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CLINICAL RECORD

Methicillin-resistant *Staphylococcus aureus* bacteraemia associated with Lemierre's syndrome: case report and literature review

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Abstract

Background: Community-acquired methicillin-resistant *Staphylococcus aureus* is a growing health concern. Lemierre's syndrome is a septic jugular thrombophlebitis that primarily affects young adults. This paper aimed to identify a possible sub-group of Lemierre's syndrome cases associated with community-acquired methicillin-resistant *Staphylococcus aureus*.

Method: This paper reports the case of a 16-year-old male who was admitted for increasing fever, tachycardia, tachypnoea and neck pain. The patient was diagnosed with methicillin-resistant *Staphylococcus aureus* bacteraemia associated with Lemierre's syndrome. A literature review was subsequently conducted.

Results: Following intravenous antibiotic treatment and the sterilisation of blood cultures, the patient improved. The literature review indicated a rise in the past 2 years of Lemierre's syndrome associated with methicillin-resistant *Staphylococcus aureus* among patients less than 18 years of age.

Conclusion: Community-acquired methicillin-resistant *Staphylococcus aureus* bacteraemia can lead to pulmonary sequelae. When it is associated with pharyngitis, nasopharyngitis or parapharyngeal lymphadenitis, the affected patient may be predisposed to Lemierre's syndrome. As bacterial carriage is predominantly nasal, pharyngitis may not be present. Methicillin-resistant *Staphylococcus aureus* should be included as an offending bacterium where there is suspicion of Lemierre's syndrome. It is unclear whether anticoagulation alters the course of the bacterium, and surgery is probably contraindicated.

Key words: Lemierre Syndrome; MRSA; Staphylococcus Aureus; Anticoagulation; Child; Pediatrics

Introduction

Lemierre's syndrome is a septic internal jugular vein thrombosis primarily caused by *Fusobacterium necrophorum*. It can also be caused by other strains, including *Staphylococcus aureus* and methicillin-resistant *S aureus* (MRSA). A PubMed search of Lemierre's syndrome and MRSA yielded eight reported cases, four of which occurred in the paediatric population and the rest among young adults. A further PubMed search of Lemierre's syndrome and *S aureus* returned 11 case reports (which included cases of MRSA); the earliest of these was published in 2002.[1] Although the nose is the most common site to be colonised by MRSA, none of the cases were reported in the scientific otolaryngological literature. The literature search findings suggest that MRSA infections are a growing danger.[2]

Case report

A healthy, 16-year-old, male high school wrestler presented with a 5-day history of worsening neck pain, dry cough and generalised malaise. A prior diagnosis of musculoskeletal injury had been made on the basis of neck X-rays, which was subsequently treated with a cortisone injection into the neck. A chiropractor who observed tachypnoea and tachycardia referred him to the emergency department where he was reported to be febrile and tachycardic. Blood cultures were obtained. The patient was treated with ceftriaxone and azithromycin, and admitted to the ward.

The hypoxia subsequently worsened, which required oxygen treatment with a face mask. Antibiotic treatment included ceftriaxone and vancomycin. Further respiratory deterioration necessitated continuous positive airway pressure treatment. Blood cultures showed growth of MRSA that was sensitive to vancomycin and rifampin. The hypoxia worsened only to require intubation on post-admission day three.

A computed tomography (CT) scan of the neck was performed with intravenous (IV) contrast medium (Figure 1). This showed a clot in the right internal jugular vein at the level of C1. There was extensive air space consolidation including multiple small nodular lesions representing septic emboli, which in the setting of developing Lemierre's syndrome would be consistent with the clinical impression of acute respiratory distress syndrome. There were also right-sided paratracheal lymph nodes with mediastinal fluid, which raised concern of developing mediastinitis.

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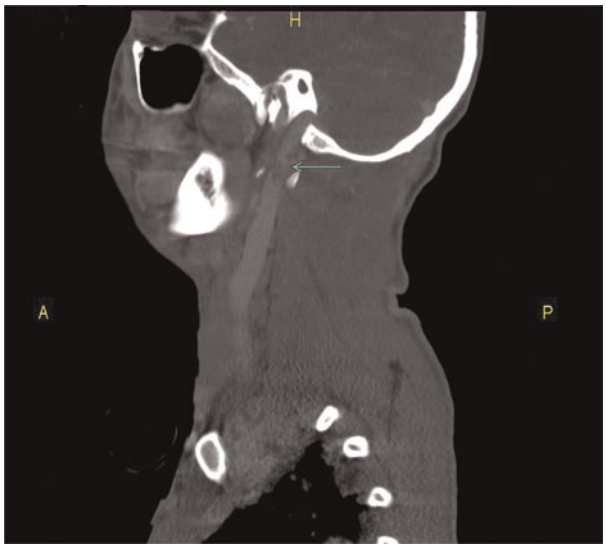

