

An Incidental Finding on Cone Beam Computed Tomography - Primary Pleomorphic Adenoma of the Parapharyngeal Space

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Case Report

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Abstract

Recent widespread adoption of cone beam computed tomography in the dental field has seen a greater volume of the craniofacial complex being imaged. Consequently, the probability of encountering an incidental finding in the scan has also increased. It is therefore of utmost importance for the referring clinician to review not only the region of interest, but the entire volume of scan data for any potentially significant findings and refer or manage as appropriate. A failure to identify and document incidental findings may have serious consequences for both the patient and the practitioner. We present a rare case of primary pleomorphic adenoma in the parapharyngeal space, which was incidentally detected during cone beam computed tomographic examination for third molar extraction.

Keywords: Incidental Findings, Pleomorphic Adenoma, Cone Beam Computed Tomography, Salivary Gland Neoplasms, Parapharyngeal Space

Abbreviations:

CBCT = Cone Beam Computed Tomography;

CT = Computed Tomography;

FOV = Field of View;

IF = Incidental Finding,

MRI = Magnetic Resonance Imaging;

PA = Pleomorphic Adenoma;

PPS = Parapharyngeal Space;

ROI = Region of Interest.

of these IFs requiring further investigation or treatment [1-3].

The potentially serious ramifications to both the patient and the practitioner for failing to identify and follow-up on any IFs has been documented [1].

We report a rare case of a primary pleomorphic adenoma arising in the parapharyngeal space (PPS) detected incidentally during CBCT examination for third molar extraction.

Introduction

An incidental finding (IF) denotes “any abnormal or pathological finding that is unrelated to the original purpose of the imaging test or tests being performed; it may be a variant that is normal or benign or is of pathological concern” [1]. The likelihood of encountering an IF during routine dental practice is increasing, particularly with the widespread adoption of cone beam computed tomography (CBCT) in general dental practice over the last 20 years. The frequency of IFs has been reported to range from 24.6 - 93.4% with approximately a third

Case Report

A 35-year-old female with unremarkable medical history was referred by their general dental practitioner for CBCT of the symptomatic right mandibular third molar prior to extraction. The patient had a recent history of right ear infection for which a general medical practitioner had prescribed three courses of antibiotics with minimal improvement.

The CBCT (Figure 1) revealed significant asymmetry of the lateral oropharynx, with enlargement in the region of

the right palatine (faucial) tonsil. Patency of the oropharynx was observed. Hypertrophy of the right palatine tonsil or a neoplastic process were included in the differential diagnosis. As the PPS contents could not be visualised on CBCT, further specialist evaluation and imaging was strongly advised.

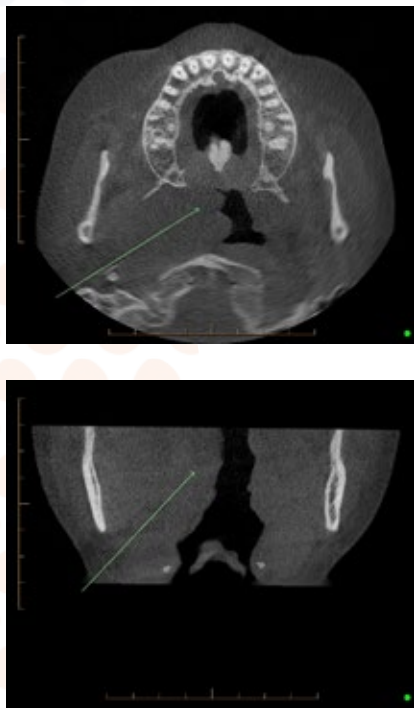


Figure 1 – Preoperative CBCT (a) axial, (b) coronal slices showing significant asymmetry of the palatine tonsillar region, with deviation of the oropharynx which remains patent.

