

Extradural Abscess, Frontal Osteomyelitis and Pott's Tumor as a Complication of Sinusitis: Case Report

Juan Dib, Santiago Marinelli, Julian Simkim and Carlos S Ruggeri*

ENT Department, Italian Hospital of Buenos Aires, Argentina

*Corresponding Author: Carlos S Ruggeri, ENT Department, Italian Hospital of Buenos Aires, Argentina.

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Abstract

The clinical case of a 10-year-old girl who had an extradural abscess, osteomyelitis of the frontal bone and a Pott's tumor as a complication of sinusitis is described.

She was successfully treated with intravenous antibiotics and combined surgical drainage: endonasal and external through bicoronal incision with craniectomy.

The need for multidisciplinary management of these serious infectious complications is emphasized.

Keywords: Frontal Sinusitis; Osteomyelitis; Extradural Abscess; Pott's Tumor

Introduction

Orbital and endocranial complications of acute and chronic sinusitis are rare.

Orbital complications represent 91% with an incidence of 6%, being more common in children than in adults [1].

The incidence of intracranial complications of sinusitis in children is approximately 4% [1].

Intracranial complications may be brain abscess, subdural and epidural empyema, meningitis, venous sinus thrombosis, and frontal bone osteomyelitis.

Treatment of these complications requires multidisciplinary management.

Due to the rapid appearance of the intracranial complication, nonspecific symptoms, and lack of neurologic signs at disease

onset, a high index of suspicion is required to diagnose an intracranial complication caused by a sinus infection.

The clinical case of a 10-year-old girl who had an extradural abscess, osteomyelitis of the frontal bone and a Pott's tumor as a complication of acute frontal sinusitis is described.

Was successfully treated by endonasal surgery, craniectomy and intravenous antibiotic therapy.

Clinical Case

A 10-year-old girl consulted the pediatrician for fever, headache, and catarrhal cough that had lasted for 24 hours.

They requested a chest X-ray and a plain radiographs of the paranasal sinuses that did not show pathology.

Nasal lavages with hypertonic sodium chloride solution were indicated.

Four days later, she consulted again due to headache and persistent fever, and a 3cm-diameter tumor in the frontal region, painful on palpation. She had no meningeal signs, no motor focus, and the pupils were isochoric.

The patient was admitted and a tomography of the brain and paranasal sinuses with intravenous contrast was performed and an intravenous treatment with antibiotics was indicated (ceftriaxone 1000 mg lyophilized: 2000mg every 12 hours and metronidazole 500mg/ml solution: 500mg every 8 hours).

The tomography (CT) revealed an occupation of the left maxillary, ethmoid, and frontal sinuses with air bubbles and soft tissue edema at the frontal level. The brain CT revealed a hypodense collection with peripheral enhancement compatible with extradural empyema at the frontal level (Figure 1).

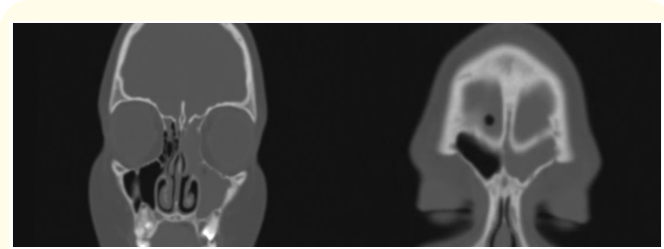


Figure 1: Computed tomography: left maxillo-ethmoidal and frontal sinusitis.

The study of the cerebrospinal fluid showed a normal cytochemical and negative culture, and the blood culture was negative.

Contrast-enhanced magnetic resonance imaging of the brain (MRI) showed an extradural empyema at the frontal level and a subcutaneous anterior frontal collection in addition to left maxillary, ethmoid, and frontal occupation.

The extradural intracranial collection was located behind the posterior table of the frontal sinus at its upper end (Figure 2).

Together with infectology, pediatrics, neurosurgery, and otorhinolaryngology, an expectant management was decided while waiting for the effect of intravenous antibiotic therapy.

The patient remained asymptomatic.

