

Salivary Glands Neoplasms

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SUMMARY

Introduction: Salivary glands neoplasms represent a rare and diverse group of tumors with different characteristics. To avoid complications and unnecessary procedures, the treatment depends on an accurate diagnosis.

Objective: Review the literature emphasizing the latest advances in diagnosis and treatment.

Method: An electronic research was performed on MEDLINE, OVID, PubMed and SciELO databases articles in a period between 1997 and 2007.

Conclusion: The proper diagnosis of salivary glands neoplasms is complex, and the otorhinolaryngologist/head and neck surgeon needs to investigate the histological subtype to ensure ideal treatment. Frequently, diagnostic exams conflict, and careful case by case evaluation is required.

Keywords: salivary glands, neoplasm, diagnosis, treatment.

INTRODUCTION

The salivary glands neoplasms are rare and represent a variable group of benign and malign tumors with different behavioral characteristics (1). The pathologic diagnosis is critical for the correct management of these lesions since the aggressivity grade depends on their histological types (2).

Between 1650 and 1750, the salivary glands surgeries were limited to the treatment of ranulas and oral calculus. The concept of parotid tumor exeresis was ascribed to BERTRANDI in 1802, by using an extensive approach that caused functional and aesthetic sequels (1).

In 1892, CODREANU was the surgeon to perform a full parotidectomy with conservation of the facial nerve. BEAHRS and ADSON (1958) described the surgical technique for the parotid surgery. They delimited the repair anatomic point so as to avoid the facial nerve lesion and defended superficial parotidectomy only for non-invasive lesions (1).

In spite of wide works on the theme and advances to the complimentary exams and surgical technique, the diagnosis and treatment of such tumors are still complex and challenging for otorhinolaryngologists/head and neck surgeons (1).

LITERATURE REVIEW

Anatomy

The salivary glands may be divided into major salivary glands that include the parotid glands, submandibular and sublingual and the minor salivary glands (2).

The main and largest of them is the parotid gland. It's located close to the external ear (*par*, close + *otid*, ear), between the jaw branch and the mastoid process. Above it, the parotid bed is limited by the floor of the external auditory meatus and the zygomatic process of the temporal bone. In the middle, there is the temporal bone stiloid process and its associated muscles. It's laterally limited by the parotid fascia superficial blade and the skin. The rear wall extends between the mastoid and stiloid processes. The front wall is formed by the jaw branch and its fixed muscles (masseter and medial pterygoid). From the surface to the depth, the structures crossing the gland are: the facial nerve, the retromadibular vein and the external carotid artery. Vascularization by the external carotid artery and its

terminal branches (superficial, temporal and maxillary) and parasympathetic innervation by the glossopharyngeal (3).

The submandibular gland is along the jaw's structure and is partially superficial and partially deep in the mieloid muscle. It has a U format and approximately half of the parotid size. It takes almost all the submandibular fornix and has a relationship with the facial vein (superficial to the gland), facial artery (deep in the gland) and the marginal mandibular nerve (flows up along the lower edge of the jaw, superficial to the facial vein). The sublingual glands are located in the floor of the oral cavity between the jaw and the genioglossal muscle. The minor salivary glands consist of 600 to 1.000 small independent glands found across the oral cavity, palatine tonsils, pharynx and larynx (3).

Epidemiology

These correspond to approximately 1% of the head and neck tumors, with an approximate incidence of 1.5 cases/100.00 (1). Despite the incidences vary according to the literature, 67.7% to 84% of the neoplasms start in the parotid, 10% to 23% in the submandibular gland and the other cases in the sublingual gland and in the minor salivary glands (2,4,5,6). 95% of the cases occur in adults and are rare in children (2).

About 75% of the neoplasms are benign and the pleomorphic adenoma is the most common histological type (7). The smaller the gland, the greater the probability for the neoplasm to be malign (1): 25% of the parotid tumors are malign, while in the submandibular gland this number goes up to 43% and hits 82% in the minor salivary glands (7).

