

A Clinical Study on Tumors of the Parapharyngeal Space

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부인두강 종양의 임상적 고찰

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= 국문초록 =

부인두강(Parapharyngeal space)는 비인두강과 구인두강에 인접하여 위로는 두개저, 아래로는 설골사이에 위치하는 해부학적 잠재공간으로 이곳에 발생하는 종양은 매우 드무나 다양한 병리조직학적 소견을 보이며 인접한 중요장기들로 인한 수술적 어려움으로 두경부 외과의사의 관심이 되어 왔다. 최근 CT나 MRI의 도입으로 이학적 검사가 어려웠던 이부위의 진단에 많은 도움을 얻게 되었고, 발달된 수술방법의 사용으로 크기가 매우 큰 종양도 절제가 가능하게 되었다.

저자들은 1990년 9월부터 1993년 8월까지 한림대학교 이비인후과학교실에서 술전 CT나 MRI를 시행한 후 조직검사로 확진된 부인두강 종물 22례의 후향적 임상분석을 시행하여 다음의 결과를 얻었다.

- 1) 양성종양이 11례(50.0%), 악성종양이 11례(50.0%)로 빈도에 차이는 없었다.
- 2) 종양의 조직학적 기원은 타액선종양이 10례(45.5%)로 가장 많았으며 신경종양이 4례(18.2%)였고 기타 종양이 8례(36.4%)로 다양하였다.
- 3) 방사선학적 진단방법으로는 18례(81.8%)에서 CT를 시행하였고 필요한 경우에 MRI를 5례(22.7%), 혈관조영술을 3례(13.6%)에서 시행하였다.
- 4) 치료방법으로는 악성종양은 수술 및 방사선치료 또는 항암약물요법을 병리조직검사 결과에 따라 단독 또는 병합하여 시행하였고, 양성종양의 경우에는 모두 수술을 시행하였는데 수술방법은 경이하선 접근법이 가장 많이 사용되었다.
- 5) 추적조사는 평균 20개월로 양성종양의 경우는 모두 종양의 재발이 없이 치료되었으나 악성종양 중 전이암 1례와 악성 임파종 1례가 사망하였다.

Introduction

Tumors of the parapharyngeal space are relatively uncommon lesions of the head and neck, however, have been of interest to head and neck surgeons because of the wide variety of histopathologic tumors that occur in the area, the anatomic characteristics of the parapharyngeal space making clinical examination of this area a difficult and unreliable method for assessment of these tumors, and large size they often attain prior to diagnosis posing a problem in their therapeutic management.

The introduction of computed tomography(CT) and magnetic resonance imaging(MRI) in recent years has immeasurably helped the diagnosis of tumors in this area and the advent of more refined surgical techniques have changed the approach to and outlook for many of these tumors.

The following study evaluates our experience with the diagnostic and therapeutic approaches for tumors of the parapharyngeal space.

Materials and Methods

During the period from September 1990 to August 1993, twenty-two patients of tumors of the parapharyngeal space were analysed retrospectively at the two hospitals of Hallym University(Kang-Nam Sacred Heart Hospital, Kang-dong Sacred Heart Hospital). This study included the tumors located primarily in the parapharyngeal space and extended into this area secondarily from surrounding structures, or developed as part of a systemic process.

The charts were reviewed to evaluate in terms of clinical findings, diagnostic radiologic procedures, therapeutic managements, types of surgery, and outcomes.

Results

1. Patients distribution

There was a total of 20 patients ; ten men(45.5%) and twelve women(54.5%), with a mean age of 45 years(range of 13–82) years. Eighteen patients were treated initially at our hospitals and three patients had undergone previous surgery at other hospitals and underwent operation at our hospitals due to recurrence of tumors of the parapharyngeal space.

2. Clinical findings

Table 1 shows most common symptoms and findings of physical examination of these patients. The presence of an asymptomatic mass in the neck was the most frequently encountered finding, followed by parotid mass and pharyngeal mass(Fig. 1) with medial displacement of the lateral pharyngeal wall.

