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Surgical emphysema following dental treatment

R. J. SALIB, F.R.C.S. (OTO), D.L.O., P. VALENTINE, F.R.C.S., S. AKHTAR, F.R.C.S.

Abstract
Surgical emphysema is a relatively rare complication of dental surgery. Many cases go unrecognized or are misdiagnosed. Although the majority of cases resolve spontaneously, some can lead to potentially life-threatening complications requiring emergency intervention. A case of surgical emphysema following a routine restorative dental procedure is presented. The differential diagnosis and management of this condition is discussed.

Key words: Subcutaneous emphysema; Dental restoration, permanent

Introduction

Surgical emphysema is defined as the abnormal presence of air or gas in the body tissues or tissue spaces. It can be classified into spontaneous, traumatic or iatrogenic. Spontaneous emphysema can be self-induced following vigorous nose blowing (Shafto, 1945) or playing wind instruments (Shovelton, 1957). The traumatic variety can complicate fractures involving the facial skeleton (Flood, 1988). Iatrogenic surgical emphysema follows surgical procedures during which air is introduced into the soft tissues, spreading along fascial planes. Examples include maxillo-facial and head/neck surgical procedures. Surgical emphysema following an oesophagoscopy can indicate an oeosphageal perforation. Surgical emphysema resulting from dental treatment has been linked to the frequent use of air-driven hand pieces and high-speed water-cooled equipment in dental practice. The types of dental procedures most frequently associated with emphysema include tooth extraction, restorative dentistry and endodontic treatment (Heyman and Babayof, 1995). An increase in the intra-oral pressure (e.g. blowing a balloon) during the early post-operative period can also result in surgical emphysema (Shovelton, 1957). The appearance of subcutaneous emphysema following dental procedures is an uncommon, although increasingly frequent complication (Geffner, 1980; Schuman *et al.*, 1983). It can easily go unrecognized or be misdiagnosed with potentially disastrous consequences. Most cases do resolve spontaneously and the complicated ones, not surprisingly, are mostly managed by our colleagues, the maxillo-facial surgeons; a fact clearly evident in the bulk of the published work on this subject. It follows from the above that as otolaryngologists, we are unlikely to be exposed to this complication of dental treatment. The aim of this report is not to add to the recorded instances but to help ensure that in the event of being exposed to this complication, an otolaryngologist can diagnose and manage it appropriately. We, therefore, consider it noteworthy and instructive in that respect.

Case report

A 56-year-old woman attended our department as a self-referral with a right facial swelling. Twelve hours earlier,

FIG. 1
Right side of face swollen on presentation.

From the Royal National Throat, Nose and Ear Hospital, London, UK.
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she had undergone routine restorative dental treatment (buccal margin fillings) to the first and second right lower premolars under local anaesthesia (two per cent lignocaine + 1:80,000 adrenaline). She reported the sudden onset of a mild right-sided facial swelling as soon as she sat up at the end of the procedure. At that stage, the dentist felt that this represented a mild anaphylactic reaction and treated her with an anti-histamine. She was otherwise asymptomatic at that stage. Upon returning home, she noticed that the facial swelling was progressively worsening. She also started experiencing symptoms of dsyphagia and breathing difficulty. On presentation at our hospital, the right side of the face was markedly swollen (Figure 1). Involvement included the upper and lower eyelids, cheek and the neck extending down to the supraclavicular region. The right eye was completely closed. Palpation of the affected tissues revealed crepitus but no tenderness. There was no evidence of stridor or respiratory compromise. Indirect laryngoscopy was unremarkable. General physical examination failed to reveal any evidence of cardiovascular instability or bronchospasm. She was apyrexial. There was no past history of atopy or anaphylactic reactions. A soft tissue A-P and lateral neck X-rays (Figures 2a + b) revealed diffuse surgical emphysema in the soft tissue planes of the neck. The chest X-ray was normal with no evidence of mediastinal emphysema. The patient was admitted for observation and started on broad-spectrum antibiotics. Over the following 24 hours, there was a significant resolution in the extent of the swelling and the patient was allowed home the next day with a week's course of antibiotics. At review one week later, the patient was asymptomatic; the swelling and crepitus had completely resolved. This was confirmed radiologically and the patient discharged.

