADC) values) [12]. Furthermore, retropharyngeal edema (RPE) has been identified as a key prognostic imaging marker, with a strong correlation to ICU admission rates, independent of clinical and laboratory parameters [14].

Given its lack of ionizing radiation and superior soft-tissue contrast, MRI represents a valuable modality in complex or ambiguous cases, particularly in children with atypical clinical findings or persistent systemic deterioration.

While MRI is not routinely indicated in all cases of suspected lymphadenitis or superficial abscess, it may be life-saving when deeper or spinal extension is suspected, or when clinical findings are disproportionate to the presumed diagnosis.

Regarding management, surgical drainage remains the standard of care in deep neck space abscesses with radiologically confirmed liquefaction, signs of airway compromise, or systemic toxicity [10]. In superficial cervical abscesses, antibiotic therapy alone may suffice in select cases; however, failure to improve or clinical worsening—as seen in this case—should prompt urgent surgical intervention. The combined external and transoral surgical approach was essential to fully evacuate both the cervical and prevertebral compartments in our patient. Conservative management alone would likely have failed and potentially resulted in life-threatening complications such as descending mediastinitis or spinal cord compression.

4. Conclusion

This case illustrates that MRI is not always required, but in cases of atypical presentation, severe systemic illness, or suspicion of deep extension, it should be considered early. For deep neck space infection, drainage is generally considered essential, especially in the presence of mediastinal extension. Torticollis, particularly when accompanied by systemic symptoms, must be recognized as a possible sign of deep neck or spinal involvement, warranting further investigation beyond clinical examination.

CRedit authorship contribution statement

L. Brust: Writing – original draft, Methodology, Data curation, Conceptualization. **M. Linxweiler:** Writing – review & editing. **B.**

Schick: Writing – review & editing. **A. Bozzato:** Writing – review & editing. **M. Knebel:** Writing – review & editing. **N. Nourkani-Tutdibi:** Writing – review & editing. **M. Geipel:** Writing – review & editing. **J. Zimmer:** Writing – review & editing. **C.S. Hamamci:** Writing – review & editing. **L. Pillong:** Writing – review & editing, Methodology, Formal analysis, Data curation, Conceptualization.

Ethical statement

This case report was conducted in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments. Written informed consent for publication of all clinical details and images was obtained from the patient's legal guardian. Ethical approval was not required for this single-patient case report, in accordance with local guidelines.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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