Table 1. Clinical findings(N=22)

| Symptoms and signs | Number (%) |
|--------------------|------------|
| Neck mass | 11 (50.0%) |
| Parotid mass | 10 (45.5%) |
| Pharyngeal mass | 6 (27.3%) |
| Facial palsy | 4 (18.2%) |
| Throat discomfort | 4 (18.2%) |
| Dysphagia | 3 (13.6%) |
| Trismus | 3 (13.6%) |
| Hoarseness | 3 (13.6%) |
| Vocal cord palsy | 1 (4.5%) |

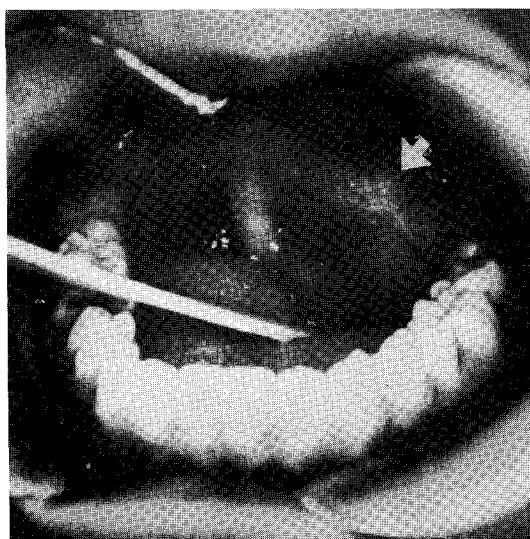


Fig. 1. Large pharyngeal mass(arrow) displacing the lateral pharyngeal wall medially.

tonsil, or soft palate. Other uncommon symptoms and signs were listed in Table 1.

3. Diagnostic imaging

Computed tomography(CT) scan accurately defined the location of the tumors relative to the sty-

loid process(Fig. 2) and correctly assessed tumors of salivary gland. According to our study(Table 2), the prestyloid location included all the salivary gland tumors and metastatic nodes of nasopharyngeal carcinoma while the retrostyloid location consisted of more various pathological tumors such as neurogenic tumors(schwannoma, carotid body tumor), vascular tumor(hemangiopericytoma), lymphoma, and metastatic tumors(laryngeal squamous cell carcinoma, thyroid papillary carcinoma).

Magnetic resonance imaging(MRI) was used in five patients when the tumors were recurred in three patients after previous surgery at other hospitals ; two cases of pleomorphic adenoma and one case of adenoid cystic carcinoma of the parotid gland, and when the tumors were suspected of very large size ; a case of schwannoma and a case of hemangiopericytoma. Angiography was performed only when the tumors were suspected of high vascularity ; a case of carotid body tumor, a case of schwannoma, and a case of hemangiopericytoma.

4. Pathology

Histological diagnoses were obtained by excision of tumors(Table 3). Of the twenty-two tumors, eleven(50.0%) were benign and eleven(50.0%) were malignant. With regard to the origin of the tumors, tumors of the salivary gland origin were most frequently present in 10 patients(45.5%) including five pleomorphic adenomas, a monomorphic adenoma, an adenocystic carcinoma, an adenocarcinoma, a mucoepidermoid carcinomas, and a myoepithelial carcinoma of the parotid gland. Tumors of the neurogenic origin were present in 4 patients(18.2%). These included three schwannomas and one case of paraganglioma(carotid body tumor). The remaining eight patients(36.4%) were presented with miscellaneous lesions, including a hemangiopericytoma, two malignant lymphoma, two nasopharyngeal carcinomas and three metastatic carcinomas (a laryngeal carcinoma, a thyroid papillary carcinoma, and an unknown primary carcinoma).

