

Brown tumour of the mandible in primary hyperparathyroidism; a case report

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ABSTRACT

We present an uncommon diagnosis in a 34-year-old female with a non-healing extraction socket. Incisional biopsy revealed multi-nucleated giant cells suggestive of central giant cell granuloma (CGCG). The computed tomography (CT) report made incidental note of a parathyroid mass. The parathyroid hormone (PTH) level was checked and found to be abnormally high. A diagnosis of brown tumour of the mandible was made. The patient was referred to a head and neck surgeon and the parathyroid mass was removed. The mandibular lesion was managed conservatively and continues to regress post-normalisation of PTH levels. The inclusion of the parathyroid region on the CT scan in this case was fortuitous. There are a range of pathologies containing multinucleated giant cells that can arise from the maxillofacial region; PTH level should, nevertheless, be checked in all such jaw lesions. This allows the clinician to exclude brown tumour from the diagnostic sieve.

INTRODUCTION

Brown tumours (osteitis fibrosa cystica) are benign bony lesions that arise in some patients with hyperparathyroidism. They are erosive lesions caused by osteolysis (Nair et al 2011). They occur relatively infrequently, affect mainly young adults with a slight female preponderance and exhibit variable aggressiveness and recurrence potential (Martinez-Gavidia et al 2000). Outside of the mandible, these lesions have been reported to occur in the ribs, clavicle and pelvic girdle (Keyser and Postma, 1996). Histologically, brown tumours are characterised by multinucleated giant cells in a fibrovascular stroma together with cyst-like spaces lined by connective tissue and foci of haemorrhage. The haemorrhage may be related to microfractures within the weakened bony architecture being expanded by the lesion itself. The subsequent release of haemosiderin results in a friable red-brown mass; hence the term 'brown tumour' (Sutbeyaz et al 2009). Histologically a central giant cell granuloma (CGCG) and a brown tumour are identical (Dorigatti de Avila et al. 2012). When histology consistent with CGCG is reported, it is important to assess PTH levels to rule out brown tumour.

CASE REPORT

A 34-year-old female sought advice from her dentist regarding toothache. The pain was thought to be attributable to tooth 36, which was extracted. The pain, however, persisted post-extraction. Swelling at the extraction site occurred over the ensuing weeks and months.

A referral to an Oral and Maxillofacial surgeon was made. Past medical history was noted to be unremarkable except for Wolf Parkinson White syndrome, which had been successfully treated by radiofrequency ablation some years prior.

Wolf Parkinson White syndrome is a rare congenital condition involving abnormal conductive cardiac tissue between the atria and the ventricles, allowing a pathway for-entrant tachycardia; it has no association with the presented case. On examination a firm, 2.0 cm diameter, expansile lesion with normal overlying gingivae and a bluish hue, was seen to be arising from the buccal aspect of the site of removed tooth 36. No regional lymphadenopathy was noted. Plain radiographs revealed a poorly defined radiolucency in the left mandibular alveolus, between teeth 35 and 37, with some loss of the lamina dura associated with tooth 35 (Figure 1). A CT scan revealed a 2.7 x 1.6 x 2.0 cm expansile lesion within the left body of mandible, centred at the site of the previously extracted molar tooth. There was breach of both lingual and buccal cortices and a lack of intact cortex superiorly. Incidental note was made of a 3.6 x 2.5 x 2.3 cm ovoid, well circumscribed low-attenuation lesion, posterior to the right lateral lobe of thyroid, likely arising from a parathyroid gland.

An incisional biopsy of the mandibular lesion was taken under local anaesthesia. The histology showed mature fibrous connective tissue containing numerous plump mesenchymal cells and multinucleate giant cells resembling osteoclasts. A strip of parakeratinised stratified squamous epithelium with underlying lamina propria was seen to be continuous with the lesion. Features favoured a CGCG (Figure 2).

A parathyroid hormone (PTH) level was requested due to presence of multinucleated giant cells in the mandibular lesion and the likelihood that the neck mass, noted on the CT scan,



Figure 1: (Above) Pre-operative panoramic dental radiograph demonstrating lesion in left mandible. (Below) Post-operative film showing evidence of partial radiographic resolution.

