American Journal of Surgery and Clinical Case Reports[R] ISSN 2689-8268 | Volume 10

Case Report Open Access

Extensive Cervicofacial Subcutaneous Emphysema with Mediastinal Extension After a Dental Procedure: A Case Report

John W R Matthews, Hung C Truong, Andrew C Jenzer*, Joseph Park

Womack Army Medical Center, Uniformed Services University of Health Sciences, USA

***Corresponding author:**

Andrew C Jenzer,
Program Director, Oral and Maxillofacial Surgery Residency, Womack Army Medical Center, Assistant Professor, Department of Surgery, Uniformed Services University of Health Sciences, USA

Received: 08 Apr 2026
Accepted: 28 Apr 2026
Published: 30 Apr 2026
J Short Name: Ajsccr

Keywords:

Subcutaneous Emphysema; Air Emphysema; Subcutaneous Air; Cervicofacial Emphysema; Pneumomediastinum; Dental Procedure; Conservative Management Subcutaneous Air Emphysema; Antibiotics in Subcutaneous Air Emphysema

Citation:

Andrew C Jenzer, Extensive Cervicofacial Subcutaneous Emphysema with Mediastinal Extension After a Dental Procedure: A Case Report. Ame journal of Sur and Clin Case Rep® 2026; V10(1): 1-9

1. Abstract

1.1. Introduction: Subcutaneous Emphysema (SE) is a rare but potentially serious complication of dental procedures, occurring when air is inadvertently forced into the soft tissues. This report presents a case of extensive cervicofacial emphysema with superior mediastinal extension following routine dental treatment.

1.2. Case Presentation: A healthy 25-year-old male developed progressive neck and facial swelling with a nasal change in voice within a day after a gingivectomy and core build-up procedure on tooth #19. He denied dyspnea or chest pain. On examination, diffuse soft tissue swelling with palpable crepitus was noted from the facial regions to the supraclavicular area. Computed Tomography (CT) revealed widespread extraluminal air throughout bilateral facial and deep cervical spaces, extending into the superior mediastinum. The patient was hemodynamically stable with no respiratory compromise. Conservative management was initiated with oral antibiotics and close outpatient observation.

1.3. Management and Outcome: The patient was treated empirically with amoxicillin-clavulanate and advised on strict return precautions. Over the next few days, his swelling and voice changes improved markedly. By one-week follow-up, clinical emphysema had completely resolved. A follow-up CT at one month confirmed full resolution of the subcutaneous air. No invasive intervention was required.

1.4. Conclusion: This case illustrates that even routine dental procedures can cause extensive subcutaneous emphysema. Prompt recognition, imaging to assess the extent of air spread, and conservative management with antibiotics and observation led to a favorable outcome without surgical intervention. Practitioners should be aware of this uncommon complication and its management.

2. Introduction

Subcutaneous Emphysema (SE) of the face and neck following dental procedures is an uncommon but significant complication [1]. It results from inadvertent introduction of air into soft tissues, often due to use of air-driven dental instruments or air/water syringes in areas where the mucosal barrier has been disrupted [2,3]. Common iatrogenic causes include high-speed handpieces with frontal exhaust, air syringes used in surgical sites, or even forceful drying of root canals, which can force air into fascial planes [2,3]. Once introduced, air can dissect through fascial spaces of the head and neck, sometimes spreading to the mediastinum or thorax [4]. This spread can lead to serious complications such as pneumomediastinum, pneumothorax, and even pneumopericardium in severe cases [4]. Clinically, patients often present sudden onset swelling of the affected regions, and the pathognomonic finding is crepitus on palpation of the skin [1-4]. Crepitation indicates air in the tissue and helps distinguish SE from other causes of swelling like angioedema or infection, which typically lack subcutaneous air and crepitus. Patients may also exhibit dysphonia, a nasal or muffled voice quality, due to air present in the parapharyngeal or retropharyngeal spaces [5]. Prompt imaging, usually with Computed Tomography (CT), is important to confirm the diagnosis, appreciate the extent of air, and rule out other pathology [1]. In this report, the authors present a case of extensive cervicofacial subcutaneous emphysema with superior mediastinal extension following a routine dental

procedure. The case underscores the clinical presentation, imaging findings, and successful conservative management, and discusses why this case is noteworthy given the unique yet generally benign dental procedure and the resultant extent of air spread, which was still able to be managed conservatively.

