Management of 122 Cases of Deep Neck Space Infections and Cervical Necrotizing Fasciitis

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INTRODUCTION & OBJECTIVES
Despite the increasing use of antibiotics and improved diagnostic modalities, deep neck space infections (DNSI) continue to challenge the field of otolaryngology. A typical upper respiratory tract or dental infection can evolve into a mediastinal abscess or cervical necrotizing fasciitis (CNF), both of which are associated with significant mortality as high as 40%. DNSI and CNF are severe infections, and management decisions must be made expeditiously after initial presentation in order to avoid progression of infection and complications.

METHODS
A retrospective chart review of patients diagnosed with DNSI and/or CNF between February 2001 and December 2006 at Hennepin County Medical Center (HCMC), Minneapolis, Minnesota was conducted using ICD codes 682.0 (cellulitis and abscess of the face), 682.1 (cellulitis of the neck), 682.2 (abscess or oral soft tissue, Ludwig’s angina), 729.4 (fasciitis, unspecified), 728.86 (necrotizing fasciitis) and 519.2 (mediastinitis). Cases without objective evidence of deep cervical anatomy involvement were excluded. Peritonsillar abscess, localized buccal abscess, and isolated facial infection were also eliminated.

RESULTS
There were 75 male and 47 female patients with the predominant age range of 21 to 50 years old (75%) (Figure 1). There were 112 DNSI and 10 CNF cases. Etiology was primarily odontogenic (Table 1 and 2). Multiple space abscesses were identified in 16 patients while 64 had single space infections (Table 3). Subcutaneous abscess (52.5%) and diabetes mellitus (8.2%) were identified as common comorbidities (Table 4). Patients with comorbidities had a prolonged hospitalization (4.7 ± 5.1 days) compared to others (3.2 ± 2.2 day, p = 0.044). Ninety-seven patients underwent radiological imaging which primarily consisted of a CT scan. Eleven patients received orthogonothrombines to characterize dental abscesses.

Surgical treatment in the operating room was performed in 97 patients (incision and drainage = 87, debridement for CNF = 10). Twelve patients received bedside incision and drainage while the rest of the population was managed conservatively with only antibiotics. All patients received antibiotics on admission with clindamycin used 46% of the time. The adjunctive use of hyperbaric oxygen (HBO) therapy was also examined. The objective of this study was to review our experience in treating DNSI and CNF. The adjunctive use of hyperbaric oxygen (HBO) therapy was also examined.

DISCUSSION
Our results suggest that DNSI may affect all age groups, but has a male predominance, whereas CNF is primarily seen in adults with equal frequency in male and female patients. This is consistent with what is reported in the literature. Most infections were odontogenic in origin, which is also a predominant reason for hospitalization. Low socioeconomic status, coupled with a high use of alcohol and tobacco, contribute to poor odontogenic hygiene which contributes to odontogenic infections, and consequently, neck infections. Patients with associated comorbidities had prolonged hospital stays.

In this study, patients below age 10 were more likely to develop DNSI in the posterior neck spaces with *Staphylococcus aureus* from trauma, necrotic lymph nodes and upper respiratory tract infections. In contrast, patients older than 10 years of age primarily had odontogenic infections due to *Streptococcus sp.*, gram negative and anaerobic organisms that involved the submandibular space. The microbiology of DNSI in adults is similar to that reported by other studies with leading organisms being *Streptococcus* and *Staphylococcus sp.* Anaerobes and occasional parasites play a lesser but significant role. However, patients who abused and/or are dependent on alcohol and tobacco were responsible for 55.6% of anaerobic DNSI in this study. Antimicrobial coverage for such individuals must include coverage for anaerobic bacteria.

There are no specific signs or symptoms that identify patients with severe head and neck infections (Table 5), thus adjunctive tests may be helpful. CT scans can provide information regarding origin, location, type of infection and extent of spread into mediastinum. It is the radiological evaluation of choice for both DNSI and CNF. It has been shown to have a sensitivity of approximately 95% for DNSI. Mediastinal involvement in these infections has an average mortality rate of 40%, necessitating the need to ideally prevent this complication, or at a minimum identify it early. In four patients in this study, a CT scan was instrumental in diagnosing mediastinal involvement.

The successful treatment of DNSI and CNF requires a high index of suspicion to facilitate prompt diagnosis. Both types of infection require prompt antimicrobial chemotherapy as well as surgical drainage or debridement. CNF, specifically, requires debridement of any and all necrotic tissue, and this may require repeated operative procedures. Our management style was aggressive with most patients being treated with a combination of surgery, often within 24 hours, and broad spectrum antibiotics. The 25 patients treated conservatively were limited to those patients with small, contained infections.

The majority (90%) of patients with CNF were treated with HBO therapy in addition to surgical debridement. Prompt and aggressive intervention was likely instrumental in limiting the spread of the disease. The majority of patients treated conservatively were limited to those patients with small, contained infections.

REFERENCES


