The Journal of Korean Academy of Maxillofacial Plastic and Reconstructive Surgery
Vol. 13, No2 : 167 - 176

TREATMENT AND PATHOLOGIC STUDY OF PLEOMORPHIC ADENOMAS

Il - Kyu Kim, D.D.S., M.S.D., Ph.D., Seong - Jun Lee, D.D.S.
Soo - Yong Ha, D.D.S., Young - Chae Chu, M.D.*
Dept. of Dentistry and Pathology College of Medicine Inha University*

This is three case - reports of pleomorphic adenomas arising from one parotid gland and two minor salivary glands treated by total parotidectomy and complete enucleation.

We conclude as follows :

1. *During the parotidectomy, we tried to preserve the facial nerve by retrograde approach to the trunk from the mandibular branch where it passes over the posterior facial vein. Although the paresis of the lower lip following the operation was seen, it disappeared in about 3 months.*

2. *Microscopically, the tumor of the first patient (case 1) contained equally myxoid and cellular components and showed well encapsulation.*

3. *In the second patient (case 2), the tumor revealed large areas of hemorrhage, cystic change, dystrophic calcification and stromal hyalinization, but no definite evidence of carcinoma, therefore we labeled this tumer as "atypical mixed tumor".*

4. *In the third patient (case 3), the tumor showed principally myxoid component and incomplete capsule, but the tumor was well demarcated.*

I. INTRODUCTION

Salivary gland tumors comprise about 5% of all benign and malignant tumors, excluding those of the skin[17]. Pleomorphic adenomas are the most common benign salivary gland tumors, and represent 60 or 70% of all neoplasms of the salivary glands[9,27,29]. These tumors occur most frequently in the parotid gland, as painless, slowly growing, often multiple, encapsulated and soft or hard depending on their relative amount of mucoid or cartilagenous stroma[14].

The term "mixed tumor" was first used by Broca in 1866 to stress the dual origin of this neoplasm from epithelial and mesenchymal element, and it was later popularized by Missen in 1874[2,5]. In more recent times, the term "pleomorphic adenoma" suggested by Willis has been used, and it emphasized both epithelial origin and the variety of histologic pattern[26].

The accepted treatment for pleomorphic adenoma is surgical excision[27].

The purpose of this article is to report three cases of pleomorphic adenoma arising from parotid gland and mimor salivary glands treated by total parotidectomy and complete enucleation with a review of literatures.

II. CASE REPORTS

Case 1

A 46-year old female patient was admitted to the our Department, Inha Hospital, with the chief complaint of palpable mass on the right infraauricular areas on 12th, Jan., 1990. The mass was first noticed 2 months ago, and the size of the mass increased very slowly till the time to admission. The mass was firm hard, easily movable and no tender on palpation

(Fig. 1). Intraoral examination revealed decreased salivary flow through the duct orifice of the right parotid gland.

On sialogram of right parotid gland, there was a soft tissue mass displacing of intraglandular duct from the lateral border of the ramus of the mandible. The adjacent duct was curvilinearly draped and stretched around the mass, producing the characteristic "ball-in hand appearance"(Fig. 2).

On the computed tomographic scan, 3×4cm sized homogenous and well-defined ovoid mass was seen between superficial and deep lobe of the right parotid gland(Fig. 3).

In summation, we diagnosed tentatively benign tumor of the right parotid gland and performed total parotidectomy with preservation of the facial nerve.

Surgical procedures were as follows ;

1. A preauricular incision is made with a curved cervical extension below the angle of the jaw.
2. Anterior and posterior skin flaps are developed, exposing the entire parotid gland.
3. The mandibular branch of the facial nerve is identified as it crosses to the posterior facial vein. The dissction then proceeds retrograde to the main trunk of the nerve.
4. Superficial lobe of the gland including the tumor mass is dissected free carefully from the branches of the facial nerve(Fig. 4).
5. The deep lobe is removed through the spaces between the divisions and branches of the facial nerve.

Following the operation, she showed the paralysis of the lower lip, but it returned completely in about 3 months(Fig. 5).

On cut section of the 3x3x4 cm tumor mass, exposed surface was gray-white with a faint yellow cast (Fig. 6).

Microscopically, the characteristic mixture of ductal, myoepithelial,, and mesenchymal cells were obse-

Fig. 1. Preoperative photograph demonstrates palpable mass on the right infraauricular areas.