In the parotids, the most common histological subtype is the pleomorphic adenoma (53.3%), followed by the Warthin's tumor (28.3%) and by the mucoepidermoid carcinoma (9%). In the other glands the pleomorphic adenoma is also the most common (36% in the submandibular and 43% in the sublingual and minor glands), followed by the cystic adenoid carcinoma (25% in the submandibular and 34% in the sublingual and minor glands) and by the mucoepidermoid carcinoma (12% in the submandibular and 11% in the sublingual and minor glands) (2).

Risk Factors

The etiologic factor for the general salivary glands neoplasms isn't well defined, but some research's statements suggest associations with:

- Radiation: radiotherapy in low dosages has been implied in the pleomorphic adenoma pathogenesis, squamous cell carcinoma and mucoepidermoid carcinoma after 15 to 20 years of exposure (1). The greater evidence of such association is in the increased incidence of these tumors in survivors from areas exposed to atomic bomb (8).
- Smoking: in spite it's not bound to the development of salivary glands carcinoma, smoking has been associated to the WARTHIN'S tumor (9).
- Epstein-Barr's Virus: except for the undifferentiated carcinoma, the viral etiologic role was not present in the salivary glands neoplasms (10).
- Genetic Factors: P53 (tumor suppressing gene) and MDM2 (oncogene) were identified in high percentage in the pleomorphic ex-adenoma carcinomas; high levels of (VEGF) endothelial growth factor would be bound to a larger tumor size, vascular invasion, recurrence, metastasis and aggressivity. Allelic loss or translocations 12q13-15 are associated with the pleomorphic adenoma (1).

Clinical History

They appear as slow growth asymptomatic masses. Pain is not common, but in the benign neoplasms there may occur infection, hemorrhage or cystic increase. In the malign neoplasms the pain may indicate neural invasion, but the pain should not be used as a parameter for differentiation among the neoplasms. The facial nerve paralysis strongly suggests a malign tumor, although it's not pathognomonic, once it may occur through the nerve compression or stretching by lengthy benign tumors (7). Other suggestive signals of malignity are the mass fixing and the lack of definition of adjacent structures (11).

The minor salivary glands have a variable shape depending upon their location. in the oral cavity as non-ulcerated and painless masses generally in palate and the floor of the mouth; in paranasal sinuses they include sinusitis and rhinitis symptoms; in the laryngotracheal region with raucousness, dysphagia, cough and sensation of foreign body; in the parapharyngeal space they are asymptomatic until reaching a large size, and repel several peripheral structures leading to dysphagia and "hot potato" voice (2).

Because of its low relative frequency, the immediate recognition of the neoplasm demands attention by the specialist doctor (7). However there are no reliable clinical criteria to differentiate them and it's necessary to request complimentary exams for the adequate diagnosis of the tumors.

Aspiration Puncture with Fine needle

The major salivary glands are easily accessible and therefore excellent targets for (PAAF) fine needle aspiration puncture. Such technique has been used for decades with great accuracy and achieved a great acceptance among surgeons and pathologists, but it's still controversial, without formal indication (12).

According to ZBÄREN et al (13) (2001) and LIN et al (14) (2007), the PAAF is required for pre-operative evaluation of all the parotid masses, because the diagnosis preoperative recognition would prepare both the surgeon and the patient on the surgical planning. GONÇALVES et al (15) (2007) presents the importance of the judicious analysis of negative results for malignity, because the neoplasm process possibility is not insignificant, mainly when it comes to the diagnoses suggested to be different from pleomorphic adenoma, Warthin's tumor and cystic lesions. ALPHS et al (16) (2006) criticize the routine use of PAAF for parotid masses because the PAAF wouldn't change the final procedure, however they understand there has been advances both in the technique (avoiding complications) and in the analysis (immunohistochemistry, PCR...).

PAAF must be taken as one of the first steps to the salivary glands neoplasms diagnostic research.

Biopsy Operations

For minor salivary glands tumors of the oral cavity, the biopsy is generally unnecessary, since the lesions tend to be small and the surgical approach is excisional, but for those of nasal cavity and paranasal sinuses the conventional biopsy is indicated. The open biopsy must be avoided for the risk of bleeding, tumor implantation in other plans and local infection (2).

