

CEREBELLAR ABSCESS BY *Gemella morbillorum* IN A PATIENT WITH INTER-ATRIAL COMMUNICATION

Armando Lopes¹, Rui Providencia², Rui Pedro Pais³,
Maria João Frade⁴, Feres Chaddad Neto⁵, Evandro de Oliveira⁶

ABSTRACT – *Gemella morbillorum*, a commensal of the oropharynx, upper respiratory, urogenital and gastrointestinal tract is rarely associated with infections in humans. However, an increasing number of infectious processes in different locations have been reported. Cerebral abscesses caused by these bacteria are extremely uncommon with only four cases previously described in the literature. We present the case of a cerebellar abscess by *Gemella morbillorum* in a 50 years-old man with inter-atrial communication dealt by surgical excision and antimicrobial therapy.

KEY WORDS: cerebellar abscess, inter-atrial communication, Gemella.

Abscesso cerebelar por *Gemella morbillorum* em paciente com comunicação inter-atrial

RESUMO - *Gemella morbillorum*, uma bactéria comensal da orofaringe, vias aéreas superiores e aparelhos urogenital e gastrointestinal, raramente causa infecções em humanos. No entanto, um crescente número de processos infecciosos em diferentes localizações tem sido referido. Abscessos cerebrais provocados por esta bactéria são extremamente raros, encontrando-se apenas quatro casos previamente descritos na literatura. Apresentamos o caso de um abscesso cerebelar por *Gemella morbillorum* em um homem de 50 anos com comunicação inter-atrial, tratado por excisão cirúrgica e terapêutica antimicrobiana.

PALAVRAS-CHAVE: abscesso cerebelar, comunicação inter-atrial, Gemella.

Cerebral abscesses are usually associated with conditions like pulmonary abnormalities, congenital cyanotic heart disease, bacterial endocarditis, penetrating head trauma and AIDS. The source of cerebral abscess is either hematogenous (congenital cyanotic heart disease, lung abscess, empyema, pulmonary arterio-venous fistulas, bacterial endocarditis and gastro-intestinal infections) or contiguous spread from sinuses or dental region diseases.

Histological classification of abscesses enclosures four stages (early cerebritis, late cerebritis, early capsule and late capsule), progressing for at least two weeks. Clinical features are unspecific and are related to the abscess location and surrounding edema. Most of the symptoms are due to raised intracranial pressure. Motor deficits and seizures are also common. Blood work with peripheral cell blood count, erythrocyte sedimentation rate and C – reactive protein may reveal normal or unspecific results. Blood cultures are usually negative.

Lumbar puncture should be avoided due to the risk involved and the low yield of useful information obtained.

Computerized tomography and magnetic resonance imaging are irreplaceable in the characterization of the lesion, but the radiological findings vary in different stages of abscess formation. Surgical drainage (open or needle) or excision plus antimicrobial therapy is the treatment of choice. Medical therapy alone may be used in early abscess and in patients with multiple small abscesses or those located in critical areas (brain stem, internal capsule...).

Initial combination of antimicrobial drugs should include vancomycin, third generation cephalosporin and metronidazole or cloranphenicol. When in vitro sensitivities become available appropriate therapy changes must be made. Antimicrobial therapy is discontinued after 6-8 weeks. The use of steroids should be reserved for those cases presenting with significant mass effect and clinical related deterioration

¹Médico Residente do Centro de Neurocirurgia de Coimbra, Centro Hospitalar de Coimbra, Portugal (CHC); ²Médico Residente do Serviço de Cardiologia, CHC; ³Neurorradiologista do Serviço de Neurorradiologia, CHC; ⁴Neurocirurgiã do Centro de Neurocirurgia de Coimbra, CHC; ⁵Neurocirurgião do Instituto de Ciências Neurológicas, São Paulo, Brasil (ICNE), Neurocirurgião-Assistente da Disciplina de Neurocirurgia do Departamento de Neurologia da Universidade de Campinas, Campinas SP, Brasil (UNICAMP); ⁶Diretor do ICNE, Professor e Chefe da Disciplina de Neurocirurgia da Faculdade de Ciências Médicas da UNICAMP.

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Dr. Feres Chaddad Neto - Praça Amadeu Amaral 27 / 5º andar - 01327-010 São Paulo SP - Brasil. E-mail: fereschaddad@hotmail.com

because they may reduce penetration of antibiotics into the abscess.

Anticonvulsants are usually recommended.

Although mortality has been significantly reduced with improvement in antibiotics, surgery and CT diagnosis and follow-up, morbidity is still high, with neurological deficits and seizures being the most common complications.