Discussion

Surgical emphysema is characterized by soft tissue swelling of sudden onset, usually developing within seconds or minutes. Palpation of the affected tissues reveals crepitus or crackling, an important diagnostic feature. Discomfort is a variable finding. Most cases run an uneventful course as the air is gradually absorbed from the tissues. Occasionally, air may involve the deeper structures such as the mediastinum or more rarely the peritoneal cavity, pleura or pericardium (Sandler *et al.*, 1975; Shacleford and Cassani, 1993). This complication seems to affect males more frequently and tends to be associated with extraction of molar teeth (Heymans and Babayof, 1995). Although death as a result of air embolism has been reported (Rickles and Joshi, 1963), this is rare.

The differential diagnosis of emphysema includes conditions which produce rapid-onset swelling such as anaphylaxis, angio-oedema and internal haemorrhage. The context in which the swelling occurs is obviously important in making the diagnosis. Crepitus is the most important differentiating factor and is absent in angio-oedema and haematoma formation. A case of surgical emphysema

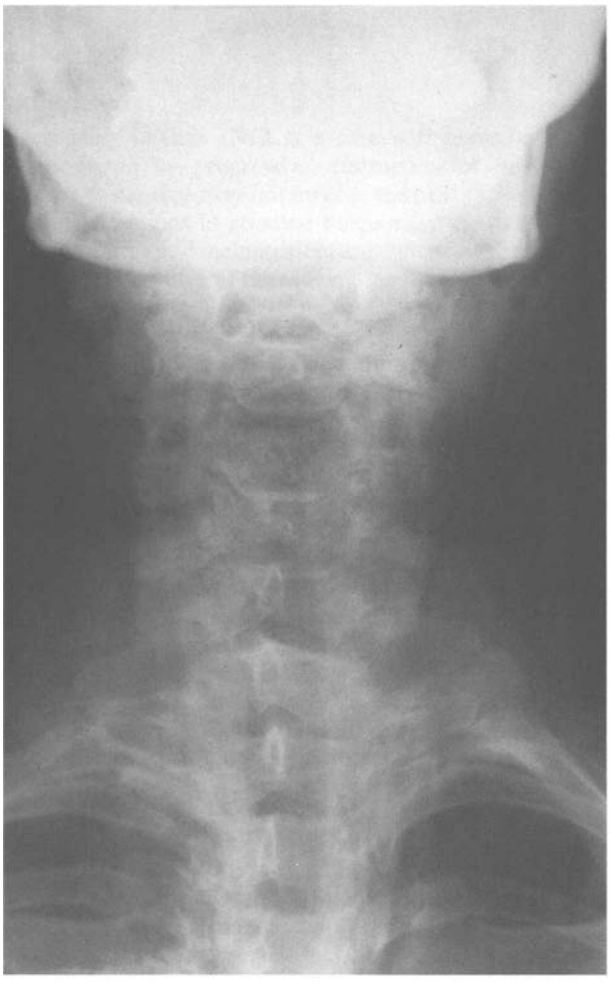

FIG. 2a

FIG. 2b

FIG. 2a and b
Soft tissue A-P and lateral neck X-ray of patient.

during restorative surgery where crepitus could not be elicited immediately has been described (Sivaloganathan and Whear, 1990) but this is the exception rather than the rule. In case of diagnostic difficulty, it is safer to treat for anaphylaxis.

Provided that there is no airway compromise, surgical emphysema can be treated conservatively. The prognosis is good. Infection is a potential risk and antibiotics are usually prescribed although this remains controversial (Shovelton, 1957). Emergency intervention could be required in severe cases with evidence of airway compromise and dysphagia.

Conclusion

Surgical emphysema is an uncommon, although increasingly frequent complication of dental treatment. Most cases resolve spontaneously but severe cases can potentially lead to disastrous sequelae. Although unlikely to be encountered in otolaryngological practice, the need for prompt diagnosis and appropriate management are essential.

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Address for correspondence:
Mr R. J. Salib,
10 Roxborough Avenue,
Harrow,
Middlesex HA1 3BU.