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CASE REPORT

UNILATERAL PANSINUSITIS IN A 12-YEAR-OLD GIRL SECONDARY TO A DENTAL ABCESS

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Abstract. Odontogenic sinusitis is a rare adult clinical pathology and only a few cases have been described in the pediatric population. Usually, it involves the maxillary sinuses and are secondary to dental abcesses produced by polymicrobial aerobic-anaerobic microorganisms. Complications are a result of the infectious spread to the orbit (mainly cellulitis) and the central nervous system (meningitis, abscess). Management imposes a multidisciplinary team with both medical and surgical therapy. We report the management of a unilateral pansinusitis secondary to a dental abcess in a 12-year-old female patient. Under extensive wide-spectrum antibiotherapy and odontogenic therapy she exhibited a favorable therapeutic outcome with no complications, neither orbital, nor intracranial.

Key words: pansinusitis, odontogenic infection, pediatric sinusitis

Introduction

Headache is a common pediatric complaint. Identifying a primary or secondary etiology is vital [1]. While primary causes are the commonest, secondary ones impose rapid management in the presence of potential life-threatening etiologies. ICHD-3beta establishes eight main secondary causes: head and/or neck trauma, cranial or cervical vascular disorder, non-vascular intracranial disorder, substance withdrawal, infections, disorder of homeostasis, disorders of cranium, neck, sinuses, or psychiatric disorder. [2,3]

The most frequent causes of pediatric acute headache consist of viral infection, migraine and sinusitis [1,3]. American Academy of Pediatrics establishes the diagnosis of bacterial sinusitis exclusively according to clinical criteria: persistent illness (nasal discharge, daytime cough lasting more than 10 days without improvement), or worsening course (fever after initial improvement), or severe onset (fever ≥39°C, purulent nasal discharge for at least 3 consecutive days). [1,3,4] Imaging investigations such as cerebral contrast-enhanced computed tomography are recommended only in the presence of orbital complications or central nervous system involvement. [4,5]

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We report a case of a unilateral pansinusitis in a 12-year-old girl who presented for progressive acute headache. The pansinusitis proved to be secondary to an untreated dental abscess. An emphasis is put on the importance of a rapid diagnosis and prompt treatment in order to prevent the occurrence of severe central nervous infections.

Case History

A 12-year-old girl, fully immunized with an unremarkable past medical history presented to the Emergency Department for a 15-days history of progressive right-sided headache and malaise and a 5-days-history of fever (up to maximum 39.5 degrees). In addition, she has been experiencing unilateral purulent nasal discharge for the last 7 days. She has been evaluated by her family doctor who prescribed oral Amoxiciline-clavulanate for 5 days with no symptoms alleviation.

The headache was localized on the right-side, it had a pulsatile character and its intensity progressively increased since onset (starting from 4/10 VAS and reaching 10/10 VAS on presentation). The recurrent headaches had a variable duration, were accompanied by nausea and vertigo, initially responded to oral non-steroidal anti-inflammatory medication, but eventually became non-responsive.

Upon admission, she was feverish, anxious but with normal vital signs. Neurological examination was within normal range with neither meningeal nor focal signs. Ophtalmoscopic examination revealed no signs

of papilledema. The ENT exam revealed right sinusal points' tenderness during palpation. The patient had a severely poor oral hygiene with numerous erosive carious lesions. The upper right second molar had an extensive lesion and the surrounding vestibulum was fluctuant.

Laboratory tests revealed signs of a severe infection (white blood cell count = 32000/mm3, C-reactive protein= 56 mg/dL, erythrocyte sedimentation rate = 90 mm/h, fibrinogen=780 mg/dL) and mild microcytic hypochromic anemia. Due to the severity of the headache, an emergency contrast-enhanced cerebral computed tomography was performed. It revealed a complete opacification of the right frontal, ethmoid and maxillary sinuses (Figure 1, Figure 2). A diagnosis of Right pansinusitis secondary to dental abcess was established.

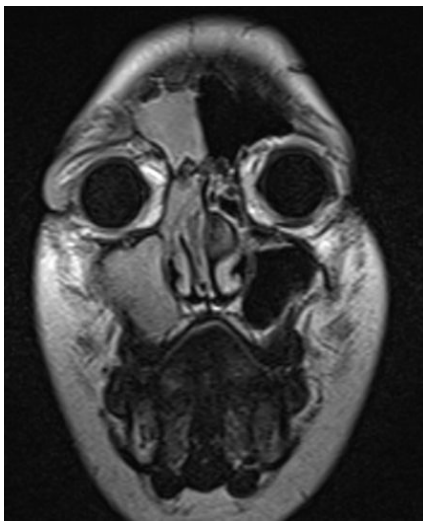

Fig.1. Right pansinusitis – opacification of the right frontal, ethmoid and maxillary sinus

Fig.2. Complete opacification of the right maxillary sinus

A pedodontist consult was requested and the upper right second molar was extracted under sedation. In addition, buccal vestibulum adjacent to the tooth was incised for drainage and after pus evacuation a rubber drain was sutured in the incision. Given the coexistence of the dental infection, an infection with respiratory anaerobes was suspected. However, all cultures were negative. The patient was put immediately under intravenous double antibiotherapy with Ceftriaxone and Clindamycin (anaerobes coverage). The evolution was favourable with no orbital or intracranial complications. She was discharged after three weeks. The 3-months MRI-follow-up was normal.