CASE

A 50 years-old man, transferred from another institution, presenting with headache, vomiting, dizziness and gait ataxia in association with fever for the past fifteen days, after a dental procedure. He had no motor deficits but there was uncoordination of motion on the right side.

Twenty years earlier he had been diagnosed a congenital cardiac malformation for which he denied surgery. He

had Class II New York Heart Association classification for heart failure symptoms. Enlargement of the right cardiac chambers, paradoxal movements of the inter-ventricular septum and flow through an inter-auricular septum defect were seen in previous trans-thoracic echocardiograms.

Blood sampling revealed leucocytosis (12000 cells/mm³) and elevation of C-reactive protein.

Both computerized tomography (Fig 1) and magnetic resonance imaging (Figs 2 and 3) showed a cystic lesion with a peripheral rim of contrast enhancement and involving edema, located in the right medial cerebellar hemisphere and vermis.

Intravenous therapy with ceftriaxone, vancomycin and metronidazole was empirically initiated.

A short course of steroids was used to reduce the mass effect from the lesion.

Pre-operative electrocardiogram was consistent with a right blockage pattern of His bundle and right auricle anomaly. Blood cultures were negative.

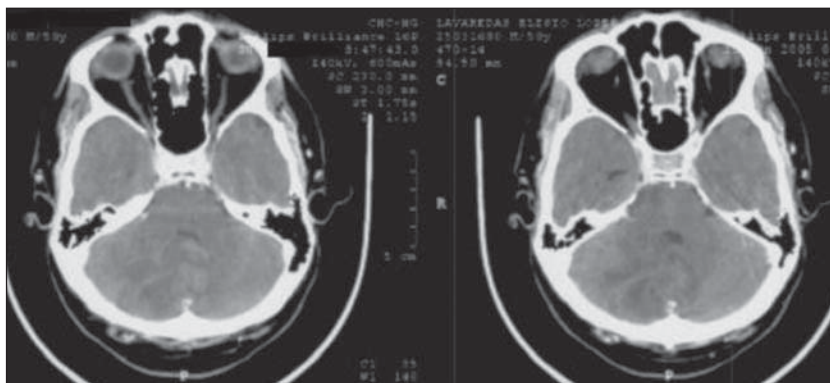


Fig 1. CT with IV contrast revealing vermian and right hemispheric lesion, with heterogeneous enhancement and surrounding hipodensity.



Fig 2. Sagittal, coronal and axial T1WI after gadolinium, with better characterization of a cystic lesion with a peripheral rim of contrast enhancement affecting the vermis and the medial right cerebellar hemisphere.

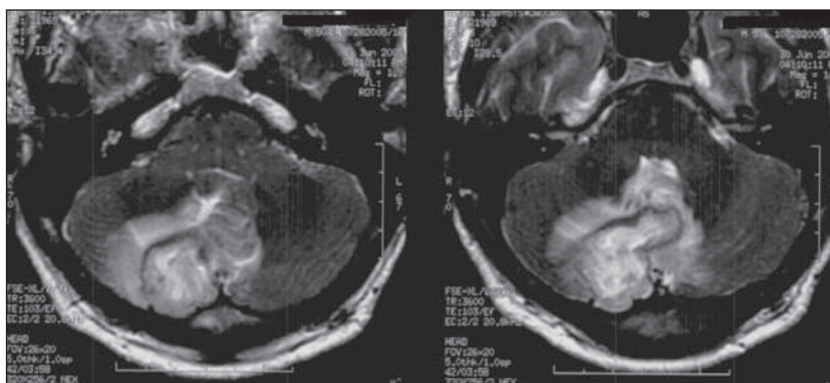


Fig 3. FLAIR sequence showing significant edema involving the lesion.

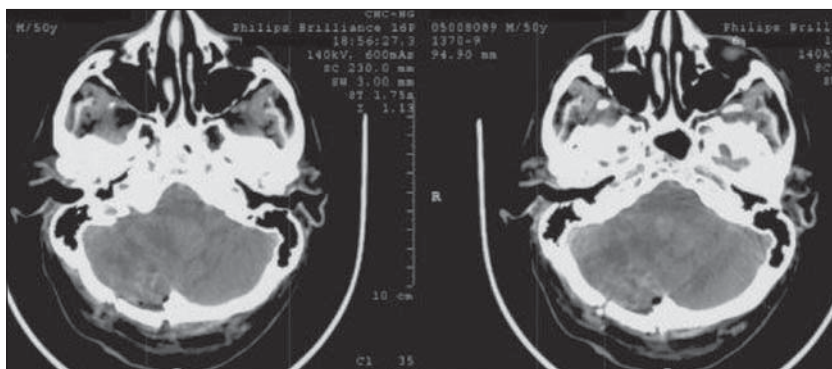


Fig 4. First day post-operative CT scan without surgical complications.

