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CASE REPORT

Extensive surgical emphysema following restorative dental treatment

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Abstract

We present a patient with extensive surgical emphysema following the dental restoration the upper left first molar (tooth 26) with a high speed turbine handpiece. The clinical findings and management of subcutaneous cervical emphysema are discussed.

Key words: *dental treatment, subcutaneous cervical emphysema.*

Introduction

A 31-year-old woman was referred to the Emergency Department of Westmead Hospital by her general dental practitioner (GDP) following the acute onset of left periorbital and facial swelling during the dental restoration of the upper left first molar (tooth 26). After obtaining local anaesthesia by infiltrating 2 mL of 2% lignocaine and adrenaline 1:100 000 into the buccal sulcus, the cavity preparation proceeded uneventfully until rapid facial swelling occurred towards the end of the procedure. Her GDP ceased further work and referred her to the ED.

On examination, a well looking woman with obvious left facial swelling was seen (Fig. 1). Her vital signs were all within normal limits (temperature 37.1°C, respiratory rate 16 breaths per minute, heart rate 80 beats per minute, blood pressure 120/70 mmHg) and she was warm and well perfused.

Examination of her respiratory and cardiovascular system revealed vesicular breath sounds with good air entry bibasally and a midline trachea. She was able to swallow and was not in any respiratory distress. The apex beat was located in the midclavicular line at the 5th intercostal space and the heart sounds were dual with no added sounds.

Palpation of the swollen areas of the patient's face elicited crepitus. There was some tenderness on palpation of the left sternocleidomastoid muscle and she had trismus with a maximal interincisal opening distance of 25 mm. The patient was reluctant to rotate her head to the contralateral side of the swelling as this elicited pain in the left sternocleidomastoid muscle.

Intraoral examination revealed a small laceration in the depths of the upper left buccal vestibule adjacent to tooth 26 and measuring approximately 5 mm in length. The wound was not gaping and did not require repair. The remainder of her intraoral examination was normal and in particular there was no swelling or distortion of the posterior or lateral pharyngeal walls and the uvula was located in the midline with no deviation.

Radiographic examination included posteroanterior and lateral chest films and a CT study of her face and neck. The chest films were unremarkable, however, the CT scan of her face and neck showed extensive surgical emphysema extending into the left infratemporal fossa

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Conflicts of interest: None

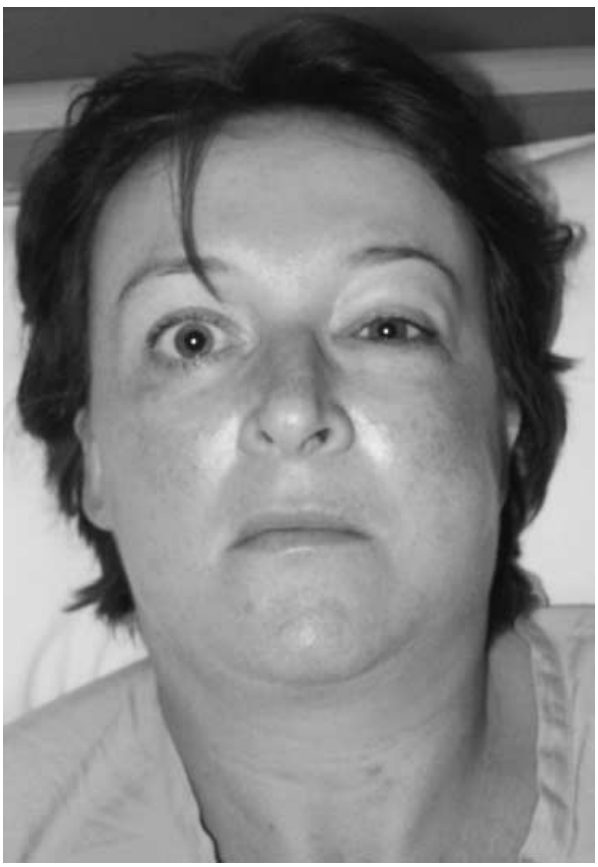

Figure 1. Clinical appearance of subcutaneous cervical emphysema.

