

FACIAL EMPHYSEMA DURING ENDODONTIC TREATMENT: A CASE REPORT

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ABSTRACT:

Subcutaneous emphysema is the abnormal presence of air or gas in body tissue or spaces. This iatrogenic complication is usually caused by surgical procedures that introduce air into the soft tissues. Very few cases have been reported of this condition developing during endodontic procedures. This case illustrates peri-orbital subcutaneous emphysema in a patient during routine endodontics in an upper second molar tooth. During initial debridement and cleaning of the root canals, the patient felt a sudden pricking pain, immediately after which she developed facial swelling extending to the peri-orbital area. Since the cause of the swelling could not immediately be discerned, she was administered anti-histamines to counteract any possible allergic reaction. Later, the lack of systemic symptoms and the absence of any local signs of inflammation, along with the presence of crepitus indicated that the swelling arose as a result of subcutaneous emphysema

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انتفاخ الوجه الهوائي أثناء المعالجة اللبية: تقرير حالة

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انتفاخ تحت الجلد هو وجود غير طبيعي للهواء أو الغاز في أنسجة الجسم. وعادة ما تحدث هذه المضاعفات عن طريق الخطأ أثناء العمليات الجراحية التي تدخل الهواء إلى الأنسجة الرخوة. وقد تم نشر تقارير عن حالات قليلة جداً من هذا المشاكل النامية خلال إجراءات العلاجات اللبية. توضح هذه الورقة حالة انتفاخ تحت الجلد و حول العين في مريضة أثناء حشو روتيني في الأسنان الطاحونة الثانية العلوية. خلال التنضير الأولي وتنظيف القنوات الجذرية، شعر المريضة بألم ووخز مفاجئ، وعلى الفور وبعد ذلك ابرز تورم في الوجه وامتد إلى منطقة ما حول العين. عند ظهور التورم ولم يتسن على الفور معرفة هويته، وبدء العلاج بمضادات الهيستامين لمواجهة أي حساسية ممكنة في وقت لاحق، ولم يلاحظ وجود أعراض جهازية وعدم وجود أي علامات للالتهابات المحلية، جنباً إلى جنب مع وجود فرقعة أثناء جس التورم وبناءاً عليه تم التوصل لتشخيص الورم كانتفاخ تحت الجلد.

INTRODUCTION

In dentistry, the use of air-driven hand pieces during oral surgery has been frequently associated with subcutaneous emphysema.¹ Its occurrence during restorative procedures is rare and even lesser number of cases have been associated with endodontics. Only 6 cases of pneumomediastinum following endodontic treatment have been reported between 1960 and 2008.^{2,3} Possible causes of this complication arising during or after an endodontic procedure could include the use of high speed hand pieces, compressed air to dry the operating field along with the forceful introduction of the endodontic irrigant into the root canals. Although the incidence of subcutaneous emphysema occurring in relation to endodontics is rare, its frequency is increasing. It is imperative that dentists be knowledgeable about the possibility of such an episode happening in their patient during a restorative procedure and how to manage it. Most cases resolve spontaneously, but they can be life threatening in some instances. Air can enter the parapharyngeal and retropharyngeal spaces, where accumulation of air can lead to airway compromise,⁴ air embolism,⁵ and soft tissue infection.⁶ Some reports have also described pneumothorax, optic nerve damage,⁷ and even death by air embolism.⁸

CASE REPORT:

A 56 years old lady came to our dental clinics at The Aga Khan University Hospital, Karachi, with the complaint of prolonged sensitivity in the upper right back tooth. After clinical and radiographic examination, it was diagnosed that the tooth #17 suffered from irreversible pulpitis secondary to caries and would require endodontic treatment. The patient was otherwise medically fit and did not report any allergies. After consent was obtained, the endodontic procedure was initiated. The tooth in question was noted, on the peri-apical radiograph, to have long roots extended into the sinus but no significant complications were anticipated during the treatment. The access to the pulp chamber and root canals were obtained, followed by debridement and irrigation with 5.25% Sodium hypochlorite as irrigant and compressed air was used to dry the operating field. While the endodontic procedure was

