

## Bilateral acute mastoiditis complicated by lateral sinus thrombosis

M. F. OYARZABAL, M.D., K. S. PATEL, F.R.C.S., N. S. TOLLEY, M.D., F.R.C.S.

### Abstract

A case of bilateral mastoiditis with subperiosteal abscesses complicating acute otitis media in a two and a half year old girl is presented. Contrast enhanced computerized tomography confirmed the diagnosis of right lateral sinus thrombosis. The aetiology, diagnosis and management of these conditions are discussed.

### Introduction

Since the advent of antibiotic therapy, acute mastoiditis has become an uncommon complication of acute otitis media. Failure to recognize this condition may lead to serious intracranial complications including lateral sinus thrombosis (LST). To the best of our knowledge, this is the first report of bilateral acute mastoiditis complicated by subperiosteal abscesses with unilateral LST formation.

The importance of an early otolaryngological opinion in unresolved cases of acute otitis media is stressed, to avoid delay in recognition of potentially lethal complications.

### Case report

A previously healthy two and a half-year-old girl was admitted with a persistent high fever and progressive drowsiness. On admission she was febrile (40°C) drowsy and irritable. There was no papilloedema, cutaneous rash, neck stiffness or focal neurological signs. A green purulent discharge from the right ear was noted, and the remainder of her physical examination was normal. White blood cell (WBC) count was  $18.8 \times 10^9/l$ . Meningoencephalitis secondary to acute otitis media was diagnosed and treatment with IV benzylpenicillin and chloramphenicol was commenced.

Repeated blood cultures and swabs taken from the ears were negative for pathogenic organisms. Latex tests for *Haemophilus influenzae* and *Neisseria meningitidis* were negative. Viral titres and immune function tests were within normal limits.

Contrast enhanced computerized tomography (CT) failed to show any intracranial pathology. Subsequent lumbar puncture yielded colourless clear fluid, from which no bacterial growth was obtained.

Two days after admission, an otolaryngological opinion was requested. Bilateral mastoiditis with subperiosteal abscesses were diagnosed. The child underwent bilateral cortical mastoidectomy, drainage of the subperiosteal abscesses and bilateral insertion of mastoid drains and ventilation tubes. Both mastoid antra were full of pus and granulations. In the post-operative period, the patient had a persistent swinging pyrexia with rigors, developed papilloedema and became anaemic (Hb: 7.4 g/dl). Repeated contrast enhanced (CT) of the head and neck suggested a thrombus in the right lateral venous sinus extending to the sigmoid sinus and internal jugular vein as far down as the second cervical vertebra (Figs. 1 & 2).

Surgical exposure of the right sinodural plate, opening of the

lateral venous sinus and evacuation of pus and infected thrombus were performed until active bleeding from above and below was observed. The sinus was packed with BIPP and a drain was inserted into the mastoid cavity. No bacterial growth was obtained from the pus or thrombus.

Following drainage of the lateral sinus, the patient made a slow recovery with no long-term neurological sequelae.

Audiological assessment has shown a bilateral 15 dB conductive loss at six months.

### Discussion

Acute mastoiditis is a complication of acute suppurative ear disease. Inflammation and oedema of the mucosa surrounding the aditus ad antrum prevents appropriate drainage of the mastoid cavity resulting in accumulation of pus with subsequent demineralization of the bony trabeculae and osteitis. If the infectious process persists, extension outside the mastoid cavity may occur with formation of subperiosteal abscess and eventually intracranial spread.

The advent of antibiotic therapy has markedly reduced the incidence of mastoiditis and its complications (Zoller, 1972). Characteristic features of mastoiditis are pyrexia, otalgia, otorrhoea, protruding pinnae, retroauricular swelling, erythema and tenderness over the mastoid area. Clinicians must be aware of the possibility of underlying mastoid involvement in the absence of these clinical features (Scott and Jackler, 1989). In recent series Samuel and Fernandes (1985) reported 21 cases of otogenic complications with an intact tympanic membrane, and Holt and Gates (1983) reported nine cases of 'masked mastoiditis'. In suspected cases, mastoid radiographs are useful by providing images of clouding, sclerosis and occasionally bone reabsorption. They are not, however, helpful in deciding which cases need surgical intervention (Samuel and Fernandes, 1985; Ogle and Lauer, 1986).

Computerized tomography (CT) is better at demonstrating osteitis or bone destruction, and is indicated when intracranial complications are suspected (Samuel and Fernandes, 1985; Scott and Jackler, 1989).

