

A CLINICAL STUDY ON ENDOSCOPIC ASSISTED TRANSORAL EXCISION OF PARAPHARYNGEAL TUMORS

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ABSTRACT: INTRODUCTION: Parapharyngeal space tumors are rare, but are reported all over the world with an incidence of 0.5% of Head and Neck tumors. Parapharyngeal space is a potential space lateral to the upper part of pharynx extending from base of the skull to the Hyoid bone. It contains important and vital structures connecting the Head and thorax. The importance of the tumors of this space lies in the fact that its approach from outside (Trans cervical) is a surgical challenge and from within (Transoral) does not give a good vascular control. Improved visibility and monitored dissection is reported with the use of endoscopes to assist Transoral approach to parapharyngeal tumors excision is reported from all over the world. A retrospective study of sinus endoscopes assisted excision of parapharyngeal tumors was conducted at the Government Hospital attached to Kakatiya Medical College, Thiruvananthapuram, Telangana between August 2012 and July 2013. **MATERIALS AND METHODS:** 19 patients were operated for Para-pharyngeal tumors. All the tumors were benign in nature. They included 9 tumors of mixed salivary gland type, 6 were neurogenic, 2 were Schwannomas and 2 were lipomas. Operative notes and video films of the surgical procedure undertaken by different surgeons are the source of the present study. **OBSERVATIONS:** The diagnosis of all the tumors was based on HRCT of the neck. Pre-operative arteriogram was not undertaken in any of the patients. HRCT helped to determine the size and extent of the tumor and to differentiate tumors of parotid and extra-parotid origin and to demonstrate degree of tumor vascularity. Sensitivity to differentiate between benign and malignant tumors with HRCT was found to be 97%. The tumor resectability was judged by the presence of fat at the periphery of the tumor which gives low density marking. Sinus endoscope (Zero degree and thirty degree) was found to be useful to magnify, observe the cleavage of dissection behind the tumor mass intra-operatively. **CONCLUSIONS:** Sinus endoscope assisted dissection of parapharyngeal tumors of parapharyngeal tumors is superior to naked eye dissection, as it guides the surgeon to visualize the cleavage between the tumor and the normal tissue. It gives a haemostatic control over minor bleeding vessels. It gives a magnified recording facility.

KEYWORDS: Surgery, Parapharyngeal space, Transoral, Sinus endoscope, Pleomorphic adenoma, Parotid, Carotid body tumor.

INTRODUCTION: Parapharyngeal tumors are rare; they contribute to 0.5 of Head and Neck tumors. Surgical excision is a challenging task to the surgeon due to important structures in its close vicinity and the mortality after surgery.⁽¹⁾ Many surgical approaches are described and practiced all over the world. To name a few are Tran Oral, transcervical, transparotid, Trans Mandibular and combined approaches.^(2,3) The choice of surgeon depends upon the nature,

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location (Pre Styloid or post Styloid), vascularity, tumor's relation to great vessels and nerves and malignant change.⁽⁴⁾ Ehrlich in 1950 described the Trans oral approach for small, less vascular tumors. Transoral route gives poor exposure and vascular control.⁽⁵⁾ Mc Elroth presented a series of 112 patients in whom Transoral approach along with ligation of external carotid artery was used. In the present retrospective study Operative notes and videos of 19 patients are analyzed to highlight the endoscope assisted excision of parapharyngeal tumors.