Freezing biopsy is indicated to ensure surgical margin (2). MIANROOD et al (17) (2006) strongly suggest the freezing must be performed in all surgeries because it many times modifies the procedure of the case. SEETHALA et al (18) (2005) suggest freezing and PAAF have similar accuracy, with greater sensitivity to PAAF and greater specificity to freezing and then both methods are complimentary to each other in the neoplasms diagnosis.

Image Exams

The radiologic studies are generally performed in large tumors and in those affecting the minor salivary glands, but they are unnecessary in small parotid and

submandibular mobile and well define masses. They don't often change the therapeutic approach and don't differentiate the benign lesions from the malign (2). YERLI et al (19) (2007) evaluated the post-contrast enhancement in computed tomography of benign and malign lesions of parotid in three distinct phases (30s, 90s and 5min), and differentiated the Warthin's tumor (peak in 30s), the pleomorphic adenoma (peak in all phases) and malign tumors (peak in 90s) with such technique.

Both (CT) computerized tomography and (MR) magnetic resonance have similar sensitivities and specificities to evaluate the location and infiltration of the tumor mass and may be carried out for the evaluation of affection of deep spaces and evaluation of the contralateral gland (1).

Other modalities such as ultrasonography and PET-CT do not differentiate benign and malign lesions and have no diagnostic function defined (2). The salivary glands scintigraphy with technetium has great accuracy in the Warthin's tumor diagnosis (2) and it's important in these tumors' affection in non-surgical cases (20).

The study of images, specially from the computerized tomography and magnetic resonance, is necessary for the permanence and therapeutic planning of the tumors.

Pleomorphic Adenoma

Benign tumor corresponding to 2/3 of all parotid neoplasms and the most frequent in all other salivary glands. It's the second most frequent tumor in children and is only secondary to hemangiomas (2).

Macroscopically, it has a well defined fibrous capsule and we may histologically observe an incomplete capsule. In a series of 100 patients with pleomorphic adenoma, STENNERT et al (21) (2001) showed by histopathologic exam dangerous changes to the capsule of most tumors, transcapsular growth giving the tumor its typical characteristic of pseudopodal extension, which justifies the high percentage of local recurrence of the lesion in spite of its surgical enucleation.

The treatment for the parotid pleomorphic adenoma is the superficial parotidectomy by tumor resection with normal gland surgical margin (1). Most cases (90%) affect the gland superficial lobe and 80% in its lower portion. Bilateral tumors are extremely rare (22).

The tumor recurrence happens often multilocally and may manifest from 10 to 15 years after the initial resection. The reoperations put the facial nerve at risk and their monitoring would help diminish such risk. Cure rates

are 25% lower in reoperations. Radiotherapy may be usable in the treatment of several recurrences and is chosen on a case by case basis (1).

The minor salivary glands adenomas are rare, and when they occur the most common affected place is the palate (50-60%) followed by the upper lip (23). And it may occur in rare places such as the base of the tongue (23) and the nasal septum (24).

The carcinoma development is seldom; such case is variably called carcinoma ex pleomorphic adenoma. The malign transformation incidence increases with the duration of the tumor, and it's of about 2% for the tumors present for less than 5 years and of 10% for those with more than 15 years of duration. Lamentably when they appear, such cancers are among the most aggressive malign neoplasms of the salivary glands and they correspond to 30 to 50% of mortality in 5 years (25).

In special cases, this tumor may result in long distance metastasis (26).

Warthin's Tumor

Also known as lymphomatous papillary cystadenoma, it's the second most frequent benign tumor in parotid, and it corresponds to 6-10% of all parotid tumors (2). It occurs almost exclusively in the parotid with some rare cases described in submandibular gland (1). Most cases occur in the 6th and 7th decades of life, specially in the male sex, but with growing incidence in the female sex, possibly relating to the increase of smokers (27).

It's encapsulated with lobe surface, in 90% of the cases in the parotid superficial lobe and in 5% of the cases it occurs bilaterally. Most cases present cystic spaces, filled by a brown viscous liquid (27).

As for this tumor histogenesis, we consider it represents a neoplasm proliferation of the salivary ducts in its development course within lymphoid tissues associated with the major salivary glands, specially the parotid because it is encapsulated lately compared to the submandibular and sublingual glands (27).