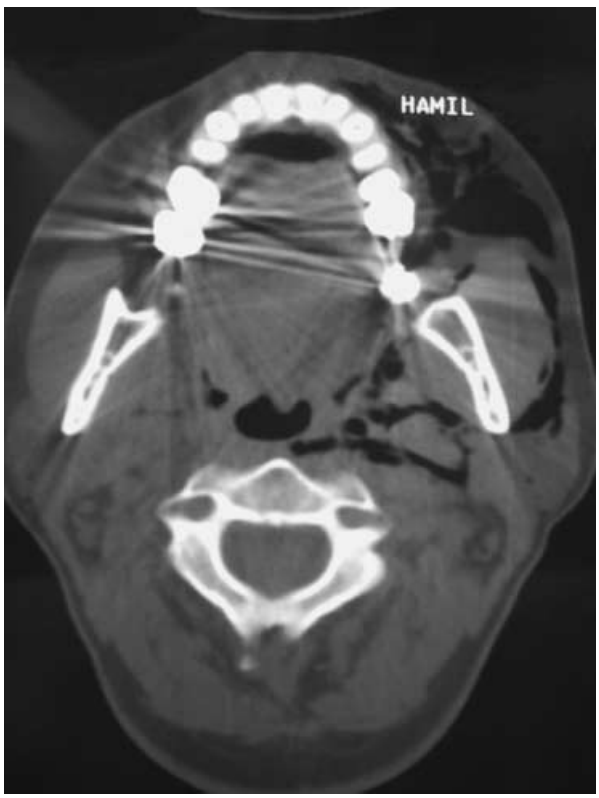

Figure 2. CT scan of patient in Figure 1 showing extensive surgical emphysema.

and inferiorly along the anterior aspect of the left sternocleidomastoid muscle (Fig. 2).

A diagnosis of subcutaneous cervical emphysema (SCE) was made and she was admitted for observation and commencement of intravenous antibiotics. She reported previous urticarial reactions to penicillin, so she was prescribed clindamycin 300 mg intravenously, four times a day.

Over the next two days the surgical emphysema progressively resolved and she remained well. She was discharged home on day 3 of her admission.

Discussion

Subcutaneous cervical emphysema can be defined as the collection of air (or another gas) below the subcutaneous tissues.[1] In the dental setting, it usually occurs when high speed dental handpieces are being used and the dental bur lacerates the adjacent mucosa. These handpieces are air turbine driven and expel high pressure air downwards towards the cutting surface of the bur. Once a breach in the mucosa is made, air under pressure is able to track subcutaneously.

Although alarming to the patient and clinician, it is usually a benign condition that resolves over 3–10 days[1–4] as the gas is resorbed into the blood stream for eventual excretion via the lungs. Rarely, serious complications such as pneumomediastinum[5,6] and airway compromise are seen.[7] Death due to an air embolus has been reported in a patient undergoing endodontic treatment who developed SCE and an embolus when an air water syringe was discharged into a root canal.[8]

Our literature review was unable to find any reports of serious infective sequale such as mediastinitis following SCE, however, most reports of this condition have placed the patient on a course of antibiotics designed to cover normal oral flora. The rationale for this is that the breach in the mucosa is almost certainly accompanied by ingress of oral flora which has the potential to infect the subcutaneous tissues. There has not been (and probably never will be), a

randomised case controlled study of the use of antibiotics in SCE. Thus we are unable to make a definitive pronouncement on the use of antibiotics in this condition, although the weight of opinion in the literature would seem to advocate the use of chemoprophylaxis.[1–8]

The presenting signs and symptoms of this patient can be explained by the widespread presence of subcutaneous air. Her trismus was most likely due to spasm of the masseter and pterygoid musculature secondary to trauma associated with dissection of tissue planes by high pressure air. Likewise, the tenderness of the left sternocleidomastoid muscle together with pain located in this muscle on turning the head to the contralateral side, can be explained by the same mechanism.

Treatment of SCE is symptomatic and antibiotic cover is usually prescribed as described above. If general anaesthesia is required, then nitrous oxide should be avoided given its propensity to exacerbate dysbaric conditions. No reference in the literature describing the use of hyperbaric treatment for SCE was found, however, this treatment modality may be theoretically attractive in severely symptomatic patients.

Summary

A case of extensive SCE with florid presenting signs following minor dental treatment is presented and used to illustrate the typical presentation signs and management of this uncommon condition.

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References

1. Schuman NJ, Owens BM, Shelton JT. Subcutaneous emphysema after restorative dental treatment. *Compendium* 22 January 2001; **1**: 38–42.
2. Schuman NJ, Edwards BC, Walker W *et al.* Subcutaneous emphysema during operative dentistry: report of a case with 30 month follow up. *J. Oral Med.* 1983; **38**: 168–9.
3. Baringer JV. Subcutaneous and retropharyngeal emphysema following dental restoration — an uncommon complication. *Ann. Emerg. Med.* 1982; **11**: 371–4.
4. Monsour PA, Savage NW. Cervicofacial emphysema following dental procedures. *Aust. Dent. J.* 1989; **34**: 304–406.
5. Maunder RJ, Pierson DJ, Hudson LD. Subcutaneous and mediastinal emphysema. Pathophysiology, diagnosis and management. *Arch. Intern. Med.* 1984; **144**: 1447–53.
6. Goorhuis H, Rothrock SG. Cervicofacial and thoracic barotrauma following a minor dental procedure. *Pediatr. Emerg. Care.* 1993; **9**: 29–32.
7. Breznick DA, Saporito JL. Iatrogenic retrophayngeal emphysema with impending airway obstruction. *Arch. Otolaryngol. Head Neck Surg.* 1989; **115**: 1367–72.
8. Rickls NH, Joshi BA. Death from air embolism during root canal therapy. *J. Am. Dent. Assoc.* 1963; **67**: 399–404.