

Luc's abscess: two successive cases of a forgotten complication

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Abstract

Introduction: Luc's abscess is a rare complication of acute otitis media, characterized by a collection beneath the temporal muscle. Its pathogenesis and optimal surgical management remain poorly defined, particularly in the absence of mastoid coalescence. **Case report:** We report the cases of two pediatric patients presenting with acute otitis media associated with temporal and zygomatic swelling. Computed tomography confirmed Luc's abscesses with no radiological evidence of coalescent mastoiditis in either case. Both patients underwent surgical drainage and myringotomy with ventilation tube placement. One recovered after the initial procedure, whereas the other required a subsequent cortical mastoidectomy due to clinical deterioration. **Discussion:** These cases illustrate the variability in clinical course and support a stepwise surgical approach.

Keywords: Zygoma. Abscess. Otitis media. Mastoiditis. Mastoidectomy.

Abcesso de Luc: dois casos consecutivos de uma complicação esquecida

Resumo

Introdução: O abcesso de Luc é uma complicação rara da otite média aguda, caracterizada pela formação de uma coleção localizada profundamente ao músculo temporal. A sua patogénese e abordagem cirúrgica ideal permanecem mal definidas, particularmente na ausência de coalescência mastoideia. **Caso Clínico:** Descrevemos dois doentes pediátricos que se apresentaram com otite média aguda associada a tumefação temporal e zigomática. A tomografia computadorizada confirmou a presença de abcesso de Luc em ambos os casos, sem evidência radiológica de mastoidite coalescente. Ambos foram submetidos a drenagem cirúrgica e miringotomia com colocação de tubos de ventilação. Um evoluiu favoravelmente após o procedimento inicial, enquanto o outro necessitou posteriormente de mastoidectomia cortical por agravamento clínico. **Discussão:** Estes casos ilustram a variabilidade do curso clínico e apoiam uma abordagem cirúrgica escalonada.

Palavras-chave: Zigoma. Abscesso. Otite média. Mastoidite. Mastoidectomia.

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Keypoints

What is known

- Luc's abscess is a rare extracranial complication of acute otitis media.
- It has classically been described as a temporal abscess occurring with no mastoid coalescence.
- Optimal surgical management remains controversial due to limited published data.

What is new

- Two pediatric cases with no mastoid coalescence were managed using a stepwise surgical approach.
- Drainage and myringotomy provided effective initial control in both patients.
- A cortical mastoidectomy was only required after the lack of response to minimally invasive management.

Introduction

Acute mastoiditis is a potentially serious complication of acute otitis media and may progress to extracranial or intracranial complications. A subperiosteal abscess, which falls into the former group, is the most frequent complication in the pediatric population and results from the lateral extension of infection with erosion of the mastoid cortical bone^{1,2}. In rare cases, the infectious process spreads along the zygomatic bone, leading to Luc's abscess (LA), a collection located beneath the temporal muscle, manifesting as temporozygomatic swelling³.

LA is classically considered a distinct entity from coalescent mastoiditis, resulting from the direct spread of a middle ear infection through the Notch of Rivinus, with no intraosseous suppuration⁴. However, accumulating evidence has described LA in association with mastoid bone destruction, suggesting a heterogeneous pathogenic mechanism³. Clinically, patients may present with atypical facial swelling, particularly involving the malar and periorbital regions, which can delay diagnosis and the initiation of appropriate treatment.

Given its rarity, the available literature is scarce and largely limited to small case series or isolated case reports, hindering the determination of incidence and the establishment of standardized management strategies, particularly concerning the role and timing of mastoidectomy. In this context, we report two consecutive pediatric cases of LA with the hope of avoiding an unnecessary mastoidectomy, as was Luc's intent in his original publication, a principle that remains clinically relevant in contemporary practice.

Therefore, we aim to add to the body of evidence on the management of this rare complication of acute otitis media. Furthermore, we seek to raise awareness of this entity among both otolaryngologists and pediatricians, particularly in the Portuguese setting, where it has previously gone unreported, thereby contributing to a more timely diagnosis.

Case report

Case one

A twenty-month-old male child presented with a two-day history of fever and right-sided otalgia, followed by the onset of temporal swelling on the day he presented to the emergency department. On admission, laboratory evaluation revealed a C-reactive protein level of 19.09 mg/dL, with no leukocytosis or neutrophilia. The patient was hospitalized under empirical intravenous antibiotic therapy. However, the swelling gradually worsened, extending to the face, which prompted his transfer to our center after completing four days of ceftriaxone and one day of clindamycin.

