PARAPHARYNGEAL SPACE TUMOURS A RADIOLOGICAL AND SURGICAL CORRELATION

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ABSTRACT: The parapharyngeal space is a deeply situated space on either side of head. Clinical assessment of lesions in this space is very difficult. 28 patients with parapharyngeal space masses diagnosed and managed in the department of Otorhinolaryngology and Head & Neck Surgery of Postgraduate Institute of Medical Education and Research, Chandigarh were studied. 8 patients were excluded as the tumour could not be removed en-bloc in these. 20 were analysed further.

Key Words : Parapharyngeal Tumours, C T Scan, Surgical Excision

INTRODUCTION

The parapharyngeal (PPS) space approximates the shape of an inverted pyramid, set within the base of the skull and greater cornu of the hyoid bone. Its base, posterior, and lateral boundaries are similar in that they are rigid. The lateral boundary is composed of the medial pterygoid muscle, ramus of the mandible, and posterior belly of the digastric muscle. The posterior boundary is made up of the vertebral column and the paravertebral muscles. Superiorly, its base is formed by the temporal and sphenoid bones. However, its medial boundary is soft and pliable, composed of the superior pharyngeal constrictor, the tonsillar pillars, and the soft palate.[1] It is further divided into a prestyloid and a poststyloid compartment.

Due to presence of variety of structures of varying histological types in this space, tumours of a large variety are found in this space. Most common among them are tumours of salivary gland origin and neurologic tumours, 'Tumours usually grow in a path of least resistance into the lateral pharyngeal wall, causing downward and medial displacement of the tonsil and palatal arches in the oropharynx. Most of these lesions have a slow, insidious growth and are clinically asymptomatic for a long time. They may also present with an external mass located anterior or inferior to the tragus of the ear. Patients may present with dyspnoea, dysphagia, a vague discomfort or a sensation of pressure or foreign body in the throat. Occasionally, there may be a unilateral hearing loss. Neurologic deficits can potentially exist in cranial nerves IX through XII or the cervical sympathetic chain.[1]

Modes of radiological assessment in pre-computed tomography scan era were sialography of the parotid gland to see whether the tumour is of salivary origin and angiography to note the vascularity of the tumour. Post CT (computed tomography) scan era has markedly changed the assessment protocol.[2]

Rapid sequence CT provides information about the vascular anatomy (CT angiography), locates major blood vessels encased by tumour, and eliminates the possibility of avascular lesions in the differential diagnosis of a head and neck. tumour. Further the use of density time curves allows arterial and venous time. The patterns of density time curves are characteristic for vascular lesions.[1]

CT scan can provide information about the location, extent, consistency and vascularity of the tumour. A correct preoperative diagnosis can be made with the help of CT scan in 88-96%[4-5-6] of patients

Mafee[3] (1982) studied the role of dynamic CT and he found that the patterns of density - time curves were characteristic for various lesions. Som et al[4] (1984) studied the parapharyngeal masses in 104 patients so that a protocol could be developed which would allow a preoperative diagnosis, so that the most appropriate surgical approach could be undertaken.

The aim of this study is to find correlation between the CT scan and surgical findings in the tumours involving the parapharyngeal space.

MATERIAL AND METHODS

This study was conducted on 28 patients with parapharyngeal space masses diagnosed and managed in the department of Otorhinolaryngology and Head and Neck Surgery of Postgraduate Institute of Medical Education and Research, Chandigarh, India, between 1996-1998. In 8 patients, the tumour was removed piecemeal to save the vital structures and were excluded from the study, so only 20 patients were analysed further.

Selection Criteria

- Presence of mass in the upper part of neck.
- Symptoms secondary to shift of the pharyngeal wall and pharyngeal tonsil medially.
- Symptoms secondary to involvement of the pterygoid muscles.
- Patients having isolated proven metastasis in the parapharyngeal space with primary focus else where in the body.

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Exclusion Criteria

Patients having involvement of the parapharyngeal space secondary to encroachment by the mass from surrounding areas.

For evaluation, a complete history and physical examination, including bimanual palpation with ballottement of the tumour mass was done. A detailed systemic examination, routine haematological and biochemical investigations were also done. Fine needle aspiration cytology was done to assess the probable histological diagnosis, in all patients either prior to or after admission. Urinary test was done to assess the secretory nature of the mass.

