

Tonsillitis to mediastinitis

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Abstract

Parapharyngeal abscess secondary to quinsy is a well understood complication; however, its incidence has significantly declined following early use of effective antibiotics. Tracking of infection from the parapharyngeal space through the anatomical planes to cause mediastinitis has a significant mortality rate and requires early detection and aggressive management. A case of quinsy leading to mediastinitis, pericarditis and pleural effusions is presented. It highlights the potentially life-threatening complications of a commonly encountered ENT problem.

Key words: Peritonsillar Abscess; Mediastinitis; Neck

Case report

A 48-year-old demolition worker was referred by his general practitioner (GP) with a three-day history of sore throat, dysphagia, cervical swelling and fever. This had not responded to 24 hours of oral amoxicillin. The patient had experienced left-sided otalgia one week prior to admission, which had resolved. He was otherwise fit and well with no significant past medical or family history.

On examination, the patient had significant, firm swelling of the whole neck, worse on the left than the right. This had caused loss of definition of his jaw on the left and he was slightly tender in the left submandibular and submental region. The overlying skin was of normal appearance. The patient had some trismus and fullness of the left side of the soft palate, with displacement of the uvula to the right. Both tonsils appeared inflamed and there were three small openings in the region of the left tonsil actively discharging pus into the oral cavity. Systemically, the patient's temperature was 37.9°C and his pulse was 110 bpm. His cardiorespiratory examination was otherwise unremarkable. There was no other lymphadenopathy and no respiratory compromise.

The left-sided peritonsillar collection was incised and drained under topical anaesthesia and the patient was commenced on intravenous (IV) Augmentin and metronidazole. The blood cultures and intra-oral pus swab taken on admission grew *Streptococcus salivarius* sensitive to the chosen antibiotics. Forty-eight hours later, the intra-oral swelling had responded well but the neck swelling had not improved, and a computed tomography (CT) scan of the neck was performed (Figure 1). This revealed areas of low attenuation in the fascial planes of the neck, extending from the level of the body of the mandible to the thyroid gland on the left side, consistent with a fluid collection. This collection was incised and drained under general anaesthesia and a corrugated drain was left in situ. The drain was removed after 48 hours when the cavity drainage had slowed and was replaced with a non-adherent, absorbent dressing.

Over the following nine days, the patient's clinical condition significantly improved, and this was reflected in his white cell count (WCC) and C reactive protein results. A submental pus swab taken intra-operatively reported no growth. In view of the patient's systemic and biochemical improvement, the initially isolated organism and its antibiotic sensitivities were used as a guide and the original antibiotics continued. By day seven, the patient had been afebrile for 48 hours and the IV antibiotics were converted to oral; he continued to do well.

However, on day 10, the patient's condition deteriorated; he became feverish, lethargic and complained of a sharp, positional chest pain. His temperature was 38.2°C, pulse 120 bpm and on examination he had reduced air entry at the right lung base and muffled heart sounds. A septic screen was performed, a chest X-ray demonstrated a widened mediastinum, bulky hilar and right pleural effusion (Figure 2), and the WCC was $32 \times 10^9/L$. A neck and chest CT and echocardiogram were requested.

The neck and chest CT showed findings consistent with tracking of infection from its origin in the left peritonsillar region to the submental and parapharyngeal space and down the fascial planes into the mediastinum, with a pericardial and pleural effusion (Figure 3). Echocardiography revealed a pericardial effusion of 1.8 cm anteriorly.

The patient was diagnosed with mediastinitis, pericarditis and bilateral pleural effusions. Clinically, there were minimal signs of tamponade, and he was managed non-operatively by a multidisciplinary team. Blood cultures reported no growth and a repeat neck swab grew staphylococcus species, documented as normal flora. The patient was treated for a further nine days with IV Augmentin and metronidazole, converted to oral administration once he had remained afebrile for 48 hours. He was eventually discharged 25 days after admission.

Echocardiography performed two months after discharge showed complete resolution of the pericardial fluid without fibrosis. An elective tonsillectomy, scheduled following discharge, was postponed due to newly diagnosed hypertension.

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Accepted for publication: 26 January 2006.