On arrival, physical examination revealed right temporal, zygomatic, and periorbital swelling, with tenderness and fluctuation over the temporal area. Otomicroscopy of the right ear showed inflammatory signs of the external auditory canal and bulging of the tympanic membrane with profuse otorrhea, consistent with acute otitis media. Computed tomography (CT) demonstrated complete inflammatory opacification of the right middle ear and mastoid, with partial involvement on the left side. No mastoid cortical bone erosion was identified (Fig. 1A). Extension of the inflammatory and infectious process to the external auditory canal and subcutaneous soft tissues of the right temporal region was noted, confirming a subperiosteal abscess measuring 40 × 12 mm (Fig. 1B).

Due to the lack of response to medical therapy, incision and drainage of the abscess and myringotomy were performed. Ventilation tube placement was attempted but proved technically difficult due to marked inflammation of the tympanic membrane, which presented with profuse bleeding and purulent drainage that was sent for microbiological analysis.

Initial postoperative improvement was observed, followed by the recurrence of fever and re-accumulation of the temporal abscess coincident with obstruction of the surgical drain, which was then removed. The reopening of the surgical incision allowed evacuation

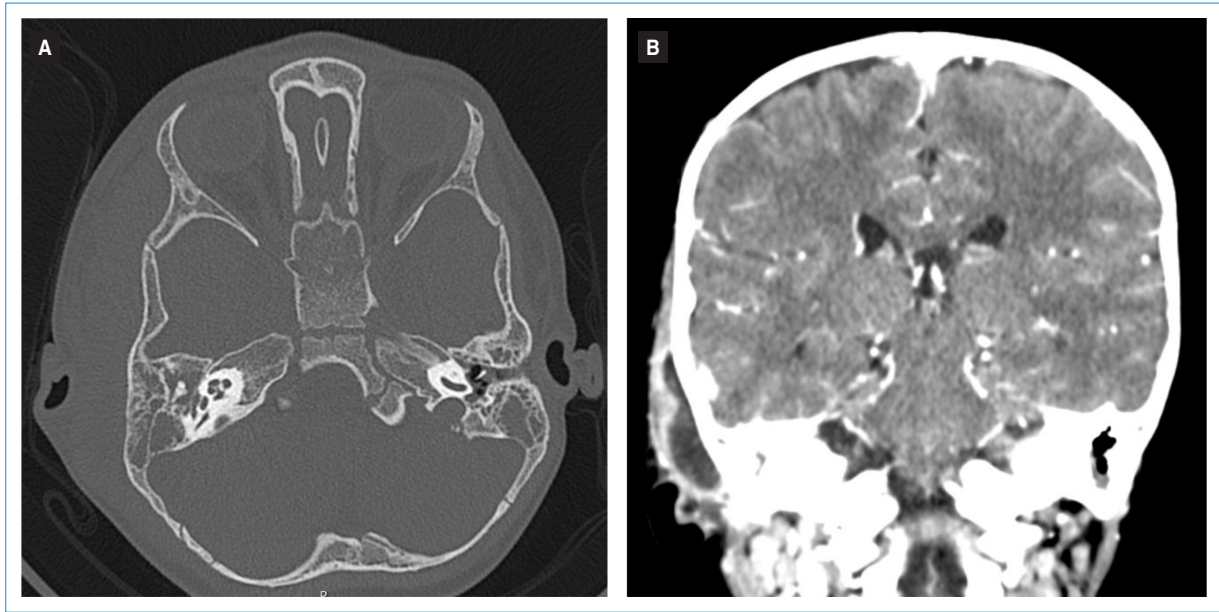


Figure 1. CT scans. Case 1 — Axial CT image shows bilateral mastoid opacification with marked swelling of the right zygomatic and temporal regions (A). The coronal CT image with contrast demonstrates a collection beneath the temporal muscle, just above the pinna (B).

of serohematic fluid upon manual compression of the temporal region. Antibiotic therapy was adjusted to piperacillin–tazobactam.

The following day, surgical revision was undertaken, consisting of cortical mastoidectomy and ventilation tube placement. Intraoperatively, the mastoid mucosa was edematous, with no granulation tissue, cortical bone breach, or findings suggestive of coalescent mastoiditis, including intraosseous suppuration or trabecular erosion. The patient subsequently showed favorable clinical evolution and was discharged after completing twenty-one days of intravenous antibiotic therapy. Microbiological cultures from the initial procedure yielded no bacterial growth. Six months postoperatively, no sequelae were identified.

