



Pneumomediastinum And Cervicofacial Subcutaneous Emphysema In A Young Male Following Molar Tooth Extraction: A Case Report

¹Dr. Jyotsna M Jose, ²Dr. Anilkumar Asokan, ³Dr. Harikrishnan Somasekaran,
⁴Dr. Sreedhanya Sreehari, ⁵Dr Parvathy R S, ⁶Dr. Arya R Nair, ⁷Dr. Aby Eapen C,
⁸Dr Gowtham Kishore C G, ⁸Dr Lekshmi Rajeswary

¹MD, DNB (Anaesthesia), DrNB Resident in Critical Care Medicine

²MD (Anaes), DA, DNB (Anaes), MNAMS, HOD,

³MD (Anaes), DA (Anaes), FNB (Critical Care), Senior Consultant,

^{4,6}DNB Emergency Medicine, ⁵M D General Medicine, ⁷DNB (Anaesthesia), ⁸MD (Anaesthesia)

^{4,5,6,7,8}DrNB Resident in Critical Care Medicine

^{1,2,3,4}Department of Critical Care,

Ananthapuri Hospital & Research Institute

Address: Thiruvananthapuram, Kerala, India

*Corresponding Author:

Dr. Jyotsna M Jose

MD, DNB (Anaesthesia) DrNB Resident in Critical Care Medicine,

Ananthapuri Hospital & Research Institute, Thiruvananthapuram, Kerala, India

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Subcutaneous emphysema and pneumomediastinum are rare but serious complications after dental extraction, often linked to the use of compressed-air instruments. This case report describes a rare incidence of subcutaneous emphysema and pneumomediastinum following the extraction of a lower third molar in a 28-year-old male. The patient was managed conservatively with oxygen, antibiotics, and observation, with complete resolution. Prompt recognition and conservative management are key to management of this condition.

Keywords: Pneumomediastinum, Subcutaneous Emphysema, Molar Tooth Extraction, Air tracking

Introduction

Subcutaneous emphysema and pneumomediastinum are uncommon complications of oral surgery, particularly following molar extractions[1]. Although rare, these conditions can have serious and potentially life-threatening consequences if not diagnosed promptly. While often self-limiting, effective and timely management is crucial to reduce the risk of severe complications[2]. The condition is characterized by the forceful introduction of air underneath the tissue, which manifests clinically as palpable crepitus and swelling. The air subsequently tracks along the fascial planes, potentially spreading to the periorbital, mediastinal, pericardial, and/or thoracic spaces[2]. In the majority of reported

instances, the use of air-driven handpieces is implicated as the common etiological factor. However, other perioperative events, including endotracheal intubation, positive pressure ventilation[2], an increase in intraoral pressure (e.g., from sneezing or blowing the nose), and the use of air syringes or chemical irrigants (e.g., hydrogen peroxide) have also been identified[3]. The following report presents a case of pneumomediastinum and subcutaneous emphysema following lower third molar extraction without the reported use of compressed air devices, describing the clinical management and discussing critical issues related to the diagnosis and prevention of this complication

Case Report:

A 28-year-old male, with history of gout recently started on febuxostat, underwent elective extraction of the impacted right lower third molar tooth under local anaesthesia at a dental clinic. Use of air driven compressor during extraction was not reported. On the same evening, he experienced pain on right side of face and neck with a noticeable swelling on right side of face. He visited a local hospital next day and was prescribed oral analgesics, which provided partial pain relief. But on the second post extraction day, he developed increasing pain in face and neck along with chest discomfort, with more visible swelling in the face and neck regions. He also experienced dysphagia and increased pain on deep inspiration. Concerned about his worsening symptoms, he presented to the emergency department of our hospital.

At Emergency Room, he was afebrile, airway was patent with stable vitals: Heart rate 96bpm, blood pressure 128/80 mmHg, respiratory rate 18/min and oxygen saturation 98% room air. On examination, there was visible swelling and palpable crepitus over the right facial, submandibular regions extending to supraclavicular areas. Crepitus extended across midline to lower part of face and neck till left supraclavicular areas. Cardiopulmonary examination revealed normal breath sounds and heart sounds. Sutured wound noted in Right molar area; no discharge/pus.