MATERIALS AND METHODS: 19 patients attending the Department of ENT, Government Hospital attached to Government Medical College, Thiruvananthapuram underwent surgery for excision of Parapharyngeal tumors. They are studied retrospectively to know the methods of investigations undertaken for confirmation of their diagnosis and surgical details. Patients presenting with the complaints of mass in the Oropharynx, dysphagia, and regurgitation of fluids through nose and aspiration of fluids while swallowing were included in the study. The duration of symptoms was recorded. All the demographic data, like age, sex, occupation, and professional and socio economic status were recorded. Radiological investigation with HRCT was undertaken in all the patients using axial, coronal and sagittal views. MRI scan was done in patients with suspicious vascular nature of the PPS tumor. FNAC was done in all patients. Arteriography or Embolization procedures were not undertaken in any of the patients. Consent for the surgery and risk of developing post-operative neurological deficit was taken. One unit of compatible blood was reserved for all the surgeries and a compatible donor was also kept ready for bleed when necessary. All the patients were operated under General Anesthesia through Transoral route. Patient is kept in Tonsillectomy position with Davis Boyles mouth gag used to expose the oropharynx. Nasal Endoscope (Zero Degree and 30 Degree) was used to visualize the cleavage of inaccessible areas behind the tumor mass while dissecting and recording the dissection. Dissection was carried out with the help of the Tonsil dissector initially followed by pushing a Gauge bolster between the tumor and the normal tissue. This helped in minimizing the bleeding and expediting the dissection. Dissection was carried out with gloved finger where ever necessary. In all the patients the dissection was easy and the entire tumor could be removed except in one case where the tumor ruptured and had to be removed piece meal. Bleeding points were cauterized with bipolar cautery during the dissection. Once the tumor was removed the hemostasis was secured in the bed of the tumor with bipolar cautery. The wound was closed in layers. All the patients were fed with Ryle's tube during the postoperative period. FNAC cytology reports were correlated with HPE results.

OBSERVATIONS: Out of 19 patients, 12 patients were males and 7 were females. They were aged between 20 years to 65 years. The mean age was 46.3 years. 10 patients presented with the complaint of mass in the oropharynx, 7 patients complained of dysphagia and 3 patients complained of nasal regurgitation of fluids on swallowing. One patient complained of pain in the ear. One patient presented with swelling in the neck. The duration of symptoms were ranging between two to three years. 11 patients belonged to low socioeconomic status and the remaining 8 were from middle class. 8 patients presented with mass in the Oropharynx with pushing of tonsil medially (Fig. 1, 9, 10). Endoscope was used to view behind the tumor mass (Fig. 2). Axial

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view of HRCT scan in all the patients showed an area of radiolucency surrounding the mass indicative of compressed useful guide in 91% of the patients to decide the route of approach for excision of PPS tumors (Fig. 3, 8 and 11). In 12 patients MRI scan was undertaken due to suspected vascularity. In all these patients no enhancement was found. Fine needle aspiration was undertaken in all the patients and the report was conclusive in all the patients (100%) with the final Histopathological study. Procedures of Arteriography and Embolization were not undertaken as the mass lesions were not enhancing. In all the patients 0 and 30 degrees sinus endoscope connected to Storz 3 chip camera used during the entire surgery. This gave a clear picture of even small vessels (Fig 4). The size of the tumors varied from 4.5 Cms to 7.5 Cms in Diameter. There was no rupture of the tumors while dissection in all the patients (Fig. 6). The post-operative period was uneventful in all the patients (Fig. 7, 8, 9). One patient developed X, XII nerve palsy. This patient had to be kept on Ryle's tube feeding for more than 3 months. All the patients were followed for 2 years with no recurrence or complication.

DISCUSSION: Para-pharyngeal space is a facial space that extends from skull base to the hyoid bone, and forms the neurovascular passage to head. Tumors may arise from the individual components of the space or may invade from the surrounding structures. EPIDEMIOLOGY:⁽¹⁾ World literature suggests that Para Pharyngeal space lesion account for nearly 0.5% of all head & neck tumors.⁽⁶⁾ 80% of the tumors are benign in nature. Among these benign tumors pleomorphic adenoma is the commonest tumor pathology reported accounting to 50%.⁽⁷⁾ They present as enhancing hyperdense lesions Involving the Superficial and Deep Lobe of Parotid, like Pleomorphic Adenoma or arising de novo from salivary rest cells in the parapharyngeal space.⁽⁶⁾ Neurogenic tumors like Neurofibromas, Schwannomas and Paragangliomas are the second commonest tumors reported accounting to 30%. Other tumors of lesser incidence are Lipomas, Leiomyoma, Teratoma and Rhabdomyomas accounting to 20%.

