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Case Report

Self-Induced Pneumoparotid as a Result of Covering Mouth While Coughing: A Case Report

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Abstract

Introduction

Pneumoparotid is a rare condition characterized by the presence of air in the parotid gland, usually caused by the retrograde flow of air through the parotid duct. This report presents a rare occurrence of self-induced pneumoparotid.

Case presentation

A-41-year-old female presented with a recurrent painless right-sided parotid gland swelling for one month. She reported covering her mouth with her hands while coughing. Clinical examination revealed a right parotid swelling inferior to her right ear. The mass was non-tender and compressible. The neck and skull base computed tomography with contrast revealed a large thin wall cystic space with small air bubbles in the course of Stenson's duct. The patient underwent conservative management with good outcome.

Conclusion

Pneumoparotid is an extremely uncommon condition characterized by the presence of air in the parotid gland. Diagnostic imaging techniques such as ultrasound, sialography, or CT scans are valuable in confirming the diagnosis.

1. Introduction

Pneumoparotid (PP) disorder is an extremely rare and underdiagnosed cause of parotid gland enlargement, and it is caused by air insufflation inside the ducts or parenchymal tissue as a result of its reflex throughout the Stenson's duct. Hyrtel was the first to report it in 1865 [1]. In the literature, many synonyms have been documented, including pneumosialadenitis, pneumoparotitis, anesthetic or surgical mumps, and wind parotitis. Many etiologies have been identified, including stones, mumps, neoplasms, viral and non-viral infections, post-dental surgery, autoimmune diseases, and conditions that increase intraoral pressure, such as playing wind instruments, severe coughs, Valsalva's maneuver, and inadequate Stenson's duct [1-3]. The literature also indicates that psychosocial issues can contribute to this condition in adolescents and adults [3,4].

Obtaining a comprehensive medical history and conducting imaging examinations, such as ultrasound (US), sialendoscopy, and head-neck computed tomography (CT), are crucial in making an accurate diagnosis [4].

This study presents a rare occurrence of self-induced PP in a 40-year-old woman, which resulted from increased intraoral pressure caused by covering her mouth with her hands while coughing. The article has been written in line with CARE guideline.

2. Case Presentation

2.1. Patient information

A 41-year-old female presented to Smart Health Tower (Head and Neck Center) with recurrent painless right-sided parotid gland swelling for one month. Past medical and surgical histories were unremarkable. There was no history of recent dental treatment, fever, malaise, or constitutional symptoms of infection during the course of her symptoms. She denied any previous history of trauma to the face; however, she reported covering her mouth with her hands while coughing.

2.2. Clinical findings

Clinical examination revealed a right parotid swelling inferior to her right ear. The mass was non-tender, compressible, and without any erythema or other changes to the overlying skin. The swelling vanished when pressure was applied to the area in front of the ear. Apart from this, the head and neck examination did not reveal any notable findings.

2.3. Diagnostic assessment

Neck US showed a well-defined anteriorly, ill-defined posteriorly, acoustic shadowing, and hypovascular nodule measuring 26*17*12 mm. The neck and skull base CT with contrast revealed a large thin-walled cystic space measuring 29*21*28 mm with small air bubbles in the course of Stenson's duct (Figure 1).

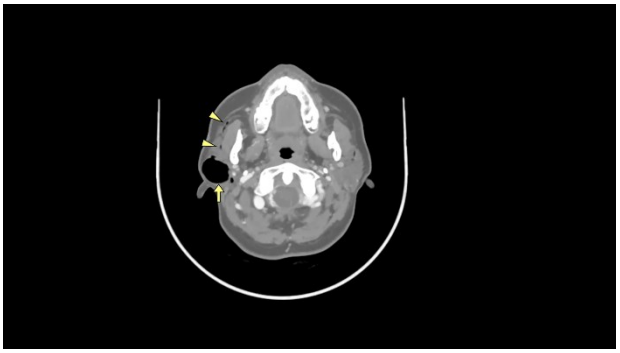

Figure 1. Axial CT scan of the skull base (air window) showed A well-defined air attenuation mass-like lesion (arrow) within the right parotid parenchyma; no solid or cystic component is noted within the lesion. A discontinuous curvilinear air density is seen anterior to the parotid gland at the course of the parotid duct (arrow heads), an indication of air within Stensen's duct.

2.4. Therapeutic intervention

The patient was advised to massage the right parotid region daily with warming completion and drink plenty of fluids.

2.5. Follow-up

After six months, almost all of the swelling disappeared.