3. Case Report

A 25-year-old male with no significant medical history presented to the Emergency Department (ED) with painless swelling of the face and neck, accompanied by a change in voice quality described as "nasal," approximately 24 hours after a dental procedure. The day prior, he had undergone endodontic treatment on tooth #19 followed by a core build-up and crown lengthening gingivectomy his endodontist. The procedure was uneventful with no immediate complications reported. During the dental visit, the endodontist performed a gingivectomy around tooth #19 using a System B electrocautery device (Kerr Dental) at approximately 400°F to remove excess gingival tissue and achieve hemostasis. After the gingivectomy, the tooth was isolated for the core build-up using a rubber dam and a copper band matrix sealed with a temporary filling material (Cavit, 3M) and a light-cured gingival barrier (OpalDam™, Ultradent) for isolation (see Figure 1a, 1b). The endodontist then etched, primed, and bonded four fiber posts into the root canals, followed by placement of a dual-cure composite core material (LuxaCore Dual™, DMG). The build-up was finished and polished with high-speed composite finishing burs. A periapical radiograph taken at the end of the visit confirmed that the core build-up restoration extended to the level of the alveolar crest (Figure 1c). Later that evening, the patient noticed mild swelling developing on both sides of his face. The swelling gradually spread downward from the temples through the cheek regions and into the neck by the next morning. He also noted a change in his voice, describing it as unusually nasal. Assuming these symptoms might be normal postoperative effects or related to local anesthesia, he initially did not seek care. However, when the swelling persisted and worsened overnight, he presented to the ED the following day for evaluation. On examination in the ED, the patient was alert and in no acute distress, with normal vital signs. He denied any difficulty breathing and denied chest pain. Notable symmetrical soft tissue swelling was observed extending from the bilateral infratemporal regions and cheeks down through the submandibular areas into the cervical region and supraclavicular area (Figure 2). Palpation of the swollen areas revealed a characteristic crackling sensation (subcutaneous crepitus) throughout the face, neck, and upper chest. There was no overlying erythema or warmth of the skin. The patient's voice was nasal in quality. No stridor or respiratory distress was present, and oxygen saturation was 100% on room air. A CT scan of the maxillofacial and cervical regions with contrast was obtained urgently to confirm the diagnosis and assess the extent of air. Axial and coronal CT images demonstrated extensive fill of air in the subcutaneous tissues of the right and left face, distributed along deep cervical fascial planes including the peripharyngeal and prevertebral spaces (Figure 3). Notably, air was tracked inferiorly into the superior mediastinum and anterior chest wall. Axial CT images of the neck showed extensive subcutaneous emphysema in bilateral facial and neck spaces, with air extending into the superior mediastinum. Despite the widespread emphysema evident on imaging, the patient remained clinically stable without signs of airway compromise. The on-call Oral and Maxillofacial Surgery service was consulted. Given the absence of respiratory difficulty, the team elected for conservative management. The patient was offered hospital admission for observation versus discharge with close outpatient follow-up. He preferred to go home. He was then discharged from the ED on oral broad-spectrum antibiotics to prevent any potential infection from oral flora introduced into the tissue planes. Amoxicillin-clavulanic acid (Augmentin™) 875 mg/125 mg twice a day was prescribed for 7 days. He was instructed to limit physical exertion, placed on sinus precautions (avoid Valsalva-like maneuvers such as forceful nose blowing or coughing), and was given strict return precautions to seek immediate care if he developed breathing difficulty, chest pain, or worsening swelling. An outpatient 3-day follow-up appointment was made. At the 3-day follow-up visit, the patient showed significant improvement (see Figure 4). The facial and cervical swelling had markedly decreased, and there was minimal palpable crepitus remaining on exam. His voice had returned to normal. He reported that the swelling started regressing about two days after the ED visit and continued to improve each day. He had been compliant with his prescribed antibiotic regimen and remained afebrile with no signs of infection. The patient was advised to complete the full 7-day course of antibiotics. By 1 week post-procedure, all swelling and crepitus had resolved. A follow-up CT scan (Figure 5) obtained about one month later confirmed complete resolution of the emphysema with no residual air pockets.

