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Life-threatening peripharyngeal suppuration

by

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Introduction

Peripharyngeal suppuration may present as an emergency with acute airway obstruction (Valdazo, 1978; Gonty and Costrich, 1981). In three cases, seen within one month at two London Hospitals,* problems of management were encountered. The features of this otherwise rare condition are defined and a rational therapeutic approach is proposed.

Case Reports

Case 1

A 44-year-old station foreman presented as an emergency with dyspnoea. He gave a two-day history of increasing sore throat. Latterly he had developed total dysphagia, difficulty in coughing and shortness of breath. Prior to this he was perfectly fit.

Examination

A heavily built man, he was distressed, dyspnoeic and pyrexial—38.2 °C. orally. His neck was inflamed and symmetrically swollen. Trismus prevented full examination of his oropharynx, which appeared generally red. The first right lower molar was decayed. However, neither this nor the under-surface of his chin was tender.

Lateral soft-tissue X-ray of his neck showed gas spread diffusely in the tissue planes overlying the larynx (Fig. 1), with near-total obliteration of the airway.

Treatment

Despite these signs, he was neither cyanosed nor tired and intensive medical treatment was started. This consisted of Helium and Oxygen by MC mask, intravenous penicillin, chloramphenicol and metronidazole. After sixteen hours there was no improvement; the patient was still maintaining a high respiratory rate and was tiring.

Tracheostomy was necessary after a difficult induction. Attempts at endotracheal intubation failed because of the trismus and the grossly oedematous soft tissues in the pharynx and supraglottis. The anaesthetic was given by mask and oral airway.

Offensive pus welled into the wound on incision of the deep cervical fascia for tracheostomy. Digital exploration of this plane showed continuous extension of the collection around the larynx and pharynx. Superiorly the abscess reached both parapharyngeal spaces into which corrugated drains were placed. Control of the airway was established by inserting a 36FG cuffed Portex tube through the second tracheal ring. Pharyngoscopy revealed pus entering the pharynx through a sinus in the right piriform fossa.

Post-operatively he had a bronchopneumonia which cleared after a week of continued antibiotics and physiotherapy.

The origin of this infection was never obvious and in retrospect was thought to be either dental or pharyngeal. Microscopy of the pus collected at operation showed a few Gram-positive cocci in necrotic debris but no organism was cultured. An orthopantomogram revealed a lucent area around the alveolar margin of the first right lower molar. This tooth was subsequently extracted under local anaesthetic.

* From The Royal Free Hospital and St. Bartholomew's Hospital, London.

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FIG. 1

Case 1: Lateral soft-tissue X-ray of neck. Note the diffuse mottling overlying the larynx and lower pharynx. The laryngeal airway is indistinct.

The patient made a complete recovery and was discharged from follow-up five weeks after admission.

Case 2

History and examination

A 19-year-old girl presented in casualty with a swelling under her tongue, bad breath and a mild fever. A left lower molar tooth was carious and a dental opinion was sought. An orthopantomogram showed periapical bone erosion of this tooth (Fig. 2).

Treatment

She was admitted and given intravenous Cephotaxime and Metronidazole. Twenty-four hours later she developed severe dysphagia and the swelling was worse, but remained brawny and non-fluctuant and so was not considered to be an abscess. Her white cell count had risen to $22{,}000 \times 10^9/l$. Intravenous Netilmycin was added to her medication.

After another day without improvement, the rapid onset of stridor necessitated tracheostomy. While patient and theatre were hurriedly prepared, a mixture of Helium 80 per cent and Oxygen 20 per cent relieved the stridor.

Oro-tracheal intubation by a senior anaesthetist proved impossible because of the swollen supraglottis and so the anaesthetic was administered by a face mask.

The surgeon was surprised when incision of the investing layer of the deep fascia released large quantities of pus which flooded the operative field. A much longer procedure than usual, tracheostomy was eventually established through the third tracheal ring. Some pus entered the trachea, but insertion of a cuffed portex tube secured an airway and allowed effective anaesthesia. Multiple large-bore drains were placed in the deep fascial planes where pus had collected (Fig. 3).

