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Pneumoparotid in "puffed cheek" computed tomography: incidence and relation to oropharyngeal conditions

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Abstract

Pneumoparotid is common in patients with lesions of the oral cavity who have diagnostic computed tomography (CT) with the "puffed cheek" technique. Although such observations are often noted, we could find few papers about the incidence in relation to oropharyngeal conditions. We present a retrospective series of 47/300 patients who developed pneumoparotid during multidetector CT examination of the oropharyngeal region to assess the incidence and any possible correlation with regional disease. Patients were followed up for any symptoms and also for complications. In 14 patients the pneumoparotid was right-sided, in 17 left-sided, and in 16 it was bilateral. There was a significant association between the incidence of pneumoparotid and the site of disease, it being stronger ($p < 0.001$) with lesions in the oral cavity than with those in the oropharynx and hypopharynx. Apart from brief discomfort, none of the patients had any symptoms after the procedure. In summary, pneumoparotid developed in 47/300 (16%) of our patients after multidetector CT when the "puffed cheek" technique was used, and was more common in patients with lesions of the oral cavity and anterior tongue than among patients with lesions of the oropharyngeal, nasopharyngeal, and hypopharyngeal regions. Few patients experienced transient fullness immediately after the procedure. None of our patients had lasting or infective symptoms.

Keywords: Pneumoparotid; Puffed cheek technique; MDCT; Oral pathology

Introduction

That the "puffed cheek" technique is of immense value in showing mucosal lesions in the oral cavity has been shown in many studies.[1–3] The technique involves distension of the oral cavity by pursing the lips and distending it with air. It is relatively simple and can be done by most patients, even those with lesions in the oral cavity. Despite the slight discomfort caused by existing disease, many patients can distend the vestibule of the mouth for long enough for a good evaluation by computed tomography (CT). The distension is generally required for only a short time, and causes no lasting discomfort or complication. In some patients the parotid ducts can be seen filled with air after the procedure, and this is described as pneumoparotid. We know of no reports of the exact incidence, but there are many isolated reports and short series,[4] after attempted spirometry, endoscopy, dental procedures, blowing of wind instruments and, occasionally, spontaneously.[5] No complications develop unless infection is introduced. We know of no specific studies that correlate pneumoparotid with lesions in the oral cavity.

We have documented the incidence of pneumoparotid after "puffed cheek" multidetector CT to evaluate the part played by pneumoparotid in relation to the primary conditions of the oral cavity, and to evaluate the symptoms.

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Patients and methods

Three hundred consecutive patients who had multidetector CT imaging with the "puffed cheek" technique were included in this retrospective study. Indications included patients with suspected lesions of the oral cavity (buccal mucosa and tongue), oropharynx, hypopharynx, and nasopharynx, and those with cervical nodes that were confirmed to contain malignant tissue but in whom the primary was so far unknown. The "puffed cheek" technique was explained to patients, and was reinforced with demonstration whenever necessary. The ages of the patients ranged from 19 to 83 years (mean 51) and 212 were male (71%).

The technique involved distension of the vestibule of the oral cavity by the patient for a short period during a plain or contrast-enhanced spiral CT. We used a GE Light speed VCT (General Electric, Milwaukee, USA), and the protocol involved Kv120, smart mA (100–450)/0.7 s, pitch 1.375:1 covering the region from the skull base to the level of the thoracic inlet. Data were subsequently reconstructed at 0.625 mm intervals in the coronal and sagittal planes with a 512 × 512 matrix. The presence of pneumoparotid and extent of visualisation of the parotid duct were recorded after evaluation of the axial and multiplanar CT data. The extent of visualisation of the ducts was classified as minor or major, depending on the extent of visualisation of the proximal duct or of the entire intraglandular ducts in addition to the main duct. The presence of pneumoparotid was correlated with distension of the oral vestibule, and was categorised as minor (Grade 1), mild (Grade 2), moderate (Grade 3), or gross (Grade 4) based on the extent of distension (Fig. 1).