A magnetic resonance imaging (MRI) scan (Figure 2) and an aspiration biopsy was conducted to establish a more definitive diagnosis following prompt referral to an oral and maxillofacial surgeon. On imaging, there was a large, lobulated, heterogeneous T2 hyperintense mass with its epicenter in the right PPS, measuring 49mm (transverse) x 42mm (craniocaudal) x 22mm (anterior-posterior). There was heterogeneous post-contrast enhancement. Polypoidal extension medially into the submucosal nasopharynx was noted, with extrinsic compression of the right eustachian tube and secondary opacification of the right petrous mastoid and middle ear. Laterally, the lesion abutted and displaced the deep lobe of the right parotid gland with a clear fat plane existing between the two structures. Displacement of other adjacent structures including the pterygoid and prevertebral muscles, carotid artery, right palatine tonsil and soft palate was observed. No significant widening of the stylomandibular tunnel, nor large nerve perineural spread was noted. A right level two lymph node was at the upper limit of normal, although hilar fat was maintained with no nodal necrosis at any of the levels. The MRI appearances suggested a large, long-standing salivary gland neoplasm, most likely a pleomorphic adenoma in the right PPS, with medial submucosal polypoidal projection in the nasopharynx.

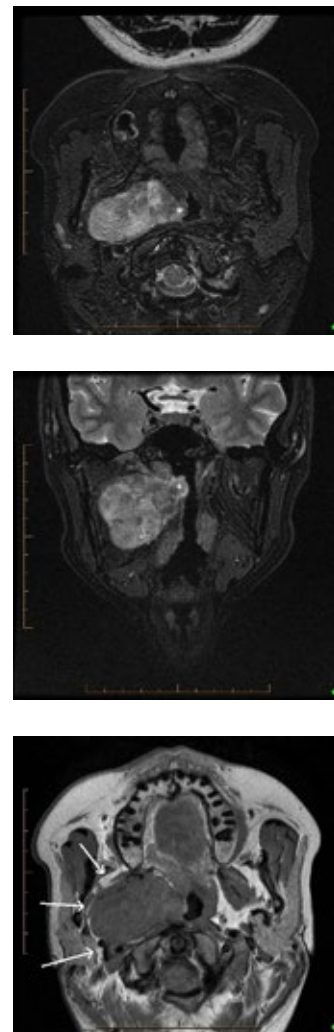


Figure 2: Preoperative MRI (a) axial T2 FS, (b) coronal T2 FS and (c) T1 slices demonstrating the extent of the lesion with polypoidal extension medially into the submucosal nasopharynx (asterisk). Preservation of the fat plane separating the lesion from the deep lobe of the right parotid gland is demonstrated (white arrows).

The aspiration biopsy confirmed the initial diagnosis of pleomorphic adenoma. Surgical resection of the lesion was conducted using a transcervical approach with removal of the right submandibular salivary gland. Further access with transection of the posterior digastric and styloglossus muscles, and a lip split mandibulotomy through the mandibular central incisors was required for this case. The specimen was then sent for histopathologic examination.

The macroscopic specimen consisted of a nodular piece of cream tissue measuring 60 x 45 x 25 mm (Figure 3). Sectioning revealed a variegated cut surface with some areas that were predominantly solid and cream with areas of haemorrhage seen. Microscopic examination (Figure 4) confirmed a pleomorphic adenoma composed of chondromyxoid stroma and a mixture of myoepithelial and ductal cells forming ducts and clusters of cells. The lesion had a thin capsule with narrowly clear margins. No malignant transformation was identified.

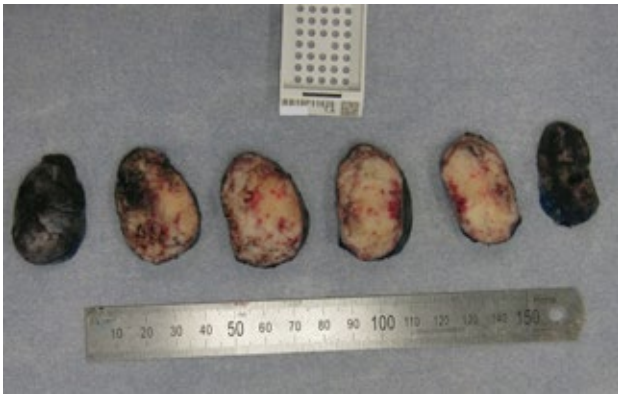


Figure 3: Photograph demonstrating the sliced macroscopic specimen which consisted of a nodular piece of cream tissue measuring 60 x 45 x 25 mm.