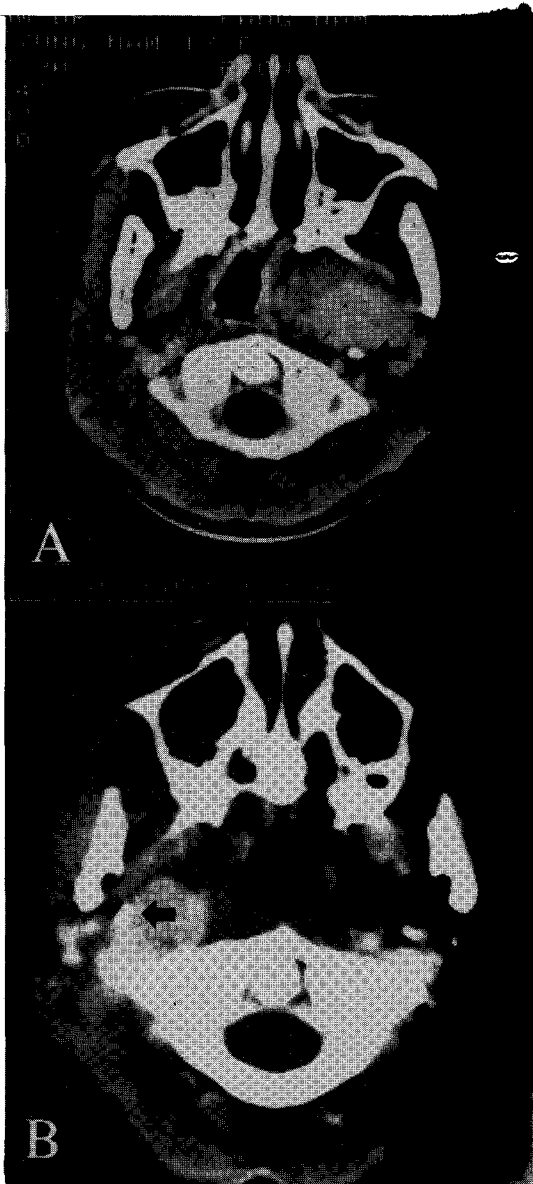


Fig. 2. A : Parapharyngeal tumor(mixed tumor of deep lobe of parotid gland) in the prestyloid compartment(arrow ; styloid process). B : Parapharyngeal tumor(Schwannoma) in the retrostyloid compartment(arrow ; styloid process).

Table 2. Locations of parapharyngeal space tumors in CT(N=19)

| Prestyloid | | Retrostyloid | |
|--------------------------|------------|--------------------------------|-----------|
| Pleomorphic adenoma | 5 | Schwannoma | 2 |
| Monomorphic adenoma | 1 | Carotid body tumor | 1 |
| Adenoid cystic carcinoma | 1 | Hemangiopericytoma | 1 |
| Adenocarcinoma | 1 | Malignant lymphoma | 2 |
| Myoepitheliocarcinoma | 1 | Metastatic laryngeal carcinoma | 1 |
| Nasopharyngeal carcinoma | 2 | Metastatic thyroid carcinoma | 1 |
| Total | 11 (57.9%) | | 8 (42.1%) |

Table 3. Pathologies of the parapharyngeal space tumors(N=22)

| Origin \ Type | | Benign | | Malignant | |
|--------------------------------|---------------------|-----------|--|---------------------------|---|
| Salivary (N=10, 45.5%) | Pleomorphic adenoma | 5 | | Adenoid cystic carcinoma | 1 |
| | Monomorphic adenoma | 1 | | Adenocarcinoma | 1 |
| | | | | Mucoepidermoid carcinoma | 1 |
| | | | | Myoepithelial carcinoma | 1 |
| Neurogenic (N= 4, 18.2%) | Schwannoma | 3 | | | |
| | Carotid body tumor | 1 | | | |
| Miscellaneous (N= 8, 36.4%) | Hemangiopericytoma | 1 | | Malignant lymphoma | 2 |
| | | | | Nasopharyngeal carcinoma | 2 |
| | | | | Laryngeal carcinoma | 1 |
| | | | | Thyroid carcinoma | 1 |
| | | | | Unknown primary carcinoma | 1 |
| Total (%) | | 11(50.0%) | | 11(50.0%) | |

5. Treatment modalities

Therapeutically, three of the twenty-two patients underwent a biopsy only and according to the biopsy result, two cases of nasopharyngeal carcinoma were treated by radiation therapy and one case of malignant lymphoma was received chemotherapy only. And as a combined treatment modality, four patients with malignancy (a case of adenocarcinoma, an adenoid cystic carcinoma, a mucoepidermoid carcinoma of the parotid gland, metastatic laryngeal squamous cell carcinoma) were treated by initial surgery and additional radiation therapy and in one patient of malignant lymphoma surgery and postoperative chemotherapy was done. The remaining thirteen patients underwent only surgical removal. Three surgical approach to the parapharyngeal space (Table 4) were used. Among them, transparotid approach was the most common procedure used (11 patients, 57.9%) and transcervical app-

roach was selected in 5 patients (26.31%). Three patients (15.8%) with two large benign tumors (schwannoma, hemangiopericytoma) and a case of metastatic laryngeal carcinoma required mandibulotomy for purposes of exposure or adequate removal of tumor.

