Streptococcus pluranimalium associated with invasive wound infection post-visit to traditional healer: case report

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This case study involves an unusual clinical case of a 46-year-old female of African descent, presenting to a tertiary hospital from her rural clinic with a one-day history of difficulty in breathing after a visit to her traditional healer. COVID-19 PCR was negative and retro viral disease (RVD) status unknown. No wound was noted, but likely present at time of presentation. After an emergency tracheostomy because of sudden deterioration due to airway obstruction, an acute progressive wound was noted with discolouration and epidermolysis of the overlying skin.

The patient was admitted to ICU and demised on day three after presentation due to multiple organ failure secondary to overt sepsis due to multiple organisms, including the newly described pathogen *Streptococcus pluranimalium,* which was grown on blood cultures tests collected on admission and released post-mortem. This organism was possibly introduced through a small superficial wound induced by her traditional healer.

Keywords: *Streptococcus pluranimalium*, soft tissue infection, wound infection, traditional healer, open wound, toxic shock-like syndrome

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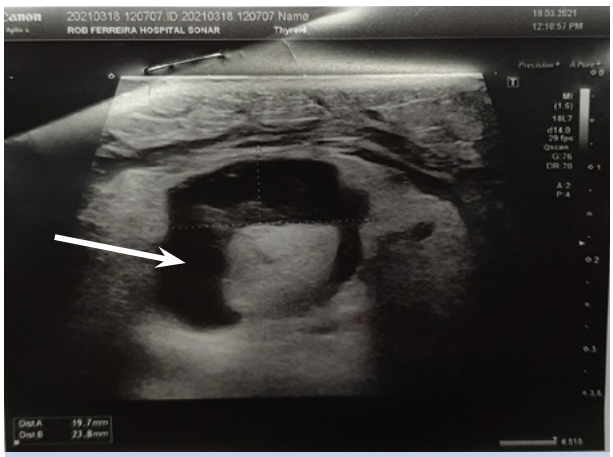
Case report

A 46-year-old female of African descent, with no known comorbidities or allergies, presented to her local clinic, complaining of a one-day history of difficulty in breathing and three-day history of a neck mass. She mentioned that her symptoms started two days after a visit to her traditional healer. The reason for her visit to her traditional healer is unknown. The patient was referred to Rob Ferreira Tertiary Hospital in Mpumalanga, South Africa, from her clinic. Coronavirus disease-2019 polymerase chain reaction (COVID-19 PCR) test result was negative on admission. Retro viral disease (RVD) status was unknown, due to the patient's refusal to be tested. No previous tuberculosis (TB) history or constitutional symptoms such as fever, weight loss, and fatigue were noted by the patient.

On arrival, the patient was hypotensive (blood pressure [BP] 77/66 mmHg and pulse 98 bpm) with diaphoresis, general body weakness and a neck mass visible on the right neck measuring 7 x 10 cm and on the left measuring 4 x 4 cm. Both were tender, hard, firm, not warm to touch, and overlying skin normal without any surrounding hyperaemia. The patient was able to open her mouth normally, and no trismus, airway compromise or intra-oral extension of the neck mass was noted.

The patient responded well to fluid resuscitation, with an increase of her blood pressure noted as 110/82 mmHg, and her vitals at that time were considered acceptable: pulse of 92 bpm, saturation of oxygen 99% on room air, haemo-glucose test (HGT) value of 6.0 mmol/L, temperature of 36.4 ºC and respiratory rate (RR) of 21. Although her vitals were stable, she looked acutely ill and was kept on supplemental oxygen. A broad-spectrum antibiotic (intravenous Augmentin 1.2 g 8 hourly) was started. A neck ultrasound (U/S) was suggestive of an abscess (Figure 1).

The skin overlying the neck mass changed to dark purple a few hours after the patient's arrival. The patient had an emergency tracheostomy performed in casualty due to acute swelling of the vocal cords and sudden deterioration of her clinical status. The patient was too unstable for the booked computed tomography (CT) to be carried out and a decision was made to perform a neck exploration, lymph node biopsy and dissection plus formalisation of tracheostomy in theatre.



U/S report:
Complex fluid collection on left side of neck, measuring 20 x 24 mm. Thick echoic fluid seen in collection. Large lymph nodes seen on right side of neck, not associated with severe swelling. Suspect there might be more pathology present that is not demonstrated with sonar.
Conclusion: Left-sided complex fluid collection, highly suspicious of abscess, with right-sided lymph nodes, not in keeping with severe swelling.

Figure 1: Ultrasound image of neck lesion and report; arrow indicating fluid collection

Figures 2A, 2B and 2C: Wounds extending from the neck, right upper chest and breast, with ruptured blisters with underlying non-blanched dark red tissue

No abscess or fluid collection was found intraoperatively, only massively enlarged cervical lymph nodes. A large mass was resected from the patient's right submandibular area. A 20 x 10 cm bruised area with ruptured blisters was documented extending over the right upper breast, upper chest and neck area (Figure 2A). Over the left breast area, a 5 x 5 cm wound with similar characteristics was noted (Figure 2B) and similar features were also seen on the neck (Figure 2C).