Case two

A four-year-old male child presented with a two-week history of bilateral otalgia, followed by fever and swelling of the supra-auricular and zygomatic regions on the right side. Laboratory evaluation revealed leukocytosis of 21,800 cells/ μ L with neutrophilia of 16,300 cells/ μ L and a C-reactive protein level of 6.07 mg/dL. Otoscopic examination showed bilateral bulging of the tympanic membrane, and physical examination revealed right-sided supra-auricular fluctuance.

The child was admitted and started on empirical intravenous ceftriaxone and clindamycin. After 48 hours of antibiotic therapy, with no obvious improvement, a CT scan was performed in anticipation of the need for surgical intervention. There were no neurological or other signs suggestive of intracranial complications. The CT scan demonstrated a subperiosteal abscess adjacent to the right temporal squama, above the temporozygomatic region, measuring 21 $\times$ 8 $\times$ 16 mm, associated with focal bony erosion and a 4 mm contiguous extra-axial intracranial empyema (Fig. 2A). There were no signs of parenchymal compression. Both mastoids and middle ears showed inflammatory opacification, with no evidence of coalescent mastoiditis (Fig. 2B).

Upon consultation with Neuropediatrics and Neurosurgery, vancomycin was added to the antibiotic regimen and surgical drainage of the abscess combined with bilateral ventilation tube placement was performed.

Microbiological analysis of the pus yielded multi-sensitive *Streptococcus pyogenes*, allowing antibiotic de-escalation to ceftriaxone according to susceptibility testing. Given his favorable clinical progress, the patient was discharged home after 14 days of hospitalization, remaining on ceftriaxone for a total of 28 days. No recurrence was observed during the four months of close follow-up.

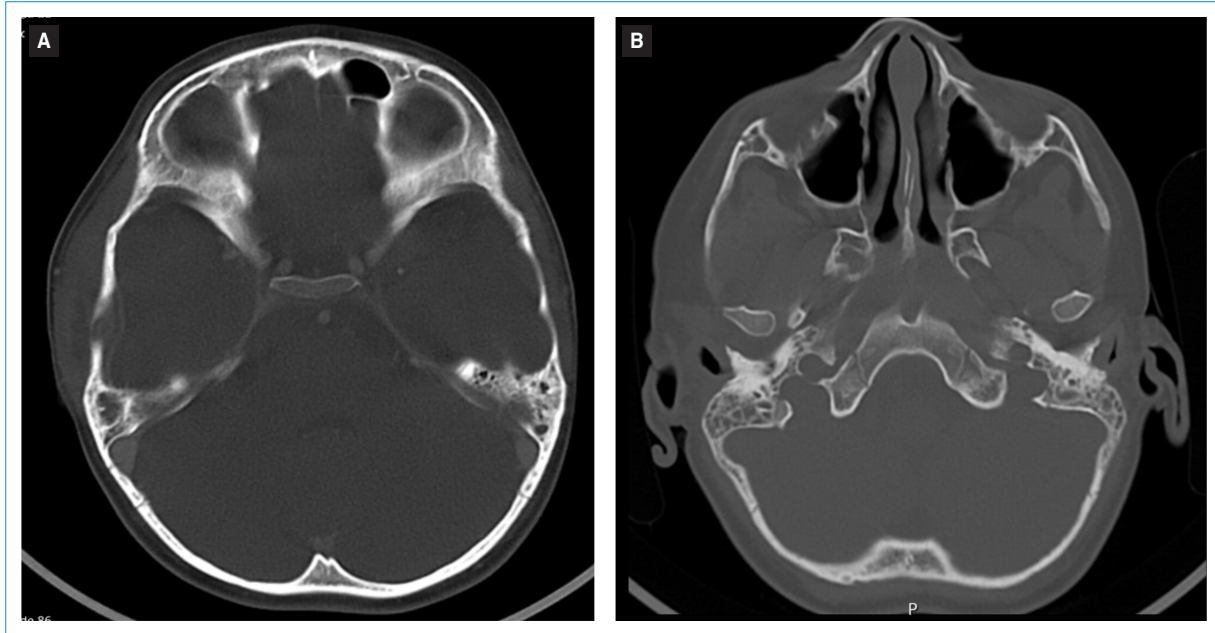


Figure 2. CT scans. Case 2 — Axial CT images show a collection beneath the temporal muscle with erosion of the temporal squama and a contiguous extra-axial intracranial empyema (A). Despite bilateral mastoid opacification, no bony erosion is evident within the mastoid (B).

Discussion

The two cases described represent the only instances of LA identified over a thirteen-year period in this tertiary pediatric center, which includes more than 150 documented cases of acute mastoiditis requiring hospitalization. Both cases were notable for the absence of mastoid coalescence on CT, in accordance with the original description by Luc⁴.