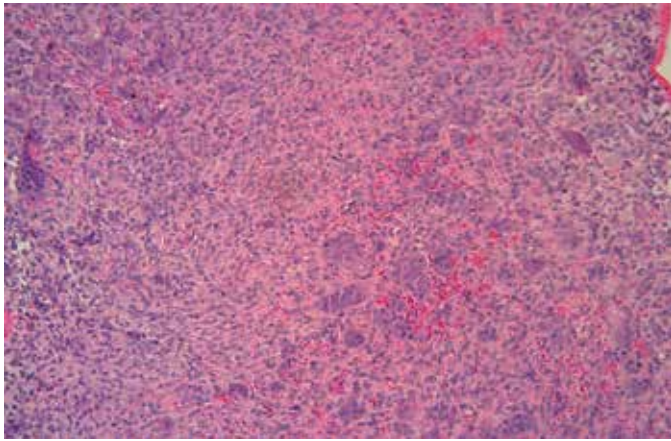


Figure 2: Haematoxylin and eosin stain x 100 magnification. Numerous giant cells with extravasated erythrocytes and fibroblastic stroma, consistent with CGCG or brown tumour.

was arising from a parathyroid gland. Elevated serum PTH (116 pmol/L (1.7 – 7.3)), ALP (338 U/L (40-100)) and adjusted calcium (3.75 mmol/L (2.10 – 2.55)) established the diagnosis of primary hyperparathyroidism. The diagnosis was revised, from CGCG, to brown tumour.

The patient was referred to a head and neck surgeon and underwent right inferior parathyroidectomy and removal of the associated mass. The histology of the mass was reported as adenoma. The post-operative course was uneventful. PTH levels have since normalised. The mandibular lesion has been treated conservatively with early signs of regression noted clinically and radiographically (Figure 1).

DISCUSSION

Hyperparathyroidism is classically described as being either *Primary*; the result of uncontrolled PTH production, *Secondary*; continuous PTH secretion in response to low levels of serum calcium (e.g. in chronic renal failure) or *Tertiary*; occurring after a long period of secondary hyperparathyroidism where persistent parathyroid stimulation results in unregulated parathyroid function and hypercalcaemia. Brown tumours are usually described in association with primary hyperparathyroidism (Nair et al. 2011).

Primary hyperparathyroidism is characterised by increased PTH secretion occurring as a result of abnormality in one or more of the parathyroid glands. The condition is most commonly caused by adenoma (80 – 85%), followed by hyperplasia (10 – 15%) and carcinoma (less than 1%) (Mackenzie-Feder et al. 2011). Brown tumours tend to occur late and are seen in less than 5% of cases of primary hyperparathyroidism (Triantafyllidou et al. 2006). This infrequency may be due, at least in part, to early detection and successful management of primary hyperparathyroidism (Sutbeyaz et al. 2009).

Symptoms of hyperparathyroidism include non-specific malaise, fatigue, weakness and anorexia. Hypercalcaemia effects are remembered by the mnemonic *stones* (renal or biliary), *bones* (bone pain), *groans* (abdominal pain, nausea and vomiting), *thrones* (polyuria) and *psychiatric overtones* (depression, anxiety, cognitive impairment, insomnia, coma). In the case reported, no symptoms were reported other than a vague pain associated with the mandibular lesion. This was incorrectly thought to be odontogenic in origin, resulting in extraction of a tooth.

PTH regulates serum calcium through its effects on bone, the kidneys and the intestines. It indirectly causes bone resorption

by osteoclasts. Osteoclasts do not have a receptor for PTH. PTH instead binds to osteoblasts, increasing their expression of RANKL and inhibiting their expression of osteoprotegerin. This, in turn, increases the number and activity of osteoclasts (Coetzee and Kruger, 2004). Calcitonin, by way of contrast, is secreted by the thyroid gland and decreases the number and activity of osteoclasts. Increased calcium raises the threshold for depolarization of nerve and muscle fibers by blocking sodium channels (Armstrong and Cota, 1999) this may lead to clinically symptomatic hypercalcaemia. The skeletal effects of hyperparathyroidism include diffuse osteopenia or circumscribed lytic lesions (Sutbeyaz et al. 2009). Bone pain and pathological fractures occur.