CT Scan

All patients were subjected to contrast CT scanning of the head and neck with 5-mm-thick contiguous sections obtained in the axial plane. Coronal studies were performed in 4 cases (case no. 1, 8, 12 and 20), where skull base involvement was suspected. All of the CT scans were done with a 60ml of lohexol as bolus injection of medium at the beginning of the procedure. The details of the tumour, the size, the extent and the status of the major blood vessels and cranial nerves were noted down and a record was maintained.

The size of the mass was measured with the help of CT scan in anteroposterior, lateral to medial and superior to inferior directions. All the measurements were taken on a standard centimeter scale. The maximum dimension only was taken into account. Anteroposterior measurement being taken as length, lateral to medial as width and superior to inferior dimension taken as height. The extent of the mass was described by noting the presence, absence or displacement of various boundaries of the parapharyngeal space.

All patients were subjected to surgical treatment after admission, within 15 days of the CT scan under general anaesthesia. The approach for the exploration of the PPS depended upon the size of the tumour, its extent and histological diagnosis. The details of the tumour such as size of the tumour, the extent of the tumour in prestyloid or poststyloid compartment, the relationship to the surrounding structures including the great vessels, the involvement of lower cranial nerves (9th, 10th, llth, 12th) and extension beyond the PPS either downwards into the neck, laterally into the superficial parotid lobe or erosion of mandible, medially with or without fixation to the structures over the lateral pharyngeal wall, superiorly into the cranium were noted and a record was kept.

OBSERVATIONS

Out of 20 patients of the parapharyngeal mass, 14 were males and 6 were females, ranging between 4 years and 70 years of age (mean age = 37.4 years) with maximum number of cases between 31-40 years of age.The histological diagnosis of all these patients is shown in table 1.

Table 1: Histological Diagnosis Correlation Between Pre op CT and Surgical Findings

Histological	No. of Patients	%
Schwannoma	10	50%
Pleomorphic Adenoma	4	20%
Glomus Jugulare	2	10%
Lipoma	1.	5%
Lymphangioma	1	5%
Sq. cell carcinoma	1	5%

Table 2: Correlation with Dimensions of mass

Patient	CT			Surgery		
No.	L	W	H	L	W	II
1	5.5	5	4	Piecemeal		
2	4.3	3	2.8	4	3	3
3	3	2	2	Piecemeal		
4	5.5	6	8	6	7	6.6
5	4.6	4	3	Piecemeal		
6	4.5	4	3	4	3.5	2
6	4	3		Piecemeal		
8	6.6	2.7	2.4	6.5	3	3
9	8	5.1	4	8.7	5.1	3.2
10	6.5	6	3.5	8	5.5	2.5
11	7	5.5	4	6.8	6	4
12	8	6.4	4	Piecemeal		
13	7.2	5	4	7	5.3	4
14	11.5	6	7.5	12	6	8
15	5.5	4.5	6	Piecemeal		
16	9.5	6	6.5	10	6	6
17	10	8	5.2	10.4	9	5.4
18	6	5	5	Piecemeal		
19	.4	3.7	4.9	4.8	4	4
20	Not assessed			Piecemeal		

Radiological Findings

Size: The size of mass could be measured on CT scan in 19 patients. In the 20th patient the size could not be measured due to indiscriminate spread in various directions, and gross irregularity of the margins (Table 2). L = Length (anlcro posterior dimension in cms) W = Width (lateral to medial dimension in cms) H - Height (superior to inferior dimension in cms)The extent of the tumour as shown on CT scan is depicted in the table3

