

Controversies in the Management of Oral and Maxillofacial Infections

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KEYWORDS

- Infection • Deep neck space infection • Abscess • Cellulitis • Biofilm • Head and neck infection
- Antibiotics • Imaging

KEY POINTS

- Although the general principles of infection management have not changed, there have been modifications in the timing of treatment sequences as well as treatment techniques.
- Numerous prospective and retrospective studies have been performed confirming the utility of computed tomography (CT) scanning in the diagnosis of these infections, as well as corroborating the capricious nature of clinical examinations.
- Contrast-enhanced CT is the most practical imaging modality for severe oral and maxillofacial infections, but ultrasound also can be used in selected circumstances.
- Surgical drainage should focus on areas of defined collections whereas cellulitis and less severe infections can often be treated medically using appropriately selected antibiotics.

INTRODUCTION

The management and treatment of odontogenic infection, and its frequent extension into the head and neck, remains an important segment of oral and maxillofacial surgical practice. This area of maxillofacial expertise, historically and widely recognized by the medical community, is essential to the hospital referral system.

Although the general principles of infection management have not changed, there have been modifications in the timing of treatment sequences as well as treatment techniques, influenced by the development of diagnostic methods and advances in bacterial genetics and antibiotic usage. Thus, a review of treatment considerations and controversies is warranted, and is the purpose of this article. The following issues of diagnosis and treatment are explained and discussed.

TOPICS OF CONTROVERSY

- Diagnosis
 - Clinical examination
 - Use of computed tomography (CT)
 - Use of MRI
 - Use of ultrasound
 - Correlation with presence of drainable collection
- Treatment
 - Role of conservative management
 - Interventional radiology-guided drainage
 - Microbiota and antibiotic selection
 - Antibiotic resistance
 - Role of biofilms
 - Irrigation
 - Use of steroids
 - Airway management
 - Early versus late tracheostomy

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IS CONTRAST-ENHANCED COMPUTED TOMOGRAPHY IMAGING MORE ACCURATE THAN CLINICAL EXAMINATION ALONE?

In relatively recent decades (1930s–1950s) deep neck infection was diagnosed by clinical presentation, physical examination, and surgical exploration, with, or more often without, plain film imaging.¹ The introduction of CT has provided an excellent modality for the diagnosis of potential life-threatening infections.^{1,2} Nonetheless, there has been debate in the literature regarding the value of CT scanning.^{1–5}

Proponents of physical examination as the sole diagnostic criterion have argued that a trained clinician can accurately distinguish between a drainable collection and cellulitis, and the time required to obtain a CT scan may result in an unnecessary and harmful delay to timely treatment. Radiographic criteria for the identification of abscess in a contrast-enhanced CT include “discrete low attenuation areas within a soft tissue inflammatory mass with an enhancing peripheral rim.” Most investigators state that homogeneous hypodensities without rim enhancement are less likely to correlate with discrete areas that require drainage¹ (Fig. 1).

Numerous prospective and retrospective studies have been performed confirming the utility of CT scanning in the diagnosis of these infections, as well as corroborating the capricious nature of clinical examinations.¹ Although individual study

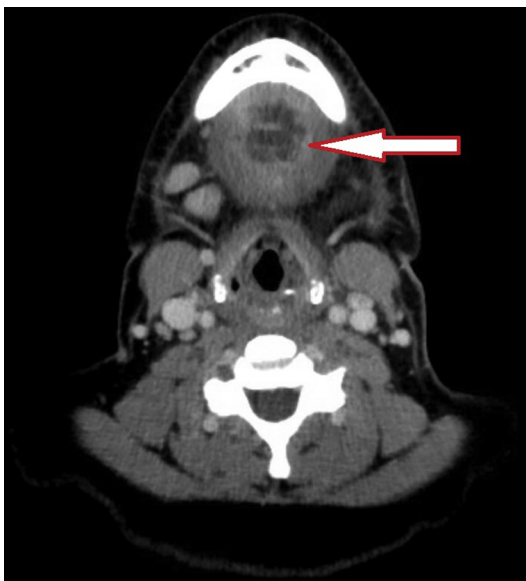


Fig. 1. A representative contrast-enhanced CT image, demonstrating the classic appearance of a hypodensity with peripheral rim enhancement (arrow). Such lesions have a strong correlation with a drainable abscess cavity when surgically accessed.

results vary, the majority opinion suggests that the sensitivity and specificity of a contrast-enhanced CT scan is far superior to stand-alone clinical examination. One commonly cited prospective study suggests the accuracy of contrast CT in the detection of a drainable fluid collection is 77% accurate compared with 63% for physical examination only.¹ When clinical examination and CT scan were combined, the accuracy improved to 89%, thus confirming the utility of assessing multiple diagnostic modalities in concert.¹

The authors believe that despite early controversy, they and the literature clearly support the use of contrast-enhanced CT imaging in the diagnostics of deep neck space infection. Our practice experience and guidelines rely on ready access to adequate imaging and that diagnostic imaging is indicated in most instances, unless there is possibility or probability of an impending airway blockage.

IS THERE A ROLE FOR THE USE OF MRI IN THE DIAGNOSIS OF DEEP NECK SPACE INFECTIONS?

Having already established the utility of imaging to aid in the diagnosis of deep neck infections, one must now ask the question “Which of the many available imaging modalities is most useful?” MRI has several potentially beneficial advantages over CT imaging. MRI has a superb ability to differentiate soft tissue pathology from surrounding tissues and can often differentiate soft tissue structures not readily discerned on CT imaging. MRI is also said to result in less image degradation from dental restorations as well as ossified structures.⁶ Furthermore, by not using iodinated gadolinium compounds for contrast enhancement, MRI may carry an additional advantage for patients who have impaired renal function or have a history of reactions to iodinated contrast agents.⁷

The primary disadvantages of MRI relate to the prolonged acquisition time and cost. Modern CT scanners are capable of acquiring imaging within minutes, whereas MR scans are far more prolonged. This increases the chances of motion artifacts, decompensation of unstable patients, and may be a contraindication for patients suffering from severe anxiety. Furthermore, implants with ferromagnetic properties may be displaced during image acquisition, resulting in iatrogenic harm. These properties make MRI impractical for most typical head and neck infections, with CT imaging providing adequate diagnostic information.⁷

However, there are cases in which MRI modalities offer a distinct advantage. MRI is superior to CT to demonstrate bone marrow alterations,

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