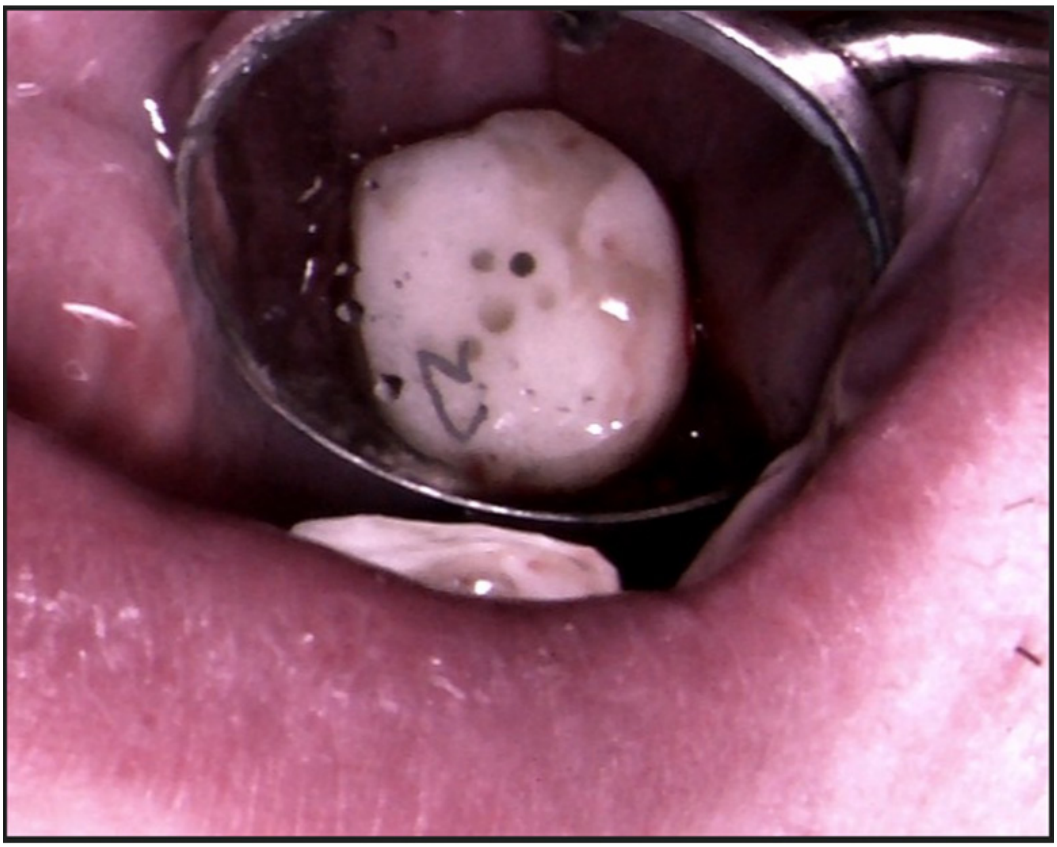


Figure 1A: Intraoral pre-operative photo of tooth #19 prior to core buildup.

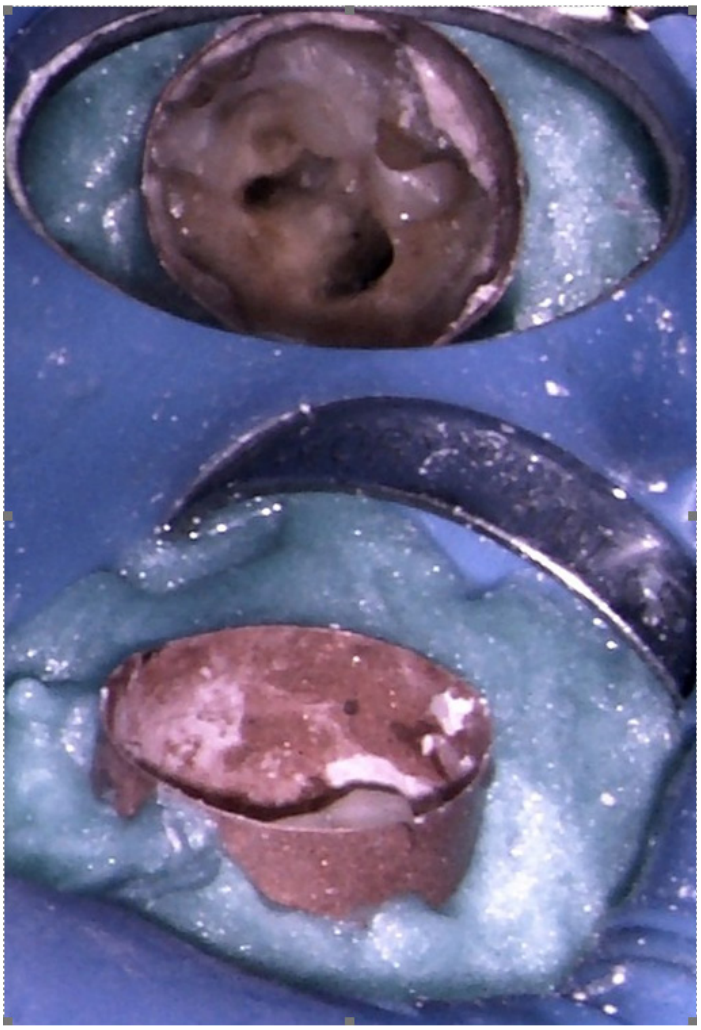


Figure 1B: Intraoral operative photo showing copper band, OpalDam (Ultradent), and rubber dam isolation.