Recovery was rapid over the next two days, but

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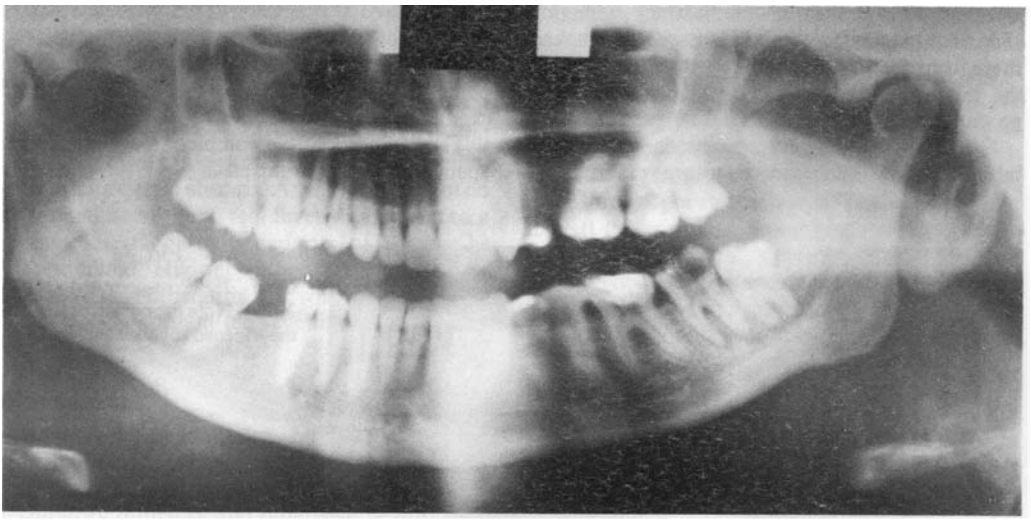


FIG. 2

Case 2: Orthopantomogram. Near-complete destruction of the crown of the second lower left molar tooth with periapical radiolucency of the surrounding mandible.

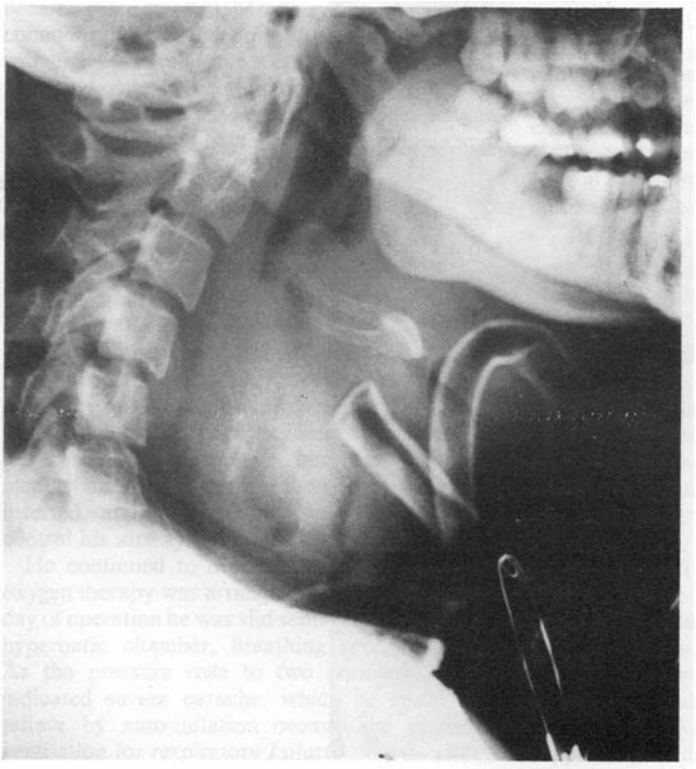


FIG. 3

Case 2: Post-operative lateral soft-tissue X-ray of neck. The secondary curvature is reversed. Note the tracheostomy tube, large bore drains and gross soft-tissue swelling around the laryngeal inlet.

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a chest X-ray showed mediastinal widening (Fig. 4a), indicating that infection had tracked there from the neck. Fortunately this responded to the high doses of antibiotics, and no drainage procedure was required (Fig. 4b).

Of all the swabs and specimens sent to the laboratory, the only positive culture was from the pus obtained at operation. This yielded a scanty growth of staphylococcus epidermidis and Bacteroides spp., both of which were resistant to penicillin and sensitive to the antibiotics used (v.s.).

The patient made a complete recovery having spent two weeks in hospital.