FIG. 1
Sagittal computed tomography neck scan with intravenous contrast medium showing thrombus in the internal jugular vein (arrow). A = anterior; H = head; P = posterior

In light of the jugular septic thrombophlebitis caused by MRSA and further complicated by acute respiratory distress syndrome, rifampin and clindamycin were also administered, but anticoagulation treatment was withheld. The daily cultures of bloods drawn whilst the patient was in the paediatric intensive care unit tested positive for MRSA for the six consecutive days following the initial positive culture. All subsequent cultures were negative. An abdominal CT with IV contrast showed: hepatomegaly with periportal oedema, heterogeneous enhancement of the kidneys bilaterally with possible multifocal areas of infarction, and worsening bilateral pleural effusions amid evidence of multifocal cavitation areas.

Blood samples taken on admission demonstrated an elevation of lactate dehydrogenase, aspartate transaminase and alanine aminotransferase, with elongated prothrombin time and leukocytosis with a left shift. On the sixth day post-admission, the blood tests had normalised. An ultrasound of the neck performed on the seventh day post-admission showed no venous thrombus, with good venous flow in all neck vessels.

The patient was weaned off his ventilator and extubated on the 10th day post-admission. He wore a face mask whilst recovering, and was subsequently discharged.

Discussion

Methicillin-resistant *S aureus* can be acquired in hospital or in the community. Community-acquired MRSA is currently the leading cause of soft tissue and skin infection, with a carrier rate of up to 2 per cent within the general population. The primary carrier areas are the nose, pharynx, axilla and groin. Risk factors include: playing contact sports, sharing towels or other personal items, immunosuppression, unsanitary or crowded living conditions (dormitories or military barracks), being a healthcare worker, and young or old age.

Lemierre's syndrome secondary to MRSA is a relatively new entity and only 11 cases have been reported in the literature.[3–6] Eight of these 11 cases were reported as being MRSA-induced. Half of the patients affected were children and the other half were no older than 32 years. All of the patients had pulmonary complications ranging from acute respiratory distress syndrome, cavitation, empyema, pneumothorax, haemorrhagic pericardial effusion and necrotising pneumonia. All but one presented with a (unilateral) thrombosed jugular vein. Nearly all of the patients recovered; the one exception was, incidentally, the only patient to receive surgical drainage. For the majority of patients, treatment included various types of anticoagulation.

The cases described above demonstrate that the diagnosis of Lemierre's syndrome is not straightforward. As the clinical presentation of Lemierre's syndrome is elusive at the initial stage, treatment may be delayed. In addition, MRSA is not regarded as a frequent cause of Lemierre's syndrome and so appropriate antibiotic coverage may not be provided immediately. A delay in diagnosis, together with possible increased virulence factors associated with MRSA infections, can increase disease severity. Awareness of the clinical presentation of Lemierre's syndrome (fever and neck pain preceded by tonsillopharyngitis) and the causative agents will lead to timely and appropriate antibiotic administration and better treatment outcomes.

For patients who have clear risk factors for MRSA carrier state, several questions should be considered. For instance, bearing in mind that only positive blood cultures lead to appropriate therapy, should a patient with a strong risk factor for MRSA carrier state be screened and treated periodically? Should MRSA screening take place for any infectious process in such an individual? The rising incidence of MRSA in Lemierre's syndrome may lead to the conclusion that it would be prudent to add vancomycin to the antibiotic regimen immediately after Lemierre's syndrome has been diagnosed, and probably when the suspicion of Lemierre's syndrome arises in an individual with the pertaining risk factors.

- **Community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) is a growing medical concern that can cause Lemierre's syndrome**
- **Lemierre's syndrome caused by MRSA is common in the paediatric population and is associated with pulmonary complications**
- **Treatment should consist of antibiotics alone; the benefit of anticoagulants is questionable, and surgery may be contraindicated**

Consideration of anticoagulation treatment can be challenging and controversial. Four of the eight patients reported to have Lemierre's syndrome associated with MRSA received anticoagulation treatment without haemorrhagic sequelae, whilst the others recovered without this treatment. The addition of a potentially dangerous regimen that may not alter the disease course needs careful consideration. There was only one death among the cases reviewed; this occurred in a seven-month-old who was also the only patient to receive surgical drainage. This outcome suggests that surgical intervention is probably contraindicated for such patients. Therefore, the mainstay of treatment remains appropriate antibiotic coverage, with or without anticoagulation.

In conclusion, this study, which has a level of evidence of 4, showed that an awareness of Lemierre's syndrome and

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MRSA is warranted, especially in the paediatric population, with antibiotics being the mainstay of treatment.

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