Table 3: Correlation with the extent of mass

	APEX		BASE		MEDIAL WALL		ANTEROLATERAL WALL		POSTERIOR WALL	
No.	CT	Surgery	CT	Surgery	CT	Surgery	CT	Surgery	CT	Surgery
1.	C3	Lower border of mandible	Intracranial extention	Intracranial extention	Lateral pharyn. wall	Lateral pharyn. wall	Post wall of maxilla & mandible	Post wall of maxilla & mandible	Carotid vesseles	Carotid vesseles
2.	C3	Hyoid Bone	Skull base	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Mandibular ramus & parotid	Mandibular ramus & parotid	Prevertebral muscles	Prevertebral muscles
3.	C3	Base of tongue	Skull base	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Medial pterygoid & parotid	Medial pterygoid & parotid	Carotid vessels & styloid pr	Carotid vessels & styloid pr
4.	C4	Hyoid Bone	Skull base	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Mandible	Mandible	Prevertebral muscles	Prevertebral muscles
5.	C6	Post belly of digastric	C 1	Hard pallate	Lateral pharyn. wall	Lateral pharyn. wall	Mandible & carotid sheath	Mandible & carotid sheath	Prevertebral muscles	Prevertebral muscles
6.	C3	Post belly of digastric	C 1	Skull base	Lateral pharyn. wall (post part)	Lateral pharyn. wall (post part)	Medicle pterygoid mandible & parotid	Mandible& fat between Parotid and pharynx	Prevertebral muscles	Prevertebral muscles
7.	C3	Carotid bifurcation	Skull base	Skull base	Fixed to surrondigs	Fixed to surrondigs	Fixed to surrondigs	Fixed to surrondigs	Prevertebral muscles	Prevertebral muscles
8.	C4	Hyoid Bone	Widened Jugular foramen	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Styloid apparatus	Styloid apparatus	Prevertebral muscles	Prevertebral muscles
9.	C4	Hyoid Bone	Skull base	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Post wall of maxilla & mandible	Post wall of maxilla & mandible	Carotid sheath	Carotid sheath
10.	C6	Cricoid cartilage	C 2	2 cms below Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Carotid sheath	Carotid sheath	Prevertebral muscles	Prevertebral muscles
11.	C2	Cricoid cartilage	Skull base	Skull base	Lateral pharyn. wall	Lateral pharyn. wall	Mandible and Parotid	Mandible and Parotid	Carotid sheath and contents	Carotid sheath
12	C5	Carotid bifurcation	Widned jugular Foramen	Widened jugular Foramen	Lateral pharyn wall	Lateral pharyn wall	Mandible & Parotid	Mandible and parotid	Carotid sheath and contents	Carotid sheath
13	C4	Hyoid Bone	Skull Base	Skull Base	Lateral pharyn. wall	Lateral pharyn. wall	Manibular ramus & post wall of maxilla	Mandibular ramus & post wall of maxilla	Carotid sheath	Carotid sheath
14	C4	Hyoid Bone	Skull Base	Skull Base	Lateral pharyn. wall	Lateral pharyn. wall	Mandibular ramus & post wall of maxilla	Mandubular ramus & post. wall of maxilla	Prevertebral muscles	Prevertebral muscles
15.	C3	Post. belly of digastric	C 1	C1	Lateral pharyn. wall	Lateral pharyn. wall	Medial pterygoid	Medial pterygoid	Prevertebral muscles	Prevertebral muscles
16.	C3	Post. belly of digastric	C 1	C1	Lateral pharyn. wall	Lateral pharyn. wall	Medial pterygoid	Medial pterygoid	Carotid sheath	Carotid sheath
17.	C3	Hyoid Bone	Skull Base	Skull Base	Lateral pharyn.	Lateral pharyn.	Mandibular ramus & parotid	Mandibular ramus & parotid	Carotid sheath	Carotid sheath
18.	C3	Hyoid Bone	Skull Base	Skull Base	Lateral pharyn.	Lateral pharyn.	Mandibular ramus	Mandibular ramus & Medical pterygoid	Carotid sheath	Carotid sheath
19.	C4	Superior Cornu of thyroid	C 1	C 1	Lateral pharyn. wall	Lateral pharyn. wall	Mandibular ramus parotid and IJV	Mandibular ramus & IJV and parotid	Carotid sheath	Carotid sheath
20.	C4	Below hyoid bone	Intracranial extention	Intracranial extention	Lateral pharyn. wall	Lateral pharyn. wall	Mandibular ramus parotid and IJV	Mandibular ramus & IJV and parotid	Prevertebral muscles	Prevertebral muscles

Table 4 : Poststyloid Compartment (involvement of Cranial nerves) Correlation Between Preop. CT and Surgical Finding