Laboratory investigations including complete blood count, renal and liver function tests, electrolytes were unremarkable. Arterial blood gases found normal. Chest X-ray revealed extensive subcutaneous emphysema extending from the face down to the neck and mediastinum, without evidence of pneumothorax.

Computed Tomography CT Neck showed diffuse subcutaneous emphysema involving anterior neck and right temporal fossa; air noted within bilateral masticator, parotid, parapharyngeal, buccal, posterior cervical, retropharyngeal, and carotid spaces. Air extending into the mediastinum seen- no pneumothorax/pneumopericardium. Subcentimetric right cervical lymphadenopathy seen.

Diagnosis of extensive subcutaneous emphysema with pneumomediastinum secondary to air tracking from dental extraction site was made. Patient was admitted to multidisciplinary ICU for close monitoring and

confined to bed. He was administered oxygen via face mask 5L/min. Empiric broad-spectrum antibiotics were initiated. Analgesia was provided with acetaminophen and NSAIDS. Oral intake was initially restricted for initial 12 hours, later soft oral diet restarted once he had resolution of symptoms. Inflammatory markers were found negative. Over the next 48 hours, swelling and pain subsided and crepitus diminished. Repeat chest radiograph showed near complete resolution of subcutaneous emphysema. Patient was weaned off oxygen and shifted out of ICU after 72 hours. He was discharged on day 5 with short course of oral antibiotics. He remained asymptomatic at 2 week followup.

Discussion:

Although most cases of pneumomediastinum after dental extractions occur intra- or immediately post-operatively, delayed presentations[1]— as in this case — can occur. Most of these cases were attributable to the use of compressed air turbines but other causes identified were (during the procedure) the use of air syringes, spreading the mucoperiosteal flap too wide with retractors, and irrigation with hydrogen peroxide, endotracheal intubation/ventilation, and patient activities after surgical procedures causing an increase of pressure like sneezing, inflating a balloon, or blowing the nose.[3,4,5] The cause of subcutaneous emphysema in this case report was uncertain because the extraction was performed with a conventional handpiece and without air injection.

The pressurized air introduced during extraction may dissect into fascial planes and migrate into the mediastinum over hours to days. In particular, the 1st, 2nd, and 3rd roots of the molar teeth are linked directly to the sublingual and submandibular area. Subcutaneous emphysema arises when air is forced, under pressure, into the fascial spaces. Once the air is under the tissue, dissection can occur along the relatively delicate connective tissue joining adjacent muscle planes.[4] The classical pathway involves spread from the submandibular space into the parapharyngeal and retropharyngeal spaces, then through the visceral space of the neck into the superior mediastinum. Symptoms can be localized (facial/neck swelling, crepitus) or systemic (chest discomfort, dysphagia, dyspnea)[3].

Subcutaneous emphysema requires prompt recognition, as delayed diagnosis may lead to serious

complications. Air under pressure can dissect into the orbital region, risking visual loss, or compress the airway and adjacent nerves, causing obstruction or vocal cord paresis.[6] Extension into the thorax may result in pneumomediastinum or pneumopericardium or even extension to spinal canal(pneumorrhachis).[7]In cases of pleural rupture, secondary pneumothorax or even air embolism may occur. Infective spread from oral flora or contaminated irrigation may lead to mediastinitis or necrotizing fasciitis, though these remain rare but life-threatening events.[3]

In our case, the emphysema extended into the thorax, causing pneumomediastinum; however, the air remained confined to the mediastinal space without secondary infection or additional complications.

In a literature review on dental procedure related emphysema, almost half was associated with use of air driven handpieces. Of the cases reviewed, 15 % resulted in significant complications after subcutaneous emphysema[8] Centripetal air dissection, with retropharyngeal and mediastinal emphysema was found to occur very rarely as per most literature reviews.[4]

Prompt and accurate diagnosis relies on imaging to confirm the presence of ectopic air, determine its extent, and exclude critical associated pathology. While a clinical diagnosis is often suspected based on history and physical examination (crepitus), radiographic confirmation is mandatory for management planning.

On a posteroanterior chest X-ray, the most common radiological findings include air streaks in the superior mediastinum, a clearly outlined cardiac silhouette, and subcutaneous emphysema over the neck and shoulder regions. Less common but distinctive signs are the **double bronchial wall sign**, where the tracheal or main bronchial wall becomes visible between intraluminal air and extraluminal leaked air, and the **continuous diaphragm sign**, in which leaked mediastinal air outlines and visually connects both hemidiaphragms beneath the heart.[9]. CT is the diagnostic modality of choice, as it can precisely delineate the extent of air.

