

# Mediastinitis: a life-threatening complication of acute tonsillitis

Z BELL, MRCS, A A C MENEZES, FRCS, W J PRIMROSE, FRCS, J A MCGUIGAN, FRCS

## Abstract

Acute tonsillitis is a common condition and usually runs a benign course. However life-threatening complications do still occur, even in this postantibiotic era. Infection can spread downwards into the mediastinum through the anatomic cervical spaces, causing widespread cellulitis, necrosis, abscess formation and sepsis. We present a case of descending mediastinitis in an 18-year-old woman, arising from her first episode of tonsillitis and treated successfully by surgical drainage. We believe that an awareness of this complication, early diagnosis using computed tomography scanning, and prompt, adequate surgical drainage will reduce morbidity and mortality.

**Key words:** Tonsillitis; Mediastinitis; Retropharyngeal Abscess, Complications

## Introduction

Tonsillitis is frequently encountered in both the primary-care and hospital settings. We report a case of acute tonsillitis with a life-threatening complication which highlights the importance of vigilance in the management of this common condition.

## Case report

An 18-year-old female student presented to her general practitioner (GP) with a one-day history of a sore throat. Following examination, she was diagnosed as having acute tonsillitis – her first episode – and prescribed penicillin. Over the next three days she developed increasing central chest and back pain, cough and shortness of breath. She was reviewed by her GP and also attended a hospital accident and emergency (A&E) department where she was given symptomatic treatment and discharged.

On day five she returned to A&E, where examination found her to be tachycardic with inflamed tonsillar pillars and decreased air entry at the right lung base. She had a leucocytosis of 22 300/ml, a c-reactive protein (CRP) of 416 units and a chest X-ray showing increased shadowing at the right lung base. A lower respiratory tract infection was diagnosed and she was admitted and treated with antibiotics (coamoxiclav initially then intravenous cefotaxime and doxycyclin).

However seven days later her clinical condition had still not significantly improved and computed tomography (CT) of her neck and chest was requested.

The neck CT showed pus in relation to the lower pole of the left tonsil, tracking across to the right-hand side and forming a right retropharyngeal abscess (Figure 1). Chest CT revealed a collection of fluid and gas in the superior and anterior mediastinum (Figure 2) as well as pericardial and bilateral pleural effusions (Figure 3). A subsequent Niapam

swallow test showed a pharyngeal perforation which was seen to be discharging pus on nasopharyngoscopy. The patient was therefore transferred immediately to the regional thoracic surgical unit for further management.

Surgical exploration via a presternomastoid incision revealed an abscess around the pharynx and upper oesophagus extending into the mediastinum. The pus was evacuated and a drain inserted into the mediastinum. The pleural effusions were also drained and the patient was commenced on combination antibiotics (ciproxin,



FIG. 1

Neck computed tomography scan showing pus in relation to lower left tonsillar pole, extending across to the right-hand side in the retropharyngeal space.

From the Department of Thoracic Surgery, Royal Victoria Hospital, Belfast, Northern Ireland.

Accepted for publication: 14 April 2005.

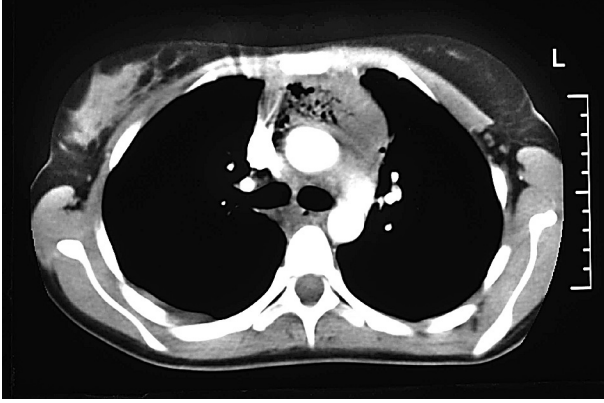


FIG. 2

Contrast-enhanced computed tomography scan showing a fluid and gas collection within the anterior mediastinum.

clindamycin and fluconazole). However pus sent for both aerobic and anaerobic culture failed to reveal the causative organism.