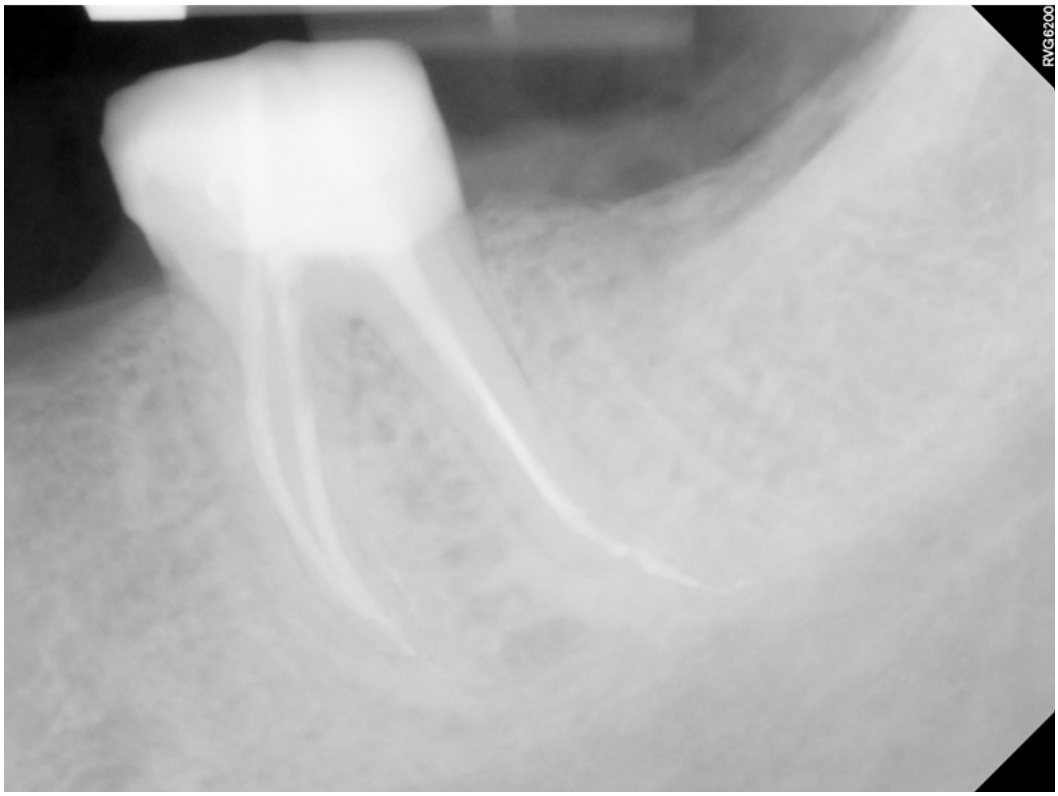
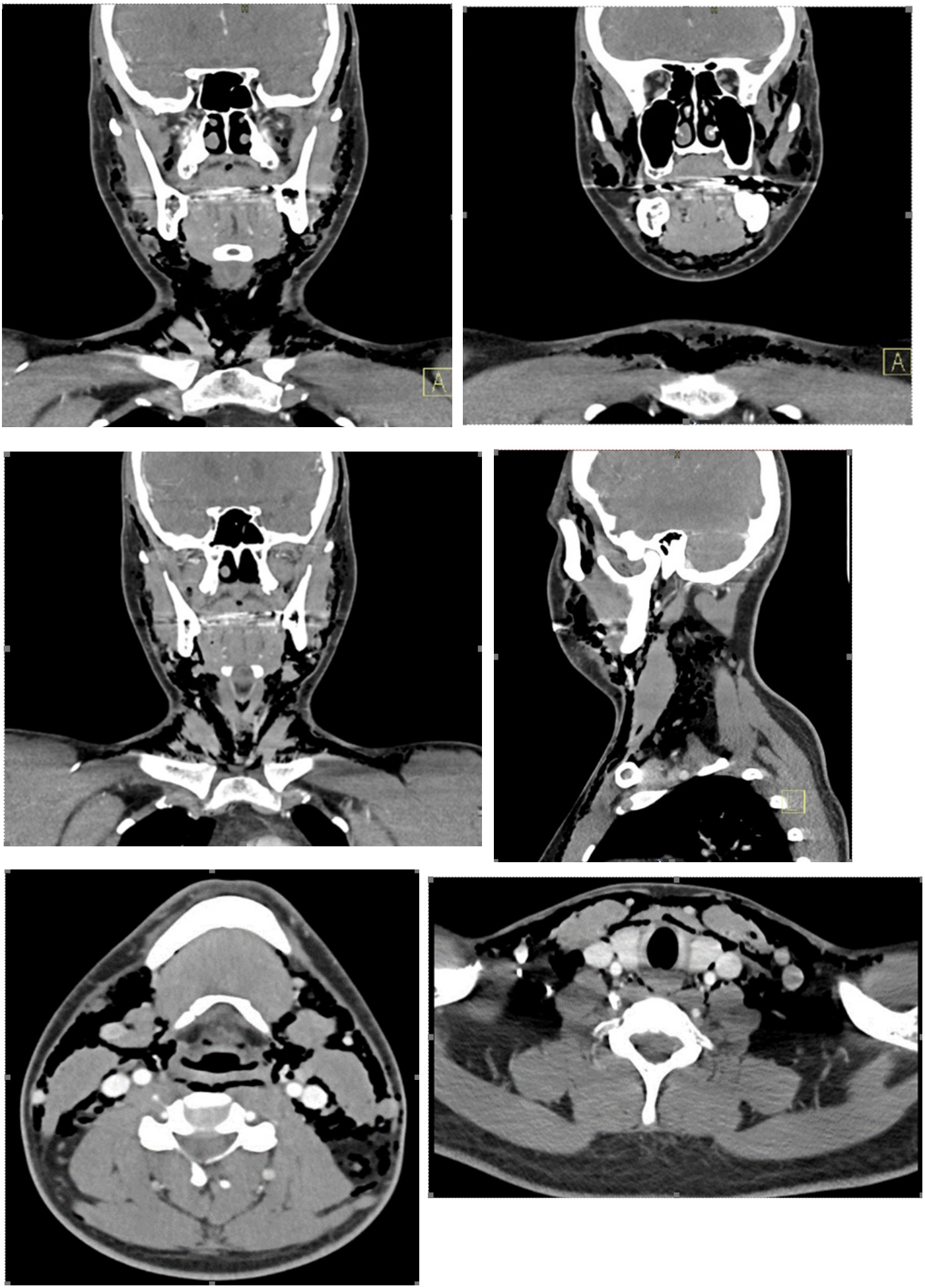


