



Case Report

Retropharyngeal Tuberculous Lymphadenitis as a Paradoxical Reaction in an Immunocompetent Child: A Case Report

Hajar Boudhar*, Aboutalib Adoum, Meryem Lahjaoui,
Meryem Loudghiri, Walid Bijou, Youssef Oukessou, Sami
Rouadi, Reda Abada, Mohamed Roubal and Mohamed
Mahtar

Department of Otorhinolaryngology – Head and Neck Surgery, 20 Août 1953 Hospital, CHU Ibn Rochd, Casablanca, Morocco

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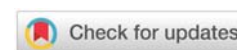
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*Corresponding author: Hajar Boudhar, Department of Otorhinolaryngology – Head and Neck Surgery, 20 Août 1953 Hospital, CHU Ibn Rochd, Casablanca, Morocco, E-mail: Hajar.boudhar@gmail.com

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Abstract

Background: Paradoxical reactions during antituberculous therapy represent an immunologically driven worsening of clinical or radiological findings in patients with confirmed tuberculosis responding to appropriate treatment. Retropharyngeal localization of such a reaction constitutes an exceptionally rare and potentially life-threatening complication due to its close proximity to the airway.

Case Presentation: We report the case of a 12-year-old immunocompetent girl with no significant past medical history, presenting with bilateral cervical lymphadenopathy (level IIb) over a two month period in the context of close household TB contact. Histopathological examination of an excised cervical node confirmed tuberculous lymphadenitis, and antituberculous treatment was initiated. Six weeks into treatment, the patient developed a paradoxical reaction manifesting as dysphagia, dyspnoea, and nocturnal snoring. Clinical examination revealed oropharyngeal bulging and nasofibroscopy confirmed significant narrowing of the upper airway. Cervical CT Scan revealed a retropharyngeal conglomerate of necrotic lymphadenopathies on the left side, the largest measuring 20×15 mm, causing anterior displacement and bulging of the pharyngeal wall. The patient underwent successful transoral surgical excision of the retropharyngeal lymphadenopathic mass. GeneXpert MTB/RIF assay and histopathology confirmed the diagnosis of tuberculosis. The patient was maintained on ATT with favourable outcome at three-month follow-up.

Conclusion: Retropharyngeal tuberculosis lymphadenitis presenting as a paradoxical reaction is a rare but potentially fatal entity requiring prompt multidisciplinary management. Combined diagnostic workup with CT imaging, GeneXpert, and histopathology, along with timely surgical intervention via a transoral approach, was key to a good recovery.

Introduction

Tuberculosis, an infectious bacterial disease caused by *Mycobacterium tuberculosis*, remains a formidable global health threat, despite significant progress, disproportionately affecting low- and middle-income countries. Morocco, like many African nations, carries a non-negligible TB incidence, with extrapulmonary forms accounting for a significant proportion of cases. Among extrapulmonary manifestations,

cervical tuberculous lymphadenitis is the most frequent, representing up to 35–40% of all extrapulmonary TB cases, its incidence is steadily increasing [1,2].

A paradoxical reaction (PR) is defined as the clinical or radiological worsening of pre-existing TB lesions, or the emergence of new lesions, in a patient on appropriate antituberculous treatment (ATT), after exclusion of other alternate causes. [3,4]. First described by Choremis et al. in

the 1950s [5], paradoxical reactions are now recognised as an immunological phenomenon linked to the restoration of mycobacterial-specific immunity following initiation of ATT. The incidence of PR in tuberculous lymphadenitis (TBLN) ranges from 8% to 23% in immunocompetent, HIV-negative patients [6,7].

While paradoxical reactions in cervical lymphadenitis typically manifest as local enlargement, suppuration, or fistula formation, retropharyngeal localization is exceptionally rare and carries significant risk of upper airway obstruction. Only isolated case reports have described retropharyngeal abscess or lymphadenopathy as a paradoxical reaction in children on ATT [8]. The clinical presentation may closely mimic acute deep neck space infection, complicating both diagnosis and management.