Radiographically, isolated brown tumours of the jaw mimic more common lesions such as central giant cell granuloma, ameloblastoma and odontogenic cysts. Histologically brown tumours look similar to other giant cell lesions like such as aneurysmal bone cyst, cherubism, and central giant cell granuloma (Angadi et al. 2010). PTH assay will differentiate brown tumour from other giant cell lesions.

There is agreement in the literature that management of a brown tumour of the jaw should be directed to the underlying cause. In most cases of primary hyperparathyroidism this will mean surgical removal of a parathyroid adenoma. It is well documented that normalization of parathyroid function leads to a reduction in size, or resolution, of the brown tumour (Keyser and Postma, 1996). The time for isolated tumours to regress, following normalization of PTH levels, varies in the literature from six months to five years or more (Sutbeyaz et al. 2009). Some authors advocate curettage of the brown tumor to accelerate healing (Nair et al. 2011). Others have reported good response to intralesional corticosteroid injection (Martinez-Gavidia et al. 2000).

At the time of writing, the patient presented is showing good signs of tumour regression both clinically and radiographically. This case is a reminder that some jaw lesions result from systemic causes. Common things occur commonly, but clinicians should be aware of important uncommon differentials and how to exclude these. PTH level should be checked for any patient presenting with jaw lesions that contain multinucleated giant cells.

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Book Reviews

Advanced Immediate Loading

Georgios E Ramanos, 2012. Chicago: Quintessence. ISBN: 978-0-86715-491-7. Contains 179 pages. Price, US\$148.00.

This book is an exhaustive work on state-of-the-art research and protocols for advanced immediate loading. The initial chapters deal with bone biology, the importance of implant surface and design, the basic clinical procedure for immediate loading and the histological results. This introductory part gives the reader all the necessary information to properly interpret the clinical sections. The following chapters focus on the clinical applications of this surgical and restorative procedure, describing guidelines for immediate loading in the anterior mandible, edentulous arches, posterior regions, single implants, and fresh post-extraction sites. This section is followed by four chapters about advanced applications of immediate loading in grafted bone, management of immunocompromised patients, simultaneous sinus elevation and implant placement with immediate functional loading. The book is completed with a chapter that describes the management of all the main complications associated with immediate loading. Every topic of the text is debated with clinical cases that are thoroughly documented and highly explanatory. This book is a very useful guide for all the clinicians who want to start treating selected cases by immediate loading but also for all those who are more experienced and want to improve their implant skills.

Alessandro Quaranta (Dunedin)

Dancing Hands

Herluf Skovsgaard, 2013. London: Quintessence. ISBN: 978-1-85097-263-1. Contains 296 pages. Price, US\$198.00.

Dancing hands was written to teach dentists and their assistants how to improve their working methods and thus prevent musculoskeletal problems, develop teamwork and work more efficiently. The author likens a dentist's hands with a dancing couple – elegant, relaxed, and working in perfect co-operation.

This book contains so much information that it is a little overwhelming. Unfortunately, in not one of the clinical photographs is the patient wearing eye protection, and several photographs show the dentist's left hand resting over the patient's half-closed eye. In addition, dental dam is not used for any of the treatment illustrated. It is only in the few photographs of endodontic treatment (on a simulation head positioned on a bench top) that a dam is used. As a result the author's descriptions of where to place the mirror or suction heads are not applicable for those practicing to the generally accepted standards of care.

The chapters on organization of instruments and design of the dental surgery may be of interest to someone setting up a new dental practice. The sections on posture and vision provide some usual information. However, I would not recommend putting this book near the top of your Christmas list.

Colleen Murray (Dunedin)