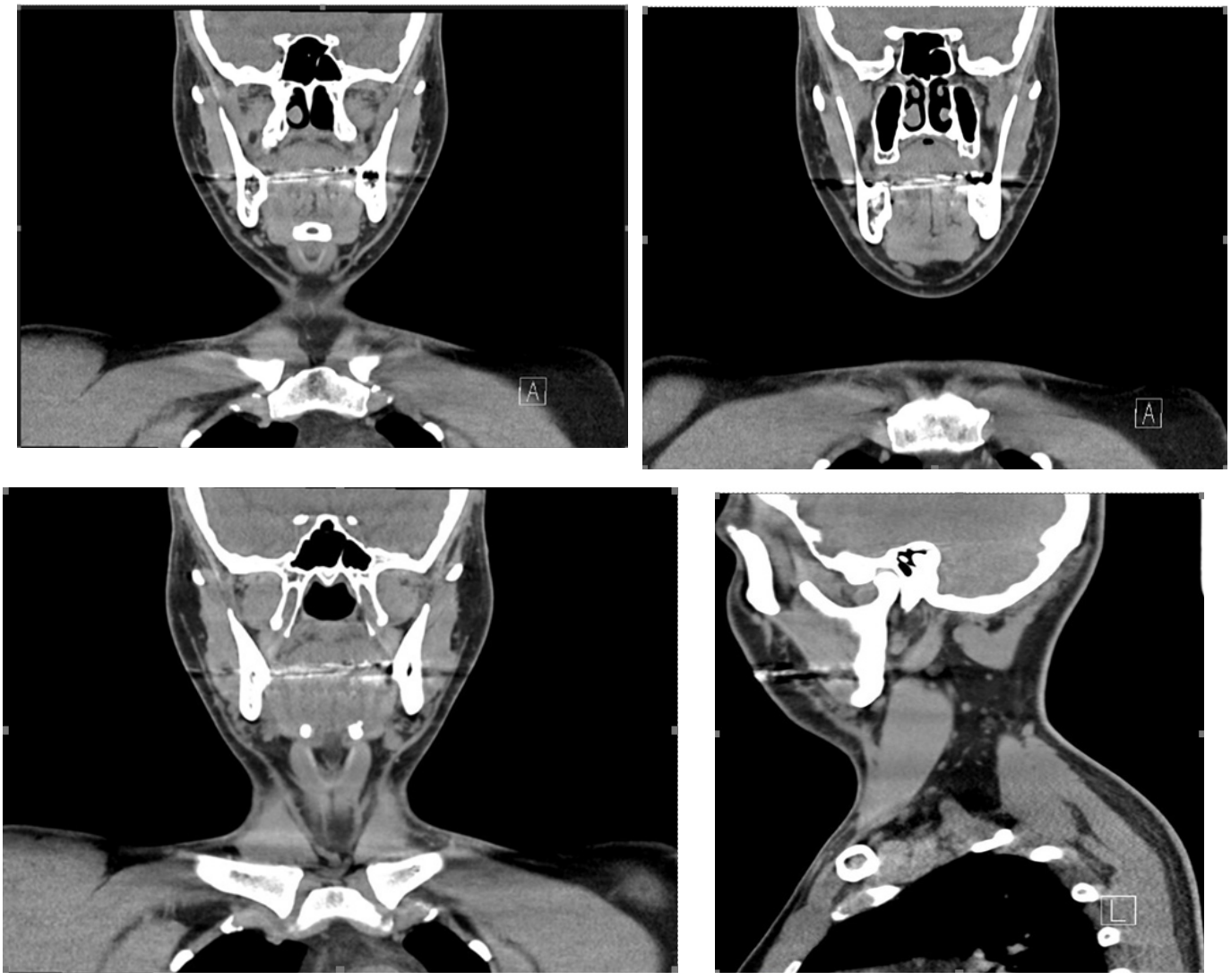
Figure 1C: Postoperative periapical radiograph of tooth #19 showing extend of core build up subgingivally approximating the alveolar crest.