Enhancing Hyperdense lesions like Carotid Body Tumor also occur in this space. Paragangliomas produce Intense Homogenous Enhancement of mass lesion on HRCT due to their vascular nature. The parapharyngeal space is a potential space lateral to upper pharynx with an inverted pyramid shape, extending from base of the skull to the greater cornua of the Hyoid Bone. The Para pharyngeal space is divided in three main compartments. They are Pre Styloid or antero-medial compartment, Post Styloid or Postero lateral, containing important structures like Carotid artery, Vagus nerve and sympathetic chain and retropharyngeal space, containing lymph nodes and loose areolar tissue. Deep lobe of parotid gland is closely related to the lateral boundary of this space and frequently its tumor may invade this space. The difference in the structure and consistency of tissues of the compartments helps in localizing the tumor with the help of HRCT or MRI.⁽⁸⁾

Commonest type of tumor in Para pharyngeal space is pleomorphic adenoma that may rise either from minor salivary gland or from deep lobe of parotid. Next common is the neurogenic tumor accounting for 27% to 30% of Para pharyngeal tumors. Neurofibromas present with disturbed nerve function unlike Schwannomas which do not produce nerve deficit. Para gangliomas are spindle shaped well capsulated, brownish tumors that may arise from the Vagus nerve, hypoglossal nerve and carotid body and occupies the space. Malignant tumors occurring in

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this space are Lymphomas; secondaries and other possible malignant lesions of the region. Paragangliomas consists of clusters of epithelial cells of Zellballen surrounded by highly vascular stroma. They secrete catecholamine. The tumor coverings may undergo malignant transformation in Schwannomas. Antoni type 'A' whorl like arrangement tumor cells and nuclei and Verrucae bodies are pathognomonic of Neurofibromas.⁽⁹⁾ Despite their varied pathology the symptoms produced are late and negligible in nature. Tumors of Parapharyngeal space are slow growing, presenting with mass in the Oropharynx pushing the tonsil, swelling in the neck or parotid region. Patients with Large tumors of parapharyngeal space present with muffled voice.

HRCT is useful in identifying the parapharyngeal tumors, but at times it is difficult to locate the small tumors. Displacement of the deep lobe of the parotid by the tumors in the prestyloid compartment is characteristically seen in HRCT. Tumors arising from the salivary glands are multifocal unlike the tumors of nerve origin, which is a useful guide in HRCT. Primary prestyloid Parapharyngeal tumors are minor salivary gland tumors, atypical type II first branchial cleft anomalies and lipomas. Secondary masses are usually spread of malignant disease from adjacent spaces or from visceral spaces. The commonest among these are deep extension of squamous cell carcinoma arising in tonsillar region. Such spread may become a contraindication to resect tonsillar carcinoma with wide local extension, through an intraoral approach. Metastatic Cervical Lymphadenopathy from Adjacent Nasopharyngeal Carcinomas can occur. Metastatic Cervical Lymphadenopathy from Adjacent Tonsillar Carcinoma can occur.⁽¹⁰⁾ Axial views of MRI would guide the surgeon to decide upon the approach to excise the tumor as clinical palpation is difficult to decide by ordinary methods. The role of MR Imaging in the diagnosis and preoperative assessment of Paraganglioma has been established. MRI allows evaluation of these lesions and adjacent soft tissue and vascular structures. Oslen et al described chronic appearance of Paraganglioma, that is, a salt pepper appearance in all lesions larger than 2 cm in diameter. A drop out sign has been described by Vogl et al for skull base Paraganglioma. This effect was seen after a large bolus of IV Contrast was infused, where by susceptibility effects from the contrast led to an abrupt drop off in signal intensity on gradient echo MRI 24-42 seconds after the bolus, independent of location, size, or classification of glomus tumor. With time susceptibility effect diminishes and increased signal intensity could be seen.⁽¹¹⁾ Malone et al described the excision by transcervical approach in 90 to 100% of cases.⁽¹²⁾ Hughes et al published series of 172 cases using transcervical and transparotid approach in 94% of the patients and Mandibular osteotomy approaches in 2% of the cases.⁽¹³⁾ In a similar study by Avil Kumar Jana fifteen patients with parapharyngeal tumors are surgically treated in ENT department of Calcutta National Medical College in last two years included; 80% of patients with benign tumors. The most common tumor was Schwannomas. Most important investigation was found to be CT scan.⁽¹⁴⁾ It was reported by Windfur JP that Parapharyngeal tumors prevail in the majority of cases originated from the salivary glands. CT scan and MRI remained the most useful diagnostic tool to select the choice of surgical approach with least mortality. MRI gives Soft-tissue resolution, multiplanar imaging, identification of the vascular structures and no exposition to ionizing radiation. Radiation Arteriography should be performed if indicated. Incision biopsy should be performed only in tumors which are inaccessible and unresectable.⁽¹⁵⁾ W. Jarrard, Goodwin Jr found in six patients with parapharyngeal tumors presenting intra orally over the past 16 years was managed by

