

Pneumoparotitis: Tackling the Unexpected

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Abstract: Medical emergencies in dental practice are those adverse events that may present in the course of dental treatment. Each of them requires a correct diagnosis for effective and safe management. The contemporary dentist must be prepared for a quick and effective management of those problems that may arise with specific responses. During routine clinical practice, A rare medical emergency was encountered i.e. a case displaying symptoms of pneumoparotitis. While isolating the teeth with 3-way syringe, an inadvertent air was pushed into the parotid duct, patient immediately experienced extreme pain in the lower left preauricular area, with sudden appearance of swelling. The cause, investigations and management of pneumoparotitis has been emphasized in this case report.

Keywords: Pneumoparotitis, Medical emergency, Parotid gland swelling, Dental emergency

1. Introduction

Any medical emergency has been described as a serious and unexpected situation involving illness or injury and requiring immediate action. In dentistry an emergency describes an injury to the teeth and the supporting tissues. It can be potentially serious and should never be ignored. Literature stated that 19%-44% of dentists have a patient with medical emergency in one year.¹ Although medical emergencies might be unusual, they are certainly challenging in orthodontic practice. Medical history taken by an orthodontist is a significant step in preparing for a potential medical emergency and gives a better opportunity to preventing it. In my practice I came across medical emergency of pneumoparotitis which is a rare cause of parotid gland swelling that occurs when air is pushed through the parotid (Stenson) duct resulting in ductal inflation. It is an unusual condition associated with retrograde airflow into the ductal system of the gland and secondary infections.² The pathophysiology involves an incompetent valve system in the papilla of Stensen's duct which results in air entering the parotid gland especially in case of increased intraoral pressure. Air pressure in the mouth has been documented as the major causes of Pneumoparotitis.³ It has been documented in people who regularly have raised pressure in the mouth, for instance, wind instrument players, glass and balloon blowers. Also, with activities like bicycle tyre inflation, nose blowing, coughing, Valsalva manoeuvre and whistling.⁴ In this report, a case of accidental pneumoparotitis during usage of air through 3 way syringe for tooth isolation purpose in the clinical orthodontic office has been reported.

Diagnosis and Etiology

A 23 year old female patient was undergoing Orthodontic treatment since 8 months for molar uprighting using orthodontic micro-implant. Post uprighting, placement of Nance palatal button was planned for stabilizing the molar. While doing the isolation, the air was blown in molar region, prior to cementation of band. On doing so the patient immediately experienced extreme pain and an extraoral swelling in lower left preauricular area. (Fig 1 and 2)



Figure 1: Profile View Immediately after Appearance of Swelling



Figure 2: Three Quarter View Immediately after Appearance of Swelling

Clinical Examination

On extra oral examination, the swelling was soft and slightly tender. No crepitus could be elicited on palpation. There was slight erythema of overlying skin. On intra oral examination, parotid gland duct opening was examined and the area was massaged to check the salivary flow. It was observed that salivary secretion was noticeably decreased on the affected side, with no air bubbles, saliva or frothy secretion at the opening of duct present (Fig 3). Further patency of the duct was also checked which revealed no obstruction of the duct.



Figure 3: Intraoral Examination Immediately after Appearance of the Swelling

Differential diagnosis

The swelling of this nature can be due to both bacterial and viral infections like Sjogren's syndrome, mumps, hematoma, mucocele, sialadenitis, pneumoparotitis and sialolithiasis. Sjogren syndrome is a chronic autoimmune disease which represents itself with xerostomia and dry eyes.⁵ The swelling in this case report is acute and has no association with eyes. Mumps was ruled out as it is a bilateral swelling of parotid gland and is chronic in nature. Acute swelling can also be due to hematoma, which represents itself as a bluish discoloration, and mucocele, which mostly involves lips. Sialadenitis presents itself with systemic signs of fevers and chills which was not seen in this case. Thus, this case represents classical signs of pneumoparotitis and sialolithiasis, which was further investigated using OPG and ultrasonography.

Radiographic Investigation

The imaging tools used for diagnostic of pneumoparotitis are conventional radiography, ultrasonography, sialography, computerized tomography (CT), contrast enhanced computed tomography (CECT), cone beam computed tomography (CBCT) and magnetic resonance imaging.⁶ In case the obstruction is due to salivary duct calculi, an orthopantomogram (OPG) will allow the visualization of the opaque calculi, as reportedly approximately 80-90% of the sialoliths are radiopaque as seen in the OPG. Our first aim was to assess the patency of the duct. OPG was taken which showed absence of any calculi. Thus, sialolithiasis was ruled out. Ultrasonogram is regarded as a modality of choice in salivary gland diseases. As reported, its sensitivity in calculi detection amounts to 94.7%, specificity 97.4% and accuracy 99.4%.⁷ Further Ultrasonography was done which revealed air within the parotid gland (Fig 4). Thus, confirming that it is a case of pneumoparotitis



Figure 4: Radiographic Investigation - OPG



Figure 5: Ultrasonography

Treatment objectives: In accordance to the problem encountered following were the treatment objectives; 1. To relieve the signs and the symptoms of inflammation. 2. To prevent the condition from worsening. 3. To ensure the safety of the patient.

