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Management of Salivary Gland Neoplasms: A Review

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ABSTRACT

Background: In head and neck region salivary gland tumors represents 1%to 3% of all the neoplasms of head and neck and these tumors are comparatively uncommon. Salivary gland tumours grows as painless lump and most of the tumours are benign and located in parotid gland. Approximate 80% tumors that originate from minor salivary gland are malignant whereas 80% of major salivary gland are benign. The management of salivary gland disease forms a considerable part of the work done by oral and maxillofacial surgeons. The principal problem in their management lies in the difficulty in distinguishing benign from malignant tumours. Investigations such as fine needle aspiration cytology and MRI scans provide some useful information, but most cases will require surgical excision as a means of coming to a definitive diagnosis. Benign tumours and early low-grade malignancies can be adequately treated with surgery alone, while more advanced and high-grade tumours with regional lymph node metastasis will require postoperative radiotherapy. This paper highlights some of the more important aspects in the management of salivary gland tumours.

Keywords: Salivary gland tumors, parotid gland; submandibular gland; sublingual gland, surgery.

INTRODUCTION

Salivary gland tumours are rare and most cases are referred to the head and neck clinic. The majority of these neoplasms are benign and only 20% are malignant. The annual incidence of salivary gland cancers ranges from 0.5 to 2 per 100,000 in different parts of the world, with the highest incidence occurring in Croatia [1]. In the United States, there is a rise in the incidence of salivary gland cancers; this group accounted for 6.3% of all head and neck cancers in 1974–1976, as compared to 8.1% in 1998-1999 [2]. Most of the salivary glands tumour arises in six decade of life and sex distribution is equal [3]. Tumours can occur in both the major and minor salivary glands. 80% of major salivary gland tumours occur in the parotid glands, while most minor salivary tumours are located in the palate [4]. Tumours arises in minor salivary glands are most likely as a general rule become malignant. In the parotid glands, 20–25% of the tumours are malignant. This rises to 40% for the submandibular glands, and more than 90% of sublingual gland tumours are malignant [5, 6]. The etiological agents of salivary gland cancers remain unclear. Cancers of head and neck mostly related to smoking and drinking while on the other hand etiological factors for salivary glands tumours remain unclear. Some studies have found that a diet rich in vitamin C and low in cholesterol may be effective in preventing salivary gland cancer [7]. On the other hand, possible risk factors include therapeutic radiation for other head and neck cancers, occupational exposures in rubber manufacturing and woodworking, and also employment at hairdressers or beauty shops [8, 9].

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History of previous cancers, related to Epstein-Barr virus, immunosuppression, and radiation were also associated with an increased risk of salivary gland cancer. In a Swedish study, the risk of salivary gland cancer was increased 4 fold in Hodgkin's lymphoma patients [10]. HIV infection was also found to increase the risk of salivary gland cancers [11]. If the salivary gland tumours are associated with symptom of pain and facial nerve palsy, tumour may be malignant otherwise tumours of submandibular and parotid salivary gland grows as enlarging mass. Minor salivary gland tumours present as a submucosal intraoral mass which subsequently ulcerates. Clinical features suspicious for malignancy include ipsilateral facial nerve palsy, sudden tumour growth, pain, tumour fixation to the overlying skin or underlying muscle, and cervical lymphadenopathy.

Histology

In both the major and minor salivary glands, the commonest type of benign tumour is pleomorphic adenoma. Pleomorphic adenoma, also called benign mixed tumour, can occur in the deep lobe of the parotid gland with extension into the parapharyngeal space, which makes it the commonest type of parapharyngeal space tumour constituting 40% of tumours there [12]. Pleomorphic adenomas should be treated carefully to avoid its reoccurence and malignant transformation.Capsular rupture and subsequent tumour spillage during excision is the most important risk factor for recurrence. The risk of malignant change has been report to be up to 10%. Features predictive of malignant change include age, tumour size, a long history of the mass, submandibular location, and the presence of hyalinised stroma [13]. For malignant salivary tumour, the commonest type overall is mucoepidermoid carcinoma. Mucoepidermoid carcinoma comprising about 33% of all the cancer in parotid gland. [14]. Adenoid cystic carcinoma is the commonest cancer in the submandibular and minor salivary glands, making up 42–49%. Acinic cell carcinoma is also considered to be a low-grade tumour which seldom invades the facial nerve.