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Transoral route. All patients had benign tumors of salivary gland origin (1 monomorphic and 5 pleomorphic). 3 out of 6 patients were asymptomatic. There were no surgical complications and blood loss was minor in all cases.⁽¹⁶⁾ Wei-liang Chen, You-yuan Wang et al in their study of evaluating the outcome of Endoscopic assisted Transoral resection of large benign tumors of the parapharyngeal space concluded that is a simple and safe technique that achieves excellent aesthetic and functional results.⁽¹⁷⁾ Wang X, Gong S et al in their comparison between long term effects of Endoscopic assisted Transoral excision of their parapharyngeal tumors and Other methods like trans cervical, trans parotid and trans Mandibular approaches, found that EATA (Endoscopic Assisted Transoral approach) was found to be significant statistically lower blood loss, hospitalized time and post-operative pain ($P < 0.05$). They also concluded that the PPS could be removed completely with preservation of facial cosmetic.⁽¹⁸⁾ Iseri M, Ozturk M et al in their study of endoscopic assisted excision of four cases of parapharyngeal tumors concluded that the technique provided less operative trauma, a more comfortable postoperative period, and, most importantly, increased operative exposure.

CONCLUSIONS: Retrospective study of operative procedures in the present study and Follow-up examinations revealed that in most patients the tumor was discovered on routine physical examination. If benign tumors are removed from the Para-pharyngeal space in a deliberately planned manner, recurrence rates are extremely low. Endoscopic assistance in Transoral route gives better visualization of areas behind the tumor and good vascular control of minor vessels. Arteriography though a valuable and safe diagnostic study was not necessary in these patients as these were non- enhancing in nature. Postoperative cranial nerve palsies occurred for the most part in those patients who underwent surgical excision of Schwannomas. Most benign Parapharyngeal space tumors can be surgically removed with a low rate of complications and recurrence. Fine needle aspiration cytology is helpful in evaluation. HRCT and MRI give the details of tumor which is not possible with simple clinical palpation to give direction to the surgeon about the approach for resection.

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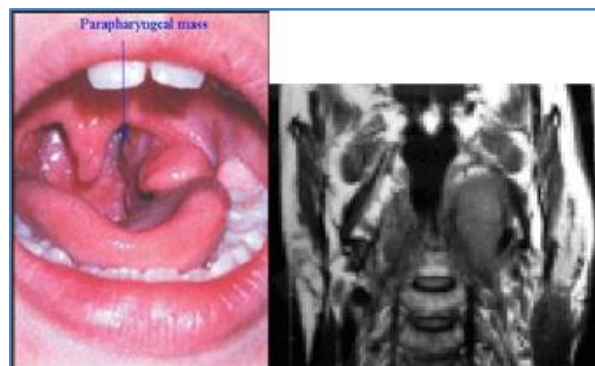


Fig. 1: Showing the pre-operative picture and its CT scan of Parapharyngeal tumor (Tumor pushing the left Tonsil)

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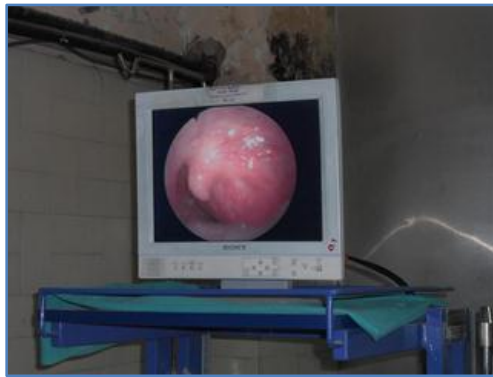


Fig. 2: Showing the endoscopic view of the Parapharyngeal Tumor pushing the tonsil