No.	Glassopharyneal		Vagus		Accessory		Hypoglossal		Sympathetic Chain	
	CT	Surgical	CT	Surgical	CT	Surgical	CT	Surgical	CT	Surgical
1.	-	Normal	-	-	-	-	-	-	-	-
2.	-	-	-	-	-	-	-	-	-	-
3.	-	-	-	Post Displacement	-	-	-	-	-	-
4.	-	-	-	-	-	-	-	Ant. displacement	-	-
5.	-	-	-	-	-	-	-	Stretched over Tumour	-	-
6	-	-	Site of origin	Site of origin	-	-	-	Supreficial attachement	-	-
7	-	-	-	Site of origin	-	Superficial to tumor	-	Cross tumor	-	-
8.	-	-	-	Site of origin	-	-	-	-	-	-
9.	-	-	-	-	-	-	-	-	-	-
10.	-	-	-	-	-	-	-	Stretched over tumor	-	-
11.	-	-	-	-	-	-	-	-	-	-
12.	-	-	-	Superficial to tumor	-	-	-	Superficial to tumor	-	-
13	-	-	-	-	-	-	-	-	-	-
14.	-	-	-	-	-	-	-	-	-	-
15.	-	-	-	-	-	-	-	-	-	-
16.	-	Normal	-	-	-	Normal	-	Superficial to tumor	-	-
17.	-	-	-	-	-	-	-	Normal	-	-
18.	-	Normal	-	-	-	-	-	-	-	-
19.	-	-	Site of origin	Normal	-	Normal	-	Normal	-	-
20.	Probably Involved	Involved	Probably Involved	Involved	Probably Involved	Normal	Probably Involved	Involved	-	-

The tumours were presenting in the prestyloid compartment in 11 (55%) patients out of which 3 were also extending into the poststyloid compartment, whereas in 9 cases tumours were confined to only poststyloid compartment.

Extent

Great Vessels and Cranial Nerves

Internal carotid artery (ICA) was seen to be displaced posteriorly in 7 patients (35%), anteriorly in 3 patients (15%), posteromedially, laterally, medially and anterolaterally in 2 patients (10%) each (Fig. 1) and was normal in position in 1 patients (5%).

The position of Internal jugular vein (IJV) as shown on CT scan was posteriorly displaced in 6 patients (30%), laterally displaced in 4 patients (20%), anterolaterally, posterolaterally and posteromedially in 2 patients each (10%), anteriorly displaced in 1 patient (5%), normal in 1 patient (5%), compressed in 1patient (5%), and could not be identified on CT scan in 1 patient (5%). The effect on cranial nerves is shown in table 4.

The extension of the tumour beyond the PPS was seen in 8 patients (40%). Intracranial extension was seen in 3 patients (37.5%) (Fig. 2), into the neck in 3 patients (37.5%) (Fig. 4), out of

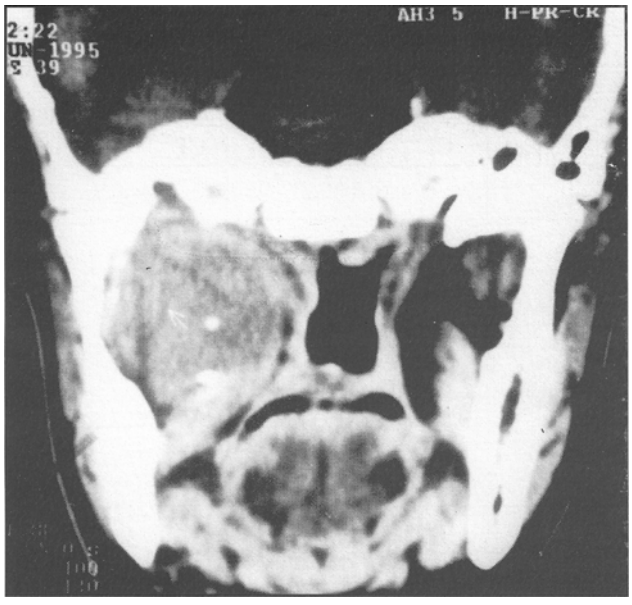

Fig 1: CECT neck showing parapharyngeal mass in postyloid compartment. ICA and IJV pushed posteriorly