The scintigraphy with technetium 99 may be requested, since the radioactive isotope may be captured and concentrated by the tumor's oncocytic cells, although it's a low sensitivity exam (27).

The treatment is surgical with superficial parotidectomy. Both the recurrence and the malign degeneration are described, but they occur rarely (2).

Oncocytoma

A tumor that corresponds to less than 1% of the salivary glands neoplasms, almost exclusively of parotid and in patients after the 6th decade (2). Its origin is in oncocytic epithelial cells that may also be found in other organs such as pancreas, thyroid, kidney; however, its major occurrence is in the parotid gland superficial lobe (7).

Macroscopically it's a red, firm and noncystic mass. It's histologically composed by brown and round granular eosinophile cells with small wheel-spoke nucleus. Malign degeneration may occur, but it's rare (2). Despite it's benign, it may present a destructive potential, and must be treated surgically (7).

Monomorphic Adenoma

This type of tumor has actually the name of several types of rare tumors of salivary glands, and the most common is the basal cells adenoma found in the minor salivary glands of the upper lip. Other types are the adenoma rich in glycogen, bright cells adenoma and sebaceous adenoma (2).

They appear as well defined and encapsulated tumors. Microscopically, the basal cells adenoma forms round cells palisades under a thin basal membrane and may be confused with the cystic adenoid carcinoma that is even deemed to be its malign version (1).

The sebaceous adenoma, also called sebaceous lymphadenoma, is a rare salivary glands benign tumor. It appears in normal sebaceous glands present in the interductal tissue in blind bottom, with functioning glandular tissue. It seldom occurs in minor salivary glands. There are no cases of malignity described. They're clinically asymptomatic, of slow growth, and usually occur in the parotid. Their treatment is surgical (7).

The monomorphic adenoma is deemed to be benign and non-aggressive. The treatment consists of resection with margins (2).

Mucoepidermoid Carcinoma

Most common parotid malign tumor (15% of the parotid tumors) and the second most frequent in submandibular gland (2).

It's histologically composed by 2 types of cells, the mucous and the epidermoid cells, and from this differentiation they may be divided into *low*, *intermediate*

and high grade, based on the prevalence of one or another. The tumoral level is one of the most important prognostic factors in 5 years: 92-100% in those of low grade, 62-92% in intermediate grade and 0-43% in high grade (28).

Low grade tumors are composed by several mucous cells and cystic spaces (2). Most of them occur between the 4th and the 6th decades generally with a record of low growth in months or years, with slight feminine predominance and in $\pm 7\%$ of the cases the patients have peripheral facial paralysis to diagnosis (29). At macroscopy, it appears as a well-circumscribed, partially encapsulated mass (2). The treatment chosen is the surgical margin surgery and evaluation of intra-parotid lymph nodes: where free, the deep lobe and the cervical lymph nodes wouldn't need complementary treatment, where affected, the treatment with wide approach must be carried out (29).

The high grade tumors are quite similar to the squamous cells carcinoma and in some cases require a more specific pathologic evaluation (2). Macroscopically they appear without very clear margins, hardened consistency and gray coloration (1). The treatment is surgical, with wide excision, surgical margin and conservation of the facial nerve in case there's no involvement (2). The prophylactic cervical dissection remains controversial (28). Due to the large rate of occult metastasis, an elective cervical dissection must be considered in one neck N01.

There are reports of improvement of the local lesions control after complementary radiotherapy in the primary place and in the cervical fields. The treatment with chemotherapy has been reserved for uncontrolled lesions after the surgery and radiotherapy aiming at the symptomatic alleviation (30).

Cystic Adenoid Carcinoma

The second most common salivary glands malign tumor and corresponds to 10% of the neoplasms. There's no predominance as to sex and race and the diagnosis average age is about 45 years (2).

Macroscopically it generally represents inadequately encapsulated, infiltrative and pink-grey small lesions (25). Perineural invasion is a typical statement of such neoplasm (28). And it composes the most painful neoplasm of the salivary glands (25).

