CASE REPORT

Air Leak into the Soft Tissues During the Puffed Cheek CT Evaluation of Oral Cavity: Diagnosis and Implication of a Rare Phenomenon

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Abstract Leakage of small pockets of air in to soft tissues of cheek along vascular bundle is reported in a patient with ulcerated oral malignancy with history of recent biopsy. Leakage occurred during an attempt to puff the cheek during CT examination of oral cavity. Hereto undocumented phenomenon was self limiting and did not lead to clinical disability. Imaging appearance and likely mechanism of the complication are discussed.

Keywords Puffed cheek CT · Interstitial air leak · Complication · Oral malignancy

Introduction

Puffed cheek CT evaluation of the oral cavity is a well established technique for visualisation of the malignancy of the oral cavity. In view of a transient distension of the oral vestibule during the examination, the procedure is well tolerated and usually not associated with any complications. An incidental observation during the examination is the occurrence of a pneumoparotid, occurring in approximately 17 % of examination [1]. Procedure may be associated with mild local pain, otherwise no major disability or complication reported during or after the procedure. Dissection of air into soft tissues after the procedure is

unknown, even in presence of proliferative or ulcerated lesions. Penetration of air pockets into subcutaneous soft tissue through an ulcerated malignancy is noted in our patient, during the attempt to perform puffed cheek CT technique (PCCT). Clinical presentation and imaging appearances of the rare phenomenon is presented.

Case Report

50 year old female presented with a swelling on the right side of the lower face associated with vague pain in the cheek during eating since 4 month. She had biopsy of oral lesion 5 days ago. However there was no history of bleeding or pain. On clinical examination patient had minimal limitation of mouth opening and localised swelling of the right side of the face overlying the masseter. Swelling was non-tender on palpation. Examination of the oral cavity revealed a large ulcerated lesion along the posterior buccal mucosa on right side extending to the retromolar region. There were areas of leukoplakia around the lesion (Fig. 1a) No active bleeding site was visualised. There was palpable level IB lymph node; rest of the neck examination was unremarkable. Patient was referred for CT imaging of the oral cavity with puffed cheek CT technique. During the training part of the study the patient was able to puff her oral cavity, however, due to some discomfort could not distend the oral vestibule during the subsequent examination. At the end of the examination patient had no significant discomfort. Review of CT images revealed a large mucosal lesion in the posterior aspect of the right oral cavity (Figure 1b). There was mucosal enhancement of approximately 3–4 mm thickness, from superior gingivo-buccal sulcus to inferior buccal sulcus extending posteriorly to retromolar trigone. There was no

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Fig. 1 **a** Intra-oral photograph demonstrates an ulcerated lesion in posterior oral mucosa and adjacent retromolar trigone. Surrounding leucoplakia is evident. **b** Axial contrast enhanced CT shows irregular

mucosal lesion (*open arrow*). There are small air pockets in the soft tissues (*white arrows*)

Fig. 2 **a, c** Axial and sagittal CT reconstructions demonstrates air pockets (*arrow*) adjacent to enhancing vessels. Cluster of air is not in the anatomical location of parotid duct. **b** Coronal CT reconstruction

shows irregular mucosal lesion (*open arrow*) and soft tissue air pockets (*white arrow*)

pneumoparotid. Incidentally small air pockets were detected in the soft tissues of the cheek, located the around the venous channels (Figure 2a–c). Review of two phases of examination (Plain and contrast enhanced), no significant displacement was noted in the position of air pockets demonstrated, indicating that air pockets were not in the vascular system (Figure 2c). There was enlargement of IB lymph node. Patient was followed up for clinical symptoms. During the hospital stay patient remained asymptomatic. Patient had surgery with curative intent, is presently on follow up.

Discussion

Passage of interstitial air in to soft tissues is not one of the known complication of puffed cheek CT examination of oral cavity. Dissection of air into soft tissues, through a defect or ulceration in the mucosa, during the performance of a puffed cheek is theoretically feasible. Large ulcerated mass or recent surgical intervention with mucosal defect may lead to communication with blood vessels allowing small pocket of air could enter into the vascular system. Though distension of oral cavity during PCCT is voluntary, it can potentially build a high pressure zone forcing air in to soft tissues or open vascular channels. Such examples are known in the examination of the gastrointestinal system, with dissection of the air into the large bowel leading to air in mesocolon or further in to mediastinum [2, 3]. There are instances in dental surgery showing complication of interstitial emphysema (periorbital) using high pressure pneumatic instrument [4]. Also there is a report of occurrence of surgical emphysema of facial region and mediastinum during tooth extraction [5]. Extensive review of literature, and observation in our own large group of PCCT examinations, exceeding 400 patients, we have not come across documentation of such incidence even in patients with large ulcerated lesions. It appears that, distension of

the oral vestibule with air, allowed passage of small air pockets into the defective mucosal barrier of an ulcerated neoplasm. Certainly there appears to be important role of a recent biopsy in the etiogenesis of this observation. Though patient had no symptoms or active bleeding at the time of examination, site of biopsy could be a potential focus through which air could enter soft tissues. Phenomenon showed relatively benign course on follow up indicating that such complication may not have clinical significance. Nevertheless it is important to be vigilant while investigating patient with a recent open biopsy of oral lesion. Hence due diligence is necessary, in avoiding over-distension of oral vestibule if examination is done with PC CT. Awareness of this rare complication, will remind us to modify PC CT technique in patients with large oral ulceration or history of recent biopsy.

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