Lesions were divided by site into first, the oral cavity (in which lesions were anterior to the plane of the palatoglossal folds and the plane passing through the circumvallate papillae). The rest were classified as the posterior group. The incidence of pneumoparotid was recorded and the significance of the difference between them was assessed.

Lesions that were not clearly defined into these categories, and lesions that extended across both regions, were not included in the statistical analysis. In lesions of the buccal mucosa with pneumoparotid on the same side, the distance from the visualised margin of the lesion to the opening of Stenson's duct was recorded using a poly line or spline line (Philips Intelli-Space Portal) measurement option. We carefully scrutinised the region of the parotid duct and surrounding region to document any focal lesion, or abnormal mucosal thickening, or signs of infiltration.

The significance of differences between groups was assessed using the chi square test or Fisher's exact test as applicable, and probabilities of less than 0.05 were accepted as significant.

Results

Forty-seven of 300 patients showed signs of pneumoparotid; in 14 it was on the right side, in 17 on the left side, and in 16 it was bilateral (Fig. 2). None of the patients had parotid sialography, previous surgery, or ductal dilatation before the CT. The entire duct was seen (major pneumoparotid) in 21/47 patients (44%), and the rest had minor or minimal pneumoparotid. The primary lesion was in the buccal mucosa (Fig. 3), maxillary or mandibular alveolus, retromolar trigone, palate, or the tongue in 36/47 (77%). Patients with a pathological lesion in the buccal mucosa and anterior tongue had a higher incidence of pneumoparotid than those with lesions in the oropharynx and hypopharynx ($p < 0.001$). A total of 209/300 patients (69%) achieved good distension of the vestibule (Grade 3 or 4) whereas in 38 (12%) it was minor and in 53 (18%) it was mild. The presence of pneumoparotid showed no linear relation to the degree of distension of the oral cavity. A lesion close to the parotid duct on the same side as the pneumoparotid was noted in only one patient

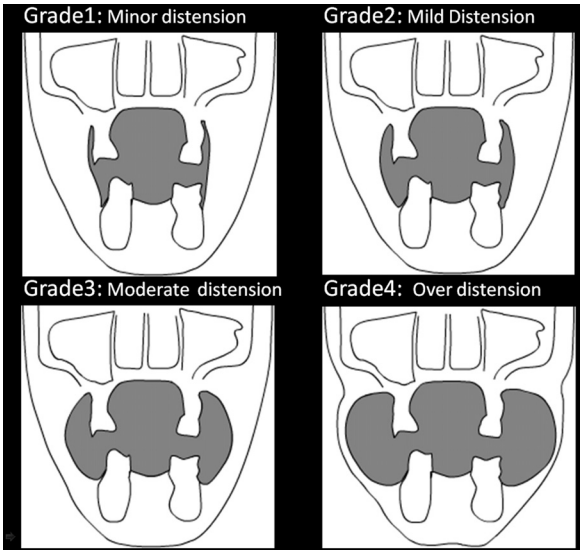

Fig. 1. Diagram of grading of distension of the oral cavity in "puffed cheek" computed tomography.

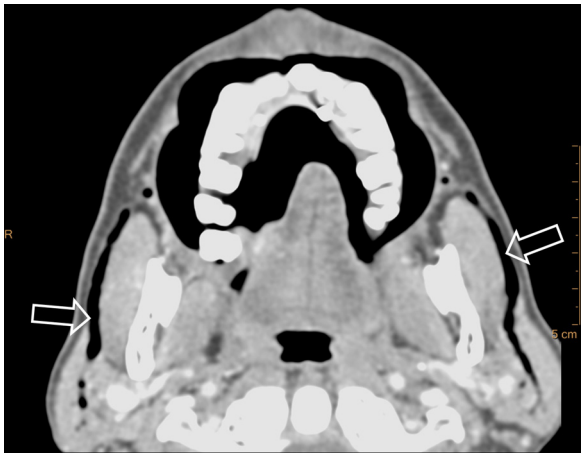

Fig. 2. Axial computed tomographic image showing bilateral major pneumoparotid (open arrows).