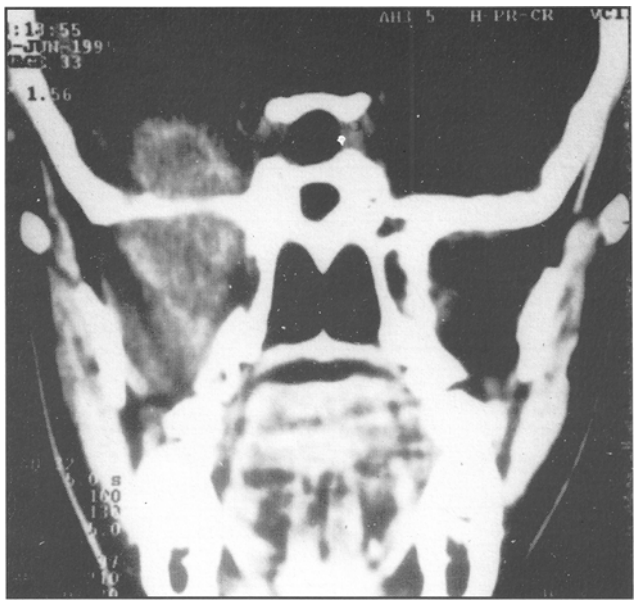

Fig 2: CECT showing parapharyngeal mass extending intracranially.

these one was also extending into middle ear. Lateral extension to superficial lobe of parotid was seen in 2 patients (25%) (Fig. 3), into middle ear and neck in one patient (5%).

Surgical Findings

Surgical excision of tumour was done in all the cases under GA. The mass was removed via transcervical approach in 15 patients (75%), via transparotid approach in 3 patients (15%), via transcervical with vertical extension along Sterno cieidomastoid in 1 patient (5%) and transcervical + transparotid + mandibulotomy in one patient (5%).The tumour was removed completely as a single block in 20 patients. All the three parameters i.e. the length, width and height was measured and compared with the preoperative CT findings.

Extent

Apex : The inferior extent of the mass was seen at the level of hyoid bone in 8 patients (40%), post belly of digastric in 3 patients (15%), carotid bifurcation in 2 patients (10%), upper and lower border of mandible in 1 patient each (5%), at the level of base of tongue in 1 patient (5%), thyroid gland isthmus in] patient (5%), cricoid cartilage in 1 patient (5%), superior cornu of thyroid in 1 patient (5%) and below the level of hyoid bone in 1 patient (5%).

Base : The superior extent of tumour was seen at skull base in II patients (55%), intracranial extension was seen in 4 patients (20%), out of these 1 was , also extending into middle ear. At the level of CI (first cervical vertebra) in 3 patients (15%), at the level of hard palate in 1 patient (5%), 2 cms below skull base in I patient (5%).

Medial wall : Lateral pharyngeal wall formed the boundary of medial extent in 19 patients (95%). In 1 patient the mass was fixed to the structures over lateral pharyngeal wall (5%).

Anterolateral wall: This limit was seen at posterior wall of maxilla and mandible in 4 patients (20%), ramus of the mandible and parotid in 4 patients (20%), medial pterygoid and mandible and the parotid in 2 patients (10%), ramus of mandible and medial plerygoid in 1 patient (5%), carotid sheath in 3 patients (15%), medial pterygoid in 2 patients, ramus of mandible, parotid and 1JV in 2 patients (10%), styloid process in 1 patient (5%), and fixed to surrounding structures in 1 patient (5%).

Posterior wall: Formed by prevertebral muscles in 11 patients (55%), carotid vessels in 7 patients (35%), carotid vessels and styloid process in 1 patient (5%) and carotid vessels and prevertebral muscles in 1 patient (5%).Mass was seen in poststyloid compartment in 10 patients. Out of which 3 were in both pre and poststyloid compartments. So sole prestyloid compartment mass was seen in 7 patients. The prestyloid compartment was seen compressed in 9 patients (45%). In one patient (case no. 11) CT showed the presence of hypodense lesion in prestyloid compartment but it was seen as compressed intraoperatively. Friable lesion was seen in 4 patients (20%) with fixity and bony erosion in 1 patient and without bony erosion in 2 patients. Firm well encapsulated mass was seen in 2 patients (10%), firm lesion with bony erosion in 1 patient (5%), highly vascular firm mass was seen in 1 patient (5%), and prestyloid compartment could not be seen in 1 patient (5%). The mass was solely present in poststyloid compartment in 10 patients (50%).