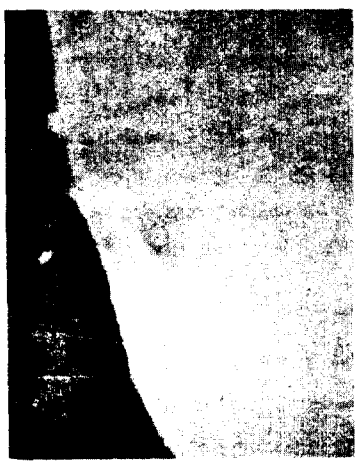

Fig. 2. Sialograph of right parotid gland shows a characteristic "ball-in-hand appearance"

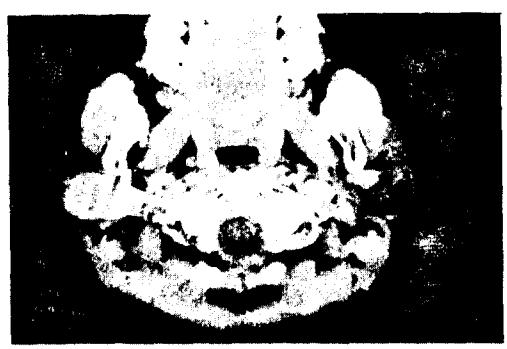

Fig. 3. Computed tomograph shows well-defined ovoid mass(arrow) between superfical and deep lobe of the right parotid gland.

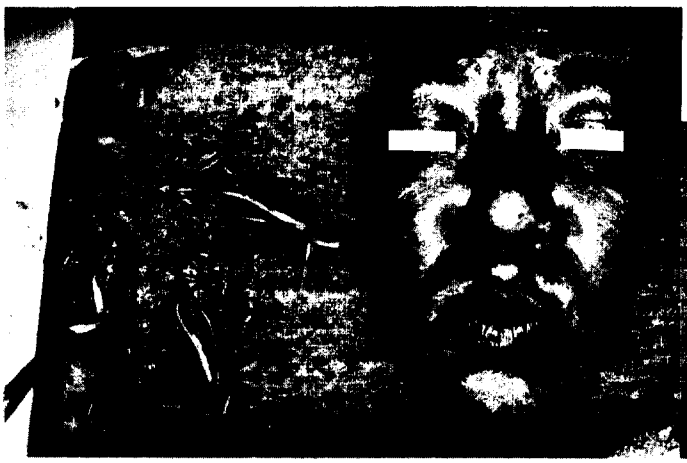

Fig. 4. Showing the facial nerve branches after tumor resectionn.

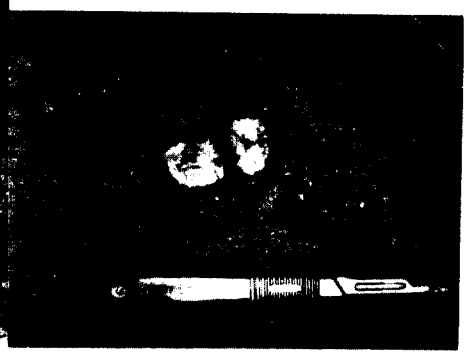

Fig. 5. Facial photograph after 3 months after surgery shows no sign of facial paralysis.

Fig. 6. Showing cut surface of the tumor, measuring 3×2×4 cm.

Fig. 7. Photomicrograph showing the pleomorphic nature of the tumor and the connective tissue capsule (arrow) separating the tumor from the normal gland.

Fig. 8. Photomicrograph showing the tubular pattern of epithelial cells.

Fig. 9. Photomicrograph showing the admixture of myxoid and chondroid tissue.

rved. The ductal cells were arranged in tubular pattern and the myoepithelial cell proliferation was seen around these tubular structures. The stroma consisted of admixture of myxoid and chondroid tissue (Fig. 7, 8, 9).

Case 2

A 67−year old female patient was referred to our hospital because of hard mass on the right cheek on 10th, Sep., 1990. The small sized mass was first noticed 40 years ago and it grew more rapidly in the last three years. In clinical examination, firm hard

and easily movable mass was palpable on the right cheek and it became prominnent when she opened the mouth widely(Fig. 10).

Intraoral examination revealed swelling on the right buccal mucosa.

Ultrasonogram of the right cheek showed solid echogenic mass with cystic component in the right cheek(Fig. 11).

On the computed tomographic scan, 3×5 cm sized, inhomogenously enhanced soft tissue mass with round calcification was located in anterior aspect of the right masticator space. It was well-defined with no evidence of abnormal invasion to the surrounding soft tissue(Fig. 12).

