

Supraglottitis and abscess formation

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Abstract

Objective: This case series report aims to raise awareness of the association between supraglottic infection and abscess formation, which has been rarely documented.

Method: We report a series of four patients who developed cervical abscesses following supraglottic infection. The diagnosis was confirmed by imaging in three patients, and by incision and drainage of pus at direct laryngoscopy in one.

Results: All four patients were treated with intravenous antibiotics, steroids and humidification; two also underwent surgical drainage of pus. All made an uneventful recovery.

Conclusion: The factors that lead to neck abscess formation are poorly understood. Physicians should always be aware of this potential complication. If it is suspected, appropriate neck imaging should be undertaken, after excluding airway compromise; this will aid early diagnosis and treatment.

Key words: Pharynx; Neck; Pharyngitis; Abscess; Epiglottitis

Introduction

Supraglottitis is a disease characterised by inflammation of the larynx and adjacent pharynx above the level of the true vocal folds. The inflammation may also affect the true vocal folds and subglottic larynx.¹

In children, swelling may be most marked at the epiglottis, and for this reason the condition has been referred to as epiglottitis.^{2,3} However, since the introduction of the *Haemophilus influenzae* type b vaccination the prevalence of this disease has decreased dramatically in children, and it is now more common in adults.^{4–7}

Supraglottitis is thought to follow a more benign course in adults, although the insidious onset and non-specific symptoms which can occur in adults may lead to a delay in diagnosis and the development of complications.⁷ The most important complication is upper airway obstruction, which is potentially life-threatening and has been extensively discussed in the literature.^{7–10} Neck abscess formation is a rarely described complication.^{11,12}

We present four adult cases of supraglottitis complicated by neck abscess formation.

Case presentations

Case one

A 75-year-old woman was admitted with a five-day history of increasing hoarseness, dysphagia, dyspnoea and fever.

On examination, she was febrile (38°C), tachycardic and mildly dyspnoeic. Examination of the neck revealed tenderness on deep palpation in the left anterior triangle, with no cervical lymphadenopathy.

Flexible nasopharyngoscopy showed pooling of saliva in the hypopharynx and supraglottic oedema. There was an irregular mass on the left false vocal fold extending to the left piriform fossa.

The patient was treated with intravenous cefotaxime, metronidazole and dexamethasone and humidified air.

At direct laryngoscopy, pus was drained from the swollen left hemi-larynx.

Histological examination of biopsy tissue showed acute inflammation of the surface epithelium, with granulation tissue forming in the underlying corium.

Culture of the pus did not grow any organisms.

The patient made an uneventful recovery and was discharged after one week.

Case two

A 78-year-old woman presented with a two-day history of sore throat, dysphagia and left neck swelling. She was pyrexial (37.6°C) and in moderate respiratory distress, with a respiratory rate of 25 breaths per minute, but not stridulous.

Examination of the patient's neck revealed a fluctuant swelling in the left anterior triangle.

Flexible nasopharyngoscopy showed supraglottic oedema and marked swelling of the left piriform fossa.

A throat swab did not culture any organisms.

The patient was treated with intravenous cefotaxime, metronidazole and dexamethasone and humidified air.

Ultrasonography of the neck showed a loculated abscess at the base of the left anterior triangle extending into the hemi-thyroid area. Magnetic resonance imaging (MRI) showed a fluid collection in the region of the left aryepiglottic fold and lateral aspect of the piriform fossa, surrounded by oedema with minimal narrowing of the rima glottidis. There was also extension of the oedema to the subglottis.

Direct laryngoscopy was performed and a biopsy taken.

Histological examination of the biopsy specimen showed inflamed parakeratotic squamous mucosa and reactive lymphoid tissue.

The patient's supraglottic and neck swelling subsided with medical management, and she was discharged seven days after admission.

Case three

A 40-year-old woman presented with a two-day history of sore throat, dysphagia, trismus and fever.

On examination, she was afebrile (36.1°C), mildly dyspnoeic and exhibited trismus. There was no neck swelling.

