



Case report

Pseudomonas aeruginosa as a culprit of cervical necrotizing fasciitis: A case report

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ABSTRACT

Introduction and importance: Necrotizing fasciitis is usually a polymicrobial infection and odontogenic source is usually the foci for infection in the neck region. Cervical necrotizing fasciitis due to *Pseudomonas* is a rare and potentially fatal complication in diabetic patients. The study highlights the importance of early intervention to improve the outcome of the patient.

Case presentation: We report a case of a 48-year female who presented with neck pain for 10 days. On further investigations, she had diabetic ketoacidosis, and a culture of the wound showed *Pseudomonas*. With appropriate antibiotics and surgical intervention, her condition gradually improved.

Clinical discussion: Necrotizing fasciitis in the neck region with *Pseudomonas* without odontogenic infections is a rare occurrence. Early medical and surgical intervention leads to a better outcome. The location of the infection and its extensions can affect the prognosis.

Conclusion: Physicians should be aware of cervical necrotizing fasciitis as a complication in diabetic ketoacidosis and install early treatment to improve survivability and the outcome.

1. Introduction

The extensive necrosis of the subcutaneous tissues and underlying fascia is the hallmark of necrotizing fasciitis (NF), a rare infection of the soft tissues that spreads quickly. It is caused by pathogenic bacteria that can produce toxins and even sepsis, a condition that, if left untreated, has a significant death and morbidity rate [1]. The common finding in the causation of necrotizing fasciitis is polymicrobial and if a single organism has to be noted out then it is group A *Streptococcus* [2]. Diabetes, cancer, alcohol misuse, and chronic liver and renal disease are considered common predisposing risk factors. Initial symptoms include pain, fever, discomfort, swelling, and erythema, resembling cellulitis or erysipelas [3]. Diagnosis is essentially clinically based. The infected areas are divided basically into the outer zone of erythema, the middle one with purple, tender tissue, and the central dark zone, necrotic material that eventually ulcerates showing the necrotic fascia [2].

Computed tomography (CT) is used as the choice of imaging modality to look for extent and progression [4]. Hemorrhagic bullae, aberrant vital signs, and/or discomfort that first manifests out of proportion to the local findings are defining characteristics [1]. However, it seldom affects the head and neck, and when it does, it is frequently accompanied by pharyngeal abscesses, insect bites, neck surgery, and osteoradionecrosis [5]. Cervicofacial necrotizing fasciitis is frequently a complication of an underlying primary infection or injury, such as a laceration, or scratch, following a tooth infection or extraction, although few have been recorded without any known etiology [6].

Herein, we report a case of NF of the neck that developed in a diabetic patient without odontogenic cause or communications to the oral cavity. The study also intends to highlight the importance of early intervention to improve the outcome of the patient. The case study has been prepared as per SCARE guidelines 2020 [7].

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2. Presentation of case

A 48-year-old postmenopausal female from Lalitpur, presented with lateral neck pain for 10 days. The pain was gradual onset non-radiating with no aggravating and relieving factors. There was no associated fever, throat pain, fever, or trauma. She is a diabetic and has regular oral hypoglycemic medication and had skipped the medication for the last four days. Her other co-morbid conditions include well-controlled hypothyroidism and hypertension. She works at a private firm and has three children. She drinks alcohol socially. Her regular medication includes thyroxine 87.5 microgram daily, liraglutide 5 mg daily, repaglinide 1 mg thrice daily, aspirin 75 mg daily, and atorvastatin 10 mg daily.

On examinations, she was a woman with a normal body mass index (BMI) who was conscious, calm, cooperative, and well-oriented to time, place, and person. Her vitals were stable. General examinations along with systemic examinations were non-revealing. On neck examination, there was a localized ill-defined area of around 3×2 cm area to the left side of the neck as shown in Fig. 1. The area was tender with a local rise in temperature and crepitations felt. Distal neurovascular status was intact and the corresponding draining lymph nodes were palpable.

The investigations report showed a total leukocyte count of 30,330 with 87 % neutrophils with a hemoglobin level of 12.5 g/dl and platelets count of 166,000/ml. Her random blood sugar level was 502 mg/dl. Serum urea and creatinine levels were 63 and 3.5 respectively with normal serum sodium and potassium levels. Urine examination revealed sugar +++, protein +, and acetone positive. Her serum protein and albumin levels were 6.4 and 3.3 g/dl respectively. Arterial blood gas analysis revealed a pH of 7.067 with pCO₂ of 8.7, pO₂ of 77 % in room air, and serum bicarbonate level of 12.6.