We report the case of a 12-year-old immunocompetent girl who developed retropharyngeal tuberculous as a paradoxical reaction during ATT, presenting with progressive dysphagia, dyspnea, and nocturnal snoring, and who was successfully managed by transoral surgical excision, with a favorable three-month outcome.

Case Presentation

A 12-year-old girl with no significant past medical history presented in the Department with a two-month history of progressive bilateral cervical lymphadenopathy. There was a documented history of close household contact with a smear-positive pulmonary TB case. The patient had no fever, night sweats, or significant weight loss at initial presentation.

Physical examination revealed bilateral level IIb cervical lymphadenopathies, firm in consistency and non-tender, without overlying skin changes. Cervical ultrasonography confirmed bilateral level IIb cervical lymphadenopathies, with the largest node located on the left side measuring 16 mm in its greatest diameter, presenting internal heterogeneous echostructure suggestive of early necrosis.

The patient underwent excisional biopsy of the largest left cervical node under general anaesthesia. Histopathological examination revealed granulomatous inflammation with central caseous necrosis and Langhans giant cells, consistent with tuberculous lymphadenitis. Based on these findings, antituberculous treatment was initiated.

Approximately six weeks after initiation of ATT, the patient re-presented with progressive dysphagia, dyspnoea, and nocturnal snoring. There was no fever, and the patient remained compliant with her medication as confirmed by treatment card review.

Oropharyngeal examination showed a prominent bulging of the posterior oropharyngeal wall, predominantly on the left side (Figure 1) Nasofibroscopy demonstrated significant narrowing of the upper aerodigestive tract at the level of the oropharynx. The hypopharynx and laryngeal inlet were accessible and showed no intrinsic pathology. There was no trismus, and cervical mobility was preserved.

CT scan of the neck showed a left retropharyngeal lymphadenopathy magma, enhanced in the periphery with necrotic center, exerting a mass effect on the pharyngeal wall which is bombing forward and arriving backward in intimate contact with the left long muscle of the neck. The largest individual node measured 20×15 mm. The pre-vertebral space was not involved and no spinal lesion was identified. The oropharyngeal airway lumen was significantly narrowed but not completely obstructed. No other cervical collections were identified (Figure 2).

Surgical intervention was performed under general anaesthesia with nasotracheal intubation. Intraoperatively, the oropharynx was exposed using a Boyle Davis mouth gag. The posterior pharyngeal wall was incised transversally at the point of maximal bulging, under direct vision. A conglomerate of necrotic lymphadenopathies densely adherent to the carotid artery was identified and excised in its entirety. Intraoperative specimens were collected and sent for bacteriological analysis (GeneXpert MTB/RIF assay and mycobacterial culture) as well as histopathological examination. Haemostasis was achieved and the pharyngeal wall was partially closed with absorbable sutures. Nasogastric tube was placed and maintained for 7 days.

The patient tolerated the procedure well, with no intraoperative complications.



Figure 1: Showing bulging over the posterior oropharyngeal wall

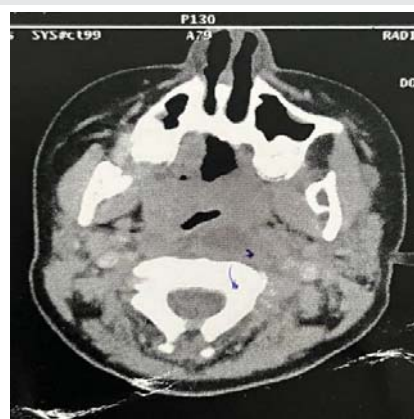


Figure 2: Contrasted CT-scan of neck with axial view showing a retropharyngeal lymphadenopathy magma

GeneXpert MTB/RIF assay performed on the excised tissue returned a positive result for *Mycobacterium tuberculosis*, with no rifampicin resistance detected. Histopathological examination revealed necrotizing tuberculoid granulomatous inflammation, consistent with tuberculosis.

The patient's dysphagia and dyspnea resolved within 48 hours of surgery. Oral feeding was reintroduced gradually with good tolerance. She was discharged on postoperative day five in a satisfactory general condition, with continued ATT. Corticosteroid therapy prednisolone 1 mg/kg/day was added to the ATT regimen to mitigate the risk of further paradoxical reaction.

