Septic hip abscess due to *Fusobacterium nucleatum* and *Actinomyces turicensis* in an immunocompetent SARS-CoV-2 positive Patient

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SUMMARY

A 42-year-old man was referred to the Department of Orthopaedic Surgery with a cutaneous fistula over his right greater trochanter with exudate, requiring daily dressings, and signs of systemic infection. The patient tested positive for SARS-CoV-2 after presenting with a temperature of 37.0°C but a history of recent fever associated with chills and sweats. CT of his pelvis showed an enhanced mass in his gluteus maximus as well as gas in the biceps femoris over the underlying hip joint. Tissue biopsy yielded *Fusobacterium nucleatum* and *Actinomyces turicensis*. The patient was successfully treated with amoxicillin/clavulanic acid 875mg/125mg and metronidazole 500mg, twice daily for 2 weeks, followed by 6 weeks of oral antibiotic therapy at his nursing home.

Despite apparently having an asymptomatic SARS-CoV-2 infection the patient was treated appropriately only after isolation of the causative microorganisms from tissue biopsy. A potential COVID-19 infection should not rule patients out from multidisciplinary diagnosis and intervention in healthcare settings during the pandemic.

BACKGROUND

We report a case of an asymptomatic SARS-CoV-2 patient who had a coincidental bacterial infection caused by *Actinomyces turicensis and Fusobacterium nucleatum*, presenting as a right hip abscess. The patient tested positive for SARS-CoV-2, but with no clinical presentation of COVID-19 infection.

Actinomyces spp. are common inhabitants of the gut and genitourinary tract and *Fusobacterium spp.* are anaerobic and Gram-negative microorganisms which are part of the normal flora of the mouth and gastrointestinal tract. *F. nucleatum* is associated with Lemierre's syndrome; a septic thrombophlebitis of the internal jugular vein which usually presents with an exudative tonsillitis, sore throat, dysphagia, and unilateral neck pain. Complications of the disease include bacteraemia with septic abscesses in the lungs, joints, liver, peritoneum, kidneys, and brain. These infections may be associated with inflammatory bowel disease and should be suspected in patients with fistulous connections from the gastrointestinal tract to the pelvis or overlying skin. Treatment should include a prolonged course of intravenous beta-lactam antibiotic plus metronidazole.

CASE PRESENTATION

A 47-year-old man presented to the emergency department in July 2020, with a cutaneous fistula over the right greater trochanter, with exudate requiring daily dressings and signs of systemic infection. Due to congenital oligophrenia the patient was accompanied by his guardian as direct communication was impossible. The patient lived in a nursing home with daily supervision and support. The presentation was complicated by an ongoing Covid-19 outbreak in the nursing home with all patients living there being placed in official quarantine. Nevertheless, the patient was transferred to hospital under enforced Covid-19 prevention measures, including the use of a FFP2 mask during transport and within the hospital.

There was no history of joint aches or myalgias, no recent sexual contact and history was negative for smoking, alcohol intake, or risk factors for acquiried human immunodeficiency virus. Other concomitant diagnoses included a history of pneumonia, dementia and epilepsy.

His body temperature was 37.0 °C with a history of recent fever associated with chills and sweats. Throat examination showed no exudate or erythema. Aural examination was normal and there was no lymphadenopathy, nor was there a heart murmur and abdominal examination was normal. A pruritic cutaneous fistula over his right hip was noted.

INVESTIGATIONS

Laboratory analysis showed an abnormal white blood count of 12.1 G/L, elevated C-reactive protein of 30mg/L, interleukin 6 558.3 pg/ml, haemoglobin 7.7g/dl, fibrinogen 6.1g/l, ferritin 1,858ng/ml and

albumin 26.9g/l. All other laboratory parameters, including urea and electrolytes, were within normal ranges. A SARS-CoV-2 specific polymerase chain reaction (PCR) test confirmed SARS-CoV-2 Infection.

Computed tomography (CT) of the pelvis showed an enhancied mass in the gluteus maximus as well as gas in the biceps femoris over the underlying hip joint (Figure 1-3). Surgery was undertaken on the day of admission, a biopsy was taken with a Gram-stain which revealed Gram-positive cocci and Gram-negative rods.

TREATMENT

The patient was given intravenous ampicillin/sulbactam 875mg/125mg, fosfomycin 8g, and metronidazole 1,500mg every 24h and was transferred postoperatively to the Intermediate Care Unit. Completed microbiological results were available after 5 days and yielded co-infection with *Actinomyces turicensis* and *Fusobacterium nucleatum* sensitive to penicillin. After the patient removed his intravenous catheter after 5 days of IV administration of antibiotics, antibiotic therapy was changes to oral amoxicillin/clavulanate 875mg/125mg and metronidazole 500mg twice daily for 2 weeks, followed by 6 weeks oral antibiotic therapy at his nursing home.

