Periapical abscess progressing to parotitis and descending necrotizing mediastinitis with thoracic abscess in a patient on etanercept: A case report

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ABSTRACT

Patients on Type 2 biologics, such as etanercept, are at increased risk for aggressive infections. This may be further exacerbated by concomitant systemic corticosteroid use or comorbidities such as diabetes. We report a case of a patient with rheumatoid arthritis on etanercept with poor dentition and periodontal disease, who developed parotitis with peritonsillar abscess and descending necrotizing mediastinitis (DNM) with periaortic abscess arising from a periapical abscess. Morbidity and mortality of such infections is high. A multimodal assessment and treatment team is required to optimize patient survival and outcomes. This manuscript discusses the diagnostic and treatment challenges of DNM of immunocompromised patients.

Key Words: Etanercept, mediastinitis, parotitis, rheumatoid arthritis

INTRODUCTION

Oropharyngeal infections are frequently evaluated in the emergency department (ED), however such illnesses rarely progress to a life-threatening state. Infrequently, odontogenic, sinus, or soft-tissue infections may extend to the mediastinum through posterior fascial planes, causing descending necrotizing mediastinitis (DNM). The mortality associated with DNM may be as high as 40%. Early recognition, treatment with broad-spectrum antibiotics, and surgical debridement are crucial to optimize outcomes and survival.

Type 2 biologics, such as etanercept (Amgen Inc., Thousand Oaks, USA), are immunomodulatory medications commonly prescribed for immune-mediated illnesses such as rheumatoid arthritis (RA). Etanercept inhibits tissue necrosis factor-alpha, which functions to signal for localized inflammation on most nucleated cells.¹ Patients on Type 2 biologics may be at risk for development and progression of bacterial and fungal infections.² Moreover, typical infectious signs and symptoms may be masked, delayed, or suppressed, further challenging diagnosis and management.³ The following case highlights this confluence of confounding variables in a patient presenting with a benign appearing parotitis that progressed to DNM with para-aortic abscess.

CASE DISCUSSION

A 72-year-old male presented to the ED with a complaint of gradual-onset left anterior neck pain and intermittent odynophagia of 1-week duration. His medical history was significant for RA treated with etanercept, hypertension, and Type 2 diabetes mellitus. He was evaluated at an

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outside facility 7 days prior to ED presentation. At that time, he was diagnosed with saliadenitis and prescribed an antibiotic (he could not recall name), and a 5-day course of prednisone 10 mg daily. However, he did not take the prescribed regimen due to progressive odynophagia and dysgeusia, followed by mild trismus. He reported no fever, malaise, arthralgias, respiratory symptoms, chest pain, or abdominal symptoms. He similarly denied injury or trauma.

ED vital signs were normal including blood pressure (136/70 mmHg), heart rate (64 bpm; on a beta-blocker), respiratory rate (16 rpm), oxygen saturation (94% on room air), and temperature (98.4°F). Physical examination was notable for mild facial swelling and tenderness in the region of the right parotid gland without palpable stone or expulsion of purulent material from the parotid duct. The tenderness extended down to his right anterior neck. Bilateral anterior cervical lymphadenopathy was present. He could open his mouth without difficulty, phonation was normal, and halitosis was noted. Oral mucosa was normal without exudate, peritonsillar swelling, uvula displacement, or pooling of secretions. Significant dental decay with periodontal disease was observed. Cardiac and respiratory exams were normal.

Given the initial concern for retropharyngeal or peritonsillar abscess, laboratory investigations were ordered as shown in Table 1. The complete blood count was notable for a leukocytosis with a left shift, without bandemia. Serum chemistries were notable for a metabolic acidosis. A computed tomography (CT) scan of the neck with intravenous contrast identified right-sided parotitis with a peritonsillar abscess extending into the bilateral ventral soft tissues exerting mass effect on the supraglottic airway (narrowed to 13 mm) and deep extension into the mediastinum to the level of the aortic arch. These findings were consistent with Type 1 DNM [Figures 1 through 4]. Broad-spectrum antibiotic coverage with ampicillin-sulbactam (3 g every 6 h) and vancomycin (1250 mg every 12 h) was initiated for initial coverage. Emergent otolaryngology and thoracic surgery consults were obtained in the ED, and the patient was taken for surgical drainage and washout 3 h and 24 min after ED triage. Operative cultures grew Streptococcus viridans (two morphotypes) and Streptococcus anginosus. After 36 h of broad-spectrum antibiotics, the regimen was narrowed to penicillin G continuous infusion (24 million units per 24 h) based on the recommendation of the attending infectious disease consultant. This regimen was continued until the patient’s discharge on hospital day 4. He was discharged on ceftriaxone (2 g every 24 h) to complete a 3-week course. Etanercept was discontinued at discharge with further RA treatment decisions to be made on an outpatient basis. During the hospital course, the patient was evaluated by a dentist, whose impression was that the original infectious nidus may have been a periapical abscess resulting from his poor dentition and periodontal disease. He was prescribed oral chlorhexidine treatment and instructed to follow-up in dental clinic. Regular follow-up was performed in the clinic over the next 2 months, and intravenous antibiotic therapy was successfully completed without further complication; the patient had complete recovery.