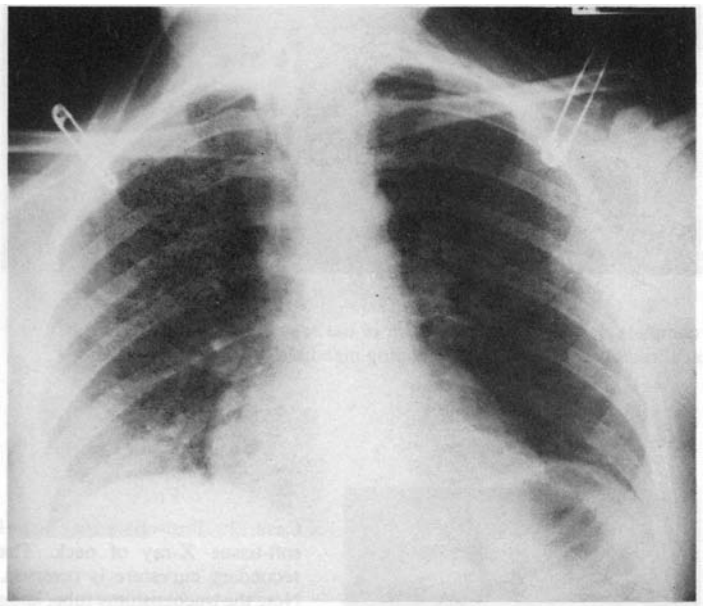


FIG. 4a

Case 2: Post-operative chest X-ray. Note the pinned drains and the widened superior mediastinum.

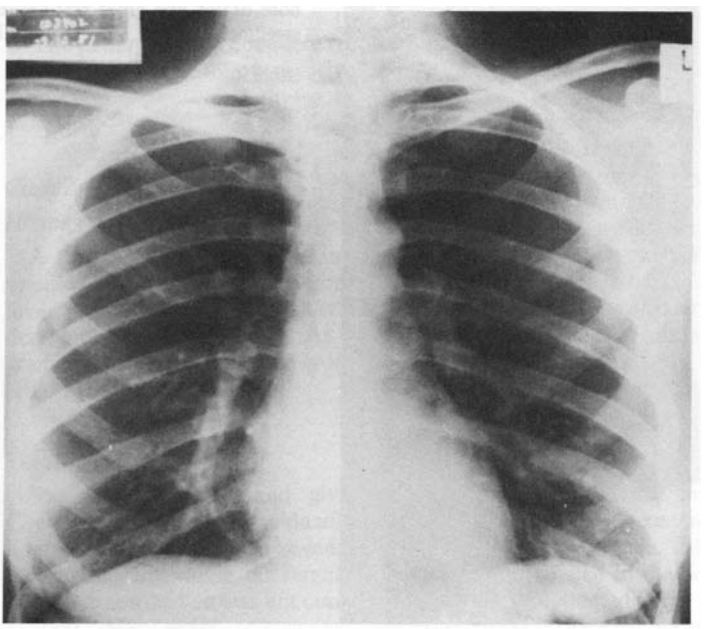


FIG. 4b

Case 2: Resolution of the mediastinitis, giving a normal appearance to the tracheal airway and mediastinum.

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Case 3

History

A 29-year-old Palestinian man noticed a swelling under his left jaw. Seeking medical attention, he was treated by a hospital dental department with a week's course of penicillin tablets for a dental abscess. As the swelling got no better and he began to feel feverish, he went to a second hospital casualty department, whence he was admitted. His only other medical problem was recurrent prostatitis, for which he had been receiving intermittent tetracycline for one year.

Examination

At the time of admission, he had a tender left submandibular swelling extending posteriorly into the neck. He was pyrexial, but not in any respiratory difficulty and otherwise healthy.

Treatment

Chest and lateral neck X-rays were taken during admission, but not reviewed until later. Intravenous penicillin was given, but after two days the whole floor of the mouth and neck became more swollen. Mouth swabs grew mixed commensal organisms only. In spite of treatment with high doses of Gentamicin, Cephotaxime and Metronidazole in combination, he deteriorated over a further two days. At this stage his tongue was so swollen that he had severe dysphagia and an endangered airway. His neck had become more swollen and the skin over the upper chest wall was dusky and crepitant. Delirium accompanied a high fever. The X-rays taken on admission showed gross peripharyngeal swelling, with widespread gas bubbles in the soft tissues and a reversed cervical curvature.

His neck was drained under general anaesthetic. Malodorous pus was widespread under the investing layer of deep cervical fascia. The tissue looked necrotic, and felt greasy. A finger could be passed into the superior mediastinum with ease. Seven drains were inserted, and tracheostomy was performed to control his airway.

He continued to deteriorate, and hyperbaric oxygen therapy was arranged. At midnight on the day of operation he was slid semi-conscious into a hyperbaric chamber, breathing spontaneously. As the pressure rose to two atmospheres he indicated severe earache, which he could not relieve by auto-inflation because he required ventilation for respiratory failure.