Flexible nasopharyngoscopy showed diffuse erythema of the larynx, with marked oedema of the epiglottis.

The patient was treated with intravenous cefotaxime, metronidazole and dexamethasone and humidified air.

Despite an improvement in her symptoms, two days after admission she developed a swelling in the lower

right anterior triangle of the neck which was tender on palpation but not fluctuant. Repeated nasopharyngoscopy revealed swelling of the right hemi-larynx, and persistent epiglottic swelling. Ultrasonography of the neck showed a 9.5 × 4.6 × 5 cm mass in the parapharyngeal region, of predominantly solid appearance. This appearance was consistent with a parapharyngeal abscess in the solid phase of development. Computed tomography (CT) scanning confirmed that the swollen tissue on the right side of the neck, with central fluid, was due to infection with abscess formation.

Medical therapy was continued and the neck swelling and supraglottic oedema resolved. A throat swab cultured *Haemophilus parainfluenza* (sensitive to cefotaxime) and a yeast.

The patient was discharged 10 days after admission.

Case four

A 53-year-old man was admitted with a three-day history of worsening odynophagia.

On examination, the right side of his neck was tender to deep palpation, without any obvious swelling. He was febrile (37.9°C) but without respiratory distress, and was otherwise in good health.

Flexible nasendoscopy showed no pooling of saliva, but did identify right supraglottitis without any lateral pharyngeal encroachment.

The patient's blood count showed a raised leucocyte count (18.0 k/ul).

Treatment with intravenous cefotaxime, metronidazole and dexamethasone was initiated. (The patient had not received any antibiotics prior to admission.)

Over the next 36–48 hours, his condition deteriorated. A painful swelling of the right neck became evident, with mild trismus. Repeated nasendoscopy showed an obliterated right parapharynx.

An urgent CT scan was performed (Figure 1), which showed a heterogeneous mass in the right parapharyngeal space extending from the mandible to the hemi-thyroid, with displacement of the larynx and gas formation.

The patient underwent incision and drainage under general anaesthesia, via a lateral neck incision.

He was discharged home five days after surgery.

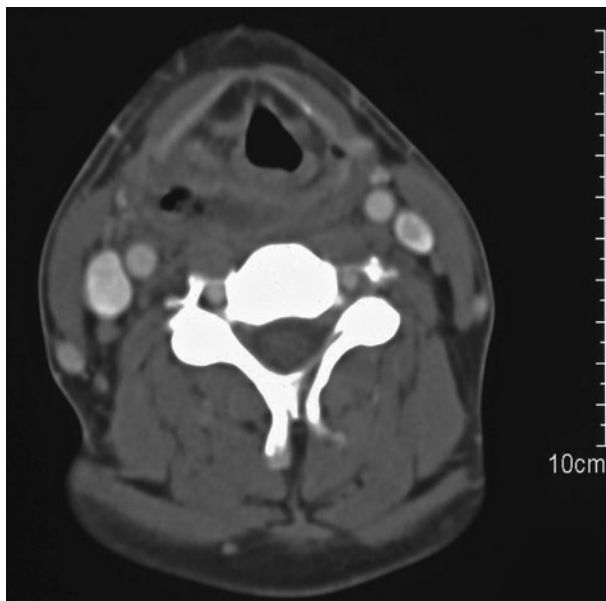


FIG. 1

Axial computed tomography scan of the fourth patient's neck, showing a right-sided parapharyngeal collection with gas formation and displacement of the laryngeal framework.

Discussion

Supraglottitis may cause potentially fatal obstruction of the airway.⁷ Early diagnosis and management may reduce morbidity and mortality rates.^{13–15} The majority of cases are infective in origin, although burns and allergy may also cause supraglottic swelling.