Other differential diagnosis includes conditions that can present with head and neck swelling—such as infection, anaphylaxis, angioedema, and hematoma

and these can easily be ruled out by history, examination and imaging.[10]

No special interventions are indicated for treatment of pneumomediastinum itself; only rest and adjunctive treatments such as analgesics, are indicated. In most cases, the reabsorption of air begins within two to three days, frequently having complete resolution by day 7–10 after onset [1]. This process may be hastened with the use of oxygen inhalation through the nasal cannula, which reduces the partial pressure of nitrogen within the blood, ultimately increasing air reabsorption [10]

Most patients can be treated conservatively with oxygen therapy, broad-spectrum antibiotics limitation of physical activity and clinical observation. Recognition of chest pain exacerbated by deep inspiration (pleuritic pain) and associated dysphagia should raise suspicion of mediastinal involvement.[7] While complications like tension pneumomediastinum, pneumothorax, or mediastinitis are rare, prompt diagnosis is essential to avoid progression. The routine use of chest tubes, tracheostomy, or mediastinal drains is not recommended.[9]

Clinicians should maintain proper maintenance of the pneumatic turbine to prevent subcutaneous emphysema[5]. Additionally, post operative instructions after a dental or surgical procedure should include avoidance of any activity that may increase pressure in the oral cavity like coughing, smoking, blowing the nose, using straws, or vomiting.[1]

Conclusion:

We have presented a case of pneumomediastinum and subcutaneous emphysema after third molar extraction. The cause was not identified, but would probably be due to an increase in intraoral pressure post extraction. The patient was hospitalized, treated with antibiotic prophylaxis, and improved favorably. Clinicians should be alert to the possibility of subcutaneous emphysema and pneumomediastinum even days after molar extractions, especially when patients report swelling and crepitus. Prompt imaging, conservative intervention, and patient reassurance are key. Avoidance of compressed-air instruments, careful operative technique, and postoperative patient guidance may help mitigate risk.

References:

1. Ocakcioglu I, Koyuncu S, Kupeli M, Bol O. Pneumomediastinum after Tooth Extraction. Case Rep Surg. 2016;2016:4769180. DOI etc. PMID: 26989552 Europe PMC
2. Sarfi D, Haitami S, Farouk M, Ben Yahya I. Subcutaneous emphysema during mandibular wisdom tooth extraction: Cases series. Ann Med Surg (Lond). 2021 Nov 11;72:103039. doi: 10.1016/j.amsu.2021.103039. PMID: 34815859; PMCID: PMC8591463
3. Peters M, Shall F, Evrard L. Pneumomediastinum after Third Molar Extraction: Case Report, Physiopathology, and Literature Review. Case Rep Dent. 2023 Aug 3;2023:4562710. PMID: 37575892
4. Heyman SN, Babayof I. Emphysematous complications in dentistry, 1960–1993: An illustrative case and review of the literature. *Quintessence Int.* 1995;26(8):535-543
5. Afzali N, Malek A, Attar AHH. Cervicofacial Emphysema and Pneumomediastinum Following Dental Extraction: Case Report. Iran J Pediatr. 2011;21(2):253–255. PMID: 23056798
6. North L, Sulman C. Subcutaneous emphysema and vocal fold paresis as a complication of a dental procedure. Int J Pediatr Otorhinolaryngol. 2019 Sep;124:76-78. doi: 10.1016/j.ijporl.2019.05.033. Epub 2019 May 25. PMID: 31170557.
7. Y.B.E. Tay, W.S. Loh, Extensive subcutaneous emphysema, pneumomediastinum, and pneumorrhachis following third molar surgery, International Journal of Oral and Maxillofacial Surgery, Volume 47, Issue 12, 2018, Pages 1609-1612, ISSN 0901-5027
8. McKenzie WS, Rosenberg M. Iatrogenic subcutaneous emphysema of dental and surgical origin: A literature review. *J Oral Maxillofac Surg.* 2009;67(6):1265-1268.
9. Takada K, Matsumoto S, Hiramatsu T, Kojima E, Shizu M, Okachi S, Ninomiya K, Morioka H. Spontaneous pneumomediastinum: an algorithm for diagnosis and management. Ther Adv Respir Dis. 2009 Dec;3(6):301-7. doi: 10.1177/1753465809350888. PMID: 19934282.
10. C.-H. Jeong, S. Yoon, S.-W. Chung, J.-Y. Kim, K.-H. Park, J.-K. Huh, Subcutaneous emphysema related to dental procedures, J Korean Assoc Oral Maxillofac Surg 44 (2018) 212–219.