Great Vessels : The involvement of great vessels as seen intraoperativehy was as follows. The internal carotid artery was seen to be displaced posteriorly in 8 patients (40%), medially in 4 patients (20%), anterolaterally and laterally displaced in 2 patients (10%) each and posterolaterally displaced in 1 patient (5%), posteromedially displaced in 1 patient (5%), normal in patient in 1 patient (5%) and was engulfed,

with evidence of adeventitial involvement in 1 patient (5%). The

IJV was seen to be displaced posteriorly in 7 patients (35%), laterally in 5 patients (25%), posterolaterally in 2 patients (10%), anteriorly, anterolaterally and posteriorly displaced in 1 patient each (5%), normal in 1 patient (5%), was not seen in 1 patient (5%) and the mass extended intraluminally in 1 patient (5%).

Cranial Nerves : The involvement of cranial nerves was as follows. Glossopharyngeal nerve was seen to be normal in position in 3 patients (15%), vagus nerve was involved in 4 patients (20%), posteriorly displaced in 1 patient (5%), was superficial to tumour in 1 patient (5%), was normal in 1 patient (5%). Accessory nerve was seen superficial to tumour in 1 patient (5 %), and was normal in 3 patients (15%). Vagus seen superficial to tumour in 6 patients (30%), was anteriorly displaced in 1 patient (5%), normal in 1 patient (5%) was involved with tumour in 1 patient (5%).

Extension beyond Parapharyngeal Space: The extension beyond the PPS was seen in 8 patients (40%) intracranial extension was seen in 3 patients (37.5%), into the neck in 3 patients (37.5%), out of these one was also extending into middle ear. Lateral extension to superficial lobe ofparotid was seen in 2 patients (25%).**RESULTS** The size of the mass on CT scan as compared to the surgical findings 'correlated well with the surgical findings. The best correlation was found in the dimension of length (i.e. antero posterior dimension) and the least correlation to the width (Lateral to medial dimension) of the mass, as is evident from the Statistical analysis table (Table 5).

Table 5: Statistical Analysis

Variable between records	Tvalue	R	P
Sl-CSl-S	1.645	.9791	.01
S2-CS2-S	1.7149	.6343	.05
S3-CS3-S	1.826	.9564	.01

The sensitivity and specificity of CT scan in estimating the extent of mass with respect to various subdivisions of PPS was 95-100%. The sensitivity in relation to the apex of PPS was found to be 100%, specificity 0.00%, a positive predictive value of 75%, false positive rate of 25% and an accuracy of 75%. The sensitivity in relation to the base was found to be 100%, specificity 0.00%, a positive predictive value of 95%, a false positive rate of 5.00%, and an accuracy of 95%, The sensitivity in relation to medial wall was seen to be 100%, positive predictive value of 100% and an accuracy of 100.00%.

The sensitivity regarding the anterolateral wall was seen to be 100.00% specificity of 0.00%, a positive predictive value of 95.00%, a false positive rate of 5.00% and an accuracy of 95.00%. The sensitivity of CT scan in relation to posterior wall was 100.00%, positive predictive value of 100.00%, false positive rate of 0.00% and an accuracy of 100.00%.

The sensitivity of CT scan in the diagnosis of tumours of prestyloid compartment was seen to be 100.00%, specificity of 33.33%, positive predictive value of 89.47%, negative predictive value of 100%, false positive rate of 66.61%, false negative rate of 0% and an accuracy of 80.00%.

Sensitivity in assessing extension beyond parapharyngeal space was seen to be 100%, specificity 71.43%, A positive predictive value of 86.67%, A negative predictive value of 100.00%, A false positive rate of 13.33%, false negative rate of 0.00% and an accuracy of 90.00%.

