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Case report

Septic emboli of the lung due to Fusobacterium necrophorum, a case of Lemierre's syndrome

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A B S T R A C T

Fusobacterium necrophorum plays a causal role in a rare and life-threatening condition, Lemierre's syndrome. It is characterized by infection involving the posterior compartment of the lateral pharyngeal space complicated by septic suppurative thrombophlebitis of the internal jugular vein with F. necrophorum bacteremia and metastatic abscesses, primarily to the lung and pulmonary septic emboli. Herein, we present a very rare case of oropharyngeal infection complicated by Lemierre's syndrome with characteristic septic emboli to the lungs presenting as sore throat in a previously healthy patient. A 23-year-old woman presented with sore throat and was found to be in sepsis and acute kidney injury. She was found to have septic emboli in lung and Streptococcus anginosus and F. necrophorum in blood. She was diagnosed with Lemierre's syndrome and successfully treated with antibiotics. Lemierre's syndrome should be included in the differential diagnosis in young patients who deteriorate in the setting of a sore throat. If the suspicion is high, throat swabs from young patients with nonstreptococcal group A tonsillitis should be cultured anaerobically on selective medium to detect the presence of F. necrophorum. While clinicians of the infectious disease team may be familiar with this condition other departments including internal medicine and critical care team may less so. Unless clinicians are aware of this syndrome, diagnosis and treatment can be delayed leading to higher morbidity and mortality.

1. Introduction

Fusobacterium necrophorum (F. necrophorum), an anaerobe [1] has been detected in the oropharynx of asymptomatic healthy young adults [2]. Rates of detection are higher in symptomatic patients with acute pharyngitis and even higher in adults with recurrent pharyngitis [2]. F. necrophorum plays a causal role in a rare and life-threatening condition, Lemierre's syndrome. It is characterized by infection involving the posterior compartment of the lateral pharyngeal space complicated by septic suppurative thrombophlebitis of the internal jugular vein with F. necrophorum bacteremia and metastatic abscesses, primarily to the lung and pulmonary septic emboli [3]. Identifying Lemierre's disease is challenging [3] and 80% of reported cases are due to F. necrophorum [4]. Herein, we present a rare case of oropharyngeal infection complicated by Lemierre's syndrome with characteristic septic emboli to the lungs presenting as sore throat in a previously healthy patient.

2. Case presentation

A previously healthy 23-year-old woman presented with sore throat, associated with nausea, subjective fever and chills for three days. One day prior, she was seen at an outside facility for a sore throat and was given oral antibiotics. On Examination, she was febrile with a temperature of 102.2° Fahrenheit, tachycardic with a heart rate of 130 beats per minute and hypotensive with a blood pressure of 90/50 mm Hg. Initial laboratory work was remarkable for a leukocyte count of 17.87 k/ul with a predominant neutrophil count of 86.8% and an elevated creatinine of 3.6 mg/dL. She was found to be in sepsis and acute kidney injury. Empiric antibiotics were given and rapid crystalloid infusion was begun, but despite greater than 30 cc/kg intravenous fluids, she remained hypotensive. She was admitted to the intensive care unit in light of fulminant septic shock. Streptococcus anginosus and F. necrophorum were isolated from blood cultures.

Further Imaging with computed tomography of the chest revealed scattered bilateral nodular opacities throughout the lung with predominant peripheral distribution suspicious for septic emboli and small bilateral pleural effusions with adjacent consolidations (Fig. 1), greater on the left. She was started on empiric piperacillin/tazobactam and metronidazole. Lemierre's syndrome was suspected and internal jugular vein thrombosis was ruled out by computed tomography of the neck with intravenous contrast.

