Case report

Lemierre syndrome associated with 12th cranial nerve palsy—A case report and review

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ABSTRACT

Since the widespread availability and use of antibiotics the prevalence of Lemierre syndrome (L.S.) has decreased. It is a well-described entity, consisting of postanginal sepsicaemia with thrombophlebitis of the internal jugular vein with metastatic infection, most commonly in the lungs. The most common causative agent is a gram-negative, non-spore-forming obligate anaerobic bacterium, Fusobacterium necrophorum (F.n.). We describe the unusual clinical features of a 12-year-old boy with Lemierre syndrome with isolated hypoglossal nerve palsy - the latter symptom is an extremely rare manifestation of this disease.

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1. Introduction

Lemierre syndrome (L.S.) is a rare, but well-characterized disease, consisting of postanginal sepsis, internal jugular vein thrombophlebitis and septic emboli secondary to the infection [1]. It is mainly caused by Fusobacterium necrophorum (F.n.), a non-spore-forming, strictly anaerobic Gram-negative bacterium and affects healthy young adults. Other microorganisms implicated belong to Fusobacterium species, anaerobic streptococci and Gram-negative anaerobes [3]. After crossing mucosal barrier postanginal sepsis develops by haematogenous spread via tonsillar veins or directly through cervical tissue. The resulting septic thrombophlebitis of the internal jugular vein subsequently leads to metastatic lesions in different organ systems.

Although the first description of human postanginal septic infection with F.n. is attributed to Courmont and Cade [2] it was the French microbiologist André Lemierre who defined the clinical entity of this syndrome. From the time of L.S.’s initial description until the beginning of the antibiotic era in the 1940s, more than 250 cases of F.n. bacteraemia have been reported worldwide. From 1950 to 1995 only 40 cases of L.S. were presented [10]. In the 1980s, an increasing number of cases emerged; studies from 1970 to 2007 showed an incidence of 0.8–1.5 per million per year [5,6,14].

We discuss a case of Lemierre syndrome with isolated left hypoglossal nerve palsy and review therapeutic strategies for the management of this syndrome.

2. Case report

A 12-year-old boy presented with a four-day-history of sore throat, neck pain and fever. A viral upper respiratory tract infection was suspected. Due to the increasing neck pain he received an occipital intramuscular injection of corticosteroid. Subsequently, neck pain increased and high fever persisted. On admission the patient had swollen cervical lymph nodes and a fixed cervical spine rotation to the left (torticollis). The oropharyngeal inspection was unremarkable without signs of retropharyngeal abscess. Antibiotic therapy with cefuroxime (100 mg/kg/d i.v.) was started as empirical
antibiotic treatment for oropharyngeal bacterial infection. On the following day he developed a left hypoglossal palsy with deviation of the tongue at clinical inspection (Fig. 1) – and clinical signs of sepsis consisting of hyperpyrexia, arterial hypotension and decreased oxygen saturation. Therefore he was admitted to intensive care unit. The laboratory results revealed thrombocytopenia (100,000/µl), coagulopathy (quick 50%), impaired kidney (creatinine 1.9 mg/dl) and liver function (AST 170 U/l, ALT 125 U/l) as well as a highly elevated C-reactive protein (206 mg/l). White blood cell count and lymphocytic differentiation were normal. A MRI scan showed inflammatory lesions dorsally and laterally to the left occipital condyle in addition to suspected thrombophlebitis of the left jugular internal vein (Figs. 2 and 3). The chest X-ray showed bilateral pulmonary lesions (Fig. 4). The patients needed supplemental oxygen and dopamine therapy. After L.S. was suspected the antibiotic therapy was changed to high dose meropenem (200 mg/kg/d i.v.) and clindamycin (40 mg/kg/d i.v.). Two days later, after transient improvement of his clinical condition, fever recurred with increasing neck pain, a left-sided cervical swelling, and severe earache. The patient’s general condition deteriorated. Due to worsening hypoxemia, the patient required intubation and mechanical ventilation.

The clinical inspection showed cervical lymphadenopathy, signs of mastoiditis (local pain, redness) and otitis media detected by otoscopy, but no retropharyngeal swelling so far. CT scan revealed cervical lymphadenopathy, torticollis of the atlanto-axial joint (Fig. 5) and fluid collection within the left mastoid air cells and the middle ear (Fig. 6). A retropharyngeal hypodensity was suspected by radiologist. During mastoidectomy and paracentesis intraoperative inspection revealed no findings of retropharyngeal abscess. Therefore no additional neck surgery was performed. After surgery the patient showed a significant clinical recovery with ongoing antibiotic treatment. Surgical cultures as well as initial blood cultures remained sterile. F.n. was detected by PCR from the surgical cultures. Low-dose heparin therapy was started. Within
one week the patient showed a significant clinical recovery. On day 19, he was discharged, while receiving oral antibiotic therapy with amoxicillin and sulbactam for an additional week. Lowdose heparin was continued for another three month. In the follow-up visits over the next three month he presented in good clinical condition, and the hypoglossal nerve function almost completely recovered (Fig. 7). The patient was a healthy young boy of non-consanguineous parents with no clinical history of immunodeficiency. The white blood cell count and lymphocytic differentiation were normal.