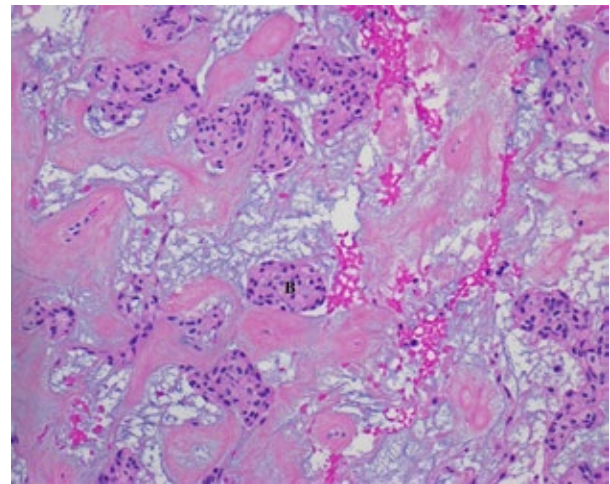
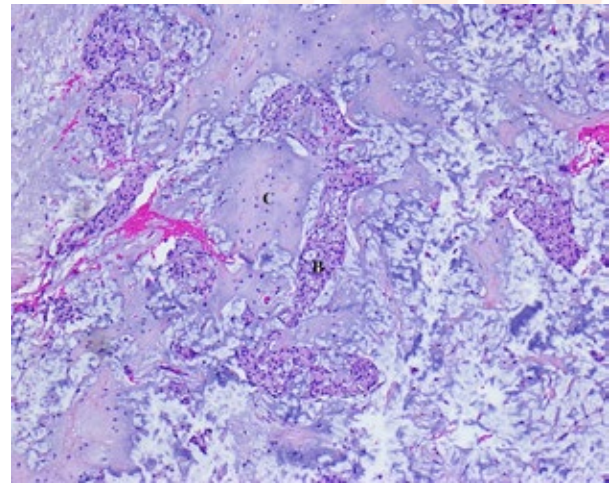
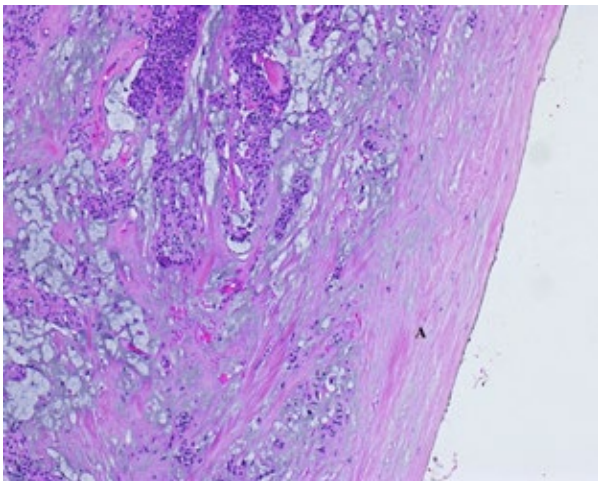
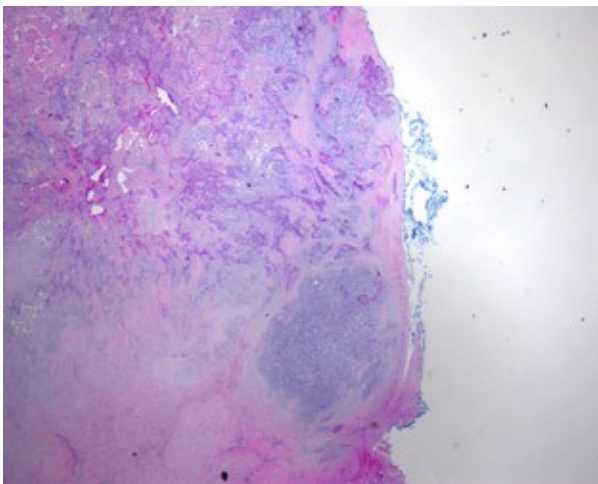