Repeat Computed tomography of the chest ten days later revealed a

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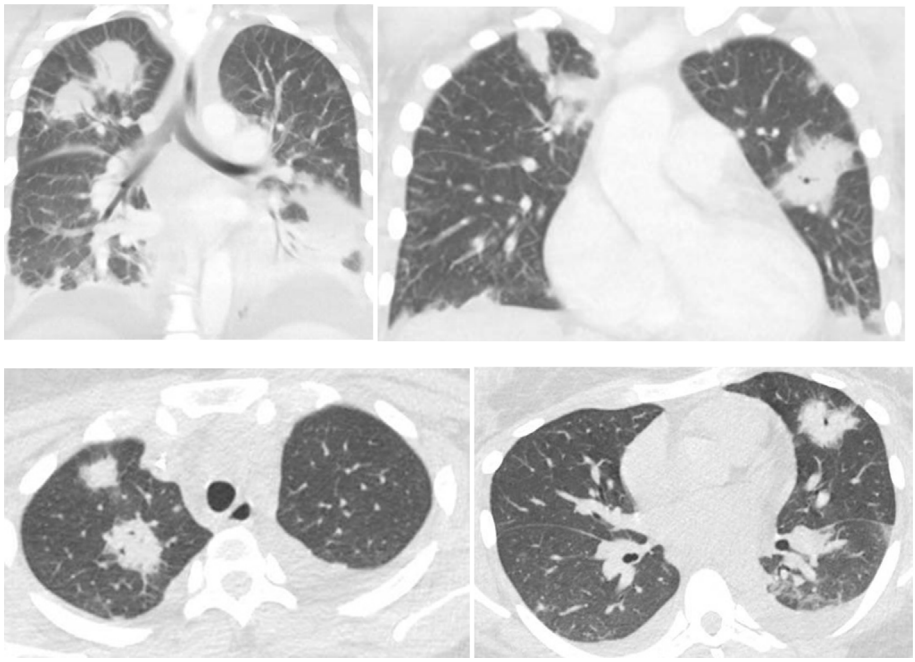

Fig. 1. Computed tomography of the chest showing scattered bilateral nodular opacities throughout the lung with predominant peripheral distribution suspicious for septic emboli and small bilateral pleural effusions with adjacent consolidations.

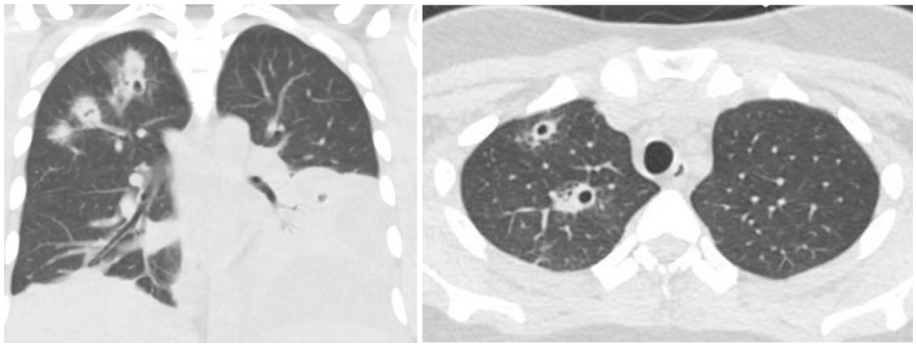

Fig. 2. Repeat Computed tomography of the chest showing decrease in the size of the bilateral nodular opacities with the majority demonstrating new areas of cavitation but an increased moderate left pleural effusion with near complete atelectasis of the left lower lobe.

decrease in the size of the bilateral nodular opacities with the majority demonstrating new areas of cavitation but an increased moderate left pleural effusion with near complete atelectasis of the left lower lobe (Fig. 2). A Left sided chest tube was placed for parapneumonic effusion.

F. necrophorum was found sensitive to augmentin, clindamycin, imipenem, and was resistant to metronidazole. Whereas, Streptococcus anginosus was pansensitive to penicillin, ceftriaxone, clindamycin, vancomycin, levofloxacin, and erythromycin. Antibiotics were later switched to piperacillin/tazobactam and clindamycin based on sensitivity. She was diagnosed with Lemierre's syndrome secondary to F. necrophorum with pulmonary septic emboli. After a stay of 18 days in the hospital, her clinical condition improved significantly and she was eventually discharged home on ceftriaxone and clindamycin. On subsequent outpatient follow-up, the patient has made a good recovery.

3. Discussion

The highest reported incidence of Lemierre syndrome was prior to the antibiotic era [2]. The incidence has increased over the last decade because of increasing antibiotic resistance, reducing rates of tonsillectomy, and better diagnostic tools [5]. It typically occurs in previously healthy adolescents and young adults [5]. It is still a rare syndrome with an estimated worldwide incidence of 1/1,000,000 [6]. F. necrophorum is a gram-negative, non-spore forming, anaerobic bacilli [1]. F. necrophorum is divided into two subspecies: F. necrophorum subsp. necrophorum and F. necrophorum subsp. Funduliforme [7]. F. necrophorum subsp. funduliforme is part of the normal flora of the human tonsils [7]. F. necrophorum has been associated with tonsillitis and peritonsillar abscesses [7].