OUTCOME AND FOLLOW-UP

Clinically, the patient improved significantly after 9 days in the hospital, without any evidence of fever, haematuria, or abdominal pain. C-reactive protein decreased to 4.3 mg/L, and the white blood count was 8.84 G/L.

Debridement was undertaken twice, because of delayed healing, at 10 days and 47 days. Biopsies and cultures of the final intervention showed negative bacteriological findings.

At 2-months follow-up, the patient's inflammatory markers returned to normal values, and the infection resolved clinically. He did not suffer any hip sequelae and remains clinical well. A nasopharyngeal swab tested for SARS-CoV-2 using rRT-PCR was negative on day 10.

DISCUSSION

Infection with *F. necrophorum* was first described in 1936 by Lemierre, which he termed post-anginal septicemia.[1] Among the most common clinical presentations is the development of a sore throat in a previously fit, healthy young adult, followed by rigors and the formation of abscesses predominantly in the lungs. Abscesses can occur at other sites including the knee joint, hip joint, liver and submandibular gland.[1] There are only a small numbers of cases with *Fusobacterium spp*. infection which have presented as a cause of pyomyositis. Most interesting is the case of a 34-yr-old man presenting with pyomyositis, in whom *Fusobacterium nucleatum* was isolated from the left quadriceps muscle.[2] Pickering and colleagues have reported bilateral gluteal abscesses in a female patient caused by *Fusobacterium spp*.[1]

The incidence of infection with *Fusobacterium spp.* in the population reported by Afra and colleagues. is 0.55/10,000/year and the majority of the Fusobacterium bacteraemia cultured were *F. nucleatum* (61 %). [3] Fusobacteria are sensitive to antibiotics including penicillin, metronidazole and clindamycin. [4]. Early antibiotic treatment is important because delayed therapy is associated with a higher mortality. [1] There was no history of any abdominal intervention in our patient, nevertheless an intra-abdominal fistula may have been present which may have facilitated the spread of infection because our case is similar to a patient who presented with vertebral osteomyelitis possibly due to intra-abdominal fistula and *F. nucleatum*.[5] Intra-abdominal infection (26%) and active haematologic disorders (18%) were the most commonly reported primary diagnoses at the time of *F. nucleatum* bacteraemia. [3]

Actinomyces spp. s are facultative anaerobic Gram-positive bacilli [6] which are are common inhabitants of the gut and genitourinary tract.[7] These organisms are normally present in healthy individuals, especially in the oral cavity and tonsillar crypts and in the colon, and should be considered as opportunistic pathogens. Abdominopelvic actinomycosis can manifest as fistula, sinus, inflammatory pseudotumour, or abscess formation.[8] High dose intravenous penicillin is the treatment of choice [8] together with surgical debridement of abscesses . [9]

Considering the restricted emergency room visits during the ongoing Covid-19 pandemic, our case highlights the possibility of oversight leading to a delay in treatment for non-Covid-19 conditions such as infections, heart attack and stroke. Due to the current rising numbers of Covid-19 infections globally patients with acute and chronic disease are less likely to attend facilities because of the fear of contracting Covid-19. Conversely, Covid19 services could lead to a lack of routine medical services. These services include

strategies being undertaken in response to the Covid-19 pandemic, leading to the scaling back of certain activities and reduced capabilities of the health system due to extraordinary high demand for the care of patients with Covid-19, together with interruptions of the supply of commodities as a result of insufficient domestic and international supply chains. [10] All these barriers may result in increased morbidity and mortality in the short-term. There is a need to continue to provide adequate health care and to encourage individuals to continue visiting healthcare facilities even in the midst of the Covid-19 pandemic.

LEARNING POINTS/TAKE HOME MESSAGES *3-5 bullet points*

- A positive SARS-CoV-2 PCR result must not influence clinicians to consider not accepting patients for proper diagnosis and treatment of non-Covid-19-infections.
- It is important for clinicians to ensure an appropriate clinical history is taken. Although rare, infections with *Fusobacterium spp.* should be considered in the differential diagnosis of hip abscess.
- The initial treatment of choice is intravenous penicillin and metronidazole.

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FIGURES

Figure 1. Computer tomography imaging of the pelvis demonstrating abscess formation (white arrows) and tissue gas

Figure 2. Computer tomography imaging of the right hip demonstrating abscess formation (white arrows) with fistula in the M. gluteus max.

Figure 3. Computer tomography imaging of the right hip demonstrating abscess formation (white arrows) and tissue gas

PATIENT'S PERSPECTIVE

TIP: *This is an important section and gives the patient/next of kin the opportunity to comment on their experience. This enhances the case report and is strongly encouraged.*