Based on the clinical, radiographic finding, the diagnosis was benign tumor developed in the right cheek areas.

Then we performed complete enucleation with intraoral approach. Prior to surgery, localization and cannulation of the Stensen's duct with polyethylene tube was done to avoid damage to the duct. Postoperatively, she showed normal salivation from the duct orifice of the right parotid gland.

The specimen consisted of a grayish-tan nodular mass, measuring 5×3×3 cm. The cut surface showed whitish-yellow solid mass, areas of hemorrhage, and cystic change(Fig. 13). Microscopically, the tumor revealed large areas of hemorrhage, cystic change, dystrophic calcificatioon and stromal hyalinization. The cellular elements consisted of tubules and nests of ductal epithelial cells and sheets of myoepithelial cell proliferation(Fig. 14). The ductal epithelial cells re-

Fig. 10. Preoperative photograph demonstrates mass on the right cheek areas.

Fig. 11. Ultrasonograph shows solid echogenic mass with cystic component.

Fig. 12. Computed tomograph shows well-defined mass with round calcification in the anterior aspect of the right masticator space.

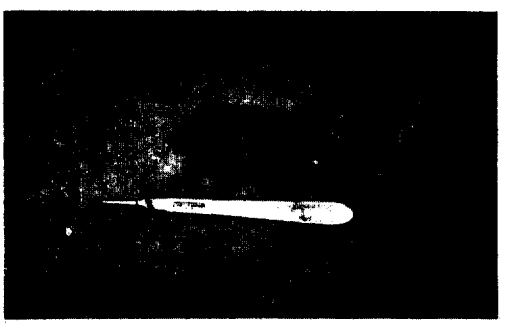

Fig. 13. Showing the cut surface of the tumor mass, measuring 5×3×3 cm.

Fig. 14. Photomicrograph showing large areas of hemorrhage, cystic change, dystrophic calcification and stromal hyalinization.

Fig. 15. Photomicrograph showing mild pleomorphism and mitotic figure of the ductal epithelial cells.

Fig. 16. Photomicrograph showing satellite nodule formation and vascular encroachment.

Fig. 17. Photomicrograph showing principaly myxoid tissue and incomplete capsule.

veasled mild pleomorphism and mitotic figures(Fig. 15). Satellite nodule formation and vascular encroachment were observed(Fig. 16). But there was no definite evidence of carcinoma.

Case 3

A 28-year old female patient visited our out-patient department because of small mass on the left upper lip mucosa on 5th, Dec., 1990. The mass on that areas was first noticed two months ago.

1.0×0.5 sized, movable soft tissue mass was excised on the left upper lip mucosa under local anesthesia.

Microscopically, the tumor was composed of both epithelial and mesenchymal elements. The tumor was principally myxoid. The capsule was incomplete, but the tumor was well demarcated(Fig. 17).

III. DISCUSSION

Pleomorphic adenoma have been reported in all age group with the highest incidence being in the 4th and 5th decades. It is somewhat more frequent in women than in men, the ratio approximately 6 : 4[5, 17, 27]. The characteristic history is the appearance of a painless mass and constant or slight increase in size, no related to salivary stimulation. Palpation reveals a firm definate mass, no adherent to the skin or to anything other than the gland[3].

All the patients in this series were women with

wide range of age from 28 to 67 years.

Although the distribution of pleomorphic adenoma varies widely, the parotid gland is the usual site ; approximately 84% are located in the parotid glands, 8% in the submaxillary glands, 6.5% in the minor saliviary glands, and 0.5% in the sublingual glands[29].

Of the three pleomorphic adenomas in this series, one was located in the parotid gland and two in minor salivary glands.

Diagnostic techniques of pleomorphic adenoma include history and physical examinnation, sialography, computed tomography, and ultrasonography[29]. Sialography aids in the determination of the size of the tumor, its location, its origin(whether intrinsic or extrinsic), and the presence of glandular impairment. If tumor is centrally located in parotid gland, sialograph shows a characteristic "ball-in hand appearance". Ultrasound appers to have considerable potential as a method of clinical investigation of the salivary gland. It has been useful in differentiating a cystic lesion from a solid mass[26]. In deep lobe tumor, particularly those presenting as enlargement gland, CT scanning has proved to be a major advannce in investigation and invaluable in the management of malignant tumors[22].