Figures 2A-B: Postoperative day 1 demonstrating significant edema of the face, neck, and superior chest.



Figures 3A-F: Representative slices of computed tomography showing the appreciable air involvement bilaterally from the temporal region to the superior mediastinum

Figures 4A-B: Postoperative day 4 photos showing significant improvement and a decrease in edema.



Figures 5A-E: Repeat computed tomography scan at one month demonstrating complete resolution.

4. Etiology and Mechanism

The introduction of pressurized air into submucosal or fascial planes during dental procedures can result in subcutaneous emphysema. In dentistry, this phenomenon is most associated with the use of air-driven handpieces, high-pressure air/water syringes, or other air-propelling devices during oral surgery and restorative procedures [2,3]. In this case, although an electrocautery which does not emit air was used for the gingivectomy, the use of high-speed burs and possibly an air syringe during the core build-up likely led to air being forced through the periodontal tissues and into the fascial planes. The gingivectomy created an entry point by breaking the mucogingival barrier, and subsequent use of an air syringe or the air-driven handpiece in proximity to the open sulcular area could have driven air into the submucosal space. Once air breaches the soft tissue, it follows the path of least resistance along connective tissue and fascial planes [1]. The head and neck fascial system represents potential channels for the air to spread widely, sometimes leading to cervicofacial emphysema, retropharyngeal emphysema, and even mediastinal emphysema if the air dissects inferiorly [4]. In a large systematic review, over half of reported SE cases in dentistry were associated with surgical tooth extractions, with most using air handpieces, and a significant portion with restorative or endodontic procedures involving air syringes [2]. Even relatively innocuous actions can cause or exacerbate emphysema. For example, SE has been reported from patients forcefully blowing their nose, coughing, or sneezing after a dental extraction [2,4]. These known mechanisms underscore the importance of preventive strategies: using rear-exhaust or electric handpieces without forward-air, when possible, careful use of air/water syringes to avoid direct air injection into wounds or root canals, and advising patients to avoid behaviors that increase intraoral pressure after procedures [4].