At the three-month follow-up visit, the patient was asymptomatic with no dysphagia, dyspnoea, or cervical lymphadenopathy. Cervical ultrasound demonstrated complete resolution of the retropharyngeal collection and significant regression of the residual cervical lymph nodes. ATT was continued as per the standard protocol. No further paradoxical reactions were observed during the follow-up period.

Discussion

Paradoxical reactions are now well-recognised in the management of TB, particularly in extrapulmonary forms. In HIV-negative patients with TBLN, the incidence of PR varies between 8% and 23%, depending on the diagnostic criteria applied and the population studied [6,7,10]. Chahed et al. reported a PR rate of 15% in a North African cohort of cervical TBLN, identifying extra-lymph node TB and node size ≥ 3 cm as independent predictors of PR [10]. Breen et al. demonstrated that PR was not exclusively linked to immune reconstitution in HIV patients but occurred frequently in immunocompetent individuals as well [4].

PR is primarily attributed to the restoration of mycobacterial antigen-specific immune responses following effective bacterial killing by ATT. As bacillary load decreases, the host's adaptive immunity – previously suppressed by the immunomodulatory properties of *M. tuberculosis* – mounts an exuberant delayed-type hypersensitivity response to residual mycobacterial antigens. This results in paradoxical inflammatory expansion of pre-existing or latent foci [2]. The immunological basis involves an imbalance between pro-inflammatory cytokines (notably IFN- γ , TNF- α , and IL-12) and regulatory responses, leading to an uncontrolled granulomatous reaction [12].

Risk factors for PR development in immunocompetent patients include younger age, larger lymph node size at diagnosis, greater extent of disease, and lower body mass index [6,11]. Our patient presented with several of these risk factors: she was a child (12 years), had bilateral cervical involvement, and was from a setting with high TB burden.

The retropharyngeal space is bounded anteriorly by the buccopharyngeal fascia and posteriorly by the alar fascia of the deep cervical fascia. It contains a chain of lymph nodes (nodes of Rouvière) that are prominent during childhood but progressively regress after the age of 4–5 years, although they may persist in some individuals [13]. Retropharyngeal

lymph node tuberculosis is a recognised but rare entity, most frequently arising as a cold abscess secondary to cervical vertebral tuberculosis (Pott's disease). However, isolated retropharyngeal TB lymphadenitis without spinal involvement, as in our case, is exceptionally uncommon [14].

Primary retropharyngeal TB lymphadenitis may result from haematogenous dissemination, lymphatic drainage from adjacent cervical nodes, or direct contiguous spread from nasopharyngeal or adenoid foci of infection. In our case, the retropharyngeal localisation developed as a paradoxical reaction from pre-existing cervical lymphadenopathy, likely through lymphatic progression or immune-mediated activation of dormant retropharyngeal nodes stimulated by ATT-induced immune reconstitution. Desai et al. described a remarkably similar case of retropharyngeal abscess as a PR in a child with multidrug-resistant TB, further supporting this pathogenic mechanism [8].

The predominant symptoms in our patient – dysphagia, dyspnoea, and nocturnal snoring – are the hallmark clinical triad of retropharyngeal space-occupying lesions. Airway compromise in such cases may evolve rapidly, as the retropharyngeal space offers little resistance to anterior displacement of the posterior pharyngeal wall [15]. Clinicians managing TBLN should remain vigilant for these symptoms during the first months of ATT.

Contrast-enhanced CT remains the imaging modality of choice for evaluating retropharyngeal collections, providing accurate delineation of the extent of disease, identification of necrosis, assessment of airway compromise, and planning of surgical approach. In our patient, CT was instrumental in confirming the retropharyngeal necrotic conglomerate and excluding spinal involvement, thus directing a purely transoral surgical strategy.

The introduction of the GeneXpert MTB/RIF assay (Xpert) has substantially transformed the diagnostic landscape of extrapulmonary TB. A 2023 meta-analysis by Wang et al. demonstrated that the Xpert assay on lymph node biopsy specimens achieved a pooled sensitivity of 84% and specificity of 97% for the diagnosis of tuberculous lymphadenitis [16]. These figures are considerably higher than conventional smear microscopy, which has sensitivity as low as 30–40% in lymph node specimens. The additional advantage of simultaneous rifampicin resistance detection makes GeneXpert particularly valuable in high-burden settings where MDR-TB is a clinical concern [17].