The relative survival to the tumor is of about 80% in the first years, but it falls dramatically over time, and hits 20% in 20 years. The primary lesion slow growth and its

recurrence in many years, as well as the appearing of distant metastasis until 20 years from the initial treatment, in addition to the long survival, even at the presence of tumor or metastasis, makes the mortality fall occur on a long-term basis (30). The long-term follow-up is mandatory for such patients (2).

Due to the poor long-term prognostic, the tendency is to set out an extremely radical treatment for this tumor (30).

Acinous Cells Carcinoma

A low grade neoplasm that represents 1% of all salivary glands neoplasms and 5-11% of malign neoplasms. It affects mainly the parotid (1). Like the Warthin's tumor, it may be multicentric in 2 to 5% and bilateral (25). Macroscopically it's encapsulated, grey, and may be solid or cystic (1).

The treatment is the wide surgical excision with 5-year survival ranging from 47 to 90% and in 25 years it's around 50%. Radiotherapy is reserved for bad prognostic cases (involving the facial nerve, metastasis, hair implication). Elective cervical emptying is indicated for the high grade cases (2).

Epithelial-Myoepithelial Carcinoma

Tumor corresponding to 1% of the salivary glands neoplasms, histologically characterized by a wide histological spectrum. In spite of the existence of aggressive histological statements, the neoplasm is of low grade, recurs frequently but rarely generates metastasis (31).

Low Grade Polymorphic Adenocarcinoma

Nearly exclusive occurrence in the minor salivary glands. It occurs in the palate, oral mucous and upper lip. Most tumors occur in the 6th decade (2).

The treatment is the large local excision with wide surgical margins. Even with the existence of neural implication, there is no indication for post-operative radiation if the resection was complete (2). The tumor has a high recurrence incidence (30).

Adenocarcinoma

Occurs most commonly in the minor salivary glands, followed by the parotid gland. It represents

approximately 15% of the parotid malign neoplasms. Aggressive behavior with strong potential to recur and become metastasis (2).

In the treatment, it follows guidance from other malign tumors of the salivary glands, and full parotidectomy or submandibulectomy are indicated. The cervical emptying is reserved for the cases of evident metastases. Complimentary radiotherapy has been used and shown a value in the long-term control (30).

(CEC) Squamous Cells Carcinoma

The primary squamous cell carcinoma of salivary gland is rare (1). It corresponds to 0.3 to 1.5% of the salivary gland tumors (2).

The diagnosis is made after exclusion of Mucoepidermoid Carcinoma, metastasis CEC, invasion of the gland by adjacent structures tumor and gland squamous metaplasia (1).

The treatment consists of complete surgical resection with post-operative radiotherapy (2). Generally, the first year after the surgery is critical and is the period when about 60% of the recurrences appear. Survival is very low and reaches 24% in 5 years (30).

Sarcoma

These are rare tumors generally in parotid, mostly common in men and appear as large and painless masses. The Rhabdomyosarcoma and Fibrosarcoma are the most common histological types (2).

The parotid primary sarcoma diagnosis requires other tissues sarcomatous tumor metastasis exclusion. The tumor prognostic relates to its size, type and differentiation histological grade (2).

The treatment is the total parotidectomy (2).

Lymphoma

The salivary glands primary Lymphoma is rare and the most developed glands are the parotid and the submandibular, and the parotid glands prevail. The diagnosis is established by the exclusion of another extra-salivary lymphoma, confirming through the histology the involvement of the salivary parenchyma instead of only intraglandular lymph nodes and the lesion malignity cytologic statement (2).

The most common type of salivary glands primary lymphoma is MALT, but with organ-specific chromosomal translocations (for instance: differently from the gastrointestinal tract and lung) (32).

The local and symptomatic malignancy low grade disease may be treated with radiotherapy with fields involved. Intermediate grade and local disease patients must be treated with polychemotherapy (30).