Discussion

Dental infections can be the source of paranasal sinusitis. Odontogenic sinusitis are extremely rare in the pediatric population. The underlying mechanism is the spread through the root apices to the surrounding muscles, the roots of the maxillary premolar and molar teeth being situated right below the sinus floor [6,7]. The labial levator and the orbicularis oculi muscle attach to the lateral wall of the maxilla above the infraorbital foramen and direct the spread of infection from the maxillary teeth to the maxillary sinus.[8]

First the infection reaches the maxillary sinus and afterwards, progressively reaches the ethmoid and the frontal sinus. It can even spread to the orbit either via the inferior orbital fissure, either through the pterygopalatine fossa or infratemporal fossa and afterwards through the inferior ophthalmic vein or either through the preseptal space by perforating the eyelid.[6,7] In our patient, fortunately there was no orbital involvement. Among the orbital complications there are preseptal cellulitis, orbital cellulitis with or without abscess formation and cavernous sinus thrombosis.[6,7]

Besides the orbital complications with potentially permanent visual loss, other complications our patient could have faced are the intracranial ones, especially as a result of the frontal sinus involvement. Actually, intracranial complications are mainly a consequence of sphenoid or frontal sinusitis [4]. Unilateral pansinusitis can lead to epidural or subdural abcess, intracerebral abcess, bacterial meningitis, bacterial encephalitis, cavernous sinus thrombosis, intracerebral venous thrombosis and even sepsis.[4,7]

In addition to the three main bacteria incriminated in the etiology of bacterial sinusitis (Streptococcus Pneumoniae, Haemophilus influenza, Moraxella catharralis), in odontogenic sinusitis there are also the anaerobe species [4]. Given that odontogenic sinusitis are common in the second and the third decade, the majority of studies are performed on adults [7]. Anaerobe bacteria can be found in up to two thirds of adults with chronic sinusitis and in up to 5-10% in those with acute maxillary sinusitis secondary to odontogenic infections.[8]

Dental infections usually have mixed polymicrobial, both aerobic and anaerobic etiologies.[4,8] Anaerobes predominate because they outnumber the aerobes in the normal oral flora, at least 400 bacterial species having been described. Another explanation is that local inflammation leads to poor drainage and increased intranasal pressure which lowers the pH and oxygen

content and thus promotes the growth of anaerobes.[8] In our patient all cultures were negative and there was not any anaerobe microorganism identified.

The diagnosis requires a multidisciplinary team consisting of a general pediatrician, pediatric neurologist, pedodontist, otolaryngologist and radiologist. Starting with a thorough history concerning not only past medical history, but also dental history, the examination should include, besides, general and neurological examination, an inspection of the buccal soft tissue and vestibule for any signs of inflammation or infection. Collaboration with an ENT specialist can provide prelevation of sinus secretion for laboratory cultures in order to identify the etiology, when possible.[8]

The gold standard for diagnosis is contrast-enhanced cerebral tomography who does not only diagnoses the sinusitis, but also the intracranial complications. It can also detect the presence of osteomyelitis, which is superior to magnetic resonance. Axial and coronal sinus captures can reveal the relationships between the dental abscess and the sinus floor [8]. The American College of Radiology recommend coronal CT for imaging persistent or chronic sinusitis in patients of any age.[4]

Once the diagnosis is established, immediate initiation of intravenous wide-spectrum antibiotherapy, including anaerobe bacteria coverage is vital [4,5]. As a particularity in odontogenic sinusitis is that antimicrobial therapy must be accompanied by odontogenic therapy and surgical drainage. The first and foremost step of the management should be elimination of the source of infection such as teeth extraction or root canal therapy. Removal of dental root is recommended in case of infection or when the size is greater than 3 mm.[8]

Conclusion

Pansinusitis secondary to dental abcess is a rare clinical entity in the pediatric population which requires a multidisciplinary approach. Both difficulties and challenges stem from its rarity accompanied by the possibility of developing life-threatening complications. The therapeutical management requires both a clinical and a surgical approach (odontogenic therapy). Pediatricians should raise their awareness towards the complications of a poor oral hygiene and whenever there are signs of infection should immediately refer patients to a pedodontist.

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