The management of acute mastoiditis will depend on the clinical situation at presentation and the evolution of symptoms. High doses of parenteral antibiotics, and establishment of an adequate drainage by myringotomy if the ear is not draining spontaneously, will attain curability in 50–68 per cent of all cases (Rubin and Wei, 1985; Ogle and Lauer, 1986; Rosen *et al.*,

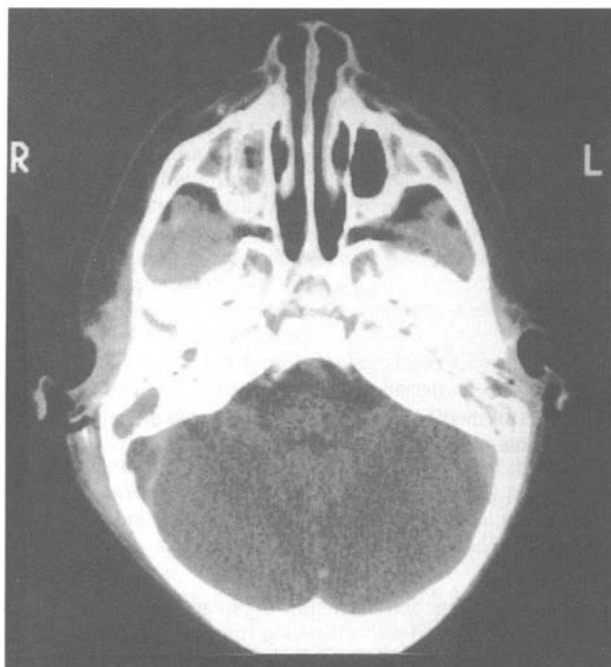


Fig. 1

Contrast enhanced CT showing a filling defect and perisinus enhancement at the confluence of the right lateral and sigmoid venous sinuses.

1986). Failure to respond to antibiotic therapy, and the presence of subperiosteal abscesses or intracranial spread are indications for urgent mastoid surgery.

Possible intracranial complications of suppurative middle ear disease include meningitis, extradural or subdural abscesses and lateral sinus thrombosis (LST). LST is thought to occur by direct extension from an infected mastoid cavity, or thrombophlebotic spread through small emissary veins. The incidence of LST has decreased dramatically with the use of antibiotics, but its mortality still remains high. Teichgraeber *et al.* (1982) reviewed the literature and reported 18–36 per cent mortality but more recent series have estimated a 10 per cent mortality rate secondary to LST (Samuel and Fernandes, 1987; Mathews, 1988).

Evidence of middle ear pathology in a patient with spiking fever, neck pain and/or stiffness, swelling over the occiput due to mastoid emissary vein thrombosis (Griesinger's sign), tenderness over the sternocleidomastoid area, signs of increased ICP or decreasing level of consciousness should raise the suspicion of LST. However, increasing number of cases have been reported in which the clinical presentation has been atypical, probably due to concomitant treatment with antibiotics (Teichgraeber *et al.*, 1982; Rizer *et al.*, 1987; Mathews, 1988; O'Connell, 1990). Enhanced CT enables diagnosis in many cases, demonstrating a filling defect of the affected sinus and occasionally perisinus enhancement as in this case (Venezio *et al.*, 1982; Goldberg *et al.*, 1986; Rizer *et al.*, 1987). Fritsch *et al.* (1990) have suggested that contrasted MRI scanning is more sensitive in detecting LST. A recent report by Irving *et al.* (1991) advocates the use of enhanced MRI in conjunction with CT as the investigation of choice in suspected LST, for a full assessment of otological and intracranial pathology. Digital subtraction angiography, retrograde jugulography and carotid arteriography are highly selective for LST, but they are not free of complications due to their invasive nature (Teichgraeber *et al.*, 1982; Irving *et al.*, 1991).

Surgical evacuation of the infected thrombus and pus is the treatment of choice together with high dose intravenous antibiotics. Intraoperative needle aspiration of the sinus will provide evidence of patency or obstruction of blood flow. Absence of free blood return, and aspiration of pus or thrombus are indications for opening the sinus, with removal of the sinodural plate,



Fig. 2

Contrast enhanced CT of the neck demonstrating thrombus in the right internal jugular vein.

longitudinal incision of the sinus and removal of the thrombus (Teichgraeber *et al.*, 1982; Rizer *et al.*, 1987; Samuel and Fernandes, 1987). Free bleeding from both ends is desirable, however if this is not obtained, evacuation of as much clot as possible will suffice.

Controversy still exists about the role of internal jugular vein ligation (Teichgraeber *et al.*, 1982). Most authors agree that it is unnecessary in all cases as it considerably increases the mortality and morbidity of the procedure, and ligation should be reserved for those cases in which thrombophlebotic or embolic spread beyond the sinus is suspected.

Of particular interest in this report is the bilateral mastoid involvement. Andreassen and Fons (1986) reported a case of bilateral acute mastoiditis in a two-year-old boy, but its association with bilateral subperiosteal abscesses and LST has not been reported before in the literature.

In the absence of an immune deficiency, an anatomical abnormality with narrowing of the aditus ad antrum could have impaired natural drainage of the mastoid air cells and explain the bilaterality of this case.

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Address for correspondence:  
Dr Manuel F. Oyarzabal,  
ENT Department,  
King's College Hospital,  
Denmark Hill,  
London SE5 9RS.

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