The clinical presentation of Lemierre syndrome or suppurative internal jugular thrombophlebitis may vary greatly [8]. It should be suspected in patients with antecedent pharyngitis, neck pain, respiratory distress, septic pulmonary emboli, and persistent fever despite antimicrobial therapy [9]. Respiratory symptoms have, on occasion, been cited as the presenting complaint for some individuals [10]. Progression is often rapid with pleural effusion and empyema common even with early antibiotic therapy [10]. The severity of respiratory consequences from Lemierre's syndrome is such that chest drain insertion and intubation may be required to combat worsening respiratory failure [10]. Lungs are the most common site of septic metastasis with an incidence of 80% [10]. This may lead to hypoxemia and empyema along with other potential consequences [9]. Metastatic infection can also occur at other sites, leading to septic arthritis, and osteomyelitis [6]. Infection usually begins in the pharynx but spreads to involve spaces in the neck and the carotid sheath [9], which contains the internal jugular vein [6]. Bacteremia due to Fusobacterium necrophorum

and septic emboli to the lung, which subsequently cavitates, are all characteristic complications of this process once the vessels are involved. Jugular vein suppurative thrombophlebitis can also be associated with intravenous catheter insertion. F. necrophorum rarely penetrates intact mucosal surfaces [7]. It has been suggested that transient infection-associated mucosal and systemic immunosuppression may contribute to the pathogenesis [7].

Some studies have shown that F. necrophorum positive pharyngitis occurs more frequently than groupA β-hemolytic streptococcal-positive pharyngitis in a student population, and F. necrophorum-positive pharyngitis clinically resembles streptococcal pharyngitis [11]. Hence, it has been suggested that throat swabs from young patients with a nonstreptococcal group A tonsillitis be cultured anaerobically on selective medium to detect the presence of F. necrophorum [12]. Other organisms reported as a cause of this syndrome includes methicillin-susceptible and methicillin-resistant *Staphylococcus aureus*, Staphylococcus epidermidis, GAS and other beta haemolytic streptococci, Streptococcus intermedius, Streptococcus constellatus, Arcanobacterium haemolyticum, Peptostreptococcus sp, Prevotella sp, Porphyromonas asaccharolytica, *Klebsiella pneumoniae*, Eikenella corrodens, Enterococcus sp., Proteus sp., and Bacteroides sp [2].

The road to diagnosis can be tortuous and is often prompted by the identification of F. necrophorum in blood cultures or unexpected imaging findings consistent with septic emboli [2]. Imaging should be considered in all infections with Fusobacterium arising from the upper respiratory tract or head region due to the high incidence of thrombotic complications and abscess formation. The diagnosis is frequently made with blood cultures and chest imaging [2]. CT findings in the chest can be quite characteristic including lobar consolidation, pleural effusion, and multiple peripheral pulmonary nodules [10]. On occasion, there may also be evidence of cavitating abscess or empyema [10]. High resolution computed tomography of the neck with contrast provides the most definitive visualization of the presence and extent of the jugular thrombus [13]. It may demonstrate filling defects or thrombus, with or without soft tissue swelling [13]. Ultrasonography may be used to evaluate for jugular vein thrombosis and assess for extension of thrombus [13]. Interestingly, in our case Lemierre's syndrome occurred in the absence of suppurative thrombophlebitis of the internal jugular vein.

Management of Lemierre's syndrome includes antibiotic therapy and surgical drainage of abscesses, or empyema [2]. Patients often require intensive care support, given the risk of septic emboli [8]. Intensive care unit admission rates can be as high as 60%–70%. Intubation is required in up to 37% of cases [10]. Metronidazole is considered the treatment of choice for Fusobacterium infections [2]. However, in our patient, F. necrophorum was found resistant to flagyl. F. necrophorum isolates show in vitro susceptibility to metronidazole, clindamycin, beta-lactam/beta-lactamase inhibitor combinations, and carbapenems [2]. F. necrophorum is intrinsically resistant to fluoroquinolones, aminoglycosides, and macrolides [2]. Antibiotics should be tailored to the culture results and susceptibility data. Antibiotic therapy should last at least until there has been a definite clinical response and until pulmonary abscesses have resolved as demonstrated by CT scan [14]. Duration of antibiotic therapy is typically in the range of 3–6 weeks but it should be individualized depending on the response to treatment, and an early switch should be made from intravenous to oral antibiotics following clinical improvement [2]. The role of anticoagulation for jugular vein suppurative thrombophlebitis is controversial [2]. Some favor anticoagulation only if there is evidence for extension of thrombus. It is not recommended in the absence of thrombus extension [9]. Anticoagulation should be considered on an individual basis with specialist teams involved if there is evidence of significant extension of thrombus, especially in the presence of persistent, progressive or refractory bacteremia or uncontrolled clinical sepsis [1,2].