Fig no 1: chest radiograph anteroposterior view taken on day of admission showing extensive subcutaneous edema extending from neck to superior mediastinum



Fig no 2: chest radiograph anteroposterior view taken 48 hours after admission showing good resolution of subcutaneous emphysema

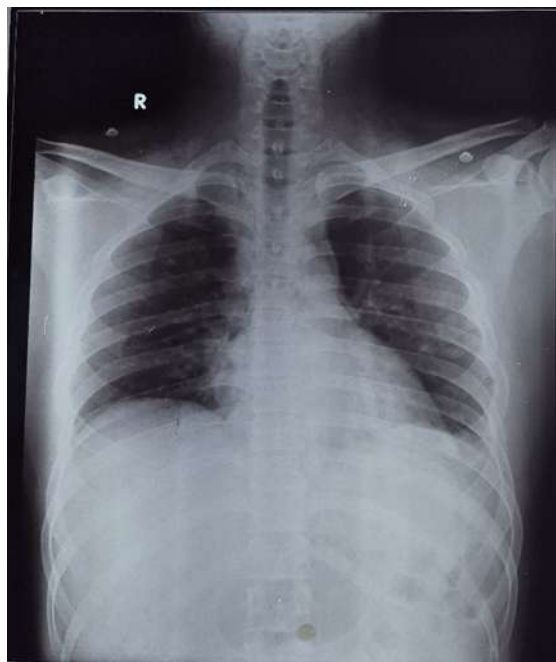


Fig no 3: X ray Anteroposterior and lateral view of Neck extensive subcutaneous emphysema extending bilaterally from face to neck and supraclavicular area

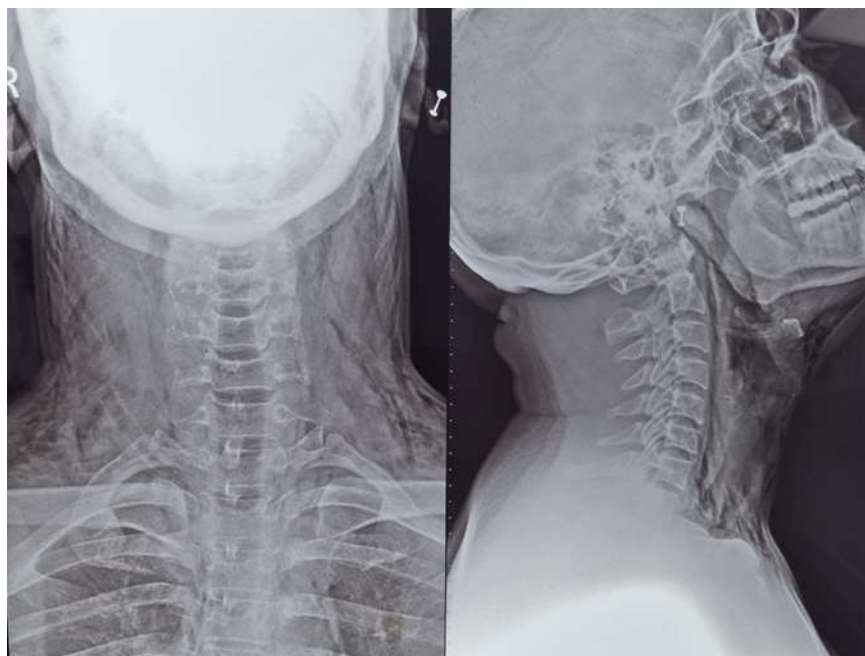


Fig no 4: computed tomography CT slice at level of neck showing bilateral subcutaneous emphysema



Fig no 5: CT slice sagittal view shows subcutaneous emphysema, retropharyngeal air and pneumomediastinum