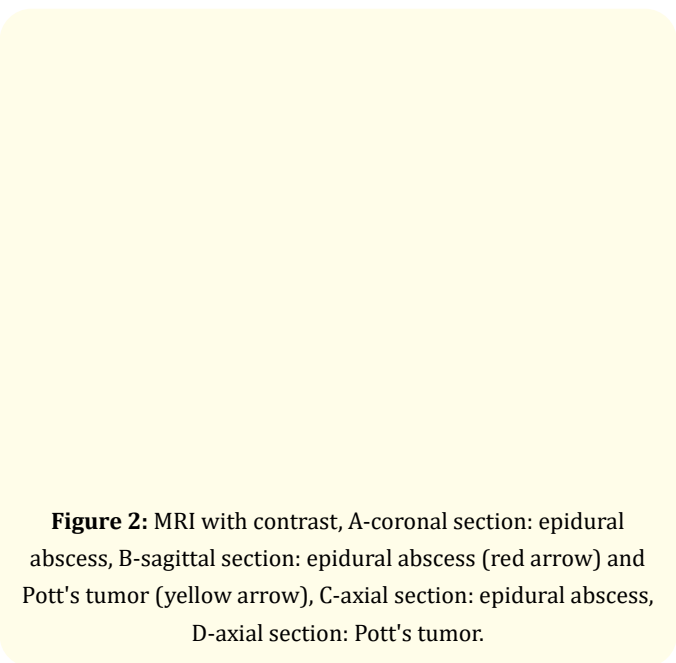


Figure 2: MRI with contrast, A-coronal section: epidural abscess, B-sagittal section: epidural abscess (red arrow) and Pott's tumor (yellow arrow), C-axial section: epidural abscess, D-axial section: Pott's tumor.

The MRI was repeated 8 days after the start of the antibiotic treatment, the study did not show changes in the size of the extradural empyema and the frontal tumor and sinus occupation persisted.

One day later it was decided to perform an endonasal drainage with the assistance of endoscopes of the compromised paranasal sinuses (wide median maxillary antrostomy, anterior and posterior ethmoidectomy and left Draf II-A type frontal drainage), in addition to external drainage of the subcutaneous frontal abscess (Figure 3).

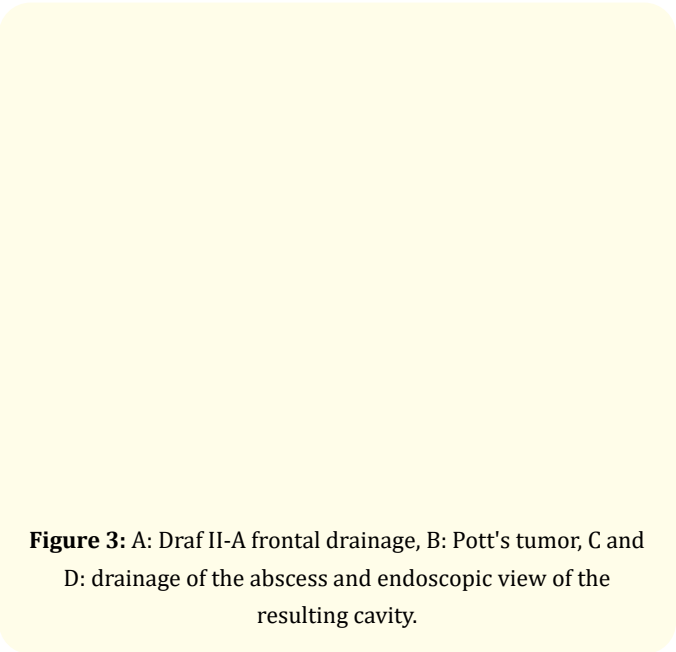


Figure 3: A: Draf II-A frontal drainage, B: Pott's tumor, C and D: drainage of the abscess and endoscopic view of the resulting cavity.

Neurosurgery insisted to wait 4 weeks of treatment with intravenous antibiotics to perform a craniectomy and drainage of the extradural empyema.

She continued asymptomatic and nasal lavages with hypertonic saline solution were indicated.

Cultures of the purulent material obtained were negative for common germs, anaerobes, and fungi.

Seven days later she was discharged from the hospital and home hospitalization was indicated, continuing with intravenous antibiotic treatment.

Fifteen days later she presented recurrence of the anterior frontal tumor without fever or other symptoms.

The control MRI showed a persistence of the extradural empyema without changes in size in relation to previous studies and an increase in the subcutaneous anterior frontal collection.

A bone scintigraphy with Tc99 was performed which showed frontal hyperemia and increased uptake in the frontal calotte with hyperfixation in the underlying frontal bone and the upper sector of the left frontal sinus suggesting inflammatory/infectious bone involvement (Figure 4).

Figure 4: Bone scintigraphy with Tc99: increased uptake is observed in the frontal calotte with hyperfixation in the underlying frontal bone and in the upper sector of the frontal sinus.

Surgery was indicated performing a combined endonasal and external approach at the same surgical time.

A review of the sinus drainage was performed by endonasal approach with endoscopes.

The permeability of the left maxillary, ethmoid and frontal sinus antrastomies was confirmed, only mild mucosal hyperplasia was found.

The neurosurgery team drained the subdural empyema by means of a 3x3 cm craniectomy through a bicoronal incision without penetrating the frontal sinus (Figure 5).

Figure 5: A: frontal craniectomy by bicoronal approach, B: resection of bone with osteomyelitis, C: epidural abscess, D: purulent collection sample for culture.

