Frontal epidural empyema (Pott’s puffy tumor) associated with *Mycoplasma* and depression

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Abstract

A 37-year-old male has left exophthalmia, which gradually evolved in the last two years, finally with a deviation of left eye (LE), down side and out, with gradually decrease of visual acuity (VA). These symptoms are accompanied with headache and psychiatric manifestations with irritability, decreased attention, anxiety, insomnia, depressed mood. Brain Computed Tomography (CT) shows a tumor mass in air leakage sinus, bilateral frontal and bilateral ethmoidal, with left orbital invasion. This tumor mass lysis by pressure the supero-posterior wall of the left orbit, with the delimitation of a frontal epidural process with a capsule and calcifications. Additionally, it has been shown there is a bilateral maxillary sinusitis. The surgical intervention removed the infection focal spots rearranging the left eyeball, recovering the VA.

Histopathological examination of the excised tissue revealed sinus ciliated respiratory mucosa with mixed acute and chronic inflammatory infiltrate and focal squamous metaplasia. The lamina propria is edematous and contains large numbers of neutrophils, lymphocytes and plasma cells. Histopathological diagnosis is acute and chronic sinusitis.

Conclusions: An untreated infection of the aerial sinuses can lead to a complication like Pott’s puffy tumor. When signs such as ophthalmologic, psychiatric and intense headaches appear, it suggests the presence of the Pott’s puffy tumor (PPT). The clinical signs are reversible once the tumor has been removed.

Keywords: Pott’s puffy tumor, depression, sinusitis, *Mycoplasma*.

Introduction

Pott’s puffy tumor (PPT) is a rare disease and in literature have been described only a few cases, first described in 1760 by Sir Percivall Pott, is synonymous with the notion of frontal bone osteomyelitis [1]. Etiology is determined by head trauma but also by complication of acute and chronic frontal sinusitis, which can associate intracranial complications such as epidural purulent collection, cortical vein thrombosis, subdural empyema and brain abscess, present in 60–85% of PPT patients. Complications of Pott’s puffy tumor include preseptal and orbital cellulitis due to downward spread of infection and intracranial infection from posterior extention of infection. The infection erodes through the wall of the obstructed infected sinus to form a subperiosteal abscess. As expected, it can be associated with intracranially extension, with epidural abscess, subdural empyema, meningitis, and cerebral abscess formation [2–4]. It may affect patients of any age, it has a higher incidence in adolescence; PPT is more common in children and rare in adults [5].

For all interventions and for our research informed consent of the patient was obtained.

Patient, Methods and Results

Patient, T.M., 37-year-old, male from rural area comes to the doctor due to a loss in visual acuity (VA) at left eye (LE), diplopia and left exophthalmia.

Patient states that for the last two years he has a left exophthalmia, which is gradually growing and deviates the left eyeball towards the down side and out (Figure 1), with a steadily decrease of VA and with headache. Along these symptoms, signs of anxiety, depressive state, insomnia and irascibility appear.

The clinical general and neurological exam was within age limits.

Ophthalmologic exam concluded that: VA at right eye (RE) 1 f.c., LE 2/3 f.c., intraocular pressure (IOP) 16 mmHg at both eyes; fundus oculi exam: RE normal, LE papilla plane, slightly discolored with the nasal edge and the superior one faded, the macular region with a faded reflex; ocular motility: RE normal, LE limited in all directions; exophthalmometry: RE 18 mm, LE 23 mm, with an edema of the superior eyelid and the left inferior one.

Clinical diagnostic: left orbital inflammatory pseudo-tumor.
From the biological exams, the following pathological modifications are noted: blood leukocytes (white blood cells – WBC) 12 000/μL; erythrocyte sedimentation rate (ESR) 38 mm in one hour; enzyme-linked immunoadsorbent assay (ELISA) for the detection of *Toxoplasma*: IgM 1.156 mg/dL, IgG 1.267 mg/dL; ELISA for *Mycoplasma*: IgM 1.134 mg/dL; LA (lupus anticoagulant) positive; plasma fibrinogen level 420 mg/dL.