Permanence

The mostly used international classification is that of 2002 from the (AJCC) American Joint Committee on Cancer (33):

Primary tumor (T):

- **TX:** tumor that may not be accessed.
- **T0:** without evidence of primary tumor.
- **T1:** tumor < 2 cm without extraparenchymatous extension.
- **T2:** 2<tumor < 4 cm without extraparenchymatous extension.
- **T3:** Tumor > 4 cm or with extraparenchymatous extension.
- **T4a:** tumor invading skin, jaw, auditory channel or facial nerve.
- **T4b:** tumor invading cranium base, pterygoid and/or carotid.

Lymph node implication (N):

- **NX:** Lymph nodes (LN) not evaluated.
- **N0:** Without lymph nodes affection.
- **N1:** metastasis in only one LN ipsilateral to the tumor with up to 3 cm.
- **N2a:** LN of 3 to 6 cm, ipsilateral.
- **N2b:** multiple ipsilateral LNs.
- **N2c:** bilateral or contralateral LN's.
- **N3:** LN's larger than 6 cm.

Metastasis (M):

- **MX:** non-evaluated metastasis;
- **M0:** without metastasis;
- **M1:** distance metastasis

Permanence:

- Stage I T1N0M0
- Stage II T2N0M0
- Stage III T3N0M0 or T1-3N1M0
- Stage IVA T4aN0-1M0 or T1-4aN2M0
- Stage IVB T4bNxM0 or TxN2-3M0
- Stage IVCTxNxM1

Survival in 5 years:

- Stage I 75%
- Stage II 59%
- Stage III 57%
- Stage IV 28%

Treatment

The best treatment for salivary neoplasms is the total surgical excision (2). The type of surgery to be employed regards the type of lesion found, for example, in some cases there may be necessary the sacrificing of nervous or vascular structures and its indication depends on the tumor biologic behavior (34).

The radiotherapy with the surgery improve the patients survival. The chemotherapy is the first indication for the palliative or undrurable cases (2).

In the parotid neoplasms generally the superficial parotidectomy with identification and conservation of the facial nerve is curative in most cases. Total resection of the parotid is indicated for malign tumors and resection with reconstruction of the facial nerve if it's been affected (2).

For submandibular benign tumors, the excision is curative (2). In the carcinomas, block resection (submandibular gland, levels I and II) followed of radiotherapy is the method chosen (35).

The follow-up must be carried out bimonthly in the first year; quadrimonthly in the second year; semestrally in the third year and annually from the fourth year. The patients treated of benign tumors and of low malignity grade may, after one year, be discharged and be guided for return (11).

Less invasive access for the Warthin's tumor in the parotid (36) and minimally invasive accesses for benign tumors located at the parotid lower edge (37) have been described more recently, and they diminish post-operative complications (hemorrhage, surgery duration time, internment time, aesthetic scar).

There are early and late complications after the parotidectomy. Temporary facial paralysis may occur in 10-30% of the patients, with the occurrence of permanent paralysis in <3% of the cases. Total transection may occur and must be corrected at the same time (2). The use of nerve stimulators may be indicated in cases of reoperation (34), as well as in large tumors submitted to previous radiotherapy or with inflammation. Alternatively a mastoidectomy with facial nerve identification in the temporal bone may help in distorted anatomy scenarios (2).

The Frey's syndrome or gustatory sudoresis is a relatively common long-term complication of the parotidectomy operations. We believe it relates to an aberrant regeneration of the parasympathetic fibers with the sympathetic fibers (34). Only 10% of the patients are symptomatic (2). The treatment includes antiperspirants, topic anticholinergics and botox applications (1). During the parotidectomy, the lifting of skin flaps down the parotid fascia would significantly diminish the occurrence of the Frey's syndrome (38).

Other complications include the rare hemorrhages, hematomas and local infection and the common salivary fistula. The latter is mostly self-limited (2).

DISCUSSION

In spite of being rare and comprising a wide variety of histological subtypes, the salivary glands neoplasms manifest clinically in a similar way. However, for its low prevalence, the first difficulty come up for the otorhinolaryngologist/head and neck surgeon, who needs to be attentive to the patients with asymptomatic or oligosymptomatic masses of low growth in the salivary glands topography. The diagnostic suspicion is important for the early diagnosis and consequently for the performance of the early treatment.