In our patient, Xpert performed on the excised retropharyngeal tissue confirmed *M. tuberculosis* without rifampicin resistance, complementing the histopathological findings. This dual molecular-histological confirmation is consistent with current WHO guidelines [18]. The concordance between Xpert and histopathology in our case reinforces the utility of combining both modalities in tissue samples from unusual TB sites.

The management of retropharyngeal collections may follow either a transoral or transcervical approach, depending on the

extent of the collection, location, risk of airway compromise, and surgeon's preference [15]. For collections confined to the retropharyngeal space without extension below the level of C3–C4, the transoral approach is the preferred technique, offering direct access, minimal invasiveness, avoidance of external scarring, and reduced risk of injury to adjacent neurovascular structures.

In our patient, the collection was confined to the left retropharyngeal space with significant oropharyngeal bulging, making the transoral approach both technically feasible and clinically appropriate. Under careful anaesthetic management with nasotracheal intubation – which also served to secure the airway preoperatively – the collection was excised in toto with adequate decompression of the pharyngeal wall. The ability to excise rather than merely drain the collection allowed for comprehensive specimen retrieval for both microbiological and histopathological confirmation, an important advantage of this approach over simple incision and drainage.

It should be noted that in cases of retropharyngeal TB where the collection is associated with cervical spondylitis (Pott's disease), the transcervical or even anterior cervical approach may be required, often in collaboration with neurosurgical teams for spinal stabilisation [14]. In our case, the absence of spinal involvement simplified management significantly.

The optimal management of paradoxical reactions in TBLN remains a subject of debate. In the majority of cases, PR follows a benign, self-limited course and does not require modification of the ATT regimen [19]. Conservative management with reassurance and monitoring is therefore appropriate for mild PR. However, when PR causes significant morbidity – as in our case, where airway compromise and dysphagia were present – active intervention is mandated.

Corticosteroids have been used empirically to suppress the immune-mediated inflammatory response underlying PR. While no randomised controlled trials have specifically addressed corticosteroid use in paradoxical TBLN, their use is extrapolated from their proven efficacy in TB meningitis and pericarditis, and from observational series in TBLN [20]. In our patient, prednisolone was added postoperatively at 1 mg/kg/day with a gradual taper over four weeks, with no further paradoxical events observed during follow-up.

Importantly, the occurrence of PR should not prompt discontinuation or modification of ATT, as doing so risks treatment failure or resistance emergence. It is essential to confirm the paradoxical nature of the reaction by excluding drug resistance, non-compliance, co-infection, or malignancy before attributing clinical worsening to PR [2,10].

Conclusion

Retropharyngeal tuberculous lymphadenitis presenting as a paradoxical reaction is an exceptionally rare but clinically significant entity, particularly in the paediatric age group. This case highlights the importance of maintaining a high index of clinical suspicion for paradoxical reactions during the

early months of ATT in children with TBLN, especially when new oropharyngeal or respiratory symptoms develop. Prompt CT imaging is essential for anatomical characterisation, airway assessment, and surgical planning. The combination of GeneXpert assay and histopathology provides rapid and reliable microbiological confirmation, even at unusual sites. Transoral surgical excision offers a safe and effective approach for retropharyngeal paradoxical TB lymphadenitis with airway compromise, allowing for definitive decompression and comprehensive specimen retrieval. Ongoing ATT with adjunct corticosteroid therapy should be maintained postoperatively to prevent recurrence.

Multidisciplinary collaboration between otolaryngologists, anaesthesiologists, paediatricians, and infectious disease specialists is paramount to achieving favourable outcomes in this challenging clinical scenario.

Declarations

Patient Consent: Written informed consent was obtained from the patient's legal guardian for publication of this case report and any accompanying images.

Ethical Approval: This case report was conducted in accordance with the ethical standards of CHU Ibn Rochd, Casablanca.

Conflict of Interest: The authors declare no conflict of interest.

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