Biological exams show infectious syndrome and inflammation. *Mycoplasma* was the cause of the infection, conclusion reinforced by the positive results at the ELISA tests for *Mycoplasma*, which confirmed the presence of antibody type IgM. The antibiotic utilized was Doxycycline.

The cerebral and eyeball CT scan (Figure 2) reveals the presence of an expansive process measuring transaxial 4/3.5 cm located in the left orbit and in the left ethmoidal labyrinth, with semifluid density, relatively well delimited, with weak iodophil pseudocapsule, extended through the upper wall of the orbit in the left front-basal area.

This formation causes atrophy by compressing the upper wall of the orbit almost to the optic bundle and also in the medium and front left ethmoid cells. Are associated fluid collections in the maxillary sinus-bilaterally, ethmoid labyrinth-bilaterally and frontal sinuses.

The expansive process determines mass effect on the intern right muscle, right superior and the lifting muscle of the left eyelid in association with left exophthalmia.

Intraneuraxial it does not show perilesional edema, determines a minimal dent of the frontal corn of the left lateral ventricle, without movement of median structures.

The ventricular system is normally positioned. Diffuse cortical atrophy exceeding age-limits is noted, with a secondary ventricular dilatation, vascular degenerative modifications on the periventricular white substance level, with leukoaraiosis aspect.

A minimal erase of the gyration, frontal on the left side appears.

Psychological examination revealed the presence of mild anxiety symptoms in a moderate depressive episode. *Hamilton Depression Rating Scale* – 17 items showed a score of 18 who confirmed the moderate depression. Patient functionality was altered with *Global Assessment of Functioning Scale* (GAF) score 51–60 represent moderate symptoms at admission moment.

Due to the presence of diffuse cortical atrophy with ventricular dilatation secondary, a *Mini Mental State Examination* (MMSE) was performed but the score was normal.

It was found that depression occurred in the context of brain tumor occurrence. Psychological examination revealed an IQ (intelligence quotient) of 80, signifying a liminar intellect.

Psychiatric diagnosis was organic affective disorder with liminar intellect deficiency.

The decision of a surgical intervention is taken under...
the protection of antibiotherapy (Doxycycline) and with general anesthesia.

An incision was made at the level of the scalp (Figure 3a) and a 2.5 cm tool a supraorbitary bone shutter removal was done which permits the cerebral abort as well as at the level of front sinuses and left intraorbitary (Figure 3b).

Histopathological examination of the excised tissue revealed sinus ciliated respiratory mucosa with mixed acute and chronic inflammatory infiltrate and focal squamous metaplasia. The lamina propria is edematous and contains large numbers of neutrophils, lymphocytes and plasma cells. Histopathological diagnosis is acute and chronic sinusitis.

In Figure 4 is presented edematous stroma, acute and chronic inflammatory infiltrate of sinus respiratory mucosa with large numbers of neutrophils, lymphocytes, and plasma cells (Figure 5).

Squamous metaplasia, submucosal edema, acute and chronic inflammatory infiltrate are observed in Figure 6.

Major causes of chronic sinusitis are repeated episodes of acute or subacute sinusitis or persistent acute inflammation. Predisposing factors are small sinus ostia, reduction of ciliary activity (immotile cilia syndrome) and cystic fibrosis, allergy, repeated episodes of common cold, or acute sinusitis determining obstruction of the sinus ostia [6].

The presence of large numbers of neutrophils in the tissue should always suggest the possibility of a bacterial infection. It has been shown that the epithelium can produce chemoattractant cytokines that may contribute to leukocyte infiltration in sinusitis. Mucosal IL-8 expression is increased in patients with chronic sinusitis, and the level of expression directly correlates with disease severity [7].

Loss of ciliary function in chronic inflamed mucosa produces a decrease of resistance to future infections so that a vicious cycle of infection and reinfection may occur in patients with chronic sinusitis.