In the poststyloid compartment, the sensitivity and specificity of CT scan in diagnosing the involvement of ICA and IJV was 100.00% and 0.00% respectively, further a positive predictive value of 80.00%, false positive rate of 20.00% and an accuracy of 80.00%.

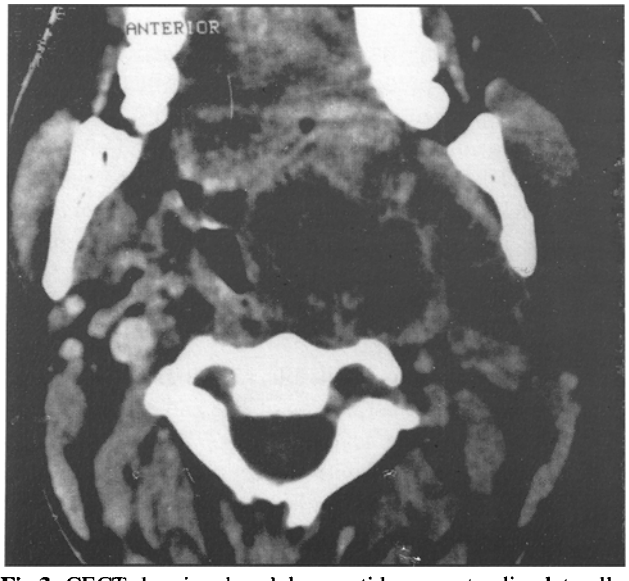

Fig 3: CECT showing deep lobe parotid mass extending laterally through th retromandibular area.

Fig 4: CECT showing parapharyngeal mass extending inferiorly into neck upto the level of thryroid cartilage.

Cranial nerves : Glossopharyngeal and Accessory: Sensitivity of 100.00%, specificity of 84.21%, positive predictive value of 25%, negative predictive value of 100%, false positive rate of 75% and an accuracy of 85%.

Vagus nerve: Sensitivity of 100%, 66.87% specificity, A positive predictive value of 25%, a negative predictive value of 100%, False positive rate = 75%, and an accuracy of 70%.

Hypoglossal nerve: A Sensitivity of 100%, specificity of 62.50%, positive predictive value of 33.33%, A negative predictive value of 90.91% A false positive rate of 66.67%, a false negative rate of 9.09%, Accuracy of 65.00%.

DISCUSSION

CT scan has been in use for the assessment of PPS mass lesion for over a decade. In the past, it had been used with contrast to obtain information about the vascular anatomy, particularly location of major blood vessels and to differentiate tumours of varying vascularity which can help predict their probable histological nature.

Sensitivity, specificity, positive predictive value, negative predictive value, false positive rate and false negative rate of each parameter on CT scan was compared with operative findings. In addition to sensitivity and specificity, the performance of screening test was measured by its predictive value which reflects the diagnostic power of the test and accuracy.

Previous studies showed that a preoperative diagnosis could be made with the help of CT scan in 88.96% of patients. Previous studies also showed that CT scan was helpful in knowing the size of the tumour preoperatively, but there is inadequate information regarding the size in all dimensions on CT scan. In our study we have found a good correlation of estimated size of tumour on CT scan to intraoperative findings.

The extent of the tumours in various sub compartments of parapharyngeal space has been shown by CT scan with a sensitivity of 100%. An accuracy of 75-100% was found. This shows that in all those cases where CT showed extension in various sub compartments were confirmed by surgery, but there were additional cases where CT had failed to show the extension, for example CT failed to show fixation to medial pterygoid in case no 18.

In the past attempt has been made to identify the position of tumours related to styloid process, i.e. whether it was present in pre or poststyloid compartment This could be ascertained in 96% of patients.[6] In our study attempt has been made to find the exact status of the prestyloid and poststyloid compartments. We found the sensitivity of CT scan regarding the cranial nerve status (9th, 10th, llth and 12th) to be 100%. This implies that all those cases where CT diagnosed the involvement of a particular nerve was confirmed on surgery but the positive predictive value ranged from 25-33%. Furukawa et al (1988)[7] studied the role of CT scan combined with ultras sound and MRI to differentiate preoperatively between schwannomas of vagus nerve and sympathetic chain. But there is no information regarding the status of other cranial nerves (9th, llth, 12th). In our study, we have tried to assess the usefulness of CT scan in defining the status of cranial nerves (9th, l0th/llth and 12th)

preoperatively. The positive predictive value of CT scan ranged from 25-33%. Extension beyond PPS had very good correlation with surgical findings in our study. CT diagnosed the spread outside the PPS with an accuracy of 90%.

