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Visual and neurologic deterioration in otogenic lateral sinus thrombosis: 15 year experience

Beáta Rosdy [a,1], Zsuzsanna Csákányi [b,2], Katalin Kollár [a,3], Judit Móser [a,4], Mónika Mellár [a], Andrea Kulcsár [c,5], Éva Kovács [d,6], György Várallyay [7,e], Gábor Katona [b,*]

[a] Department of Neurology, Heim Pál Children's Hospital, Budapest, Hungary
[b] Department of ENT & Bronchology, Heim Pál Children's Hospital, Budapest, Hungary
[c] Department of Paediatric Infectology, United St István and St László Hospital, Budapest, Hungary
[d] Department of Radiology, Heim Pál Children's Hospital, Budapest, Hungary
[e] Semmelweis Medical School MR Research Center, Budapest, Hungary

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ABSTRACT

Objectives: Otogenic lateral sinus thrombosis is a rare complication of acute otitis media whose clinical presentation has changed with the early use of antibiotics. The aim of this study was to analyze the changing clinical signs, vaccination status, therapeutic management and outcome of these patients.
Methods: Retrospective chart review of 10 children treated with otogenic lateral sinus thrombosis in a tertiary level teaching hospital in Budapest, Hungary, from January 1998 till August 2013.
Results: Patients were divided into Early and Late presenting groups. In the Early presenting group, sepsis developed within one week after the onset of acute otitis media. At admission otological symptoms were predominant. The Late presenting group experienced acute otitis media several weeks prior to presentation and in this group neurologic symptoms dominated the clinical picture at admission. All patients received antibiotics. Eight of them were also treated with low molecular weight heparin. All children underwent cortical mastoidectomy. After surgery, the clinical signs of elevated intracranial pressure transiently worsened. This manifested as progression of papilledema in seven children, causing severe visual disturbance in two cases. After medical treatment and serial lumbar punctures all patients except one recovered. This child has permanent visual acuity failure of 0.5 D unilaterally. At one year follow up complete and partial recanalization were noted in five and two patients, respectively.
Conclusions: After mastoidectomy the signs of elevated intracranial pressure can transiently worsen, papilledema can progress. Daily bedside monitoring of visual acuity and regular ophthalmoscopy with neurologic examination is recommended during hospitalization. Close follow up is advised up to one year. When the dominant sinus is occluded, the clinical scenario is more protracted and severe.

* Corresponding author at: Department of Otorhinolaryngology and Bronchology, Heim Pál Children's Hospital, Ulloi u.86, 1089 Budapest, Hungary. Tel.: +36 1 45 99 102; fax: +36 1 45 99 214.
E-mail addresses: rosdybea@gmail.com (B. Rosdy), csakanyi.zsuzsanna@gmail.com (Z. Csákányi), kollark@gmail.com (K. Kollár), jmoser5@gmail.com (J. Móser), andrea.kulcsar@laszlokorhaz.hu (A. Kulcsár), ekovacsuab@hotmail.com (É. Kovács), varally@gmail.com (G. Várallyay), g.katona@t-online.hu (G. Katona).
[1] Deputy Head of Department, Department of Neurology, Heim Pál Children's Hospital,Ulloi u.86, 1089 Budapest, Hungary.
[2] Deputy Head of Department, Department of Otorhinolaryngology and Bronchology, Heim Pál Children's Hospital, Ulloi u.86, 1089 Budapest, Hungary.
[3] Head of Department, Department of Neurology, Heim Pál Children's Hospital, Ulloi u.86, 1089 Budapest, Hungary.
[4] Department of Neurology, Heim Pál Children's Hospital, Ulloi u.86, 1089 Budapest, Hungary.
[5] Department of Paediatric Infectology, United St István and St László Hospital,Gyáli u.5-7, 1097 Budapest, Hungary.
[6] Department of Radiology, Heim Pál Children's Hospital, Ulloi u.86, 1089 Budapest, Hungary.
[7] Semmelweiss Medical School MR Research Center, Balassa u.6, 1083 Budapest, Hungary.

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1. Introduction

The frequency of complications of acute otitis media (AOM), including lateral sinus thrombosis (LST), brain abscess, and epi- and subdural abscesses has decreased dramatically with the use of appropriate antibiotics [1]. This number is further decreased by the use of vaccination against *Haemophilus influenzae type b* and *Streptococcus pneumoniae* [2,3]. However, LST still occurs even in developed countries. Because of its rarity and changing clinical picture due to the use of antibiotics [4,5] diagnosis still remains a challenge. The extension of inflammation in AOM to the mastoid bone can result in inflammation of the bony wall of the sigmoid sinus (SS), which can lead to its thrombosis [6,7]. As cerebral sinuses lack valves, the thrombi can propagate to other sinuses and to the internal jugular vein (IJV). Even unilateral occlusion of symmetrically developed cerebral venous sinuses results in reduced resorption of cerebrospinal fluid (CSF) causing elevation in intracranial pressure (ICP). The venous drainage is frequently asymmetrical. In 41% of the population the right sided sinuses are the dominant ones [8]. In thrombosis it is a determinant factor which side is occluded. If the dominant sinus is occluded, the clinical signs of elevated ICP are more severe and protracted [9]. The most dangerous complication of LST is persistently elevated ICP (also referred to as otitic hydrocephalus or pseudotumor cerebri), which may lead to retinal hemorrhages and visual disturbance. Furthermore, it can progress to blindness, which might go undiagnosed by caregivers of small children. If papilledema is present, administering acetazolamide, or in case of further progression, steroids and/or performing serial lumbar punctures are mandatory. In rare cases ventriculo-peritoneal shunt must be implanted. The recommended treatment for LST is surgery with subsequent conservative therapy [4,7,10,11]. The introduction of anticoagulants decreased the risk of death and serious neurologic consequences and reduced the recurrence of thrombosis within 6 months [7,12–14]. However its routine use is still a matter of debate [5,15–18].