6. Outcome of treatment

During a follow-up average of 20 months (range of 7-42 months), we lost follow-up in three patients (a case of malignant lymphoma, a case of adenocarcinoma of the parotid gland, and a case of unknown primary carcinoma). All the benign tumors and seven of the twelve malignant tumors demonstrated no evidence of the disease, however, the patient with metastatic laryngeal carcinoma, who had a history of total laryngectomy and radiation therapy, underwent surgery for metastatic lymph node to the parapharyngeal space but unfortunately died of bleeding from carotid artery blowout. And ano-

Table 4. Surgical approaches to the parapharyngeal space tumors(N=19)

| Approach \ Type | Benign | | Malignant | |
|----------------------------------|---------------------|---|--------------------------------|---|
| Transparotid (N=11, 57.9%) | Pleomorphic adenoma | 5 | Adenoid cystic carcinoma | 1 |
| | | | Adenocarcinoma | 1 |
| | | | Mucoepidermoid carcinoma | 1 |
| | | | Myoepithelial carcinoma | 1 |
| | | | Metastatic thyroid carcinoma | 1 |
| | | | Unknown primary carcinoma | 1 |
| Transcervical (N= 4, 26.3%) | Monomorphic adenoma | 1 | Malignant lymphoma | 1 |
| | Schwannoma | 2 | | |
| | Carotid body tumor | 1 | | |
| Transmandibular (N= 3, 15.8%) | Schwannoma | 1 | Metastatic laryngeal carcinoma | 1 |
| | | | Hemangiopericytoma | 1 |

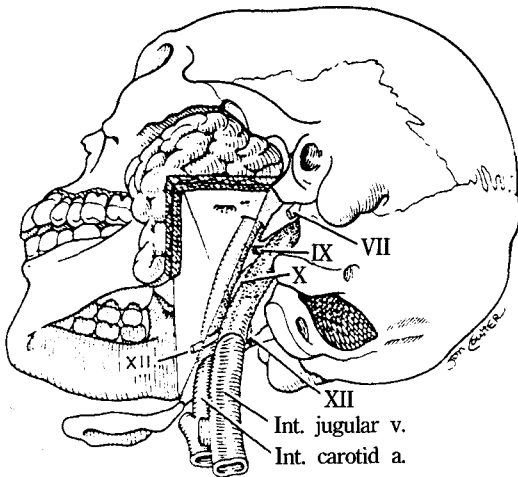


Fig. 3. Parapharyngeal space shaped as inverted pyramid with the base at the cranial base and the apex at the hyoid bone.

ther patient with malignant lymphoma developed lung metastasis and expired one year after surgery and chemotherapy.

Discussion

1. Anatomy

The parapharyngeal space(Fig. 3) lying adjacent to the naso- and oro-pharynx is a potential space, shaped like an inverted pyramid with the base at the cranial base and the apex at the greater cornu of the hyoid bone and it communicates posteromedially with the retropharyngeal space and anteriorly

with the submandibular space¹⁾²⁾³⁾⁴⁾.

From a surgical point of view, this space may be extended posteriorly to the prevertebral fascia and muscle, with the styloid process and its muscles dividing it into anterior and posterior compartment. The parapharyngeal space may then be thought of as having two compartments; the anterior or prestyloid compartment, which is adjacent to the palatine tonsil, including the pterygoid muscles, mandible, deep lobe of the parotid gland, internal maxillary artery, inferior alveolar, lingual and auriculotemporal nerves; and the posterior or poststyloid space containing the internal jugular vein, the internal carotid artery, cranial nerves IX, X, XI, XII, the cervical sympathetic chains, and lymph nodes including the node of Rouviere⁴⁾⁵⁾. Glomus bodies are numerous within the space. Thus tumors of many and varied origin may occur within this space¹⁾³⁾⁶⁾.

