A TEN-YEAR REVIEW OF THE MANAGEMENT OF PAROTID TUMOURS IN LANCASTER

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Salivary glands are situated essentially in the upper aerodigestive tract: the mouth, oropharynx and pharynx. Here, there are three major salivary glands: the parotid gland, the submandibular gland and the sublingual gland. The parotid gland is the largest. In addition, there are approximately 600 to 800 minor salivary glands distributed throughout the entire upper aerodigestive tract from the lip and extending to the lower end of the esophagus and up to the bronchial tree.[1]

Salivary gland tumours represent 2-4% of head and neck neoplasms. They constitute a significant proportion of oral tumours.

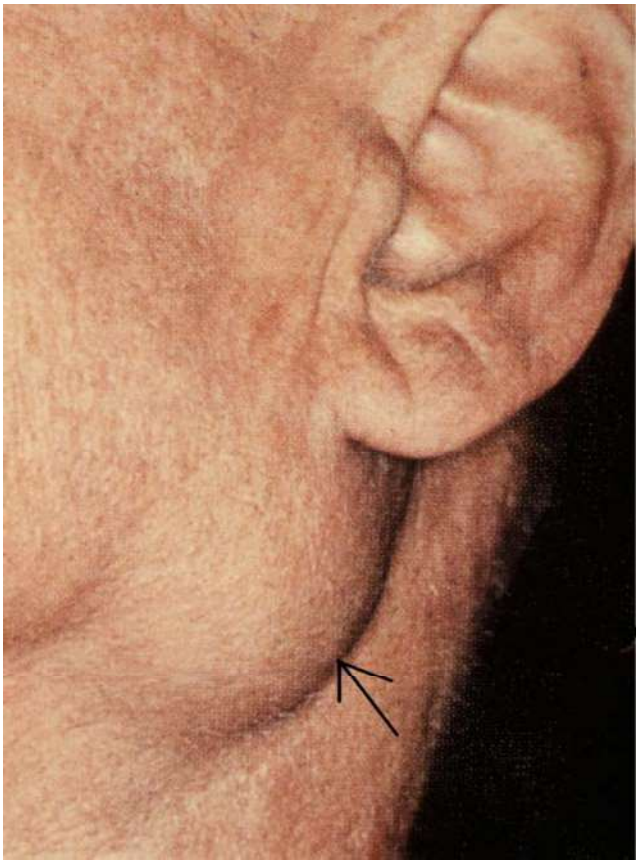

Figure 1 Left parotid tumour

Seventy percent of salivary gland tumours originate in the parotid gland, 8% in the submandibular gland and 22% in minor salivary glands. About 80% of parotid tumours are benign, whilst 50% of submandibular gland tumours are malignant and 60-80% of minor salivary gland tumours are malignant.[2] Pleomorphic adenoma is the most common benign salivary gland tumour and constitutes 85% of all salivary gland tumours (see figure 1).[3]

AETIOLOGY

There is no certainty as to the aetiology of salivary gland tumours, but a high incidence has been noted in patients who have had radiation therapy to the head and neck region in their younger years and also found in survivors of the Hiroshima and Nagasaki atomic bomb explosions. There is speculation as to the role of the Epstein-Barr virus in the aetiology of salivary gland tumours.[4]

Other theories include *bicellular stem cell theory*, which holds that tumours arise from one of two undifferentiated stem cells – the excretory duct reserve cell or the intercalated duct reserve cell. Excretory stem cells give rise to squamous cell and mucoepidermoid carcinomas, while intercalated stem cells give rise to pleomorphic adenomas, oncocytomas, adenoid cystic carcinomas, adenocarcinomas and acinic cell carcinomas.

Multicellular theory suggests that each tumour type is associated with a specific differentiated cell of origin within the salivary gland unit. Squamous cell carcinomas arise from excretory duct cells, pleomorphic adenomas arise from the intercalated duct cells, oncocytomas arise from the striated duct cells and acinic cell carcinomas arise from acinar cells.

