CASE REPORT

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Cervicofacial Emphysema After a Dental Procedure: A Case Report

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Abstract

Subcutaneous emphysema is a complication that can occur after dental procedures. Air leaking under the skin can diffuse into various potential spaces. When it spreads to the cervicofacial area, a complaint of significant facial swelling may occur a few hours after the procedure or the next day. Leaking into potential spaces can cause life-threatening situations in some cases. Two of these situations are pneumomediastinum and mediastinitis. The mucogingival barrier is a keratinized, protective structure at the junction of the oral cavity mucosa and gingiva. Caused by high-speed air rotors used in dental procedures, this complication can occur due to interventions that damage the mucogingival barrier, such as tooth extraction, restorative treatment, and root canal treatment. The aforementioned traumatic treatments may create a defect in the barrier, and the air emitted by high-speed air rotors may leak under the skin. It is rare for this complication to occur without significant damage to the mucogingival barrier. Even if cervicofacial emphysema develops, progression to pneumomediastinum and mediastinitis is rare. Clinical findings such as a significant dyspnea, high fever, and low oxygen saturation may be detected in the patient with these complications, or the patient may be asymptomatic. We present a 42-year-old female patient who developed subcutaneous emphysema and asymptomatic pneumomediastinum after caries treatment in which only 1/4 of her enamel was excised without tooth extraction.

Keywords: Dental care, subcutaneous emphysema, complication

INTRODUCTION

Subcutaneous emphysema is a rare but essential complication observed after dental procedures.

The main findings of this condition, which is characterized by the trapping of air under the skin, include crepitation and swelling on palpation. Air trapped under the skin may spread to the periorbital, mediastinal, pericardial, and thoracic regions. Subcutaneous emphysema developing after dental procedures has various causes such as tooth extraction, preparation, restorative treatment, endodontic treatment, and subgingival curettage (1).

High-speed air rotors in dental procedures that disrupt the mucogingival barrier are widely recognized as a risk factor for developing subcutaneous emphysema (2).

Emphysema in the head and neck region usually regresses spontaneously, but sometimes it can lead to significant complications such as pulmonary embolism, soft tissue infection, pneumomediastinum, and pneumopericardium (3).

We present a patient treated for dental caries who developed cervicofacial emphysema without tooth extraction.

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CASE PRESENTATION

After dental treatment, a 42-year-old female patient was admitted to our clinic complaining of swelling and pain in the left periorbital and submandibular areas. The patient had no other symptoms, such as fever or dyspnea. The patient stated that she had been treated for tooth decay the day before, and there was no tooth extraction. In the dental procedure, it was learned that 1/4 of the enamel of the left second mandibular molar was excised, and the remaining barriers were intact (Figure 1). Her general condition was good, and her vital signs were stable at the first examination. The patient's fever was 36.7 degrees Celsius; blood pressure was 120/80 mmHg; heart rate was 84/min, oxygen saturation of 99% on room air; and respiratory rate was 14/min. On physical examination, there was a painful swelling in the left periorbital and submandibular areas on palpation with crepitation (Figure 2). No infective focus was detected in the intraoral examination, and the treated tooth was intact. No pathological lung sound was heard during auscultation. The patient had no known comorbidities. The patient denied alcohol and tobacco use.

Neck computed tomography (CT) was performed as a radiological examination. Thorax CT examination was also performed due to the possibility of mediastinal spread. Both subcutaneous emphysema extended from the periorbital region to the submandibular and pneumomediastinum in the upper mediastinum (Figure 3). The white blood cell count of the patient was 11700, and the C-reactive protein value was 22 in the blood tests. Except for these, no abnormal values were detected. In the neck CT examination of the patient, it is seen that the subcutaneous emphysema extends from the left periorbital

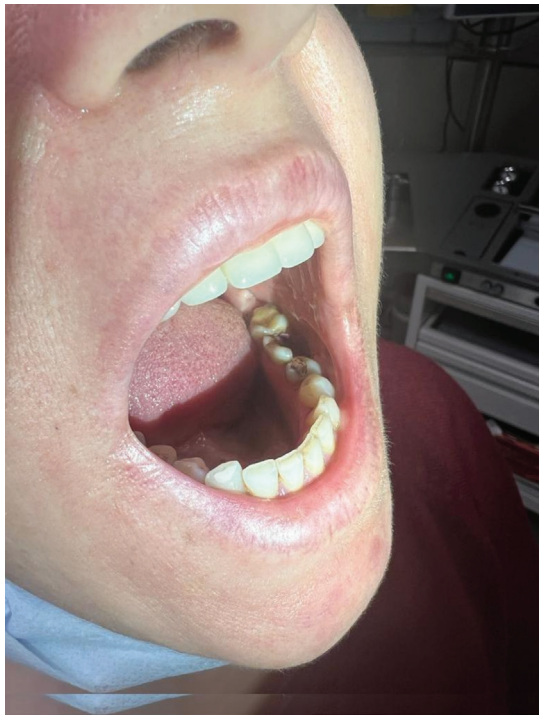

Figure 1. Pre-treatment view of the patients tooth

Figure 2. Patients first presentation and appearance of cervicofacial emphysema after dental procedure