5. Clinical Presentation and Diagnosis

Patients with subcutaneous emphysema typically present with sudden onset swelling during or shortly after a dental procedure. The swelling can appear alarming in extent, sometimes expanding over minutes to hours. A distinguishing feature of SE is the presence of crepitus on palpation – a crackling sensation under the skin caused by gas bubbles – which is pathognomonic for subcutaneous air [4]. This finding is virtually absent in other conditions that cause acute facial or neck swelling, such as allergic angioedema, hematoma, or infection, making it a critical diagnostic clue. In our patient, the broad area of painless swelling with palpable crepitus, in the absence of fever or signs of infection, strongly suggested subcutaneous emphysema. Rhinolalia, which is a nasal tone to the voice, can occur when air tracks into the retropharyngeal or parapharyngeal space and affects the nasopharyngeal resonance [5]. This was observed as a "nasal" quality to our patient's voice and has been noted in other reports of extensive emphysema involving the neck [5]. Other potential symptoms include mild soreness or dysphagia if pharyngeal tissues are expanded, but significant pain or systemic signs are usually absent unless complications develop [6]. Imaging is important to confirm the diagnosis and map the extent of air spread. While plain radiographs can occasionally show streaks of SE, the most sensitive imaging is CT [4]. CT will readily show even small volumes of air in soft tissues as dark, low radiodensity areas and can differentiate SE from other pathologies like abscesses. In addition, CT helps identify any pneumomediastinum or pneumothorax that might not be clinically obvious. In this case, CT was pivotal in demonstrating the impressive extent of air, including mediastinal involvement, thereby guiding the management plan. It also reassured the authors that there was no drainable abscess or other pathology. If the patient is clinically stable and emphysema is localized, some authors suggest that extensive imaging may not always be necessary [4]. However, given the potential for severe complications, the authors advocate for prompt CT imaging in cases of head, neck, or chest emphysema after dental work, especially if the swelling is progressing or involves atypical areas.

6. Management

The management of iatrogenic subcutaneous emphysema is largely conservative in most cases [3,4]. The air in the tissues is typically reabsorbed spontaneously into the bloodstream and expelled via the lungs over time [4]. Most reported cases of SE resolve completely within about 3 to 10 days with supportive care [3,4]. In our case, the emphysema began improving by the second day and resolved within one week, consistent with the literature. The main goals of management are to prevent infection of the affected tissue planes and to monitor for any signs of respiratory or circulatory compromise during the resolution phase [1,4]. Antibiotic prophylaxis is commonly recommended due to concern that oral bacteria introduced along with the air could lead to cellulitis or deep space infections [7]. While there

is no consensus on the optimal antibiotic regimen and some debate exists about necessity in every case, many clinicians choose to cover typical oral flora including streptococci and anaerobes [7]. Amoxicillin-clavulanate was selected for our patient, as it provides broad coverage of oral cavity aerobes and anaerobes. Studies of odontogenic infections have shown that the majority of bacteria isolated are sensitive to amoxicillin-clavulanate supporting its use as a reasonable empiric choice [7,8]. Classically, clindamycin has been used as an alternative in penicillin-allergic patients, however, due to high rates of resistance and negative side effect profile, different alternatives may be considered based on local antibiograms [8,9]. In addition to antibiotics, supportive measures include analgesics or nonsteroidal anti-inflammatory drugs for discomfort and placing the patient on sinus precautions, including avoiding maneuvers that might force more air into tissues (e.g. closed-mouth sneezing, coughing, straw use, Valsalva) [4]. Close observation is important, whether in an inpatient or outpatient setting, depending on the severity of the emphysema. Indications for hospital admission include significant mediastinal emphysema, any signs of airway compromise or possibility of compromise, difficulty breathing, hemodynamic instability, or extensive involvement that is rapidly progressing [5]. In this case, although air had reached the mediastinum, the patient's stability allowed for outpatient management with strict return precautions. The authors arranged a short-interval follow-up at 3 days to ensure improvement and compliance. In rare instances, subcutaneous emphysema can progress to cause airway compromise or tension physiology (e.g., large pneumothorax or pressure on great vessels) that requires urgent intervention [5,10]. If life-threatening compromise occurs, management escalates to securing the airway and potentially decompressing the trapped air [5,10]. Various case reports have described emergency needle decompression or subcutaneous surgical emphysema drains for massive, tense subcutaneous emphysema in the neck and chest [5,11]. For example, there are reported successful relief of extensive cervicothoracic emphysema by inserting angiocatheter needles subcutaneously to release the air [10,11]. Such invasive measures, however, are reserved for extreme cases. The vast majority of dental-origin SE cases, including this case, do not progress to that severity and can be managed without surgical intervention. Our patient's course exemplified that even an emphysema spread into deep neck spaces and upper mediastinum can resolve with conservative treatment, provided there is vigilant monitoring.