Being a helpful investigation in diagnosing extent and size of parapharyngeal mass CT scan can guide the surgical approach for the tumour excision. Cranial nerve involvement, if preoperatively diagnosed can be of certain help in preparing the patient for possible antecedent complications and the available modalities of treatment can be explained to the patient preoperatively. Information regarding the displacement of 1CA and IJV can be helpful in preparing the surgeon and minimizing the risk of injury to these vessels. Rothstein et al in their study found that CT was not accurate in demonstrating malignant invasion of carotid artery. In their case study, CT demonstrated a loss of fascial planes between carotid aetery and metastatic masses in all 11 patients but only 1 had surgically demonstrable involvemnent of carotid artery. CT had a false positive rate of 94% in our study a false positive rate of 20% has been found.

Extension of tumour in various sub-compartments and outside the parapharyngeal space are important in deciding the most appropriate surgical approach for the complete excision of the mass with minimal morbidity.[9,10] It is conceivable that the risk of recurrence would would come down if the surgical extirpation of the tumour is enmasse and complete and to achieve the latter, the surgeon, having assessed the lesion preoperatively with the help of CT, would be better prepared . However, there is little hard data showing analysis of actual perfromance of CT scan in providing an estimate of size and extent of mass lesions in various compartment of PPS. The purpose of the present study was to bring into sharp focus the actual performance of CT as an investigative tool in preoperative assessment of the PPS mass lesion with respect to size, extent, the status of prestyloid compartment, the displacement of great vessels and involvement of lower cranial nerves (9t, 10th, 11th 12th) and sympathetic chain, and extension beyond PPS. In the illumination of present results, CT still holds promise as an important investigative modality in the preoperative diagnosis of parapharyngeal space mass lesions.

SUMMARY AND CONCLUSIONS

CT scan can be taken as a reliable radiological preoperative investigative tool for the estimation of size and extent of the PPS mass lesion with an accuracy of 75-100%. The status of great vessels can also be assessed with an accuracy of 80%. Extension beyond PPS can be diagnosed with an accuracy of 90%. CT scan is inadequate in diagnosing the preoperative status of cranial nerves. CT scan is likely to fail in detecting the invasion of adventitia of great vessels and the intraluminal extension of mass within the IJV.

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ANNOUNCEMENTS

Dr. Sood Nasal Research Foundation Announces

- **29th All India Rhinoplasty course *(An Advanced Course)* between 19th to 21st November 2006 at Moolchand Hospital & Lady Harding Medical College.**
- **18th National Endoscopic Sinus Surgery Course *(An Advanced Course)* between 16th to 18th December 2006 at Metro Hospital & Maulana Azad Medical College New Delhi.**

In each course there will be lectures, live surgery, cadavanic demonstration & hands on training,
Registration fee:

Course & cadavanic dissection	Rs. 4000.00
Observer	Rs. 3000.00
PG.	Rs. 1000.00

Includes course metarial, Lunches, Tea / Cofee and a dinner, Registration on first come first serve basis

For details contact: Dr. V. P. Sood, Dr. V.P. Sood ENT Centre, 212, Aditya Arcade, 30, Community Centre, Preet Vihar, Delhi-110092. Phone: +91-11-22440011, 52420429, Fax: +91-11-22440011 E-Mail: vpsood@drsoodnasalfoundation.com, Website: www.drsoodnasalfoundation.com

- **19th Annual Conference of All India Rhinology Society (RHINOCON - 2006)** at Taj Residency, on July 22nd & 23rd 2006, Hyderabad, A.P for details **contact. Dr. V. Ramakrishnaiah, Org. Secretary**- Govt. ENT Hospital, Koti, Hyderabad - 500095, Ph: 040-24742329, 24740245, Fax: 040-24743154, Cell: 09848136841, E-mail: aoiapstatebranch@yahoo.co.in