It is noteworthy that Luc's original description dates back to 1913, an era preceding the availability of radiologic imaging. At that time, the determination of the "absence of any intraosseous suppuration" relied exclusively on surgical exploration, namely mastoidectomy, which frequently revealed a macroscopically healthy mastoid. This historical context is essential when interpreting Luc's original concept and highlights the limitations inherent in the diagnostic methods available at the time.

Regarding management, the initial surgical approach combining abscess drainage and myringotomy was effective in one case and achieved temporary control in the other, although the latter ultimately required cortical mastoidectomy due to clinical deterioration. We hypothesize that drain blockage was the cause of failure in this case.

The management of the second case might seem controversial; however, in the absence of mastoid coalescence or a close spatial relationship between the mastoid and the subperiosteal abscess on imaging,

drainage of the mastoid cells did not appear to provide additional benefit at that time. Therefore, the senior otolaryngologist, following the Neurosurgery team's advice, favored drainage of the abscess in the temporal region, where bone erosion was evident. Other authors have suggested that surgery is not mandatory in cases of intracranial complications, where high-dose broad-spectrum intravenous antibiotic therapy is paramount⁵.

Our approach aligns with recent literature advocating less invasive procedures, such as percutaneous aspiration or limited incision, in association with intravenous antibiotic therapy and myringotomy, for the management of subperiosteal abscesses with no coalescent mastoid disease⁶. Several series report comparable efficacy to mastoidectomy^{2,5,7}.

Mastoidectomy performed during the active phase of infection is associated with greater technical difficulty due to inflammation and increased risks, including bleeding, injury to adjacent structures such as the facial nerve or labyrinth, and dissemination of infection into intracranial spaces^{7,8,9}. These considerations support a stepwise surgical strategy when mastoid coalescence is absent.

In conclusion, based on the presented cases and current literature, first-line surgical management for LA in the absence of coalescent mastoiditis should prioritize less invasive techniques, combined with appropriate antibiotic therapy. Mastoidectomy may be reserved for persistent disease or newly developed complications

following mastoid-sparing approaches, as they provide effective infection control with minimal morbidity.

Author contributions:

M. Lisboa Lopes: conceptualization, writing (original draft), and writing – (review and editing). G. Félix: writing (review and editing). D. Marques: writing (review and editing). S. Paiva: supervision.

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Conflicts of interest

None.

Ethical considerations

Protection of human subjects and animals. The authors declare that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from all patients, and secured approval from the Ethics Committee.

SAGER guidelines have been followed as applicable to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing or creation of the content of this manuscript.

References

1. Ghadersohi S, Young NM, Smith-Bronstein V, Hoff S, Billings KR. Management of acute complicated mastoiditis at an urban tertiary care pediatric hospital. *Laryngoscope*. 2017;127(10):2321-2327.
2. Tiago Chantre C, Barroso M, Araújo BC, Oliveira M, Sousa H, Barros E. Subperiosteal abscesses as a complication of acute mastoiditis in the pediatric population: a 22-year experience. *Rev Port Otorrinolaringol Cir Cab Pesc*. 2022;60(3):203-208.
3. Fernandez IJ, Crocetta FM, Pelligra I, Burgio L, Demattè M. Clinical features and management of Luc's abscess: Case report and systematic review of the literature. *Auris Nasus Larynx*. 2020;47(2):173-180.
4. Luc H. The subperiosteal temporal abscess of otic origin without intraosseous suppuration. *Laryngoscope*. 1913;23:999-1003.
5. Bakhos D, Trijolet JP, Morinière S, Pondaven S, Al Zahrani M, Lescanne E. Conservative management of acute mastoiditis in children. *Arch Otolaryngol Head Neck Surg*. 2011;137(4):346-350.
6. Enoksson F, Groth A, Hultcrantz M, Stalfors J, Stenfeldt K, Hermansson A. Subperiosteal abscesses in acute mastoiditis in 115 Swedish children. *Int J Pediatr Otorhinolaryngol*. 2015;79(7):1115-1120.
7. Loh, R., Phua, M., & Shaw, C. L. (2018). Management of paediatric acute mastoiditis: systematic review. *The Journal of laryngology and otology*, 132(2), 96–104. <https://doi.org/10.1017/S0022215117001840>;
8. Flint PW, Haughey BH, Lund VJ, Niparko JK, Robbins KT, Thomas JR, et al. *Cummings Otolaryngology: Head and Neck Surgery*. 7th ed. Elsevier; 2021.
9. Migirov L, Eyal A, Kronenberg J. Intracranial complications following mastoidectomy. *Pediatr Neurosurg*. 2004;40(5):226-229.