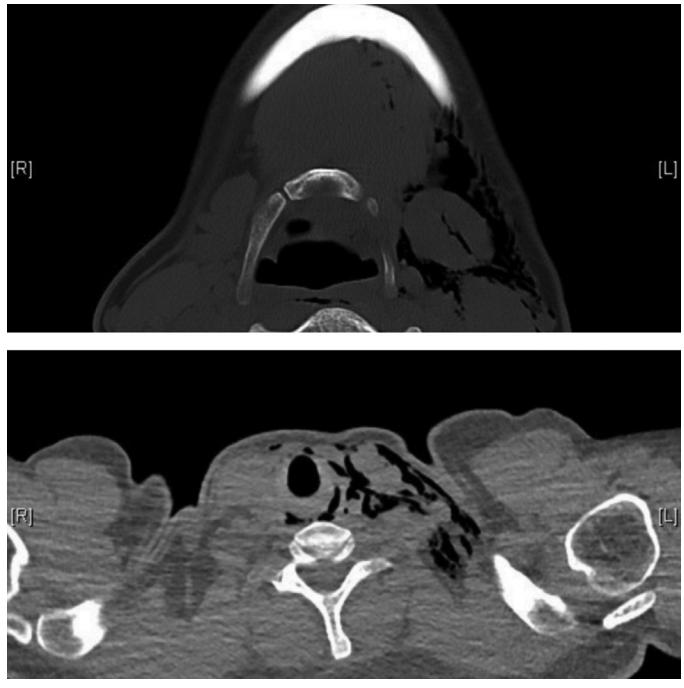

Figure 3. Above: CT image of cervicofacial emphysema below: pneumomediastinum on chest CT

CT: Computed tomography

area to the submandibular region and descends to the level of the hyoid bone. It is seen in thorax CT that subcutaneous emphysema extends to the mediastinum through the fascial planes and causes pneumomediastinum.

The patient was diagnosed with cervicofacial emphysema and asymptomatic pneumomediastinum secondary to dental caries treatment. Cefuroxime 500 mg per oral 2x1, chlorhexidine mouthwash 3x1, and a light-pressure massage to the face were used for 1 week in the therapy. Periorbital and submandibular swelling regressed significantly in the first week after the treatment, and no additional conditions or complications developed (Figure 4).

DISCUSSION

Tornbull first described subcutaneous emphysema in 1900 in a case of swelling in the neck that developed after a musician played a wind instrument whose tooth had been extracted (4). The etiology of subcutaneous emphysema can be iatrogenic, infectious, traumatic, or spontaneous. Iatrogenic causes are the most common etiological causes. These include head and neck surgery, intubation, mechanical ventilation, and dental surgery (5).

In subcutaneous emphysema developing after dental procedures, air passes through the mucosal defects and the dentoalveolar membrane to the fascial planes in the neck (6). Trapped air due to the relationship of the cervical fascia with the mediastinum can lead to pneumomediastinum and, worse, mediastinitis. Less commonly, pneumothorax (7), optic nerve damage (8), and even death due to air embolism (9) are reported complications. In sudden dyspnea and swelling after a dental procedure, most clinicians consider allergic reactions or angioedema, soft tissue infection such as cellulitis, hematoma, Ludwig's Angina, or Lemierre syndrome in the differential diagnosis. Painless edema is present in cases with isolated subcutaneous emphysema, and crepitation by palpation is pathognomonic (10).

Figure 4. The appearance of the patient whose symptoms regressed after 1 week of follow-up and treatment

The widespread use of advanced air-driven instruments in dental procedures has led to a marked increase in the incidence of subcutaneous emphysema. In especially the extraction of the mandibular third molar tooth is the most frequently reported cause in case series (11).

Less frequently, restorative treatment (12), root canal treatment (6), crown preparation (13), periodontal surgery (14), scaling (15), and laser irradiation (16) may cause subcutaneous emphysema.

Early diagnosis and treatment are essential in subcutaneous emphysema. Although subcutaneous emphysema in the head and neck region generally regresses within 5-7 days, it can lead to the previously mentioned complications through potential cavities. Patients with dyspnea should be monitored for absolute saturation, and 100% O2 support should be provided. Besides, prophylactic antibiotic use is not recommended for infections in potential cavities, but it is generally used.

In the presented case, it was observed that subcutaneous emphysema might occur without significant intraoral barrier damage, and it has been shown that this emphysema can cause asymptomatic pneumomediastinum without causing a clinical findings. Emphysema and pneumomediastinum after the endodontic procedure are mostly related to the root canal irrigated with hydrogen peroxide or dried with compressed air. Only the air turbine handpiece was used in our case, and the irrigation and root canal treatment were not applied. Although a rubber dam was used during the procedure, emphysema still developed.

CONCLUSION

Dentists should be careful when using air-driven handpieces or compressed air syringes, be aware of the possibility of subcutaneous emphysema and pneumomediastinum, and be able to diagnose. When this suspicion occurs, the extent of emphysema should be determined with the necessary imaging studies, and treatment should be started-using a rubber dam, avoiding irrigation with hydrogen peroxide, using a compressed

air syringe during irrigation, and using remote exhaust handpieces or electric motor-driven handpieces for passing these complications.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Y.A., M.B., Concept: Y.A., Design: Y.A., C.Ç., Data Collection or Processing: C.Ç., Literature Search: Y.A., C.Ç., Writing: Y.A., C.Ç., M.B.

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