Masses within this space are bounded on three sides by bone and thick fascia-superioly by the skull base, posteriorly by the cervical spine and carotid fascia or prevertebral fascia, and laterally by the mandible and the fascia of the parotid gland and pterygoid muscles.

Another important structure in understanding tumor growth and presentation in the parapharyngeal space is the stylomandibular ligament, which attaches to the styloid process and the angle of the

mandible. Patey and Tharckray⁷⁾ coined the term "stylomandibular tunnel" to describe the channel through which retromandibular parotid gland tumors may extend into the parapharyngeal space. This opening is formed by the skull base superiorly, the ascending ramus of the mandible and the internal pterygoids anteriorly, and the styloid process and stylomandibular ligament posteriorly. Since this tunnel does not expand, tumors that extend from the parotid gland medially into the parapharyngeal space become dumbbell-shaped ; with wide medial and lateral portion but a narrow neck⁴⁾.

2. Epidemiology and Pathology

Parapharyngeal space tumors constitute less than 0.5% of all head and neck neoplasia¹⁾⁸⁾. However, this relatively narrow space is occupied by many different tissue elements, the tumors involving it are of varying origin. Previous studies have shown that the most common tumor group presenting in the parapharyngeal space overall was that of the salivary gland (range of 26–47%), followed by neurogenic tumors (range 27–43%)⁹⁾¹⁰⁾. The most common individual tumor presenting in the parapharyngeal space is the benign mixed tumor, followed by neurilemmomas. Our study demonstrated the most common tumor group was of salivary origin in 45.5% of all parapharyngeal space tumors and most commonly encountered tumor was benign mixed tumor. In general, 80% of parapharyngeal space tumors are benign, whereas our study reveals 50% of parapharyngeal space tumors were benign with same frequency of malignant tumors. Many miscellaneous lesions have reported in the literature that includes paraganglioma, lymphoma, meningioma, ganglioneuroma, neuroblastoma, meningiosarcoma, malignant fibrous histiocytoma, lymphangioma, hemangioma, teratoma, dermoid, rhabdomyosarcoma, leiomyoma, lipoma, liposarcoma, branchial cleft cyst, and hemangiopericytoma⁵⁾⁶⁾¹¹⁾. In addition, one must always consider direct invasion or metastatic disease from an occult or a primary malignant

neoplasm in the differential diagnosis.

3. Clinical findings

The unique characteristics of tumors of parapharyngeal space is that they all present in a very similar fashion in spite of their wide variety of origin. Tumors originating within the parapharyngeal space usually extend in a path of least resistance. Growth of the masses within this space will proceed medially into the tonsillar, soft palate, and nasopharyngeal areas, displacing them medially. Inferior growth proceeds into the retromandibular area. Most of these lesions have a slow, insidious growth and are clinically asymptomatic. In our series, the most common symptom and sign was mass in the neck or parotid or oropharynx. Patients may present dyspnea, dysphagia, a vague discomfort, or a sensation of pressure or foreign body in the throat. The most commonly involved cranial nerve was vagus nerve, and other neurologic deficits can potentially exist in cranial nerves IX through XII or the cervical sympathetic chains ; however, they are uncommon¹⁾⁶⁾.

The physical examination, although not very specific, may suggest the origin of the tumor. Paraganglioma can be identified by their compressibility, location, and mobility in the anteroposterior and lateral axis, but not in the cephalocaudal direction¹⁾³⁾. Glomus vagale may be presented with vocal cord palsy and tumors of the deep lobe of the parotid presented most commonly as an oropharyngeal mass.

4. Diagnostic evaluation(Imaging)

The development and refinement of CT has facilitated and contributed significantly to the preoperative assessment of these lesions. High-resolution CT is now the best initial diagnostic study because it helps determine the size and extent of the tumor, distinguish tumors of parotid and extraparotid origin, establish the location of the tumors in the prestyloid or poststyloid compartments, demonstrate degree of tumor vascularity by the use of contrast,

and separate benign from malignant tumors in the parapharyngeal space¹⁾⁶⁾¹⁰⁾. MRI is very helpful when it may be difficult to distinguish the anterior border of massive tumors from the fascia of the pterygoid or other surrounding musculatures¹²⁾.