A right sub-occipital craniotomy was performed and drainage of the abscess and removal of its capsule was achieved without intercurrents. Post-operative CT (Fig 4) showed no complications.

Laboratory analysis of the aspirate identified *Gemella morbillorum* as the pathogen implicated in the infection.

Recovery from surgery was uneventful and a gradual clinical improvement was obtained. Antimicrobial therapy was then modified according to in vitro susceptibility of the *Gemella morbillorum*, maintaining metronidazole in monotherapy for approximately six weeks.

Six months after surgery the patient was neurologically intact, with CT showing a right cerebellar hemisphere hypodensity.

A trans-esophageal echocardiogram revealing "ostium secundum" inter-auricular communication of 26 millimeters was performed. Pulmonary artery systolic pressure of 35 mmHg was measured by coronary catheterization (moderate pulmonary hypertension).

He subsequently underwent a surgical correction of the inter-atrial septal defect by a median sternotomy using an autologous pericardium patch. In the cardiac follow up the patient presented with no symptoms and had no residual shunt.

The patient gave the informed consent for publish this case.

DISCUSSION

The most frequent implicated organism in cerebral abscesses is streptococcus and multiple organisms are identified in different percentage according to the series. When resulting from otitis, mastoiditis or lung abscess, anaerobes or multiple organisms are the most common pathogens. Staphylococci are prevalent with penetrating head trauma or following neurosurgical procedures. Fungal infections occur mainly in immunocompromised patients. Cultures from cerebral abscesses don't reveal any bacteria in up to 25% of cases. Unusual microorganisms are seldom identified. *Gemella* species, including *Gemella morbillorum*, a microaerophilic Gram-positive coccus, are part of the normal flora of the human oropharynx, upper respiratory, urogenital and gastrointesti-

nal tract rarely causing human infection. Although uncommonly pathogenic, they have been implicated in a variety of human infections, some of them with serious consequences, most notably infective endocarditis¹⁻⁷. Dental instrumentation appears to be the usual source of infection¹.

Central nervous system infection is unusual and brain abscess formation due to these bacteria is a rare condition with only four cases previously described⁸⁻¹¹.

Other infections like bacteremia¹² septic arthritis¹³, pneumonia¹⁴, pleural empyema¹⁵⁻¹⁸, liver abscess¹⁹⁻²², spondylodiscitis²³, septic shock²⁴, pericarditis²⁵, soft tissue infection²⁶, sub-dural empyema²⁷ (complication of frontal sinusitis) are also uncommon.

Differentiation of *Gemella* from viridans streptococci may be difficult: 16S rRNA gene sequencing is the method of choice for identification of *Gemella* species²⁸.

Although *Gemella morbillorum* is usually sensitive to beta-lactams and aminoglycosides, some resistant strains to these antibiotics have been described²⁹. Periodontal antimicrobial prophylaxis with tetracycline may result in transitory selection of subgingival species, including *Gemella morbillorum*, intrinsically resistant to this drug. The percentage of resistant microorganisms increases significantly at one week but falls to baseline levels over time³⁰.

Pathogenic mechanisms implicated in *Gemella* infections include down regulation of IL-12 and IFN- γ as well as stimulation of antineutrophil antibodies⁸.

Inter-atrial communication (IAC) accounts for 10% of all congenital cardiac malformations and results of alterations in inter-auricular septum embryogenesis. IAC *ostium secundum* has a central location near the fossa ovalis, unlike *sinus venosum* (close to vena cava) and *ostium primum* (close to the atrial-ventricular valves). This malformation (*ostium secundum*), which initially presents with left to right intra-cardiac shunt, results in overload of the right chambers, with

possible dilation, and pulmonary circulation hypertension, eventually leading to right to left shunt.

Headaches are a common feature (recently described) affecting approximately 30-40% of patients. Cerebro-vascular embolic accidents may also occur.

In this case, the *Gemella* bacteria, commensals of the oral cavity, may have entered the blood stream after the dental procedure, and passing through the inter-auricular defect escaped the activity of pulmonary macrophages, reaching the cerebral circulation causing the cerebellar abscess.

Although an uncommon pathogen, *Gemella morbillorum* has been increasingly associated with serious and potentially life-threatening infections. Diagnostic delays must be avoided to prevent the development of severe consequences.

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