The treatment of pleomorphic adenoma is completely surgical excision. Because these tumors are usually so poorly delineated from the surrounding gland tissue and they may be multicentric in origin, simple enucleation of the tumor will result in high recurrence rates, from between 20 to 45%[8,13,28,30]. For this reason, superficial or total parotidectomy becomes now the most common procedure in the treatment of pleomorphic adenomas of the parotid gland[2,5,22]. Superficial parotidectomy is used when the lesion is superficial to the facial nerve, and total parotidectomy with preservation of facial nerve when the tumor is situated in the deep portion of the gland. If the lesion is known to be malignant because of facial paralysis, pain, the presence of a harzard infiltrating tumor or previous biopsy, the procedure of choice is total radical parotidectomy with sacrifice of the facial nerve[2,5,28].

Due to the anatomic location of the parotid gland, functional or esthetic disturbance may arise as a result of the incision or from injury to the facial nerve. Since the incision proposed by Gutierrez, several authors have introduced modifications(Fig .18)[10].

Early identification of the facial nerve is the key to good parotid surgery. The preservation of the facial nerve is best accomplished by one of three methods (1) early direct identification of the main trunk where it exits through the stylomastoid foramen, (2)) retrograde approach to the trunk from either the mandibular branch where it passes over the retromandibular (posterior facial) vein or the peripheral branches alongside the parotid duct, (3) Supravital staining of the parotid gland, contrasting the blue normal gland from the unstained tumor and the gleaming white facial nerve fibers[4,26].

In our patient(case 1), as the main trunk was screened by thr tumor extended posteriorly, we failed to identify the main trunk at its emergence, therefore retrograde approach to the trunk from the mandibular brnch was used to preservation of the facial nerve.

Complications occurred in parotid surgery consist of facial nerve injury, gustatory sweating(Frey syndrome), postoperative hemorrhage from branches of the superficial temporal artery or vein, and recurrence of benign neoplasm[20].

If the surgeon knows definitely that he has not sectioned any of the major branches, he may assure the patient that the facial asymmetry will disappear in about three or fourth months[20]. If the facial nerve is cut accidently during dissection, it should be repaired by anastomosis or graft[30]. When the facial nerve is sacrified, a nerve graft is frequently inserted between the main trunk and peripheral branches. The greater auricular or other superficial cervical nerve can be used as the source of the graft[1,6,25,30]. Regenerations of the graft depend on the length and take place within one to sixteen months[1,30].

Gustatory sweating and flushing is a common complication of parotidectomy. This syndrome, usually

called by Frey syndrome, is presumed to arise from aberrant innervation of sweat gland and blood vessels of the skin after a latent period of between five weeks and one year. Thus when the patient eats, he gets a reflex flushing and sweating instead of a reflex stimulation of parotid salivary flow[12,15,21,30].

Recurrences following surgery of pleomorphic adenoma are of importance because they tend to grow rapidly and disseminate into normal tissue. Further about 25% of pleomorphic adenoma tend to become malignant following the appearance of recurrent growths[28].

Our cased patient who undergone total parotidectomy(case 1) showed the paralysis of the lower lip following the operation, but it returnned completely in aboout 3 months. No other complications occured in our patients.

Surgically excised pleomorphic adenomas usually range from 2 cm to 5 cm in diameter. They are usually ovoid, smooth, encapsulated and multilobulated. On cut section, exposed surfaces are usually moist and gray-white with a faint yellow cast. When cartilagelike material is present, the surface is translucent with a bluish hue. Cyst for mation and hemorrhage are infrequently but do occur, especially in large tumors[26].

The size of the tumors in this series varied from 1 cm to 5 cm in diameter. In the second patient(case 2), cut surface of the tumor showed areas of cystic change, calcification and hemorrhage.

Microscopically it is characteristic of pleomorphic adenomas that their histologic appearance varied, not only in different tumor, but in different part of the same tumor as well. A mixture of ductal, myoepithelial, and mesenchymal cells may be observed. The ductal cells are of many types and arranged in numerous pattern ; they form glands, tubules, solid nests, ribbons, or files. Frequently metaplastic change(squmous, oncocytic, or sebaceous) are present in the ductal cells. The stroma of the pleomorphic adenomas is also pleomorphic and consists of admixture of mucoid, myxoid, chondroid, and hyaline tissue and, on rare occasion, of bone or fat[29].