Complications of sinusitis can be divided into osseous, orbital, and intracranial. Osseous involvement is most often associated with frontal sinusitis but can involve any site. The sinus inflammation may cause bone remodeling with reactive new bone formation, lysis by pressure or osteomyelitis. Orbital or periorbital manifestations include cellulitis and abscess. Intracranial involvement is the most feared and potentially life threatening. It can results in meningitis, subdural-epidural-intracranial abscesses, and cavernous or superior sagittal sinus thrombosis [8].
Ophthalmologic exam two months postoperatory revealed: visual acuity: RE 1 f. c., LE 1 f. c., IOP 16 mmHg at both eyes; fundus oculi exam: RE normal, LE normal; ocular motility: RE normal, LE possible in all directions, normal; exophthalmometry: RE 18 mm, LE 19 mm, with a minimal edema of the superior left eyelid and inferior left (see pictures).

At two months after the surgery, the biological and paraclinical investigations are within normal limits.

Oculofacial aspect was normal at two months after surgery (Figure 7).

Figure 7 – Oculofacial aspect normal at two months after surgery.

Depressive and anxiety symptoms have stopped at two months after the surgery and the patient functionality was 100%.

Discussion

First time, in 1760, Sir Percivall Pott described Pott’s puffy tumor like a complication of trauma, but it is more frequent like complication of frontal sinusitis, fact subsequently observed [9].

Dural venous plexus communicate with diploic veins, but the mucosal venous drainage of the frontal sinus, narrow cavity and frontal bone occurs through diploic veins. Therefore, through this venous system can spread the infection by propagate from the frontal sinus into the frontal bone. Suppuration of frontal bone can cause demineralization and necrosis of inner and outer tables of skull by propagation the infection through Haversian system. Consequently appears perforation of the anterior table of frontal sinus and finally PPT by subperiosteal collection of pus and granulation tissue formation.

Intracranial complication accompanied or not of direct erosion of the frontal bone [10].

In the head and neck, infections occur mainly with anaerobic organisms and usually these infections are mixed and occupy more than 90% of dental, oral and neck space infection. The most important anaerobic organisms are Gram-negative rods (e.g., Bacteroides, Fusobacterium) and Gram-positive rods (e.g., Actinomyces, Clostridium) and cocci (e.g., Peptostreptococcus, Veillonella) [11].

In the case of the germ involved was Mycoplasma, a genus of bacteria that lack a cell wall, who can survive without oxygen and unaffected by many antibiotics that target cell wall synthesis (e.g., Penicillin or other beta-lactam antibiotics) [12].

In PPT, classic is the presence of headache, nasal drainage, diplopia, and a round swelling of the forehead. In our case, we have headache, exophthalmia and a deviation of the eyeball ahead, inferior and to the left.

It is believed that PPT is rare in the era of antibiotics; most cases are reported at children and very rarely in adults. The most frequent cause is trauma or sinusitis untreated or improperly treated [10, 13], but the second major causative factor was intranasal cocaine abuse was the second major causative factor. Inhaled cocaine and other drugs can lead at perforation of the nasal septum and compromise bones [14, 15].

Diabetes, aplastic anemia, chronic renal failure may be associated with PPT appearance. Frontal sinus infection may be activated by these underlying diseases who can lead at a compromised state.

Our patient stayed for years with intense headache, and did not seek medical treatment, so infection has evolved a long time, reaching no inner wall of the left frontal sinus by compression and not by lysis.

Addressability so late to the doctor, to incurring a very long period of time a high intensity headache, it would probably be due to liminar IQ and the other mental disorders secondary of abiotrophy and left frontal lobe compression.

Clinical outcome was favorable, two months after surgery the patient had no headache, depressive or anxious symptoms.

Conclusions

Although considered rare, PPT began to be reported more frequently in recent years. In our case, existing mental disorders, a liminar IQ, made patient to address very late to a doctor, who is why he stayed many years without treatment and the infection walked along with clinical manifestations and intense headache leading to the disappearance of the inner wall of the left frontal sinus, secondary compression. Many cases reported in recent years, somewhat up from previous periods, could be explained by the resistance at antibiotics, but here, on the background of psychiatric disorders, that led to lack addressability to the doctor and therefore lack of proper treatment in useful time.

References

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Received: March 7, 2014

Accepted: November 24, 2014