After initial clinical improvement, fever and tachycardia returned on day 27. Echocardiogram and CT revealed a 7 cm loculated pericardial effusion. Needle aspiration and insertion of a 6 Fr pigtail catheter was initially successful but on day 30 she developed clinical signs of cardiac tamponade necessitating surgical drainage of the effusion via a subxiphoid approach. Following this the patient's condition steadily improved and she was discharged on hospital day 38.

She remained well at both ENT and thoracic follow up four months later. Tonsillectomy was deferred as this was her first presentation with tonsillitis; however any further episodes would need to be treated aggressively with antibiotics followed by surgery.

### Discussion

Although acute tonsillitis usually runs a relatively benign course, complications do still occur (Table I); these can be life-threatening if treatment is delayed or inadequate.

The deep cervical fascial layers partition the neck into three potential spaces through which oropharyngeal infections can descend into the mediastinum, leading to widespread cellulitis, necrosis, abscess formation and



FIG. 3

Chest computed tomography scan showing pericardial effusion, bilateral pleural effusions and consolidation within the lower lobes.

TABLE I

#### COMPLICATIONS OF TONSILLITIS

##### *Septic*

Intratonsillar abscess  
Peritonsillar abscess  
Parapharyngeal abscess  
Retropharyngeal abscess  
Mediastinitis

##### *Vascular*

Septicaemia  
Cavernous sinus thrombosis  
Lemierre's disease  
Carotid artery thrombosis/erosion

##### *Inflammatory*

Rheumatic fever  
Acute glomerulonephritis  
Guttate psoriasis  
Arthritis  
Inflammatory torticollis  
Grisel's syndrome

sepsis.<sup>1</sup> Although uncommon, this descending necrotizing mediastinitis (DNM) is a highly lethal disease. The mortality rate, even in the postantibiotic era, has remained high at 35–40 per cent,<sup>2,3</sup> although in the most recent cases this has been reduced to 14–23 per cent with earlier diagnosis and more aggressive treatment.<sup>4-6</sup>

The retrovisceral space is the most common route of spread to the mediastinum, accounting for approximately 70 per cent of cases.<sup>7</sup> It has been estimated that 8 per cent of cases spread through the pretracheal space. The pretracheal fascia has attachments to the pericardium and parietal pleura at the level of the carina, accounting for the purulent pericarditis and empyema often seen with DNM.<sup>7</sup> Perivascular spread occurs in the remainder of cases, sometimes producing major-vessel rupture and cranial nerve deficits.<sup>7</sup>

The most common source of DNM is odontogenic infection.<sup>3</sup> Other causes include retropharyngeal abscess, peritonsillar abscess, cervical lymphadenitis, parotitis, thyroiditis, trauma and traumatic endotracheal intubation.<sup>1</sup> In our case the patient's tonsillitis was deemed the cause of her retropharyngeal abscess and subsequent DNM. There was no history of a foreign body or perforation, no other identifiable source of bacteraemia, and she was immunocompetent. Furthermore the CT findings strongly suggested that the retropharyngeal abscess developed secondary to the tonsillar enlargement.

The causative organism varies depending upon the origin of infection. However the majority of cases are polymicrobial, and synergism between aerobes and anaerobes may account for the virulence of the condition.<sup>7</sup> Streptococcus species are the most common facultative organisms, while Bacteroides species are the most common strict aerobes. Other organisms implicated include *Pseudomonas aeruginosa* and species of Fusobacterium, Peptostreptococcus, and Staphylococcus.<sup>4</sup>

TABLE II

#### COMPLICATIONS OF DESCENDING NECROTIZING MEDIASTITIS

Empyema  
Pericarditis  
Cardiac tamponade  
Erosion into hypopharynx or oesophagus  
Erosion of carotid artery or aorta  
Aortopulmonary fistula  
Cranial nerve deficits  
Adult respiratory distress syndrome  
Epidural abscess

Patients commonly present with pain and localized signs of sepsis.<sup>5</sup> They may also present with complications (Table II). Early diagnosis of mediastinitis is difficult because early symptoms are nonspecific and there is a paucity of signs on chest and neck X-rays.<sup>6</sup> Computed tomography scanning can identify mediastinitis when the chest X-ray is normal or indeterminate, accurately revealing the presence, size and location of mediastinal fluid collections, abscesses, pericardial effusion, pneumonia or empyema.<sup>8</sup> The CT is thus a vital tool in planning appropriate surgical management as well as enabling surveillance following drainage.<sup>7</sup>