As from the diagnostic suspicion it's important to set forth the suitable tools for the patient's rapid and precise diagnosis, once the treatment offers different histological subtypes both for benign and malign tumors. The PAAF presented advances both in the execution technique and in the analysis of the materials obtained, and represented the choice complementary exam, in this service, to define the histological diagnosis of the major salivary glands tumors. In the minor salivary glands tumors, the excisional biopsy is the chosen method. The operation of superficial or submandibular parotidectomy with freezing biopsy after the performance of image exams, but without PAAF, is described in the literature, however we believe the importance of freezing is restrict to surgical margin warranty in the intra-operative.

Allied to the histological diagnosis, the image exams help prepare both the surgeon and the patient as for the possibility of surgical resection and its extension, deemed to be, therefore, another important complimentary step in the research of the patient with salivary gland neoplasm. In spite of great advances in the different image diagnoses modalities, the initial choice image exam, in this service, is the computerized tomography to compliment it whenever necessary. The unlimited use of image exams, even in the services that have this utility, may expose the patient to

unnecessary exams and contribute for the delay to the beginning of the treatment.

The treatment in the different tumor subtypes raises some questions: the resection extension (for instance, in the parotidectomy, should it be regional, superficial or total?), the conservation of innervation next to the salivary glands (mainly in the facial nerve conservation, when is it not indicated?), the association of the radiotherapy or cervical emptying (when is it necessary?). Another difficulty lays on the fact the teams that have already been faced to most of the histological subtypes are only a few. Most works report the surgical experience with the pleomorphic adenoma, Warthin's tumor, mucoepidermoid carcinoma and cystic adenoid carcinoma, by chance the most common histological subtypes.

The pleomorphic adenoma, for its recurrent and multilocal characteristic added to its superficial location, must be treated with the superficial parotidectomy. There are descriptions of regional resections, but the surgeon must be aware that reoperations have low cure rates and high risk for the facial nerve lesion.

The Warthin's tumor has an almost exclusive occurrence in parotid. Its treatment may be carried out with regional resection in the cases of the parotid low portion affection cases. For the low risk of malignization and peak of incidence in the 6th and 7th decades of life, some authors justify the follow-up of the lesions with image exams. In these cases, the clarification for the patient about the diagnosis is critical for jointly decision-making.

In the mucoepidermoid carcinoma, the resection ranges according to the tumor's grade (low or high) and its permanence. In the low grade, the intra-parotid lymph nodes evaluation is critical for the parotid total excision or the need for cervical emptying, while in the high grade, the excision must always be wide and where applicable with the conservation of the facial nerve (when not affected). The supraomohyoid emptying is indicated in high grade tumors and permanence 3 (tumors > 4cm / extraparenchymatous extension or positive neck). It may also be enlarged (with level IV associated with levels I-III) or radical, depending on the case.

The cystic adenoid carcinoma has a bad long-term prognosis, and the surgery with large tumor excision followed of radiotherapy is approved. The perineural invasion statement is its characteristic. The facial nerve (in the case of parotid neoplasm) or the jaw marginal, lingual and hypoglossal nerves (in case of submandibular affection) must be removed and joined where the presence of free surgical margin is confirmed.

The exams for a precise diagnosis, the possibility of intra-operative freezing and the most accurate surgical technique, all the diagnostic and therapeutic advances have been added to that dedicated knowledge on the behavior of each tumoral histological subtype so that the otorhinolaryngologist/head and neck surgeon may perform the best case by case management of the patients with salivary glands neoplasm.

FINAL COMMENTS

Some points to stand out:

- 1) A deep knowledge of the anatomy and physiology of such glands is required for a suitable clinical and surgical approach.
- 2) The salivary glands give rise to a surprising variety of benign and malign tumors, where the pathologic diagnosis is key for these lesions management, once the aggressivity grades depend upon their histological subtypes.
- 3) There are no reliable criteria in clinical bases to differentiate them.
- 4) The PAAF may be a first step for the diagnostic research, with image exams reserved for the tumoral therapeutic permanence and planning.
- 5) There are no diagnostic and therapeutic flowchart, and the otorhinolaryngologist/head and neck surgeon is in charge of the case by case analysis of these patients.

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