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CASE REPORT

Neurological complications associated with acute sinusitis: the importance of clinical suspicion. Report of two cases

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Abstract

Acute sinusitis in childhood typically resolves without complications. However, in some cases, it can progress to severe conditions such as a brain abscess, venous thrombosis, or inflammatory Pott's tumor, which are associated with high morbidity and mortality if not accurately treated. We present two pediatric cases of complicated sinusitis.

The first case had left orbital cellulitis and a frontal epidural abscess, managed successfully with antibiotics, surgical drainage, and anticoagulation. The second case developed a cerebral empyema with midline shift and transtentorial herniation, requiring decompressive craniectomy, prolonged antibiotic therapy, and anticoagulation. This patient developed residual left hemiparesis and focal epilepsy.

These cases highlight the importance of early clinical suspicion and timely neuroimaging in patients with sinusitis who develop neurological symptoms, thereby allowing effective treatment and reducing the risk of severe sequelae.

COMPLICACIONES NEUROLÓGICAS EN LA SINUSITIS: LA IMPORTANCIA DE LA SOSPECHA CLÍNICA. REPORTE DE DOS CASOS

Resumen

La sinusitis aguda en la infancia suele resolverse sin complicaciones. Sin embargo, puede dar lugar a cuadros graves, como absceso cerebral, trombosis venosa o tumor inflamatorio de Pott, con alta morbimortalidad si no se diagnostican a tiempo. Presentamos dos casos pediátricos con sinusitis complicada.

El primero mostró celulitis orbitaria izquierda y absceso epidural frontal, tratados con antibioterapia, drenaje quirúrgico y anticoagulación, con evolución favorable. El segundo desarrolló empiema cerebral, desviación de la línea media y herniación transtentorial, requiriendo craniectomía descompresiva, tratamiento antibiótico prolongado y anticoagulación. Persistió con hemiparesia izquierda y epilepsia focal residual.

Ambos casos resaltan la importancia de la sospecha clínica precoz y el uso oportuno de neuroimagen ante síntomas neurológicos en pacientes con sinusitis, lo que permite instaurar un tratamiento eficaz y prevenir secuelas graves.

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INTRODUCTION

Sinusitis, whether viral or bacterial, usually resolves spontaneously without antibiotic treatment or long-term sequelae. However, 4-11% of bacterial sinusitis cases may progress to severe complications, with a significant risk of morbidity and mortality[1].

Given its high prevalence and typically benign course, maintaining a high index of clinical suspicion is essential for the early diagnosis and appropriate management of complications, which may require antibiotics, anticoagulation, or surgery[1,2]. The cases presented here demonstrate the potential for rapid clinical deterioration, underscoring the need for timely medical intervention.

CASE REPORTS

Case 1

An 8-year-old girl with a history of Pierre Robin sequence and cleft palate repair presented with fever (up to 39°C), upper respiratory symptoms, and a 48-hour history of headache. Clinical examination revealed left periorbital swelling, ptosis, ocular pain, and limited lateral gaze, with pain on eye movement. Contrast-enhanced orbitomaxillary computed tomography (CT) revealed pansinusitis, left preseptal cellulitis, a right frontal epidural abscess, and thrombosis of the left superior ophthalmic vein and cavernous sinus.

Empirical intravenous antibiotic therapy was initiated with cefotaxime, metronidazole, and vancomycin, and surgical drainage of the abscess and paranasal sinuses was performed. *Streptococcus constellatus* (multisensitive) was isolated from both peripheral blood and surgical specimen cultures, and antibiotic therapy was adjusted to linezolid and cefotaxime.