Figure 4: Microscopic examination at (a) x20, (b,c) x100, (d) x200 of the pleomorphic adenoma specimen demonstrating a thin capsule (A) surrounding a mixed area of melting epithelial components (B) in chondromyxoid stroma (C).

The histopathological and radiologic features were consistent with a pleomorphic adenoma.

The three-month postoperative panoramic radiograph (Figure 5) and MRI scan (Figure 6) showed evidence of surgical fixation with asymmetric enhancement in the right floor of mouth extending into the parapharyngeal fat space, consistent with post-surgical granulation tissue. Absence of the right submandibular gland was confirmed. No discrete enhancing mass was identified. The level 1B and 2 lymph nodes bilaterally were similar in appearance to the previous MRI. A small amount of fluid opacification remained present in the right mastoid air cells. Overall, the appearance was consistent with post-surgical changes in the right parapharyngeal fat space with no convincing residual tumour identified. A 12-month review with MRI has been scheduled.



Figure 5: Postoperative panoramic radiograph showing surgical hardware.

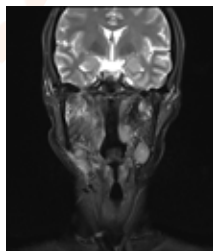
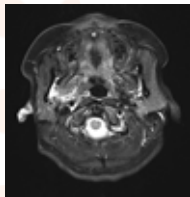


Figure 6: Postoperative MRI (a) axial T2W Dixon method, (b) coronal T2W Dixon method slices showing T2 hyperintensity within the right parapharyngeal fat space, consistent with post-surgical granulation tissue. No convincing residual tumour was identified.

Discussion

Incidental findings are routinely detected in all modes of diagnostic imaging and the likelihood of encountering IFs is increasing as the use of CBCT in dentistry rises. Although the field of view (FOV) size can be modified during CBCT acquisition, it remains the responsibility of the referring clinician to review not merely the region of interest (ROI), but the entire volume of the scan as part of their duty of care to the patient, as well as from a medicolegal point of view [4, 5].

The significance of IFs varies widely, from common benign conditions to marked pathology with serious effects on the health of the patient. A failure to recognise and follow-up IFs may lead to undesirable outcomes for both the patient and the clinician. A significant number of IFs (16.1 - 31.24%) has been found to require referral or further treatment, while 15.6 - 28.97% required monitoring [2, 3, 6]. However, false positive findings may lead to undue worry for the patient, with further unnecessary investigations leading to increased health care

costs [1]. As such, accurate interpretation of IFs is paramount, with an adequate knowledge of the normal anatomy and pathology that may be encountered in the ROI being an integral component in the radiologic interpretation process [4, 5].

The wide variation in the frequency of IFs (24.6 - 93.4%) has been attributed to the differences in the population studied, the method of reporting as well as reporter bias as to what is significant enough to report on [1, 6]. It is also important to note that IF frequency is influenced by age, with the number of IFs and certain conditions being more likely in older populations [1, 3]. The three most common IFs outside of the dentoalveolar complex were osseous changes (such as degenerative changes of the vertebrae), airway findings (including sinusitis or mucosal thickening) and soft tissue calcifications [1-3]. With the most commonly identified IFs on CBCT being extragnathic findings, the need to look beyond the jaws and review the entire dataset is affirmed [1].

Our case highlights the uncommon instance where an IF is determined to be significant pathology, which might otherwise have gone undetected and resulted in worsening patient outcomes and increased treatment complexity and costs.