Recent evidence suggests that the bicellular stem cell theory is the more probable aetiology of salivary gland neoplasms. This theory more logically explains neoplasms that contain multiple discrete cell types, such as pleomorphic adenomas and Warthin's tumours.[5]

PRESENTATION

In general practice, 80% of head and neck masses are inflamatory; about 10% are benign and less than 10% are malignant. Benign masses include sebaceous cysts, lipoma,

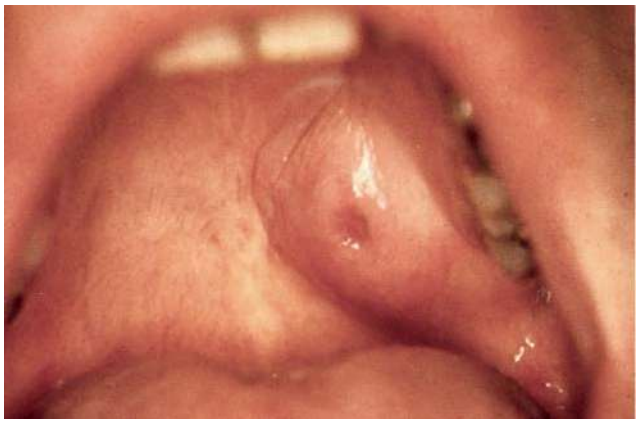

*Figure 2 Minor salivary gland tumour, **left** hard palate*

neurofibroma, dermoids, thyroid – inflammatory and goiter; laryngocoel, branchial cysts and rarely carotid body tumours. Malignant tumours include primary malignant tumours and metastatic tumours (gastric, breast, lung, colon, kidneys – rare), lymphoma and rarely occult primary tumours.

A patient who presents with symptoms suggestive of head and neck or thyroid tumour should be referred to an appropriate specialist or neck lump clinic depending on local arrangements. There are plans to set up a neck lump clinic in Lancaster. Any patient with persisting symptoms and signs related to the head and neck, in whom a definitive diagnosis of benign lesion cannot be made, should be referred or followed up until the symptoms and signs disappear. If the symptoms and signs have not disappeared after six weeks, an urgent referral should be made to a head and neck surgeon (ENT or maxillofacial). Similarly, patients with an unexplained persisting swelling in the parotid or submandibular gland, or lump in the neck, or a swelling in the mouth, which has recently appeared, or lump which has not been diagnosed before that has changed character over a period of three to six weeks, should be referred urgently.

Benign tumours

The most common type of salivary gland tumor is benign pleomorphic adenoma known as mixed tumour, which is commonest in women in the fifth decade. Other benign tumours include Warthin's tumour (cystadenoma lymphomatosum), monomorphic adenoma, oncocytoma, lipoma and retension cysts. Haemangiomata and lymphangiomata of the parotid gland are more common in children.[6]

Malignant salivary gland tumours

Malignant tumours are less common and are characterised by rapid growth or a sudden growth of an erstwhile benign tumour. The commoner malignant salivary gland tumours include mucoepidermoid carcinoma, accounting for 80% of cases,[7] occurring in minor salivary glands and in people aged between 20 and 50 years old (see figure 2). Others include adenoid cystic carcinoma, characterised by very slow growth, severe pain and often facial nerve paralysis and is most frequent in patients aged between 55 and 65 years old. Acinic cell carcinoma (very rare and unusually benign) also occurs in people in the same age group. Yet others include adenocarcinoma, epidermoid carcinoma, undifferentiated carcinoma and carcinoma in pleomorphic adenoma.[4]

Physical examination

The parotid is localised in the parotid region, an area between the zygoma and upper part of the neck and the mandible to what is commonly called the tail of the parotid. Rarely, the parotid tissue extends behind the earlobe, when it may be misdiagnosed pre-operatively as a non-salivary mass. Accessory parotid tissue is present along Stenson's duct in approximately 21% of persons. The parotid gland is divided into a superficial lobe and deep lobes by a plane at the level of the facial nerve, which is sandwiched within the gland.

Physical examination should be performed within the parotid region as well as the neck and oropharynx. The usual presentation of parotid tumours is of a painless swelling in the parotid region. Palpation would establish the consistency, mobility and tenderness of a parotid mass. Benign mixed tumours (pleomorphic adenama) are usually firm, painless, mobile masses and in the superficial portion of the gland. Parotid tumours from the deep lobe may present as a swelling behind the angle of the mandible, parapharyngeal region or distorting the shape of the soft palate and/or tonsil. In the oral cavity, the opening (papilla) of the parotid duct (Stenson's duct), usually opposite the second upper molar tooth, is examined for abnormal discharge or saliva.

Imaging

As parotid glands are relatively superficial structures, they are readily amenable to high resolution ultrasound scan (USS) examination, which is able to differentiate possible benign from malignant neoplasms, demonstrate whether a palpable lesion arises from within the parotid gland or is periparotid in location and identify those entities that may not need surgical intervention.[6] USS can also demonstrate echogenicity, homogeneity or heterogeneity, shape, and vascularity of parotid tumours. USS may also be used to guide fine-needle aspiration biopsy or core biopsy. Where the diagnosis is unequivocally a parotid tumour and surgery is contemplated, then the preferred procedure is to request a magnetic resonance imaging (MRI) scan (see figure 3), and especially where there is suspicion of a deep lobe involvement.