Som et al¹⁰⁾ concluded that angiography is not indicated in the preoperative assessment of all parapharyngeal space lesions and should be reserved for cases in which the tumor is extraparotid and enhances on CT scan, the tumor is extremely large, or there is a suspicion of malignant neoplasm with vascular invasion. We underwent angiography only in patients with clinically or radiographically vascularized masses such as carotid body tumor and schwannoma and very large hemangiopericytoma.

5. Treatment

Treatment of these tumors should be individualized depending on the type of tumor present. Biopsy of the tumor should be done from an external approach and preparation should be made for complete excision if the lesion is benign. Incisional biopsy contaminates the field and increases the morbidity of a definitive procedure and only justified with suspected malignancies.

The treatment of benign mixed tumors is total surgical removal, delivering the tumors without rupturing the capsule. If it is a dumbbell tumor, then division of the stylomandibular ligament and fracture of the styloid process may be performed to release the mass from the central constricting structures and remove it with an intact capsule¹³⁾. The preferred method of treatment of neurilemmomas and paragangliomas is total surgical excision. Patient with lymphoma usually receive radiotherapy and/or chemotherapy, depending on the stage of the disease. Wide surgical excision should be performed for malignant tumors other than lymphoma that are deemed resectable.

Many surgical approaches to parapharyngeal space tumors have been used and the choice of surgical approach is dictated by the size of the tu-

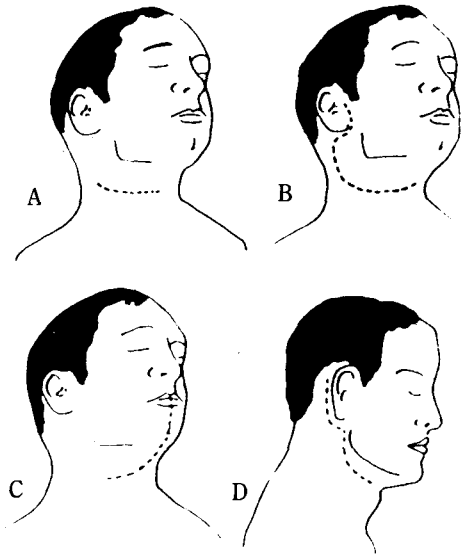


Fig. 4. Surgical approaches to the parapharyngeal tumors. A : Transcervical approach. B : Transparotid approach. C : Transmandibular approach. D : Infratemporal fossa approach.

mor, its location and relation to the major vessel, and the index of suspicion of malignancy. Since more of these masses are benign, surgical morbidity must be minimized¹⁾⁶⁾. These includes transoral, transcervical, transparotid, transmandibular, and infratemporal fossa approach (Fig. 4). In our series, we used most frequently transparotid approach (57.9 %) because it is necessary for those tumors originating from salivary gland which were main portion of tumors of our cases. Transcervical approach and tranmandibular approach was also used for individualized cases.

Conclusions

A series of twenty-two tumors of the parapharyngeal space is presented. There were 11 benign and 11 malignant tumors, and ten (45.5 %) patients with tumors of salivary gland origin, four (18.2 %) patients with tumors of neurogenous origin such as schwannoma, carotid body tumors, and eight (36.4 %) patients with tumors of miscellaneous origin including hemangiopericytoma, malignant lymphoma,

nasopharyngeal carcinoma, metastatic laryngeal carcinoma, thyroid papillary carcinoma, and unknown primary carcinoma.

The use of high-resolution CT scan is most important in the diagnosis of these patients in terms of preoperative evaluation. Because of the wide variety of tumors that occur in the parapharyngeal space, the treatment plan has to be individualized for each patient. However, as many of these tumors are surgically treatable, it is important that head and neck surgeon must be aware of the best way to approach the parapharyngeal space with minimal morbidity. In our series, the transparotid technique is the most commonly used approach with transcervical and transmandibular being chosen for selective cases.

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