Pleomorphic adenoma is the most common salivary gland tumour, accounting for approximately 50% of all salivary gland neoplasms [7, 8]. The World Health Organisation has defined the lesion as a “benign salivary gland tumour with variable cytomorphological and architectural manifestations”, whereby “the identification of epithelial and myoepithelial/stromal components is essential for the diagnosis of PA” [7]. This lesion most commonly presents in females and can occur in all ages, although more commonly during the third to sixth decades of life [7, 8]. Clinical presentation is typically that of a slow-growing, painless submucosal mass that may appear as a retrotonsillar mass or a PPS tumour, the latter of which may give rise to additional symptoms such as otalgia, neuralgia, trismus and cranial nerve IX, X, XI palsy [7, 9]. The aetiology of PA is unclear, although there is a reported increase in incidence 15-20 years after exposure to radiation therapy [7, 8].

Pleomorphic adenomas are most commonly associated with the parotid gland, although they have been reported to occur elsewhere [7]. A pleomorphic adenoma arising from minor salivary gland tissue accounts for 6.5% of all PAs [10], with the most common site being the palate, followed by the lip, buccal mucosa, floor of mouth, tongue, tonsil, pharynx, retromolar area and nasal cavity [9].

Lesions arising in the PPS are rare (0.5-1% of all head and neck masses) and the anatomical complexity of this region can provide a challenging diagnosis and management. Salivary gland tumours are the most common of all PPS masses, accounting for 45% of such lesions, of which 77% are benign [10-12]. Pleomorphic adenomas in the PPS most commonly arise from the deep lobe of the parotid gland, although they may also arise from minor salivary gland tissue within the

anatomical space, as in our case. This is very rare, with only few cases being reported in the literature [9, 13]. The embryologic origin of such tissue has been proposed to be from displaced or aberrant salivary gland tissue (epithelial rests) within a lymph node; minor salivary gland tissue found within the PPS/lateral pharyngeal wall; or ectopic salivary rests [11, 14]. Other lesions of the PPS which should be considered include neurogenic lesions, connective tissue masses, miscellaneous cystic lesions, lymphoid PPS lesions and metastatic lesions [12]. Delayed diagnosis of PPS lesions may result in an increased likelihood of complications such as cranial nerve injury or Horner's syndrome, or more severely, upper airway obstruction with acute respiratory failure [11, 12, 15].

Cross-sectional imaging using both computed tomography (CT) with contrast and MRI is considered the gold standard for the imaging of PPS lesions, in order to assess the anatomical location of the lesion in relation to the base of skull, adjacent neurovascular structures, lymph and glandular structures [12, 16]. While CT best demonstrates bony involvement and the presence of calcifications within the lesion, MRI provides superior soft tissue contrast to differentiate the mass from critical neurovascular structures, lymph and glandular structures, delineate soft tissue and demonstrate intracranial extension [16].

The histopathology of pleomorphic adenoma shows variable epithelial and myoepithelial/stromal components in a variety of patterns. Cellular phenotypes may include oval, spindle, epithelioid, clear or plasmacytoid, while the stromal elements may be myxoid, lipomatous, chondromatous, and osseous or any combination of these features [7]. Of note, lesions with a high stromal chondroid/myxoid content such as in this case are more likely to show recurrence [10]. Other risk factors for recurrence include female sex, young age at initial treatment and enucleation rather than parotidectomy [7]. Surgical resection with negative margins is the treatment of choice with the lowest recurrence rates reported [7, 8]. Malignant transformation has been reported in 6.2% of PAs, with multiple recurrences, deep parotid lobe location, male sex and older patient being factors associated with increased risk of malignancy [7].

Conclusion

Incidental findings are commonly encountered during routine dental practice, with almost one-in-three of IFs requiring treatment or follow-up. A thorough review of the entire FOV of the scan beyond the area of interest must be carried out to avoid overlooking significant pathology.

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