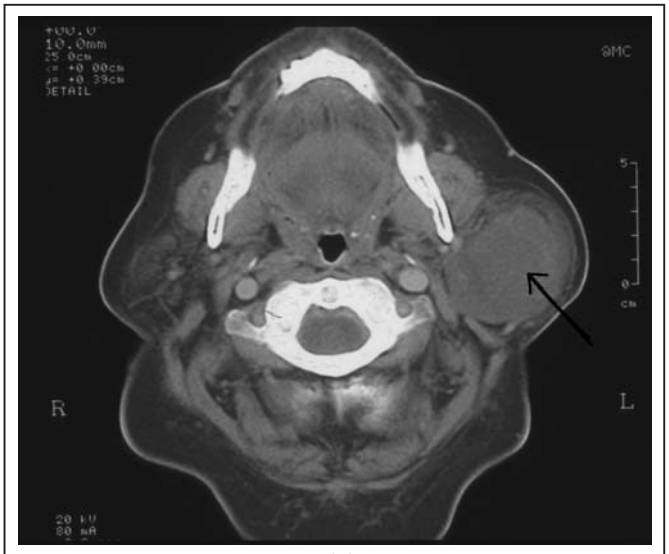

*Figure 3 MRI of **left** parotid tumour*

Biopsy

Fine needle aspiration may be a valuable pre-treatment diagnostic test. Its overall accuracy is greater than 96%, with a sensitivity for benign tumours of 88-98% and a specificity of 94%. Its sensitivity for detecting malignant tumours ranges from 58-96%, and its specificity is 71-88%. *Frozen sections* are 93% accurate when performed at surgery, but their use is controversial, since diagnosis depends on the experience of the pathologist with regard to salivary gland tumours. The standard biopsy approach is a *superficial parotidectomy* with preservation of the facial nerve. For 80-90% of parotid neoplasms, this procedure is both diagnostic and therapeutic. For this reason, pre-operative fine needle aspiration biopsy is recommended, since it can change the clinical approach in up to 35% of patients.[8]

Treatment and prognosis

The treatment for benign and malignant salivary gland tumours is surgical excision. Superficial parotidectomy is the preferred treatment for pleomorphic adenomata and aims to preserve the facial nerve. Some experts have proposed 'Lumpectomy' in selected cases, where dissection is done in a peri-capsular fashion.[9,10] Lymph nodes can be enucleated, as can Warthin's tumours. Sialadenitis does not require surgical intervention in most cases.

The recurrence rate for pleomorphic adenoma following excision is usually low, but could be high, where excision is incomplete. The facial nerve is usually sacrificed in cases of malignancy,[11] as in adenoid cystic carcinoma, which is characterised by perineural spread, hence local recurrence is not uncommon. However, for mucoepidermoid carcinoma, postoperative radiation is recommended – the five-year survival rate is 95% with the low-grade type, which primarily affects mucous cells, and 50% with the high-grade type, which primarily affects epidermoid cells.

THE LANCASTER EXPERIENCE

We reviewed the management of patients who presented to the ENT department of the Royal Lancaster Infirmary between October 1996 and September 2007. During this period, 58 patients were treated, of whom 30 were male and 28 female, with age ranging between eight and 79 years old, with mean age of 52. Patients presented mainly with swelling on the side of the face (49 patients) and as mass on the side of the face – nine cases. There was no difference between the side of presentation – 28 patients on right side and in 30 cases on left side. The average duration of symptom before presentation was 36 months. USS was done in 84.5% (49/58). Figure 4 summarises these findings.

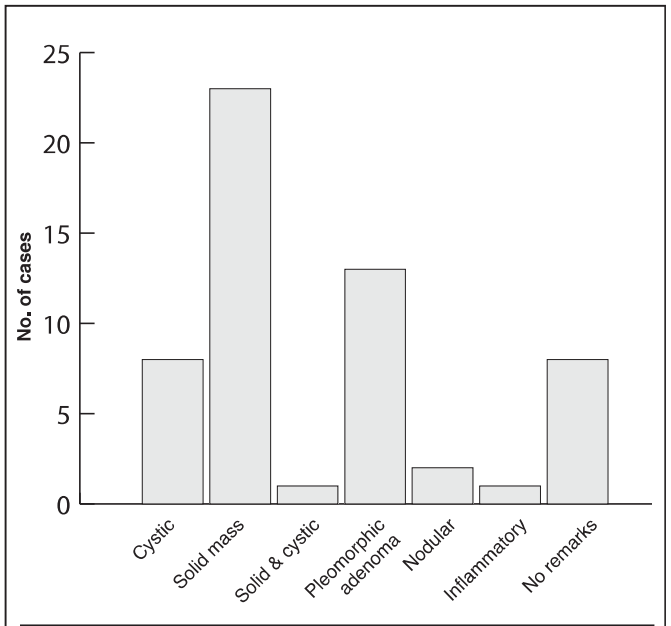

Figure 4 Ultrasonography findings

Fine needle aspiration was done in 34 cases of which pleomorphic adenoma was diagnosed in 12 cases, suspicious findings in four cases and negative report in 18 cases. Histological findings confirmed pleomorphic adenoma as the most common parotid gland tumour in 28 cases (see figure 5).