Treatment alternatives

Depending on the severity of the disease, treatment ranges from the conservative procedures to surgical intervention. Acute medical management involves antibiotics, analgesia, sialogogues, oral hygiene maintenance, hydration, massage and warm compresses. Recurring episodes of pneumoparotitis will cause chronic cystic inflammatory changes within the gland. The triggering agent is identified and should be eliminated. Self-induced recurrent pneumoparotitis in adults often need psychological and behavioural evaluation. In severe cases surgical options are also available like Salivary duct ligation for treatment of patent duct orifices, diversion of Stenson's duct to the tonsillar fossa and Parotidectomy. I presented a case of sudden onset of parotid gland swelling; hence the acute line of treatment was given to address the associated signs and symptoms.

Treatment progress

Once the symptoms appeared, the dental procedure was stopped. After completed examination and investigated the patient was then kept under observation to check the nature of the swelling. As it started to subside on its own, patient was given antibiotics, sialogogues and analgesics for a week as a prophylactic measure against any infection.

Treatment results

On follow up the swelling reduced gradually over the next 4 hours (Fig 5), and had uneventful recovery. The swelling completely disappeared after one week (Fig 6). The patient was kept under observation to check for any recurrence and no recurrence has been observed.

**Figure 6:** Four Hours Follow Up**Figure 7:** One week follow up

Discussion: Pneumoparotitis is the presence of air inside the ducts of parotid gland, with or without gland inflammation. The duct orifice normally acts as a valve to prevent the flow of air from entering the gland. Rarely, an incompetent valve may allow the insufflation of the air into the ductal system and cause pneumoparotid. Pneumoparotid may be occupational or self-induced. It is caused by an increased pressure intraorally, followed by subsequent retrograde flow of air through Stenson's duct, into the parotid acini. When pneumoparotid co-exists with inflammation or infection, it is called "pneumoparotitis". Different terminologies used for pneumoparotitis are, "Pneumosialadenitis", "pneumatoceleglandulaeparotitis", "wind parotitis", and "anaesthesia mumps". Normal intraoral pressure is 2-3 mm Hg, however, blowing or puffing of cheeks, wind instrument playing, or use of air through 3-way syringe, can cause a significant rise of intraoral pressure.⁶ It is also noted that, even with increased intraoral pressure, some individuals experience pneumatic insufflations, and some do not. The reason for the same could be attributed to anatomic abnormalities, like hypotonia of muscle fibers surrounding the papilla like the buccinator fibers, transient mucosal plugging which causes decrease in salivary flow, hypertrophy of the masseter muscle, and abnormal dilatation of duct orifice.² Presentation of pneumoparotitis commonly involves gland enlargement and palpable crepitus. Frothy saliva may be present at the duct opening or may represent itself as absence of salivary secretion. On palpation, the parotid gland may be tender or non-tender, with overlying skin being warm and erythematous. Management ranges from conservative to surgical interventions. After thorough investigation, to begin with, the precipitating factor should be eliminated. Since oral microbes have been forced in a

retrograde manner in the duct, prophylactic antibiotics need to be prescribed. Acute swelling from air insufflations alone would rapidly dissipate, over a period ranging from few hours to few days. In case of chronic recurrent pneumoparotitis, surgical interventions suggested in literature include ligation of parotid duct, glandular extirpation and repositioning.

Summary and conclusion: Pneumoparotitis is one of the rare causes of head and neck swelling. It could be attributed to autoimmune diseases, infection, endocrine disorders, and ductal obstruction. It is most commonly associated with increased intraoral pressure. The most prominent clinical presentation consists of extraoral swelling, crepitus on palpation and decreased salivary flow. The use of ultrasound is strongly recommended for finalizing the diagnosis. First step towards treatment is eliminating the triggering factor followed by antibiotics and analgesics. A parallel line of treatment may include hydration, massage of the gland, use of mouthwashes, sialogogues and warm compresses. Careful diagnosis and management are necessary for resolution of the pathology and to counteract onset of further complications.

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