**DISCUSSION**

DNM is a severe and potentially life-threatening infection involving the neck and thorax. Mortality rates of DNM may be as high as 40%[3,4] and are most commonly due to complications of sepsis and multiorgan failure in the setting of delayed diagnosis and treatment due to the vague nature of presentations.[3] DNM is defined as: (1) clinical manifestations of severe infection; (2) demonstration of characteristic radiographic findings; (3)

| Table 1: Initial emergency department laboratory studies |
|-----------------------------------|
| Parameter                  | Result                     |
| White blood cells, k/uL        | 14.8                       |
| Neutrophil, %                  | 94                         |
| Neutrophil, absolute, k/uL     | 13.80                      |
| Bands                          | None                       |
| Sodium, mEq/L                  | 135                        |
| Potassium, mEq/L               | 4.6                        |
| Chloride, mEq/L                | 103                        |
| Bicarbonate, mEq/L             | 18                         |
| Anion gap, mEq/L               | 14                         |
| Glucose, mg/dL                 | 227                        |
| BUN, mg/dL                     | 14                         |
| Creatinine, mg/dL              | 0.92                       |
| Lactic acid, mmol/L            | 1.2                        |
| ED blood culture 1             | No growth for 5 days       |
| ED blood culture 2             | No growth for 5 days       |
| Operative culture              | Streptococcus viridans     |
|                                | (two morphotypes) and Streptococcus anginosus |

WBC: White blood cell, BUN: Blood urea nitrogen, ED: Emergency department

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Figure 1: Computed tomography of the neck soft tissues, transverse view, showing parotitis and abscess collection on the right side with effacement/compression of the airway toward the left.
anterior mediastinum) and Type II B (lower posterior mediastinum). Sources of infection are most commonly dental, pharyngeal, cervical, and other head or neck infections. Most cases (58%) are due to polymicrobial infections involving oropharyngeal flora predominated by Gram-positive species such as *Streptococcus* and anaerobic bacteria. Less frequently, Gram-negative *Enterobacteriaceae* are involved, usually in patients with diabetes and other immunocompromising states. This patient’s source of infection was oropharyngeal flora likely secondary to periodontal disease causing a peritonsillar abscess in an immunocompromised patient, which extended to the superior mediastinum.

RA patients are at increased risk for deep space neck infections such as DNM (incidence 2.9%; 57.27/100,000 person-years), as compared to 1.4% (20.88/100,000 person-years) among non-RA patients. RA cohorts have also been observed to have higher morbidity and mortality with such infections when compared to the general population (hazard ratio 2.8). This is thought to be due to immunosuppressive therapeutics for RA, which may suppress or mask symptoms, thereby allowing infections to progress, which may result in patients presenting with more advanced illness.

DNM treatment requires a multidisciplinary approach. Prompt recognition of signs and symptoms with expedited laboratory and radiologic studies, broad-spectrum antibiotics that cover both Gram-positive and negative bacteria (especially in diabetics), and appropriate consultation should be a priority. A CT scan with intravenous contrast of the neck and chest is the preferred rapid diagnostic modality, followed by expedited aggressive surgical debridement.

**CONCLUSION**

Clinicians should be mindful that patients on Type 2 biologics, such as etanercept, are at increased risk for aggressive infections. This may be further exacerbated by concomitant systemic corticosteroid use and comorbidities such as diabetes mellitus. Even relatively mild infections such as a periapical abscess can progress rapidly and aggressively to peritonsillar abscess or DNM with abscess, as this case illustrates. Morbidity and mortality of such infections is high. A multimodal assessment and treatment team is required to optimize patient survival and outcomes.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that their names and initials will not be published, and documentation of necrotizing mediastinal infection in operation; and (4) establishment of oropharyngeal/cervical infection with DNM relationship. Type I DNM involves tissues above the carina, whereas Type II DNM involves tissues inferior to the tracheal bifurcation. Type II infections are further divided into Type II A (lower
due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest
There are no conflicts of interest.

Ethical conduct of research statement
This case report did not require approval by the Institutional Review Board / Ethics Committee. The authors followed applicable EQUATOR Network (http://www.equator-network.org/) guidelines, specifically the CARE guideline, during the conduct of this research project.

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