The histopathological study diagnosed devitalized bone trabeculae with acute inflammatory infiltrate compatible with osteomyelitis.

She continued with antibiotic treatment (ceftriaxone and teicoplanin) for 45 days.

MRI control showed resolution of sinus and intracranial infection.

Discussion

In a study carried out between 2006 and 2016, collecting data from 4.000 hospitals and with approximately 2-3 million hospitalized patient discharges using the Healthcare Cost and Utilization project (HCUP) database in the United States of America, they reported that children admitted to hospitals for acute rhinosinusitis decreased from 8.312 cases in 2006 to 5.592 in 2016. There was an increase in the rate of orbital complications from 8.9% to 19.3% and the intracranial complications from 2.2% to 4.3% and children with both complications increased from 0.5% to 1% of cases [2].

Mortality due to intracranial complications of rhinosinusitis decreased from 25.9% between the years 1950-1979 to 3.8% between 1980-2004 [3].

Intracranial complications of sinusitis can be caused by direct extension through dehiscences in the bony walls of the paranasal sinuses or by retrograde thrombophlebitis of the valveless veins of the bone diploe. Frontal sinusitis is one of the most frequent causes of intracranial complications.

In a study of 16 patients with intracranial complications due to sinusitis a subdural abscess was diagnosed in 56% (9/16), an epidural abscess in 44% (7/16) and a brain abscess in 19% (3/16). They diagnosed meningitis alone or associated with other abscesses in 19% of patients. Thirty-five percent (5/16) presented more than one complication with multiple abscesses. Two patients had intracranial abscesses associated with osteomyelitis of the frontal bone (Pott's tumor) [4].

The epidural abscess is a purulent collection located between the skull bone and the dura mater. In one study they reported that 60% of patients with epidural abscesses had osteomyelitis of the frontal bone [5]. Pott's tumor is a subperiosteal abscess produced by osteomyelitis of the anterior table of the frontal sinus. It represents an extracranial complication of sinusitis but is associated with intracranial complications in 60-85% of cases [6].

Treatment of epidural abscess in children is controversial, always involving intravenous administration of antibiotics alone or associated with surgical drainage.

Some studies have shown that patients with epidural abscesses without neurological deficit or elevated intracranial pressure can be treated with antibiotics alone for 6 weeks without performing neurosurgical drainage [7].

In other studies, they indicated medical treatment for intracranial abscesses <1 cm and performed radiological follow-up to early identify the need for neurosurgical drainage.

In abscesses larger than 1cm, they indicated neurosurgical drainage [8].

In the patient described treatment with intravenous antibiotics was initially attempted since the girl was asymptomatic, with no signs of neurological deficit.

A Draf II type frontal drainage and a Pott's tumor drainage were performed due to the lack of response to medical treatment, although the epidural abscesses did not increase in size.

Possibly due to the previous antibiotic treatment, the germs involved could not be identified in the cultures.

In selected cases with epidural empyemas located behind the posterior table of the frontal sinus an endonasal drainage can be performed with endoscopes through a Draf II or III type frontal endonasal access.

In the case described the epidural collection was located in the upper sector above the frontal sinus, for which this possibility was ruled out and in addition osteomyelitis of the frontal bone was confirmed by scintigraphy with CT99 which implied performing a craniectomy to resect the diseased bone. Due to the location superior to the frontal sinus of the bone with osteomyelitis the opening of the sinus and its obliteration or cranialization could be avoided when performing the craniectomy.

On the other hand, subdural empyema (purulent collection between the dura mater and the underlying arachnoid) requires early neurosurgical drainage along with the sinus infection drainage and intravenous administration of antibiotics as it is a complication with a rapidly fatal evolution [4,9].

In one study they reported that 58% of children with intracranial abscesses were treated with an ENT and neurosurgical procedure [10] and in another study they compared patients <18 years of age with complicated acute frontal sinusitis with non-contiguous intracranial abscesses in which frontal sinusitis was treated by an endonasal approach with endoscopes, an intracranial access, or the sinus was left undrained.

The authors concluded that frontal drainage was not associated with a reduction in the number of surgeries or an increase in complications. The benefit of frontal drainage was not clearly established [11].

Treatment of Pott's tumor should include the administration of intravenous antibiotics, drainage of the subperiosteal abscess, and resection of the bone with osteomyelitis [12].

Conclusion

In epidural abscesses complicating frontal sinusitis intravenous antibiotic treatment should be indicated and periodic imaging controls should be carried out to control the evolution of intracranial empyema.

After 6 weeks of antibiotics treatment if the subdural abscess does not improve or worsens before said time surgical drainage should be performed preferably simultaneously with the sinus focus with or without the resection of the frontal sinus table bone according to the presence or not of osteomyelitis.

Management must be multidisciplinary.

We do not declare conflicts of interest.

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