3. Discussion

Lemierre’s syndrome is characterized oropharyngeal infection, internal jugular vein thrombosis and isolation of anaerobic organisms mainly Fusobacterium necrophorum. Although in humans Fusobacterium species are commonly seen in oropharyngeal flora the current concept is to treat it as a pathogen [3]. F.n. can cause pharyngotonsillitis, peritonsillar abscess, middle ear infections and systemic LS. Infections with F.n. arising outside the oropharyngeal tract are summarized as necrobacillosis. They especially affect older adults with underlying disease.

During puberty, when the deep crypts of the tonsils are supposed to regress F.n. can cross the mucosal barrier. Postanginal sepsis develops after haematogenous spread of the bacterium via tonsillar veins. Histological data, however, shows that the bacterium can also spread directly through cervical tissue [4]. Concomitant bacterial or viral pharyngeal infection may play a synergistic role in invasion of mucosal tissue. The resulting septic thrombophlebitis of the internal jugular vein subsequently leads to metastatic lesions in different organ systems.

The most common metastatic manifestations are pleuropulmonary septic emboli, which occur in 92% of cases [9] and leads to the typical radiological features of LS, such as bilateral pulmonary infiltrates. Interestingly, however, these findings are very rarely complicated by the development of ARDS. 17–27% of patients develop pulmonary empyema, pleural effusion or pulmonary abscesses [5,6].

In 13–27% of patients septic arthritis mainly affects the hip, knee and shoulder joint. Other manifestations are less frequent with only 3% of patients suffering from osteomyelitis, 7.2% from muscular abscesses, 3% from skin and soft tissue abscesses, 4% from liver abscesses and 3% from spleen abscesses. Cardiac complications like endocarditis and pericarditis are very seldom reported [7]. Equally rare, but severe and often lethal complications include meningitis, cerebral infarcts or abscesses as well as septic sinus venous thrombosis. The involvement of cranial nerves occurs extremely rarely; only a total of four cases are reported in literature [3]. In contrast to our case those were mainly associated with meningitis and osteomyelitis. Therefore our case report of cranial nerve palsy represents an extremely rare, but severe complication of LS. The pathogenesis of the 12th cranial nerve palsy in our case could be a toxic neuritis, as it is discussed in literature [8,9]. This might be supported by the fact that there was no other pathology detected (suspected oropharyngeal hypodensity was not confirmed in the clinical inspection) and that the patient showed significant improvement after mastoidectomy and paracentesis.

Due to antibiotic therapy and high-level intensive care the outcome of patients has improved and the mortality of LS has been significantly reduced – from 90% in the pre-antibiotic era to 5% in current day treatment. Today a critical prognosis issue
remains the timely start of appropriate antibiotic therapy. Delays in antibiotic therapy by four or more days will worsen the clinical outcome significantly [10]. Appropriate antibiotic treatment includes the use of carbapenems, amoxicillin plus β-lactamase inhibitor or the implementation of a combination therapy including metronidazol, cefoxitine or clindamycin [5,11]. Due to mixed infections combination of antibiotics is recommended. As there are no evidence-based data concerning the duration of antibiotic therapy, treatment duration varies from 9 to 84 days [12]. According to the literature, in uncomplicated cases, the antibiotic therapy can be switched to an oral regime, and should be continued for a total of at least three weeks.

Another important therapeutic issue concerns the surgical drainage of abscesses containing necrotic tissue. Mastoidectomy due to mastoiditis and paracentesis was imperative in the case of our patient [13]. In the event of necrotic lesions the effect of antibiotic therapy is believed to be poor without surgical intervention. In the pre antibiotic era ligation of the internal jugular vein to avoid persistent sepsis and emboli was common, currently antibiotic therapy along with surgery is the therapeutic option [5].

Anticoagulation in L.S. is usually recommended, but no controlled clinical studies exist due to low incidence. In two reviews, patients with L.S. who received full-dose anticoagulation, had a favorable outcome [7,12]. If thrombosis involves cerebral sinuses, anticoagulation is recommended [14]. Due to the imminent bleeding risk in severely septic patients, there is no general recommendation regarding the use of full-dose heparin in patients with L.S. Therefore anticoagulation therapy is based on personal preference or departmental protocols.

In summary, we describe the case of L.S. with the extremely rare complication of 12th cranial nerve palsy. Due to antibiotic resistance or changes in antibiotic prescription pattern incidence of L.S. has recently increased [3]. Clinicians should therefore reconsider L.S. in differential diagnosis of oropharyngeal infection ensuring early and effective therapy to improve outcome.

**Conflict of interest**

The authors declare that they have no conflict of interest.

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**References**