Its unique presentation, difficulties encountered in isolating F. necrophorum, and delay of adequate treatment, contribute to the high morbidity and mortality [15]. Early diagnosis of Lemierre syndrome improves outcomes. Even after appropriate treatment, mortality due to Lemierre's syndrome can be high [3]. The location of the primary infection is an important prognostic factor; infection in the oropharyngeal location has been associated with a higher risk of more extended intensive care unit stays due to complications such as respiratory problems [11]. Complications of lemierre's syndrome include disseminated intravascular coagulation, Meningitis, and acute renal failure [11].

In Conclusion, we report a rare case and emphasize the importance of inclusion of Lemierre's disease as a differential diagnosis in young patients who deteriorate in the setting of a sore throat. Even though our patient did not meet the usual diagnostic criteria for Lemierre's syndrome, which includes positive blood cultures and radiological evidence of internal jugular venous thrombophlebitis, her clinical course strongly suggested Lemierre's syndrome. During the management of this case, it became evident that while members of the infectious disease team were familiar with this condition other departments including internal medicine and critical care team were less so. Unless clinicians are aware of the possibility, it may be missed initially, allowing several days to elapse before the diagnosis is made and treatment started.

Disclosure statement

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References

[1] K. De Smet, P.E. Claus, G. Alliet, A. Simpelaere, G. Desmet, Lemierre's syndrome: a case study with a short review of literature, Acta Clin. Belg. (2018) 1–5.
[2] J. Osowicki, S. Kapur, L.K. Phuong, S. Dobson, The long shadow of lemierre's syndrome, J. Infect. 74 (Suppl 1) (2017) S47–S53.
[3] B. Allen, T. Bentley, Lemierre syndrome, StatPearls[Internet], StatPearls Publishing, Treasure Island (FL), 2018.
[4] R.M. Centor, T.P. Atkinson, A.E. Ratliff, et al., The clinical presentation of Fusobacterium-positive and streptococcal-positive pharyngitis in a university health clinic: a cross-sectional study, Ann. Intern. Med. 162 (4) (2015) 241–247.
[5] M.A. Rana, Y. Kumar, A.A. Lashari, A.F. Mady, Human infection with, Case Rep. Infect. Dis. 2017 (2017) 5358095.
[6] M. Sheehan, D. McLoughlin, R. O'Sullivan, Sepsis after tonsillitis/pharyngitis, BMJ Case Rep. 12 (1) (2019).
[7] A. Jensen, L. Hagelskjaer Kristensen, J. Prag, Detection of Fusobacterium necrophorum subsp. funduliforme in tonsillitis in young adults by real-time PCR, Clin. Microbiol. Infect. 13 (7) (2007) 695–701.
[8] T. Whittle, N. Amiraraghi, B. Sarkar, Lemierre's syndrome: a rare cause of sepsis presenting with an absence of throat symptoms, BMJ Case Rep. 2018 (2018).
[9] A. Alperstein, R.M. Fertig, M. Feldman, et al., Septic thrombophlebitis of the internal jugular vein, a case of Lemierre's syndrome, Intractable Rare Dis. Res. 6 (2) (2017) 137–140.
[10] T.J. Stubington, P. James, Lemierre's syndrome: a pain in the neck with far-reaching consequences, BMJ Case Rep. 2018 (2018).
[11] P. Singh, A. Adial, J. Mann, A. Iftikhar, Lemierre's syndrome: cavitary lung disease caused by uncommon bacteria, BMJ Case Rep. 2018 (2018).
[12] A. Jensen, T.M. Hansen, S. Bank, L.H. Kristensen, J. Prag, Fusobacterium necrophorum tonsillitis: an important cause of tonsillitis in adolescents and young adults, Clin. Microbiol. Infect. 21 (3) (2015) 266.e261-263.
[13] R. Golpe, B. Marín, M. Alonso, Lemierre's syndrome (necrobacillosis), Postgrad. Med. J. 75 (881) (1999) 141–144.
[14] L. Hagelskjaer Kristensen, J. Prag, Lemierre's syndrome and other disseminated Fusobacterium necrophorum infections in Denmark: a prospective epidemiological and clinical survey, Eur. J. Clin. Microbiol. Infect. Dis. 27 (9) (2008) 779–789.
[15] D. Creemers-Schild, F. Gronthoud, L. Spanjaard, L.G. Visser, C.N. Brouwer, E.J. Kuijper, Fusobacterium necrophorum, an emerging pathogen of otogenic and paranasal infections? N. Microbes N. Infect. 2 (3) (2014) 52–57.