Dardick[7] described that the wide range of morphologic expression evident in pleomorphic adenoma would appear to be the result of a number of factors ; the amount and distribution of mucopolysaccharide matrix formed by tumor cells in myxoid appearing areas, the expression of squamous, chondroid or osseous metaplasia, and the relative frequency of tumor cells with ductal, myoepithelial, myoepith elial-like or poorly differentiated characteristics.

Foote and Frazell classified pleomorphic adenoma as (1) principally myxoid (36%) (2) equally myxoid and cellular (30%) (3) predominantly cellular (20%). With the exception of pleomorphic adenomas that obviously infiltrate and extensively destroy adjacent tissue, there is no correlation between the various histilogic subtype and the biological behavior of the neoplasm[26].

The tumor of the first patient(case 1) showed equally myxoid and cellular component. The tumor of the second patient(case 2) revealed large areas of hemorrhage, cystic change, dystrophic calcification, stromal hyalinization and satellite nodule, but no definite evidence of carcinoma. Therefore we label this tumor as "atypical mixed tumor". The tumor of third patient (case 3) showed principally myxoid component and incomplete capsule. But the tumor was well demarcated.

The great majority of so-called malignant mixed tumor of salivary gland are carcinoma ex pleomorphic adenoma that mean the finding of a flankly malignant epithelial neoplasm in an otherwise histologically benign mixed tumor. This is not to be confused with rare true malignant mixed tumor that presents in either of two biological form ; first, a histologically benign tumor that demonstrates malignant behavior and second, a histologically malignant tumor that

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rare true malignant mixed tumor that presents in either of two biological form ; first, a histologically benign tumor that demonstrates malignant behavior and second, a histologically malignant tumor that shows both a carcinomatous and a sarcomatous pattern, in other word, a carcinosarcoma[31]. This entire group of the tumors accounts for 2−10% of all pleomorphic adenoma.

Histologic type of carcinoma ex pleomorphic adenoma were composed mostly of undifferentiated carcinoma and adenocarcioma[18,19,23,24]. This carcinomatous transformation may take place in a long standing untreated tumor or in a recurrent one, or the malignant element may be present at the time of initial surgery[19,27]. Metastatic lesion most frequently is seen is regional lymph node[19], lung[18], and bone[11].

Ⅳ. SUMMARY

This is cases−report of treatment of pleomorphic adenomas arising from one parotid gland and two minor salivary glands.

We used total parotidectomy and complete enucleation for treatment of the tumors without permanent complications. During the parotidectomy, we tried to preserve the facial nerve by retrograde a pproach to the trunk from the mandibular branch where it passes over the posterior facial vein. Although the paresis of the lower lip following the operation was seen, it disappeared in about 3 months.

Microscopically, the tumor of the first patient (case 1) contained equally myxoid and cellular components and showed well encapsulation. In the second patient (case 2), the tumor revealed large areas of hemorrhage, cystic change, dystrophic calcification and stromal hyalinization, but no definite evidence of carcinoma, therefore we labeled this tumor as "atypical mixed tumor". In the third patient (case 3), the tumor showed principally myxoid component and incomplete capsule, but the tumor was well demarcated.

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국문초록

다형성 선종의 치험 및 병리조직학적 연구

인하대학교 의과대학 치과학교실 병리학교실*
김일규 · 이성준 · 하수용 · 주영채*

저자등은 우측 이하선(46세 여)과 우측 및 좌측 협점막의 소타액선(67세 여, 28세 여)에서 발생한 세 증례의 다형성 선종 환자에서, 우측 이하선 전적출술(증례 1) 및 종양 완전적출술(증례 2, 3)로 치험하고 병리조직학적 검사 결과 다음과 같은 결론을 얻었다.

1. 안면신경의 보존을 위해 하악지에서 역행하여 본관에 접근하였으며, 수술 직후에 발생한 우측 하순 운동마비 증상은 3개월 경과후 완전히 회복된 소견을 관찰하였다.

2. 현미경학적으로, 증례 1에서는 myxoid와 cellular 성분의 구성비율이 거의 같았으며 완전한 피낭형성을 보였다.

3. 증례 2에서는 출혈, 낭포성 변화, 이영양성 석회화, 지질의 초자질화 소견이 관찰되었으나, 결정적인 악성 종양의 소견은 관찰되지 않아 "Atypical mixed tumor"로 분류하였다.

4. 증례 3에서는 대부분 myxoid한 조직으로 구성되었으며 불완전한 피막을 보였으나, 정상적인 선조직과의 경계는 명확하였다.