underway, the patient inquired whether she had been injected with local anesthesia again, as she suddenly experienced a pricking, sharp pain. The dental treatment was immediately discontinued and it was seen that the patient had rapidly developed a facial swelling on the right side of her face, extending to the infra-orbital soft tissues. On palpation of the swelling, crepitus was felt, although no tenderness or increase in temperature could be detected. The patient was surprisingly comfortable and did not suffer from any systematic symptoms like shortness of breath or urticaria. The patient was reassured and since the absolute cause of the swelling could not be identified instantly, the patient was prophylactically given 8mg IV Dexamethasone and 60mg Fexafenadine orally to counteract any possible allergic reaction. Subsequently, after monitoring for one hour, it was observed that the patient's condition was stable and hence she was allowed to go home on her request. She was prescribed 'antral regime' containing Amoxicillin 1 gm BD for 5 days for prevention of further spread of infection. After inquiring about her well-being on the phone two hours after she had left, the patient reported that she was feeling fine and the swelling had started to subside. She was advised to continue the anti-histamine once daily for another 3 days as a precautionary measure.

OUTCOME AND FOLLOW-UP:

The condition of the patient was inquired on the phone in subsequent days as she insisted that she was feeling well and was not willing to come in for a follow-up of the swelling. Hence the patient was seen again after 7 days for clinical assessment and continuation of the endodontic treatment. On examination, it was seen the swelling had completely resolved. The endodontic treatment was completed in this visit, albeit without the use of Sodium hypochlorite as irrigant. Instead, normal saline was used to irrigate the canals. Further precaution was exercised by using cotton balls to dry the inside of the pulp chamber instead of using the air syringe. The procedure was completed uneventfully and the patient is scheduled to receive porcelain fused to metal crown soon. No specific investigations were carried out in this case and the patient was monitored clinically to prove the diagnosis. In some instances,

radiographs would be warranted and may aid in diagnosis. The differential diagnosis for such a clinical presentation can be angioedema, an allergic reaction to any of the components using during the dental treatment, hypochlorite accident or cellulitis.⁹ Emphysema may be differentiated from other conditions by the presence of crepitus felt during palpation and the lack of systemic symptoms.



Fig: 1. Patient immediately after development of facial swelling

DISCUSSION:

The first reported incidence of subcutaneous emphysema secondary to a dental procedure was reported more than 100 years ago in a musician who blew his bugle immediately after getting a tooth extracted.¹⁰ In terms of dentistry, the extraction of teeth, especially mandibular third molars while utilizing high speed air-driven hand pieces, has been considered the most common cause of iatrogenic emphysema.^{1,11,12} The less common dental causes include restorative treatment¹³, endodontic treatment¹⁴, during crown preparation^{15,16} and periodontal procedures¹⁷. All these procedures can result in the disruption of the intraoral barrier, leading to the introduction of pressurized air into the subcutaneous tissues through the dento alveolar membrane or root canal.^{13, 18} Most cases of emphysema after endodontic treatment have been in patients where the root canals were related irrigated with hydrogen peroxide³ or dried with compressed air.¹⁹ Dentists should be aware that the use of air-driven hand-pieces or compressed air-syringes can lead to complications like peri-orbital emphysema²⁰ or other life threatening situations, even in nonsurgical fields.²¹ They should always recognize the possibility of pneumo-mediastinum and emphysema after any dental treatment. During endodontic treatment

the complications can be prevented by (1) using a rubber dam; (2) using remote exhaust hand pieces or electric motor-driven hand pieces; (3) avoiding the use of the compressed air syringe during irrigation; and (4) avoiding the use of hydrogen peroxide while irrigating canals.¹⁸ In fact, any irrigant that is used during the endodontic procedure should not be forcefully introduced into the canals. The use of side-vented needles is also recommended. The use of an air syringe, high speed hand pieces or their combination was reported in 71% of emphysema cases.² Emphysematic condition is rarely serious, it might be expected that bacteria would be forced into the tissues from the oral cavity. Antibiotic administration is controversial; however, it seems prudent to give these patients an anti-infective agent that covers *Staphylococcus* and *Streptococcus* species as well as anaerobes that may be transmitted from the oral cavity.²² Early recognition may be of extreme importance in initiating treatment and to prevent possible secondary infections and cardiopulmonary complications.²³ Patients with subcutaneous emphysema usually recover spontaneously without complications, however, early detection and proper management is crucial to prevent complications.



Fig: 2. Patient after 8 days, after the swelling had completely resolved

CONCLUSION:

The application of rubber dam and careful use of high speed hand pieces, compressed air and root canal irrigants during endodontic treatment can prevent a similar untoward event. The dentist should be aware of the possible causes of sudden facial swelling in a patient that develops during or immediately after endodontic or restorative

treatment. If subcutaneous emphysema develops, it is essential that the dentist remain calm and reassure the patient. Management in the majority of such patients is usually conservative.

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