In keeping with best practice, all patients had surgical excision. Thirty-two (55%) patients had superficial parotidectomy, 16 (27.6%) had 'lumpectomy', nine (15%) had simples excision of tumour and one was surgical drainage of an abscess in a 13-year-old patient. The medium to longterm post-operative outcome was excellent (without complications) in 53 cases ((91%); four cases (6.9%) had temporary facial weakness, three of which had deep lobe tumours and one had superficial lobe tumour. One patient,

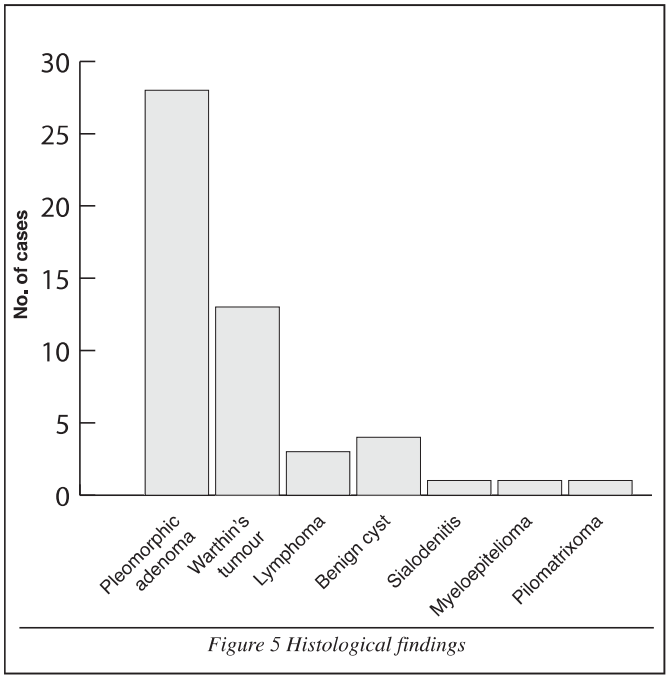

Figure 5 Histological findings

who was found to have squamous cell carcinoma, required radical parotidectomy and hence resulted in permanent facial nerve palsy. At six months follow-up appointment 98% (57 of the 58) patients reviewed had excellent outcome and complete resolution of symptoms without sequellae. Only one patient, with squamous cell carcinoma, unavoidably had permanent and complete facial nerve palsy.

DISCUSSION

Our study shows that the diagnosis of salivary gland tumours has been made essentially from clinical examination and USS with fine-needle aspiration biopsy. MRI scans were useful in planning surgical management. Interestingly, this cohort of patients showed no sex predilection.

The surgical management of parotid tumours requires thorough understanding of the topographical anatomy of the parotid region and the parotid gland. The facial nerve and its terminal branches serve as the 'filling' in a 'sandwich' of the parotid gland. The technical difficulty of parotid gland surgery (superficial parotidectomy) is essentially in identifying the main trunk of the facial nerve, before removal of the lesion within the gland.

This study also shows that an average of five cases of parotid tumour excision were performed a year, with mean age of 52. In our experience pleomorphic adenoma has been the most common tumour (40%), followed by Warthin's tumour, which was found in 24%. It was interesting to note that pleomorphic adenoma was excised in an eight-year-old boy, a rather uncommon experience. Our results show an excellent medium to longterm result with no facial paresis or palsy, except for the patient with squamous cell carcinoma. It is also interesting to note that no patient had the complication of Frey's syndrome. It is our view that Frey's syndrome can be avoided by using blunt dissection along tissue planes when raising the skin flap, as opposed to using sharp dissection, which inevitably cuts nerve endings, which subsequently heal and innervate overlying skin.

RECOMMENDATIONS

- surgical excision – the preferred procedure is superficial parotidectomy – aim to preserve VII nerve
- proposed 'Lumpectomy' in selected cases
- avoid sharp dissection when raising the skin flap
- outcome – medium to longterm result excellent – 98%, but complete facial nerve palsy was unavoidable in a patient with squamous cell carcinoma – 1.7%

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