Investigations

Radiological investigations are frequently employed in the workup of a salivary gland tumour. It is used to delineate the tumour location such as intraglandular or extraglandular and whether it is in the superficial or deep lobe of the parotid gland, to detect malignant features, to define local extension and invasion of surrounding tissues, and to detect regional nodal and systemic metastases. Superficial tumous of parotid and submandibular gland is preferably assessed by ultrasound with excellent resolusion. Ultrasound resolusion does not carry any risk of radiation for superficial structure. It can also be employed to guide the needle when carrying out fine needle aspiration cytology (FNAC) to reduce sampling error. For tumours located deep in the parotid gland or in the minor salivary glands, CT and MRI are more useful. Comparing the two modalities, MRI has an edge over CT in predicting malignancy and is also more sensitive in picking up small tumours. Benign tumours generally show high signal on T2-weighted scans, while malignant lesions usually show intermediate to low signal. MRI is more useful in detecting deep lobe extension marrow infiltration, and perineural spread and involvement of the facial nerve. MR spectroscopy is employed to differentiate malignant and benign salivary gland tumours and also to distinguish Warthin's tumour from pleomorphic adenoma [15]. The role of CT is usually limited to evaluation of cortical bone involvement and the concurrent presence of calculus disease. The role of positron emission tomography (PET) in salivary gland disease is still being evaluated. Characteristically,Warthin's tumours and oncocytomas show a strong uptake of technetium pertechnetate. Fine needle aspiration cytology (FNAC) is another investigation frequently used. The diagnostic yield of FNAC can be quite good with large study series showing sensitivity up to 85% and specificity up to 99% [16]. It is safe to say that the role of FNAC mainly lies in preoperative patient counselling and surgical planning. In the case of a malignant FNAC result, the patient can be better prepared in terms of the extent of surgery, higher potential complications, and need for neck dissection or postoperative radiotherapy.

Management of parotid tumors

Most of the tumours of parotid gland are benign and require good knowledge of anatomy and physiology. Treatment plan should be aimed at facial nerve preservation with complete surgical removal. Complete superficial parotidectomy is

unnecessary in the treatment of benign localized parotid tumors. Limited parotidectomy is associated with very low rates of morbidity and recurrence[17]. Parotid tumors are uncommon, with the majority presenting as discrete lumpsarising within the superficial portion of the gland. Conventional teaching prescribes removal of these tumors by superficial parotidectomy, which encompasses facial nerve identification and en bloc removal of the superficial portion of the gland. Extracapsular dissection (ECD) is an alternative approach to the removal of such lumps involving meticulous dissection immediately outside the tumor capsule while still preserving the facial nerve, and is distinct from enucleation. As the needs for reducing morbidity and maintaining facial aesthetics increase, ECD represents the current limit of conservative parotid surgery. ECD is a scientifically valid and oncologically safe approach to the management of the clinically benign parotid lump. Extracapsular dissection is a viable alternative to superficial parotidectomy for the majority of parotid tumors, associated with reduced morbidity without oncological compromise [18].Conservative surgical management for salivary gland cancers concerns only parotid gland cancers . For submandibular, sublingual and accessory salivary glands cancers, ablative surgery must always be radical. Conservative surgical management for parotid gland cancers means preservation of glandular (deep lobe), nervous (facial and other nerves) and vascular (intraparotid vein) components of the parotid surgical space. Technically, there is not any specific difficulty to achieve this goal, the surgical rules being the same as for conservative surgery of benign parotid tumors. Reconstructive surgery concerns the facial nerve, rarely the skin. If after skin resection, classical reconstruction methods must be applied (mostly local and free flaps), the facial nerve reconstruction remains controversial[19].

