Luc's abscess as an unlucky complication of mastoiditis

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ABSTRACT

Luc's abscess is a rare but important complication of acute otitis media (AOM), whereby infection spreads from the middle ear, resulting in a subperiosteal collection beneath the temporal muscle. Unlike other extracranial abscesses relating to AOM, Luc's abscess is not believed to involve the mastoid bone. We present the case of a patient with a Luc's abscess with mastoid involvement and discuss its successful management. We believe that patients presenting with a subperiosteal collection beneath the temporal muscle and mastoiditis may represent a different group of patients to those described originally by Luc. These individuals can be differentiated using computed tomography (CT) of the temporal bones. We advocate CT in patients with Luc's abscess and AOM; this aids preoperative surgical planning.

KEYWORDS

Mastoiditis – Paediatric otolaryngology – Otitis media – Temporal bone

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Acute otitis media (AOM) is a common self-limiting childhood illness usually managed medically. The condition is associated with a number of intra and extracranial complications including acute mastoiditis, sigmoid sinus thrombosis and intra or extracranial abscess.¹ One less frequently encountered extracranial complication is the subperiosteal temporal abscess known as Luc's abscess. Unlike other extracranial abscesses of otitic origin that develop following intraosseous suppuration, osteitis, cortical destruction and pus collection under the periosteum, Luc's abscess develops after spread of infection directly along a subperiosteal route from the middle ear along the external meatus to reach the temporal region.² This condition presents typically in patients without mastoid involvement and is commonly managed without the need for cortical mastoidectomy.

Early identification of this condition is vital as it can often spare the patient an unnecessary mastoidectomy.² We present an unusual case of a child who developed acute mastoiditis and a subperiosteal collection beneath the temporal muscle, and describe the successful operative treatment.

Case History

A four-year-old boy attended the children's emergency department with a ten-day history of malaise and right-sided otalgia associated with a preauricular facial swelling. He was otherwise fit and well, and immunisations were up to date.

On examination of the right ear, there was mild mastoid tenderness, anterior displacement of the pinna and a tender

fluctuant swelling over the temporal region; the facial nerve was intact. The tympanic membranes were inflamed bilaterally, suggesting the presence of AOM. The child was pyrexial and blood tests showed a raised white cell count and raised C-reactive protein levels.

A working diagnosis of acute mastoiditis was made and high resolution computed tomography (CT) of the temporal bones and brain (Fig 1) was arranged to exclude additional complications. The CT confirmed complete opacification of the right mastoid cavity and soft tissue thickening in the middle ear together with a 6cm × 2cm lesion deep to the right temporal muscle. These findings confirmed AOM complicated by mastoiditis and a subperiosteal abscess below the temporal muscle.

The patient was commenced on intravenous antibiotic therapy, and treated surgically with an emergency myringotomy and grommet insertion, a cortical mastoidectomy, and incision and drainage of the abscess. Intraoperative findings confirmed the presence of pus throughout the middle ear, mastoid and temporal region. A surgical drain was inserted into the abscess cavity and remained for 48 hours postoperatively. Pus samples collected intraoperatively confirmed *Streptococcus pyogenes* as the infective organism.

Following surgery, the child made an uneventful recovery. He was later discharged with a four-week course of oral and topical antibiotics guided by culture reports and microbiological advice. At the four-week outpatient review, complete resolution of the infection was confirmed in the absence of any further complications.

Discussion

In 1913 Henri Luc first described the subperiosteal temporal abscess as a complication of AOM and wished to publicise the benign nature of the condition after having found no evidence to suggest there being a correlation between

the subperiosteal temporal abscess and the development of mastoiditis.³ These findings are unlike other extracranial abscesses where mastoiditis is a frequent precursor to the complication. Through publication, Luc hoped that in a preantibiotic era he could spare patients the unnecessary and dangerous destructive bone operations of the time.

Luc believed the subperiosteal temporal abscess developed following bacterial spread via submucosal tissues.³ The notch of Rivinus and branches of the deep auricular artery were the presumed pathways connecting the external ear canal with the subperiosteum deep to the temporal muscle, allowing for infectious spread. Knappe and Gregor supported Luc's theory of infectious spread, suggesting subperiosteal temporal abscess of otitic origin in the absence of mastoid involvement.²

This theory has been challenged by a few reported cases of both children and adults presenting with a subperiosteal abscess beneath the temporal muscle with concomitant mastoiditis. In 2013 Garner and McKinnon described a case of a five-month-old male infant presenting with AOM complicated by Luc's abscess and mastoiditis managed surgically⁴ while in 2012 Asha'ari *et al* reported the case of a 75-year-old man with a Luc's abscess.⁵ Their patient also had a temporal subperiosteal abscess in combination with a mastoid abscess secondary to AOM. The mastoid abscess had developed following breach of the mastoid cortex and was in direct communication via a subperiosteal route to the temporal abscess.

The latter cases in conjunction with our findings suggest the presumed and previously thought benign history of subperiosteal temporal abscesses is not an absolute. Instead, we believe alternative pathways for infectious spread are possible through direct extension from the mastoid to the subperiosteal temporal region. These patients may not have a Luc's abscess and could represent a group of patients with another form of extracranial abscess of otitic origin. For these reasons, we advocate preoperative CT in differentiating patients with a Luc's abscess from those described by ourselves, Garner and McKinnon,⁴ and Asha'ari *et al*.⁵ In this cohort, a cortical mastoidectomy is indicated while the other group may be managed less invasively.

Conclusions

A limited number of case reports have described mastoid involvement necessitating a cortical mastoidectomy in patients presenting with a subperiosteal abscess beneath the temporal muscle following AOM. This group of patients may differ from those presenting with the abscess originally described by Luc.³ Temporal bone CT is an important preoperative diagnostic tool in identifying this cohort of individuals. We advocate CT of the temporal bones in patients with Luc's abscess and AOM; this aids the surgeon's decision in performing appropriate surgical management including mastoidectomy in addition to incision and drainage.

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