Culture of the pus from the neck grew micro-aerophilic Streptococci and mixed anaerobes, but no Clostridia.

Over the next two days the condition of his neck improved, but his mediastinal shadow, as seen on chest X-ray, broadened. Three days post-operatively, bilateral chest drains relieved him of three litres of purulent effusion. The following day his left lower second molar was extracted. Nine days after his first operation, a pericardial effusion of one litre was drained, relieving cardiac tamponade. The incision was made through the rectus sheath, and even this contained pus.

Following two weeks of ventilation he made slow progress to a complete recovery. He left hospital two months after admission.

Discussion

(1) *Aetiology*

Any focal sepsis in the oral cavity or pharynx may extend and escape to cause peripharyngeal suppuration. The cause in Cases 2 and 3 was an infected lower molar tooth. In the first case, the source of infection was less clear. Although a diseased right lower molar was extracted several weeks after the illness, no local tenderness of that tooth or floor of the mouth was elicited on admission. It may have been that these local signs disappeared when the dental abscess released its contents into the neck.

The organisms responsible for these infections were not isolated in one case. However, they may be characterized by the following properties:

(a) Gas production.
(b) Antibiotic resistance.
(c) Provenance in the oral cavity or oropharynx.

Thus the likely offenders were anaerobes (e.g. Bacteroides spp.) or a synergistic combination of aerobes and anaerobes.

Spread through the neck was along tissue planes between muscles and fascial layers. Anatomically the neck is often divided into spaces: the sub-mental compartment, the peritonsillar space, the parapharyngeal space, the retropharyngeal space, the masticator space, the sub-hyoid and parotid spaces, among others (Hora, 1963; Levitt, 1976). However, there is an anatomical communication between all of these, and together with the enzymatic action of the organisms, loculation of the suppuration depends more on the response to the infection. The word suppuration is used as it evokes an intermediary

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concept between cellulitis, when infection spreads through a tissue or organ, and an abscess, when pus gathers in a spheroidal loculation. Suppuration implies pus invading tissue planes and potential spaces without the development of a discrete abscess.

The intercommunication of the spaces of the neck is most important because of continuity with the superior mediastinum (Ramilo *et al.,* 1978). Descent of the infection into the mediastinum can be seen in Cases 2 and 3 (and in those of Valdazo, 1978), to worsen the prognosis considerably: the two cases of mediastinitis reported here nearly died, and one of Valdazo's did succumb.

(2) *Clinical Features*

The features of this condition may be summarized:

(1) A previously fit patient.
(2) Clinically toxic.
(3) Gas shadows on X-ray.
(4) Stridor.
(5) Failure of medical treatment.
(6) Intubation difficult or impossible.
(7) Pus liberated at tracheostomy.
(8) Mediastinitis.

As can be seen, the above features form a chronological sequence of increasing severity. Mediastinitis may not develop (see Case 1).

(3) *Rational therapeutic approach*

This condition should be diagnosed clinically and confirmed on lateral soft-tissue X-ray of the neck. The presence of gas is pathognomonic in a febrile patient. Helpful investigations include a full blood count, blood cultures, throat swab and arterial blood gases. Needle aspiration of the neck is recommended before high dose intravenous antibiotic therapy is begun (Moncada *et al.,* 1978). The choice of antibiotics is made with the advice of the clinical microbiologist after Gram staining material, if available. The drugs should be effective against microaerophilic Streptococci and penicillin-resistant Bacteroides spp.

Surgical drainage is always required. If performed early, airway obstruction may be obviated.

When airway obstruction is the presenting feature, Helium and Oxygen given by mask will relieve symptoms while the patient and theatre are hurriedly prepared. Intubation is invariably hazardous and sometimes impossible. The surgeon should be scrubbed to do a tracheostomy and should expect to find pus in the wound.

With an airway established, the tissue planes should be explored with a finger and large drains laid wherever pus is found.

The complications of respiratory failure and mediastinitis are to be anticipated and treated aggressively (see Cases 2 and 3).

Hyperbaric Oxygen therapy is known to be of value in overwhelming anaerobic infections (Tonjüm *et al.,* 1980). However, it is impossible to combine this treatment with intermittent positive pressure ventilation, which may be necessary if chest complications occur.

The source of the infection should be eradicated whenever possible; dental extraction was indicated in these cases.

Acknowledgements

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