7. Discussion

Subcutaneous emphysema following dental work is well documented but remains relatively rare, with most practitioners encountering at most a few cases in their career. This case is noteworthy due to the etiology, extensive anatomic spread of the air, and the conservative approach to management that led to full recovery. In many reported cases of SE, the air is localized to the face and neck. Our patient, however, had air tracking from the facial soft tissues into the retropharyngeal space and down to the superior mediastinum and anterior chest wall, essentially creating continuum from the cranial to thoracic subcutaneous compartments. Such extensive emphysema could easily be mistaken for a more dangerous condition or prompt aggressive interventions. In our case, a careful evaluation showed that despite the dramatic imaging findings, the patient's airway was patent, and the emphysema was not expanding. These findings allowed us to avoid unnecessary invasive procedures. The case underlines the importance of correlating clinical stability with imaging: not all cases with mediastinal air require surgical drainage or chest tubes if the patient is asymptomatic and stable [3,5]. Additionally, the inciting dental procedure here was a routine restorative intervention (post and core build-up with a minor gingivectomy), rather than a surgical extraction or extensive surgery which are classically associated with this complication. This etiology highlights that even less extensive dental treatments can lead to significant emphysema if air is introduced under the tissue at vulnerable sites. Each step in our patient's procedure, from the use of air-driven burs to the possible use of an air syringe to dry the core buildup, represented a potential risk factor once the mucosal barrier was broken. The case reinforces a preventive message -- clinicians should exercise caution with air-producing devices whenever working near surgical or periodontal defects. Simple measures such as using rear air exhaust surgical handpieces and employing suction or gauze instead of air syringes for drying in deep cavities, can reduce the risk. If a patient does develop unusual swelling after a procedure, timely recognition of SE can prevent misdiagnosis and guide appropriate management.

8. Conclusion

SE is a rare complication of dental treatment that requires prompt recognition and appropriate management. Clinicians should be aware that even routine procedures such as endodontic treatments or restorations can introduce air into tissue planes, particularly when using air-driven equipment or if the mucosa is inadvertently perforated [3]. Key clinical signs like rapid swelling with palpable crepitus should raise immediate suspicion for subcutaneous emphysema [4]. Once diagnosed, most cases can be managed conservatively with observation and prophylactic antibiotics, as they tend to self-resolve within several days [4]. The primary indications for more aggressive intervention are signs of airway or cardiopulmonary compromise, which fortunately are uncommon in dental-related SE [4]. This case demonstrates that even extensive SE with mediastinal involvement can resolve without surgical treatment, highlighting the importance of case-by-case clinical judgment. By understanding the etiologic factors and early signs of subcutaneous emphysema, dental professionals can minimize risks and manage this complication effectively when it does occur.

References

1. McKenzie WS, Rosenberg M. Iatrogenic subcutaneous emphysema of dental and surgical origin: a literature review. J Oral Maxillofac Surg. 2009;67(6):1265-8.
2. Jones A, Stagnell S, Renton T, Aggarwal VR, Moore R. Causes of subcutaneous emphysema following dental procedures: a systematic review of cases 1993–2020. Br Dent J. 2021;231(8):493-500.
3. Fasoulas A, Boutsioukis C, Lambrianidis T. Subcutaneous emphysema in patients undergoing root canal treatment: a systematic review of factors affecting its development and management. Int Endod J. 2019;52(11):1586-604.
4. Wong P, Palacios S, Kashtwari D. Managing subcutaneous emphysema following dental procedures. Journal of Multidisciplinary Care Decisions in Dentistry. 2017.
5. Carleton L, Eilbert W, Grant R. Extensive subcutaneous emphysema treated with subcutaneous angiocatheters. JACEP Open. 2023;4(5):e13054.
6. Lodhia J, Tenconi S. Postoperative subcutaneous emphysema: prevention and treatment. Shanghai Chest 2021;5:17.
7. Bogacz M, Morawiec T, Janowska-Bogacz K, Bubiłek-Bogacz A, Rój R, Pinocy K, et al. Evaluation of drug susceptibility of microorganisms in odontogenic inflammations and dental surgery procedures performed on an outpatient basis. Biomed Res Int. 2019;2019:2010453.
8. Lockhart PB, Tampi MP, Abt E, Aminoshariae A, Durkin MJ, Fouad AF, et al. Evidence-based clinical practice guideline on antibiotic use for the urgent management of pulpal- and periapical-related dental pain and intraoral swelling: A report from the American Dental Association. J Am Dent Assoc. 2019;150(11):906-21.
9. Otto CM, Nishimura RA, Bonow RO, Carabello BA, Erwin 3rd JP, Gentile F, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021 Feb 2;143(5):e35-e71.
10. Li M, Kim JB, Sastry BKS, Chen M. Infective endocarditis. Lancet. 2024;404(10450):377-92.
11. Kim JH, Park JG, Kim YM, Seok Chai H, Chul Kim S, Kim H, et al. Decompression technique using subcutaneous angiocatheter insertion to relieve extensive subcutaneous emphysema: a case report. J Emerg Med. 2023;64(4):491-5.