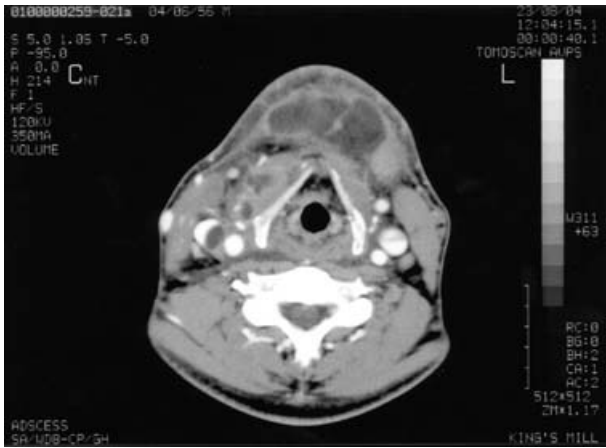


FIG. 1

Submental collection shown on axial computed tomography scan taken at cut P-95.0.

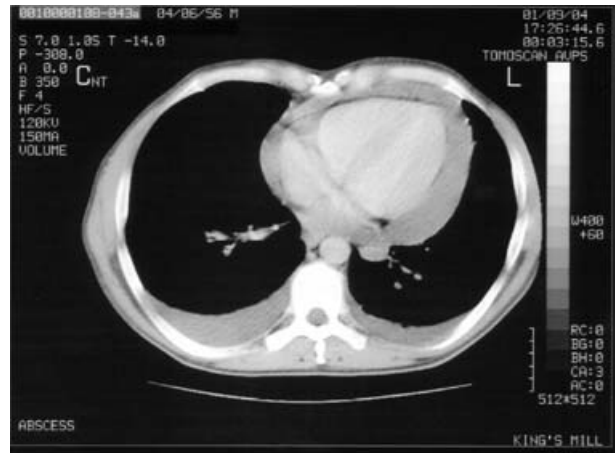


FIG. 3

Computed tomography scan demonstrating pericardial and pleural effusions, P-308.

Discussion

Peritonsillar abscess or quinsy usually occurs as a complication of acute tonsillitis.¹ Although tonsillitis is more common in childhood, quinsy most commonly affects young adults. Suggestions postulating the presence of anaerobes as the initiating factor in the formation of quinsy are not universally accepted.²⁻⁴

Management of peritonsillar abscess differs between centres. A national audit in 2002 surveyed 101 ENT consultants by questionnaire regarding their management of peritonsillar abscess. It concluded that 61 per cent of cases were managed by needle aspiration, 25 per cent by incision and drainage, and 96 per cent with IV antibiotics.¹ However, there is evidence to suggest an increase in the recurrence rate associated with aspiration (23.26 per cent) verses incision and drainage (4.0 per cent).⁵ Long-term management involves the consideration of tonsillectomy. Tonsillectomy may be used in the management of this condition at the time of diagnosis or after an interval period,^{6,7} as planned in this case.

Spread of infection through the superior constrictor muscle of the pharynx results initially in cellulitis of the tissues of the neck and later in a parapharyngeal abscess.⁸ The infection can then spread rapidly through the fascial



FIG. 2
Chest X-ray.

TABLE I
ENDO *et al.* CLASSIFICATION AND SUGGESTED SURGICAL MANAGEMENT OF DESCENDING NECROTIZING MEDIASTITIS (DNM)

Type	Definition	Management
I	Localized DNM, involving upper mediastinal space above carina T4	Parenteral antibiotics ± drainage
IIa	Diffuse DNM, to lower anterior mediastinum	Sub-xiphoid mediastinal drainage
IIb	Diffuse DNM, to lower anterior and posterior mediastinum	Complete mediastinal drainage and thoracotomy

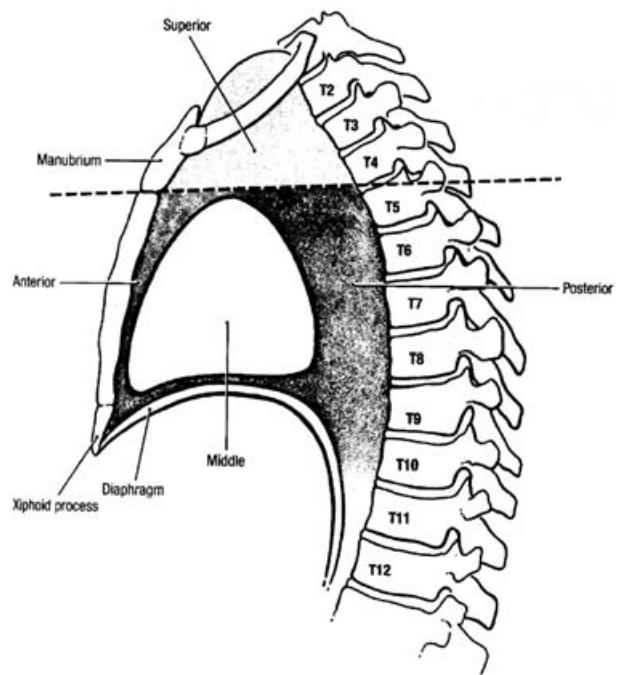


FIG. 4
Mediastinal subdivisions.