Postoperatively, the patient was admitted to the intensive care unit (ICU). The patient's clinical status subsequently deteriorated and she developed anuria secondary to acute kidney injury, refractory metabolic acidosis, watery stool and temperature spikes. The patient further deteriorated on a maximum dose adrenalin (0.6 ug/kg/min) and developed multiorgan failure and demised in ICU due to overt sepsis. *Streptococcus pluranimalium* and *Streptococcus pyogenes* were cultured from blood post-mortem. Table I demonstrates other noteworthy investigations performed and the results thereof, done during the short stay of the patient.

The histology of the submitted neck mass identified a right submandibular gland, with acute suppurative sialadenitis occurring on a background of chronic sialadenitis. No specific aetiology was identified, after ruling out malignancy.

Table I: Noteworthy investigations performed and results

Test	Results
Urine MC&S	*Escherichia coli* Sensitive to augmentin, nitrofur, cephalosporin, gentamicin
Wound swab	*Streptococcus pyogenes* Sensitive to penicillin, ampicillin, macrolides
Blood culture	*Streptococcus pyogenes* Sensitive to penicillin/ampicillin *Streptococcus pluranimalium* Resistant to penicillin/ampicillin
Stool MC&S	*Streptococcus pyogenes* Sensitive to penicillin/ampicillin and macrolides

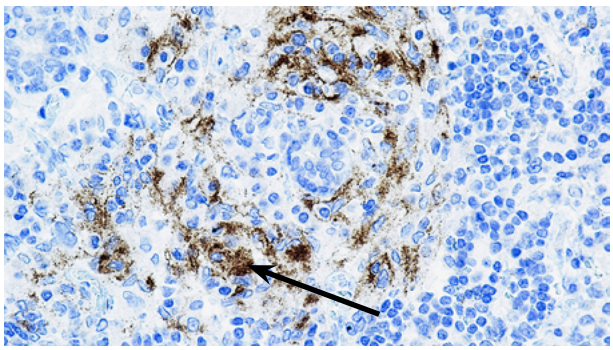


Figure 3: Histology report: cutaneous lymphoid hyperplasia (CLH)-positive staining of follicles with HIV-1 protein p24 (arrow) indicative of HIV

The microbiologist further suggested that the patient may have been immunocompromised due to the p24 reactivity (Figure 3) detected in the lymph nodes, which was suggestive of HIV.

Discussion

As per the World Health Organization, traditional medicine includes: diverse health practices, approaches, knowledge and beliefs incorporating plant, animal and/or mineral-based medicines [muthi], spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness.[1] The animal products are especially of bovine origin including skin, blood, and bones; this species is one of the hosts of *Streptococcus pluranimalium*.[2] Muthi is introduced into the client via many routes for client healing, including through skin cuts and application of the muthi on the inflicted skin cuts or by drinking of the traditional medicine.[1]

S. pluranimalium, first described by Devriese et al. in 1999, is a Gram-positive streptococcal bacterium species that form in groups, small chains and pairs.[3] Tests run in the cited 1999 study clearly indicate that *S. pluranimalium* is a new species in the genus *Streptococcus*.[3] Unlike most other streptococcal species, which only have one or a few

phylogenetically-related animal hosts, *Streptococcus pluranimalium* is found in a wide variety of animal hosts (Latin *pluris*: many and *animalium*: animals). Not only are the host species diverse, but the location occupied in the hosts varies to a much greater extent than other streptococcal species: in mammals it includes the genital tract, tonsils and udder as well as skin, respiratory tract and crop (birds).[2,3] *S. pluranimalium* mainly causes infection in bovine and avian species,[2] including meningoventriculitis in a neonatal calf, as found in one study.[4] To date, there is limited information about *S. pluranimalium* and a limited number of cases are reported in the literature worldwide. The reported patients' clinical manifestations include brain abscesses from the organism,[5-7] endocarditis[2,8] and septicaemia,[9] the latter being the cause of death in this case.

Streptococcus pyogenes, also known as group A beta-haemolytic streptococcus (BHS), causes a syndrome of fever, skin rash, desquamating skin wound, hypotension, and multiorgan-system dysfunction called streptococcal toxic shock-like syndrome (TSLS) and has a rapid fulminant course.[10] This group of bacteria can enter the tissues and blood circulation through a break in the skin epithelial barrier or penetrate through intact mucus membranes.[11] The reported patient most likely developed streptococcal TSLS, which is a rare condition with no specific demographic patient profile worldwide[11] on a background of immunosuppression, as was suggested in the histology in the present case.

Streptococcus pluranimalium is a relatively unknown but clinically significant new streptococcal species causing infection in humans, and thus the clinician should take note of the most likely complications resulting from infection.[12] In this case *S. pluranimalium* and *S. pyogenes* co-infection caused bacteraemia and death of the patient, with the organisms possibly gaining entry through a breakage in the skin epithelium, inflicted by a traditional healer. The histology result suggested that the patient was HIV-infected and therefore immune-compromised, which may have led to a more rapid progression of the infection.

Thus, this case demonstrates that it is important to consider entry of foreign pathogens through initial small and easily missed wounds; this was possibly the case with this patient, since it was not noted on the initial patient assessment. The wound quickly progressed to be clinically significant and could have even been used as a clue to the underlying pathogen, since the detection of uncommon human pathogens in challenging clinical scenarios requires an early and accurate typification.

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Conflict of interest

The author declares no conflict of interests.

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Ethical approval

Consent was given by the medical manager of Rob Ferreira Hospital for use of the patient's data since the family of the patient could not be contacted.

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