3. Discussion

Patients often express their frustration about the enlargement of their salivary glands, which can have numerous potential causes. These can range from harmless factors to more serious and cancerous origins. One particularly uncommon condition is PP. It primarily occurs when there is increased pressure in the mouth, causing saliva to flow backward through Stetson's duct and into the glandular acini and secondary ducts of the parotid gland [5]. Van Ardenne et al. classified the contributing factors to PP into three main categories: self-induced cases, isolated incidents, and recurring episodes [6].

Initially, this phenomenon was described as a condition that was commonly observed among individuals with specific occupations, such as trumpet players and glass blowers [7]. Nonetheless, the literature has documented various factors contributing to PP, including undergoing dental procedures, persistent and forceful chronic coughing, the utilization of spirometry, and certain psychiatric disorders and conditions. For instance, there have been reported cases of individuals with tics involving repeated puffing of the cheeks over 300 times [8-12]. In a systematic review conducted by Yoshida in 2023, various mean age groups were documented for different causes. The average age for abnormal habits was 28.4 years, self-induced cases were seen at 15.7 years, wind instrument-related cases were observed at 21.8 years, idiopathic cases had an average age of 37.4 years, and individuals engaged in glass blowing were reported to have an average age of 35.4 years. However, self-induced vocal fold polyps were also reported in pediatric age groups, specifically as a result of intentional habits [13]. The current case was a 41-year-old female who presented with a painless left side pre-auricular swelling due to increased intra-oral pressure because of putting her hand over her mouth during coughing.

Pneumoparotid commonly presents as repeated swelling on a single side of the parotid gland. There have been documented instances of acute cases as well [14]. Additionally, bilateral occurrences of PP are more commonly observed in patients who experience recurring episodes [15]. The swelling may either be painful or painless, and it may be accompanied by warmth and redness. The duration of time it takes for the swelling to go down can vary from a few minutes to several days [11,16]. Yamazaki and colleagues documented the presence of oral sounds characterized as "squishy" that occur when the buccal area is compressed. Additionally, crepitus, a sensation of crackling or grating, was found in approximately 50% of the cases during examination [17]. Retrograde movement of air in the weaker parts of the ductus can result in air entering the ductal system and penetrating the parotid capsule at its weakest point. Furthermore, there have been documented cases where air

extends beyond the parotid gland, reaching areas like the parapharyngeal regions [16]. In the current study, the patients presented with recurrent unilateral painless right-sided pre-auricular swelling for one month. During examination, there was no evidence of redness or warmth in the affected area, nor was there any sensation of crepitation. The trapped air was confined only to the parotid region and did not spread to other areas of the neck.

In cases of parotid gland enlargement, imaging studies are crucial for confirming the existence of air inside the parotid system and ruling out neoplastic pathology or salivary stones. Plain X-ray imaging has the potential to show the presence of air within the ductal system, which, in some cases, may escape into the surrounding tissues. On US examinations, it is common to observe multiple bright areas resembling a thin, hyperechogenic line. Sialography can reveal a dilated Stenson's duct, but CT scans, with or without contrast, are considered the most effective method for detecting air within the parotid system. [10,11,18-20). In the current case, the neck US showed a well-defined anteriorly, an ill-defined posteriorly, acoustic shadowing, and a hypovascular nodule, and the neck CT showed an air-filled cystic space with air bubble in the course of the Stenson's duct.

In most cases, salivary gland swelling will be resolved without treatment within three days [10]. If symptoms persist, conservative measures such as massaging the parotid gland, warm compresses, and adequate hydration can be helpful [19]. Some experts recommend prophylactic antibiotics because oral bacterial reflux can lead to secondary infections [11]. It is crucial to avoid increases in intra-oral pressure. Occupational PP cases (such as in trumpeters and glassblowers) can benefit from learning techniques to decrease insufflation. In self-induced cases related to psychiatric disorders, psychological therapy may be necessary. For cases that are recurrent or chronic, surgical intervention may be advised, and one of the most common surgical treatments is parotidectomy. Other approaches that can be considered include ligation of the parotid duct, either with or without superficial or complete parotidectomy, or repositioning of the parotid duct to the tonsillar fossa [18]. In the current study, the patient has received recommendations to massage the parotid gland, apply a warm compress to the area, and increase fluid intake.

4. Conclusion

Pneumoparotid is an extremely uncommon condition characterized by the presence of air in the parotid gland resulting from backward airflow. Diagnostic imaging techniques such as US, sialography, or CT scans are valuable in confirming the diagnosis. Treatment options range from observation to more invasive procedures like parotid surgery. While PP typically resolves spontaneously, additional investigation may be necessary to exclude other potential causes.

Declarations

Conflicts of interest: The author(s) have no conflicts of interest to disclose.

Ethical approval: Not applicable

Patient consent (participation and publication)**:** Written informed consent was obtained from all participants of this study.

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Data availability statement: Note applicable.

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