Diagnosis of diabetic ketoacidosis secondary to neck abscess was made. She was admitted to the medical Intensive Care Unit (ICU) and immediate therapy was begun with insulin and intravenous (IV) fluids. For infection prevention and control, piperacillin and tazobactam were started empirically.

Ultrasonography neck was performed and showed a large ill-defined mass on the left side of the neck with posterior acoustic shadow separate from the left parotid and submandibular glands of size 3×6 cm.

The following morning of the admission day, the patient underwent neck exploration for thorough debridement of the wound under general anesthesia. The culture and sensitivity of the wound swab showed pseudomonas aeruginosa sensitive to amikacin and ciprofloxacin. Her medication was changed to intravenous ciprofloxacin 200 mg twice daily and amikacin 500 mg thrice daily. Other regular treatment continued.

Histopathology report revealed fragments of fibrofatty tissue with marked inflammatory cells infiltrate comprising neutrophils, histiocytes, and focal necrosis with crushed inflammatory cell profiles. These features were suggestive of necrotizing fasciitis. Daily dressing of the neck was performed. The patient stayed for the next week and was showing good signs of recovery. She tolerated oral feeding.

One week later her lab reports showed normal hematological parameters, normal renal function and her blood sugar was 166 mg/dl. The wound showed good signs of healing. Appropriate anti-hyperglycemic medications were prescribed and she was advised for regular dressing and blood sugar monitoring. With the advice, the patient was discharged home and in subsequent visits, she was doing well both in terms of her



Fig. 1. Lesion on lateral side of neck.

wound and blood sugar.

3. Discussion

Though necrotizing fasciitis can occur anywhere in the body, the most common sites are upper and lower limb extremities, abdominal wall, and perineum [1]. And it less frequently occurs in the head and neck region. Even within it most cases of head and neck necrotizing fasciitis are odontogenic in origin and other causes listed were also associated with direct communication with the oral cavity [8]. However in our case, there was neither dental infection nor any such communications to the oral cavity. As mentioned earlier cervical necrotizing fasciitis is associated with significant morbidity and mortality. Due to the nature of this disease condition, early and aggressive medical and surgical care with intensive patient support is vital for the prognosis of the disease [9]. The mainstay of treatment is surgery for necrotizing fasciitis. The literature review showed that on average the time of admission to surgery was 25 h in survivors in comparison to 90 h in non-survivors [10]. Our patient also was taken for surgical debridement within 24 h of admission, which also favors survival following early surgical intervention. A case series by Toro et al. had six cases of cervical necrotizing fasciitis, all were of odontogenic origin and the organisms isolated were mixed flora of Prevotella, Peptostreptococcus, and coagulase-negative Staphylococcus [10]. We were able to commence broad-spectrum antibiotics which later came out to be sensitive to the cultured organism. So, these synergistic appropriate medical and early surgical interventions provided a good prognosis for our patient. Hyperbaric oxygen has been suggested by the literature as an adjunct [2] but our patient didn't require it. Shaariyah et al. reported three cases of head and neck necrotizing fasciitis in which two survived, but the third patient succumbed to death; the author suggested that early treatment is vital and infection in the airway can prove to be fatal despite aggressive surgical treatment [11]. The potential complications due to progressing necrotizing fasciitis are airway obstruction, arterial occlusion, jugular vein thrombosis, mediastinitis, and pleural as well as pericardial effusions. Location and extension of the disease also influence the outcome. In the case of cervical necrotizing fasciitis, mediastinitis along with comorbid conditions and toxic shock syndrome also increase mortality [12]. Our patient though in a state of diabetic ketoacidosis had a good outcome. Computed tomography can aid in early recognition and post-debridement assessment of the condition [13]. Though computed tomography was not used for imaging; however, the initiation of treatment was not delayed and an easily available ultrasonogram was used, which along with the clinical presentation and later the histopathological analysis confirmed the diagnosis.

4. Conclusion

Despite the rarity of head and neck necrotizing fasciitis, physicians should be aware of the associated clinical features. Early and aggressive antibiotics, electrolyte correction, and surgical debridement in an intensive care unit are key to providing a good prognosis to the patient.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Not applicable.

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Author contribution

Author 1: Concept of study, case data collection, revising, and editing the manuscript.

Author 2: Literature review, revising, and editing the manuscript.

Author 3: Literature review, revising, and editing the rough draft into the final manuscript.

Author 4: Contributed to writing the manuscript draft, revising, and editing the manuscript.

Author 5: Literature review, revising, and editing the manuscript.

Author 6: Literature review, revising, and editing the manuscript.

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