A variety of organisms have been implicated in adult supraglottitis, in contrast to childhood epiglottitis which is thought to be predominantly caused by *H influenzae* type b.^{16,17} Organisms cultured from adults with supraglottitis include group A and group F β-haemolytic *Streptococcus pyogenes*, *Staphylococcus aureus*, *S pneumoniae*, and *Nisseria meningitidis*, as well as *H influenzae* and *H parainfluenza*.¹⁸ An aggressive form of supraglottitis has been reported in patients with acquired

immunodeficiency syndrome, although this is thought to be bacterial in origin secondary to immunosuppression. Acute, fatal supraglottitis secondary to aspergillus and klebsiella infection has been described in relation to acute lymphocytic leukaemia, and candidal supraglottitis has been reported as the presenting illness of a patient with acute myeloid leukaemia. A viral aetiology has been postulated in milder cases of supraglottitis, although only herpes simplex has been positively identified on virology. However, in the majority of cases of adult supraglottitis no organism is isolated.^{17,19} This was the case in three of our patients; *H parainfluenza* was cultured in the remaining case (patient three).

- **Supraglottitis is potentially life-threatening; both localised inflammation and abscess formation must be considered as potential causes of airway obstruction**
- **The incidence of abscess formation in patients with supraglottitis is not known, but may be underestimated**
- **Abscess formation may occur despite treatment with antibiotics and steroids**
- **If an abscess is suspected neck imaging should be performed, after securing the airway if necessary; computed tomography with contrast remains the modality of choice**

The incidence of abscess formation associated with supraglottitis is unknown, and the combination has rarely been reported. It is unclear what factors may be important in abscess formation. A delay in diagnosis may be a factor, although our patients had a mean of only three days of symptoms prior to admission. Furthermore, there was no evidence of altered immunity in any of our patients. It would appear that the elderly are more susceptible to complications, and our two patients who appeared to have abscess formation on admission were 78 and 75 years old; however, our third and fourth patients, who developed neck swelling two days after admission, were 40 and 53 years old, respectively. A delay in the development of complications until two days after admission may represent a failure to respond to antibiotics; however, a throat swab in one such patient grew *H parainfluenza* sensitive to the cefotaxime, and this antibiotic had been commenced on admission.²⁰ There is no firm evidence that the use of antibiotics has an effect on the prognosis of adult patients with supraglottitis. The type of organism, however, may be a factor in abscess formation, although *H influenzae* is not characteristically associated with abscess formation.

Although the incidence of abscess formation in patients with supraglottitis is unknown, it may be more common than previously realised, and may be more frequently identified if patients are investigated radiologically. Clinically, three of our patients

developed neck swelling (patients two, three and four), raising the suspicion of abscess formation, and one patient developed neck tenderness on deep palpation (patient one). Abscess formation was confirmed by imaging in three patients (patients two, three and four) and by incision and drainage of pus at direct laryngoscopy in one (patient one). Patients two and three both underwent ultrasound examination of the neck, revealing a multiloculated mass in patient two and a solid mass in patient three. These findings were confirmed on MRI and CT scanning. In 1996, Smith *et al.* described the CT appearances of three patients with supraglottitis, including one patient with multiple neck abscesses requiring drainage.¹¹ This patient was a 36-year-old man who was admitted and intubated on the first day of developing symptoms, and who only developed neck pain and swelling four days after admission. This delay in developing neck symptoms is similar to that seen in our third patient. Interestingly, Smith *et al.* cultured *H influenzae* from their patient with multiple neck abscesses, who was treated with intravenous cefuroxime on admission.¹¹

Computed tomography scanning with contrast remains the imaging modality of choice for the identification and localisation of parapharyngeal abscesses.¹² In two of our patients, ultrasonography proved useful in identifying abscess formation.

Conclusion

The incidence of abscess formation in patients with supraglottitis is not known but may be underestimated.

We present four patients who suffered supraglottitis complicated by neck abscess; two responded to medical management alone, while two required additional incision and drainage.

The factors that lead to abscess formation in the presence of supraglottitis, and their prognostic significance, are poorly understood at present. Patients may present with a neck abscess or may develop one after admission, despite being treated with the appropriate antibiotics and steroids. Physicians should thus be aware of this potential complication. If an abscess is suspected, appropriate imaging of the patient's neck should be performed. This will prevent delayed diagnosis and facilitate early treatment.

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