TABLE II
 PROTOCOL OF INVESTIGATIONS AND MANAGEMENT OF PRIMARY OROPHARYNGEAL INFECTIONS

Level of infection	Signs and symptoms	Investigations	Management
Tonsillitis	Pyrexia Odynophagia Inflamed/exudative tonsil Upper neck lymphadenopathy	FBC Monospot ²¹	IV antibiotics
Peritonsillar abscess	(As above plus:) Trismus Unilateral peritonsillar swelling Contralateral deviation of uvula Bulging of soft palate	(As above plus:) CRP	Incision and drainage IV antibiotics Elective tonsillectomy
Deep neck infections	(As above plus:) Cervical cellulitis Neck swelling and crepitations	(As above plus:) Neck CT Chest X-ray	Oropharyngeal and cervical incision and drainage IV antibiotics
Mediastinitis	(As above plus:) Shortness of breath Chest pain Muffled heart sounds Pericardial rub	(As above plus:) ECG Chest CT ¹⁵	Treat according to level of mediastinal involvement (see Table I) ITU CT monitoring

FBC = full blood count; IV = intravenous; CRP = C-reactive protein; CT = computed tomography scan; ECG = electrocardiography; ITU = intensive therapy unit

planes of the neck to gain access to the mediastinum.^{8,9} Progression from quinsy to deep neck infection and/or mediastinitis occurs in 1.8 per cent,¹⁰ while progression of deep neck infection to mediastinitis occurs in approximately 10 per cent.^{11,12} Early recognition of descending necrotizing mediastinitis is important because the reported mortality rate is up to 30 per cent, even in the antibiotic era.^{13–17} The majority of cases are due to beta-haemolytic streptococcus species and are penicillin sensitive.^{8,18}

In our case, the blood culture and intra-oral pus swabs taken on admission grew *Streptococcus salivarius*, a gram positive, non-haemolytic organism belonging to the viridans streptococcus group, most often isolated in opportunistic or post-operative infections.¹⁹ In the case presented, the patient had no known underlying condition predisposing him to the systemic complications that developed. He had been commenced on oral antibiotics by his GP within 48 hours of symptom onset. The organism was reported to be sensitive to the antibiotics prescribed, and this was mirrored in the apparent clinical improvement until day 10 of admission. The latent period of nine days, during which the patient was improving clinically and biochemically, suggested the successful containment of infection and, with the majority of pus drained, deterioration was unexpected.

Repeat blood cultures and swabs taken following the patient's deterioration reported no growth, and it can be postulated that the later complications were as a result of loci of persistent pus in the neck cavity which tracked to the mediastinum, rather than due to the development of a confounding secondary infection or of antibiotic resistance.

Today, deep neck infections more commonly occur as a result of odontogenic infections.²⁰ A recent article (2004) reported very similar cardiorespiratory complications secondary to a molar tooth abscess in an ex-IV drug user who developed Ludwig's angina; however, this 18-year-old required open drainage of his pleural empyema.²⁰

A study by Endo *et al.* classified mediastinal involvement in such cases and related this to the appropriate level of surgical intervention (see Table I and Figure 4).²¹ Although a chest CT confirmed infection tracking to the pleural cavity (i.e. Endo *et al.* type IIb),²¹ our patient's condition rapidly stabilized with IV antibiotics. He responded to supportive treatment alone and, in this case, pericardial and/or pleural aspiration were not required.

Conclusion

Although antibiotics have significantly reduced the incidence of complications secondary to tonsillitis and quinsy, it is important to recognize signs and symptoms of disease progression and to act aggressively and appropriately in order to minimize any associated morbidity and mortality.

Having reviewed the literature, it is evident that there is a discrepancy between centres regarding their management of tonsillitis and its complications. Using the evidence published to date, Table II shows a suggested protocol of investigations and management based on clinical signs and symptoms.

- **The incidence of parapharyngeal abscess secondary to quinsy is decreasing**
- **Today, deep neck infections more commonly occur as a result of odontogenic infection**
- **Progression from quinsy to deep neck infections/mediastinitis occurs in 1.8 per cent**
- **Progression from deep neck infections to mediastinitis occurs in 10 per cent**
- **It is important to be aware of the potential complications of this commonly encountered ENT problem**
- **Following a review of the literature and the learning points generated from this case, a protocol of investigations and management based on clinical signs and symptoms is presented**

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Dr J Collin takes responsibility for the integrity of the content of the paper.

Competing interests: None declared