2. Method

We performed a retrospective chart review of patients, under 18 years of age, treated with otogenic LST in Heim Pál Teaching Children's Hospital in Budapest from January 1998 till August 2013. Information concerning age, gender, thrombotic events in the family, past medical history, vaccination status, preceding infections and their treatment, clinical signs, laboratory parameters, thrombophilic screening, microbiologic results, otoscopic picture, as well as imaging results were collected at admission. Surgical and conservative therapy were analyzed. Length of hospital stay, antibiotic and anticoagulation therapy, complications and their treatments were recorded, as well as data from clinical and imaging follow up.

Approval of the ethics committee of the hospital was obtained.

3. Results

Otogenic LST was diagnosed in ten patients (6 boys, 4 girls). Mean age of the patients was 5.6 years (age range 4–8 years). All patients were from the capital (Budapest), where 100% of the pediatric population is treated by pediatricians, and oto-rhino-laryngological consultation is readily available. Clinical signs at admission are depicted in Table 1.

Based on the clinical picture at admission, patients could be divided in two groups, which we defined as Early and Late presenting groups. One presenting early (within one week) and the other late (after 2–6 weeks) following AOM. Patients in the Early presenting group at the time of diagnoses had not yet been treated with antibiotics, while patients in the Late presenting group had. Control otoscopy at 7 days revealed healing of the acute process. Chronic otitis media was not diagnosed in any of these patients. The presence of chronic illness was not revealed in any of our patients. Neither thrombophilia nor familial recurrent thrombosis was reported.

Table 1
Clinical signs at admission.

	Early onset cases *N*:5	Late onset cases *N*:5
General symptoms		
Fever	+	–
Headache	+	+
Lethargy	+	+
Nausea	+	+
Vomiting	+	4/5
Neck pain	+	+
Sleepiness	+	+
Otologic symptoms		
Otalgia	+	2/5
Otorrhea	3/5	–
Retroauricular pain	+	–
Neurological signs		
Nuchal rigidity	2/5	1/5
Torticollis	2/5	3/5
Diplopia, abducens palsy	–	2/5
Ataxia	–	3/5
Facial palsy	–	1/5
Visual disturbance	–	–

+: in all patients; –: in none of the patients.

All patients suffered from headache, were lethargic and had nausea. All but one vomited. All patients complained about neck pain and parents reported excessive sleepiness in all. Torticollis was present in five children, nuchal rigidity in an additional three, and these occurred in both groups. 7/10 children reported otalgia. Patients in the Early presenting group experienced high spiking fever, otoscopy revealed red, inflamed tympanic membrane and otorrhea was present in 3/5. Among patients in the Late presenting group two experienced diplopia (due to abducens nerve palsy), ataxia was observed in three and facial palsy was found in one. Otoscopy revealed only slight retraction of the tympanic membrane. After surgery an additional three patients reported transient diplopia and one experienced ataxia.

Ophthalmoscopy at admission revealed papilledema in all but one of the cases. Visual disturbance was not present. Progression of papilledema with new retinal hemorrhages appeared in seven children two to three days following surgery. One patient transiently lost his vision, while another patient had severe visual disturbance. Only one patient experienced permanent visual acuity failure of 0.5 D on one eye. Clinical signs of elevated ICP worsened transiently after surgery in half of the subjects.

Results of investigations are presented in Table 2.

C-reactive protein (CRP) and leukocyte count were elevated in all patients in the Early presenting group, but in none of the cases in the Late presenting group. In two children clinical progression occurred despite of a significant decrease in the level of inflammatory markers after one day of antibiotic treatment. Three subjects underwent diagnostic lumbar puncture. One of these had elevated CSF leukocyte and protein count due to an epidural abscess. Bacteriological cultures of the middle ear were sterile in all patients. Blood cultures or CSF cultures and/or mastoid cultures taken intraoperatively proved positive for *Streptococcus pneumoniae* in 4/5 of the Early presenting cases, but in none of the Late presenting cases. Two children had been vaccinated against *Pneumococcus*. They had received heptavalent vaccine twice in the first year of life and a booster with 13 valent vaccine