CASE REPORT

Pneumatic dental extractions: an unusual cause of extensive cervical surgical emphysema

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SUMMARY

A 50-year-old fit and well man presented to the Accident and Emergency Department in a tertiary centre following lower molar extraction, complaining of voice hoarseness with neck and facial swelling. Clinical examination along with plain film radiography revealed pneumomediastinum and extensive cervical surgical emphysema. He was subsequently admitted for observation and managed conservatively under the ENT team with input from the maxillofacial and anaesthetic teams. With supportive treatment only, the emphysema resolved and he remained well up until discharge.

BACKGROUND

Cervical surgical emphysema and pneumomediastinum are rare, but recognised, complications of pneumatic dental extractions.¹ It is due to this rarity that this case seeks to provide an important reminder of rarer causes of surgical emphysema, possible differentials and their management, especially to the readership with no prior dental experience.

CASE PRESENTATION

A 50-year-old, fit and well male presented to the A+E at a tertiary centre with voice hoarseness and left-sided facial and neck swelling around 4–6 hours following left lower molar dental extraction (LL8) at a community dental practice.

At this point, a comprehensive history revealed no other risk factors, such as relevant comorbidities, other recent surgery/trauma, infections or suggestion of barotrauma.

On examination, the patient demonstrated evidence of a recent dental extraction and palpable subcutaneous emphysema from his left lower eyelid to his anterior chest wall. His voice was hoarse but appeared to have no acute airway compromise. This was confirmed on nasal endoscopy revealing a patent airway and normal supraglottic anatomy.

The patient was admitted for supportive treatment and airway observations under the ENT team. He was reviewed by the anaesthetic and maxillofacial teams soon after admission.

INVESTIGATIONS

Blood tests on admission were completely normal. Basic radiology in the form of lateral neck soft tissue and chest radiographs revealed evidence of pneumomediastinum and marked surgical emphysema throughout the neck (figure 1). Flexible

nasoendoscopy showed normal appearances of the pharynx, larynx and no evidence of airway compromise.

DIFFERENTIAL DIAGNOSIS

At this stage in this case, differential diagnoses were limited to surgical emphysema post pneumatic lower molar extraction with an absence of predisposing laryngopharyngeal or upper gastrointestinal pathology or symptoms to suggest diagnoses such as laryngocoele or Boerhaave's syndrome. However, in other cases with different presentations or circumstance, haematoma, infection and anaphylaxis should be excluded.

TREATMENT

The patient was admitted for airway observation and symptomatic treatment as an inpatient and started on regular saline nebulisers and intravenous antibiotics with good effect. The anaesthetic and maxillofacial teams subsequently reviewed him. A plan was made in the event of airway compromise with the anaesthetic team, but no further intervention was required from a dental perspective.

OUTCOME AND FOLLOW-UP

He was nursed on a high dependency bay at a regional ENT centre and kept on routine airway observations. Following a period of observation with normal parameters and gradual improvement in voice and pain control, he was discharged.

At telephone follow-up, he felt he had full resolution of all his symptoms in the subsequent 4 weeks, with no periods of relapse.

DISCUSSION

Subcutaneous emphysema is characterised by the presence of air in the subcutaneous tissues that subsequently travels along the fascial planes, most often affecting the chest, neck and face. Common signs or symptoms include swelling and pain in the chest/neck/face, airway compromise or breathing difficulties, dysphagia, voice changes and multiple palpable 'crackling' swellings in affected areas. It is also often associated with pneumomediastinum.¹

The aetiology is well documented from a number of common causes such as a perforated viscus following penetrating trauma, as a complication of a respiratory condition causing alveolar rupture such as chronic obstructive pulmonary disease and/or pneumothorax and prolonged violent vomiting.^{1–4} Rarer causes include as a complication

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Figure 1 Plain Anteroposterior film of the cervical region. Extensive supraclavicular surgical emphysema (white asterisks). There is also the suspicion of pneumomediastinum, but no pneumothorax (red asterisks).

of continuous positive airway pressure therapy/peak flow meter usage, infection with gas forming organisms (eg, *Clostridium perfringens*), barotrauma following scuba diving injuries or even as a postpartum complication.^{2,5,6} Surgical emphysema can follow an iatrogenic aetiology, such as following procedures such as tracheostomy, pneumonectomy, transanal endoscopic microsurgery or rarely pneumatic dental extraction.^{2,7}

A review of the dental literature from 1993 to 2008 identified only 16 cases attributed to the use of pneumatic dental extractions and even fewer reporting these complications post lower molar extraction.^{8–10} The process of forcing air below a reflected gingival flap allows the pressurised gas to shear through fascial planes establishing a field of loculated and trapped air within the tissues.¹⁰ On clinical examination, the findings of palpable crepitus can be elicited. Once these spaces are accessed and defined, the extent of subcutaneous emphysema can spread beyond defined anatomic subsites, such as into the parapharyngeal and retropharyngeal spaces and thereafter into the mediastinum. In our case, pressurised air entering at the oral cavity spread into the subcutaneous layers of the submandibular and submental regions of the anterior neck, thereafter spreading superiorly towards the eye and inferiorly to the anterior chest wall and deeper via the cervical route to the mediastinum.

Management of this complication is most commonly supportive including the treatment of symptoms, prophylactic antibiotics and close monitoring of the airway. Definitive airway management, subcutaneous/chest drain may be indicated should the patient's condition deteriorate.^{2,9,10}

In the management of our patient, only supportive treatment was required in the form of admission for analgesia and airway monitoring. This is in keeping with the majority of the literature but was only after a comprehensive history, examination and exclusion of other more urgent and life-threatening differentials.

A multidisciplinary approach ensured that should the patient have failed to improve or deteriorate, more significant interventions could have been introduced. As detailed above, this could have included definitive airway management or the placement of subcutaneous or chest drains.

Our case highlights a rare but recognised aetiology in dental practice; the formulation and exclusion of important differentials and the stepwise multidisciplinary approach required in the management of cervical surgical emphysema and pneumomediastinum.

Learning points

- ▶ Although a rarely recognised complication of dental surgery, this phenomenon may present in the medical community.
- ▶ Important to adequately resuscitate and exclude other important differentials.
- ▶ Important to formally assess the airway when additional airway symptoms are present.
- ▶ Important to determine extent of surgical emphysema/pneumomediastinum—through examination, complemented by radiology.
- ▶ A multidisciplinary approach to management and a clear escalation plan should the patient deteriorate is essential.

Contributors Both of the authors were involved in the patient's care and are responsible for the creation of the manuscript, including the literature review.

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