Management of tumors of submandibular glands

Surgical management of submandibular gland diseases has always been a challenge. It carries a considerable risk of injury to the mandibular branch of the facial nerve, the hypoglossal nerve, and the lingual nerve. Complete surgical extirpation of the gland is standard in the treatment for all tumors of the submandibular gland. Excision of the entire glands with meticulous preservation of the tumor capsule is the therapy of choice for benign tumors. Submandibular sialadenectomy is a safe operation with a low rate of complications. Operations for a tumor should be performed without delay considering the high rate of malignant tumors. Generally, more limited exploratory excisions or biopsies must be avoided in neoplastic disease of the submandibular gland[20].Malignant tumors show a mild symptomatology resulting in late diagnosis, treatment should be a combination of radical surgery and postoperative radiotherapy [21].

An endoscopic intraoral approach for excision of the submandibular gland is also used.This procedure is anatomically safe and can be made with minimal morbidity; a transcervical incision is avoided. Both specific instruments and solid anatomical knowledge are necessary to perform a safe and efficient glandular endoscopic excision.

Management of tumors of sublingual gland

The majority of tumors of the sublingual gland are malignant, with adenoid cystic carcinoma and mucoepidermoid carcinoma being the most common. The sublingual gland anatomically is not an unit organ and while it is described anatomically as being confined to the anterior floor of the mouth, salivary tissue may be located laterally along the submandibular duct and posterior floor of the mouth. Diagnosis should be suspected when any thickening or raised lesion presents in this area and a biopsy should be performed to confirm malignancy before planning further treatment. Surgery is the treatment of choice, and should be performed with an en-block resection of the anterior floor of mouth as a minimum, and may include a portion of mandible, as well as a supraomohyoid neck dissection. Adjuvant radiotherapy should be considered in most of the patients after Surgical excision[22].

Management of minor salivary gland tumors

Tumors arising in the minor salivary gland accounts for 22% of all salivary gland neoplasms. Majority of them are malignant with only 18% being benign. Of the benign tumors pleomorphic adenoma is most frequent. The most common site of a

pleomorphic adenoma of the minor salivary gland is the palate followed by lip, buccal mucosa, floor of mouth, tongue, tonsil, pharynx, retromolar area and nasal cavity. The treatment of pleomorphic adenoma is basically surgical. Though these benign tumors are apparently well encapsulated, resection of the tumor with an adequate margin of grossly normal surrounding tissue is necessary to prevent local recurrence as these tumors are known to have microscopic pseudopod like extension into the surrounding tissue due to "dehiscences" in the false capsule. The minor salivary gland malignancies often present as a submucosal swelling and have been reported at all anatomic subsites of the head and neck. Treatment in such cases is complete resection.

Complications of salivary gland surgery

After parotid surgery most of the studies have shown that there is an increase risk of facial nerve weakness , with few reports about the incidence of Frey syndrome (gustatory sweating). According to some surgeons a degree of gustatory sweating occurs in most patients after parotid surgery where there is no interpositional graft has been used[23, 24]. A quantitative measurement of this can be made using the starch iodine test. Various interpositional grafts have been used including the sternomastoid muscle flap, temporalis myofascial flaps,femoral facia, porcine grafts, autologous adipose tissue, and the superficial muscular aponeurotic system (SMAS) layer to avoid complications. Adequate thickness of skin flap during operation reduces the risk of Frey syndrome, but in superficial tumours it risks compromise of the tumour or rupture of the capsule. allogenic acellular dermal matrix(ADM) also used for the prevention of Frey syndrome.

CONCLUSION

In specialized head and neck clinics salivary gland tumors are best managed because of their rarity and need for thorough workup by a multidisciplinary team of specialists. For therapeutic and diagnostic purposes Surgery forms the keystone of their management . The most important steps include surgical planning and preoperative counseling. Large or deep parotid lobe tumours, and those suspected to be malignant, should be imaged preferably with MRI in order to decide on the expected extent of resection and to determine the potential risk to the facial nerve. The whole surgical exercise in removing a parotid tumour revolves around careful identification and preservation of the facial nerve. Injury to the facial nerve causes significant morbidity to the quality of life of the patients.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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