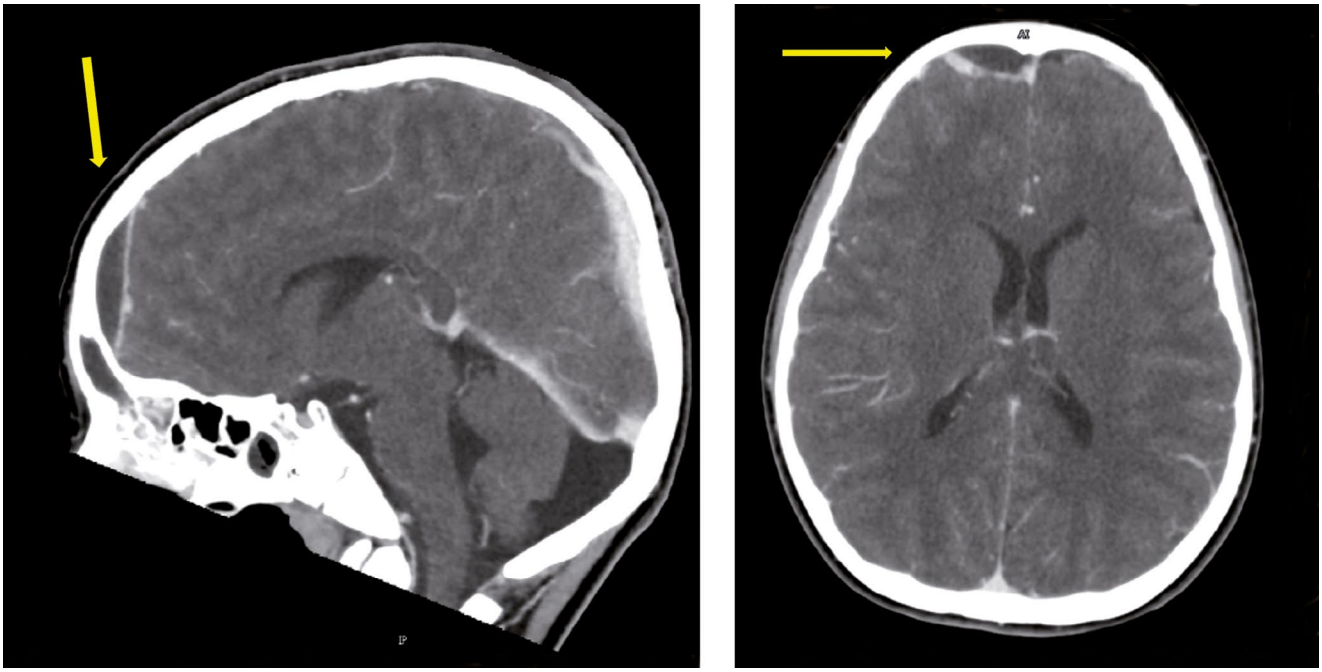
Intravenous antibiotics were administered for five weeks, followed by oral cefixime for an additional two weeks. Venous thrombosis was treated with low molecular weight heparin (LMWH), which was replaced by oral anticoagulation at discharge. Outcome of the patient was favorable, with no neurological sequelae (Figures 1 and 2).

Case 2

An 11-year-old boy with no significant medical history presented with high fever, upper respiratory symptoms, and a six-day history of headache. He also reported pain and a sensation of a mass in the right frontal region, without any preceding trauma. On initial examination, the only notable finding was dental caries. A chest X-ray revealed a possible infiltrate in the right upper lobe, and blood tests showed elevated acute phase reactants. He was admitted for empirical intravenous antibiotic therapy with ampicillin.

Over the following 12 hours, the patient experienced sudden clinical deterioration, developing bilateral eyelid edema, severe headache, and impaired consciousness, requiring urgent orotracheal intubation. A non-contrast brain CT scan revealed a right frontal extra-axial collection, frontal subdural collections, partial ventricular collapse, edema, midline shift, and transtentorial herniation. Treatment was initiated with dexamethasone, cefotaxime, vancomycin, and metronidazole. An urgent decompressive craniectomy was performed, revealing a cerebral empyema.