- **This report describes a case of tonsillitis complicated by a retropharyngeal abscess and mediastinitis**
- **This severe complication was successfully treated with combined surgical drainage and antimicrobial therapy**
- **Otolaryngologists need to be aware of the possible life-threatening complications of pharyngeal infection**

The mainstays of treatment are antibiotic therapy, cervical exploration with debridement and mediastinal drainage.<sup>9</sup> Antibiotics should be commenced empirically pending specific cultures and sensitivities. Treatment of normal oral pharyngeal flora, including *Candida* and *Aspergillus*, should also be considered, especially in the deteriorating or debilitated patient.<sup>1</sup> The optimal form of mediastinal drainage remains controversial. Opinions range from cervical drainage alone to cervical drainage and routine thoracotomy,<sup>5</sup> and as yet there are no established guidelines.

While some surgeons advocate an aggressive surgical approach including thoracotomy in all cases of DNM,<sup>6</sup> we tailored our management using clinical findings, haematological parameters, the level of mediastinitis on CT and the published experience of others.<sup>2</sup> Transcervical drainage of the pharyngeal and mediastinal collections was successfully performed. The reactive pleural and pericardial effusions were also drained using minimally invasive techniques thus avoiding major surgery and large incisions.

In conclusion this case emphasizes the need for a high index of clinical suspicion in patients whose signs and symptoms are disproportionate to those arising from a simple pharyngeal infection. Early CT scanning, adequate drainage and post-operative monitoring, both clinical and radiological, contribute to improved survival of patients with descending mediastinitis.

#### References

- 1 Kiernan PD, Hernandez A, Byrne WD, Bloom R, Diccio B, Hetrick V *et al.* Descending cervical mediastinitis. *Ann Thorac Surg* 1998;**65**:1483–8
- 2 Estrera AS, Landay MJ, Grisham JM, Sinn DP, Platt MR. Descending necrotizing mediastinitis. *Surg Gynecol Obstet* 1983;**157**:545–52
- 3 Wheatley MJ, Stirling MC, Kirsh MM, Gago O, Orringer MB. Descending necrotizing mediastinitis: transcervical drainage is not enough. *Ann Thorac Surg* 1990;**49**:780–4
- 4 Sancho LM, Minamoto H, Fernandez A, Sennes LU, Jatene FB. Descending necrotizing mediastinitis: a retrospective surgical experience. *Eur J Cardiothorac Surg* 1999;**16**:200–5
- 5 Papalia E, Rena O, Oliaro A, Cavallo A, Giobbe R, Casadio C *et al.* Descending necrotizing mediastinitis: surgical management. *Eur J Cardiothorac Surg* 2001;**20**:739–42
- 6 Marty-Ane CH, Berthet JP, Alric P, Pegis JD, Rouviere P, Mary H. Management of descending necrotizing mediastinitis: an aggressive treatment for an aggressive disease. *Ann Thorac Surg* 1999;**68**:212–7
- 7 Alsoub H, Chacko KC. Descending necrotising mediastinitis. *Postgrad Med J* 1995;**71**:98–101
- 8 Corsten MJ, Shamji FM, Odell PF, Frederico JA, Laframboise GG, Reid KR *et al.* Optimal treatment of descending necrotizing mediastinitis. *Thorax* 1997;**52**:702–8
- 9 Ris HB, Banic A, Furrer M, Caversaccio M, Cerny A, Zbaren P. Descending necrotizing mediastinitis: surgical treatment via clamshell approach. *Ann Thorac Surg* 1996;**62**:1650–4

Address for correspondence

Miss Zarina Bell,  
Department of Surgery,  
Institute of Clinical Science,  
Grosvenor Road,  
Belfast BT12 6BJ, Northern Ireland.

E-mail: zarinabell@hotmail.com

---

Miss Z Bell takes responsibility for the integrity of the content of the paper.

Competing interests: None declared

---