In the postoperative period, the patient developed convulsive status epilepticus that was managed with antiseizure medication. *Streptococcus thermophilus* was isolated in peripheral blood cultures, while *Parvimonas micra* and *Fusobacterium nucleatum* were identified in the culture of the surgical specimen. Antibiotic therapy was adjusted accordingly. Post-surgical brain magnetic resonance angiog-



FIGURES 1 AND 2. Orbito-maxillary CT scan with contrast, sagittal and axial views, shows a hypodense collection in the right frontal epidural region with peripheral enhancement following contrast administration, compatible with an epidural abscess (*yellow arrow*).

FIGURES 3 AND 4. Non-contrast brain CT scan shows a midline shift and a frontal lesion with bone involvement, suggestive of inflammatory Pott's tumor (*yellow arrow*).

raphy revealed venous sinus thrombosis, which was treated with LMWH.

Intravenous antibiotic therapy was administered for 12 weeks due to poor radiological response. At discharge, the patient presented with left hemiparesis and central facial paralysis, which progressively improved. Antiseizure medication was continued following an isolated focal seizure associated with persistent focal epileptiform activity on electroencephalogram one week after cranioplasty. Anticoagulation was maintained until the venous thrombosis resolved, eight months after diagnosis (Figures 3 and 4).

DISCUSSION

The most common complications secondary to sinusitis are extracranial, such as subperiosteal abscesses, resulting from direct inoculation from the paranasal sinuses. These complications occur more frequently in the pediatric population, especially adolescents, due to the immaturity of the frontal sinus and increased blood flow that facilitates the spread of infection[3]. The clinical presentation of subperiosteal abscesses secondary to frontal sinusitis is variable and may include impaired ocular motility and intracranial complications due to contiguous spread. Management involves intravenous antibiotic therapy and/or surgical drainage with bone debridement[4,5].

Intracranial complications, such as brain abscesses, are usually caused by septic emboli from nearby infectious foci or by direct inoculation, as may occur during neurosurgery or following head trauma[1]. Although their incidence is low, these complications are associated with high mortality rates (5-15%) and result in sequelae in up to 40% of cases, even with early and appropriate treatment[2].

Diagnostic delay is common in cases of intracranial complications due to the nonspecific nature of early clinical symptoms, such as headache, fever, and vomiting. Diagnosis is typically prompted by later-developing signs of intracranial hypertension, including morning headache, explosive vomiting, and impaired consciousness[6,7]. Neuroimaging is essential and should be performed prior to lumbar puncture. CT angiography and/or MR angiography are recommended, given the frequent occurrence of venous thrombosis; however, non-contrast imaging may be preferred initially, as it is faster and safer in acute settings[8,9].

Upon diagnosis of a brain abscess, empirical intravenous antibiotic therapy should be initiated. The regimen varies depending on the suspected primary focus, typically including a third-generation cephalosporin combined with cloxacillin, or vancomycin and metronidazole, with subsequent adjustment based on the antibiogram results[2,7,9,10]. A surgical approach is usually required, although it may be avoided in cases of intracerebral abscesses smaller than 1.5-3 cm, if the pathogen is known and the patient shows a good response to antibiotics, or if the location of the abscess is deep or near critical structures. Antibiotic therapy is generally maintained for 6 to 8 weeks, depending on surgical success and radiological response. In cases with favorable progression, oral antibiotic therapy may be considered after 2-3 weeks[2,7,9,10].

In summary, a neurological examination should be included in the assessment of patients with sinusitis to allow early detection of potentially serious complications. While clinical evaluation can be helpful, neuroimaging is essential to differentiate between extracranial and intracranial complications.

COMMENTS

A high index of clinical suspicion is important to identify complications of sinusitis. Early focal neurological signs (such as restricted eye movements, as seen in the first case) or nonspecific but characteristic neurological symptoms (such as frontal pain due to Pott's tumor, as in the second case) should lead to urgent neuroimaging and hospital admission for intravenous antibiotic therapy.

Verbal consent was obtained from the patients' parents for the publication of this report.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest. No funding was received for this study.

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