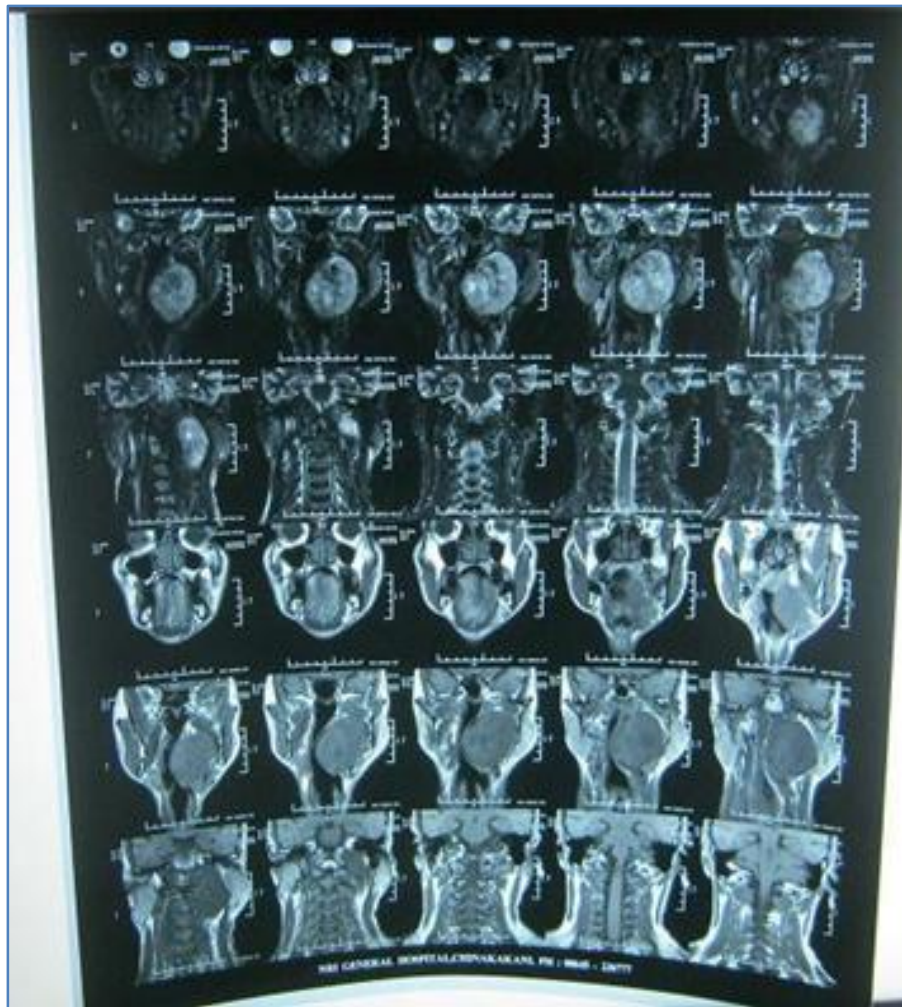


Fig. 3: Showing the C T Scan of the patient with the mass pushing the tonsil medially



Fig. 4: Showing the endoscopic view of the dissection with minor vessels coursing across the posterior aspect of the tumor (Endoscopic assisted Transoral approach)

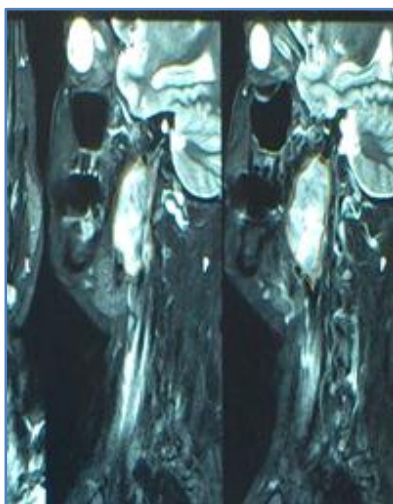


Fig. 5: Showing CT scan Neck (Sagittal view) The Lower Extent of the tumor

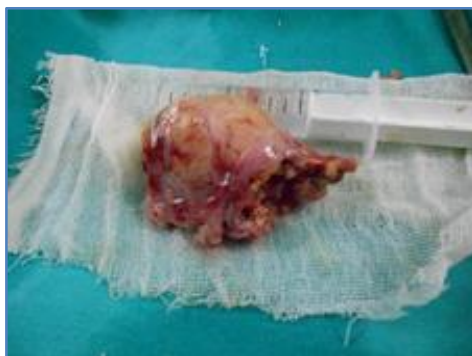


Fig. 6: Showing Excised Specimen of Neurofibroma of Parapharyngeal space



Fig. 7: Showing Post operative picture of Parapharyngeal tumor excision

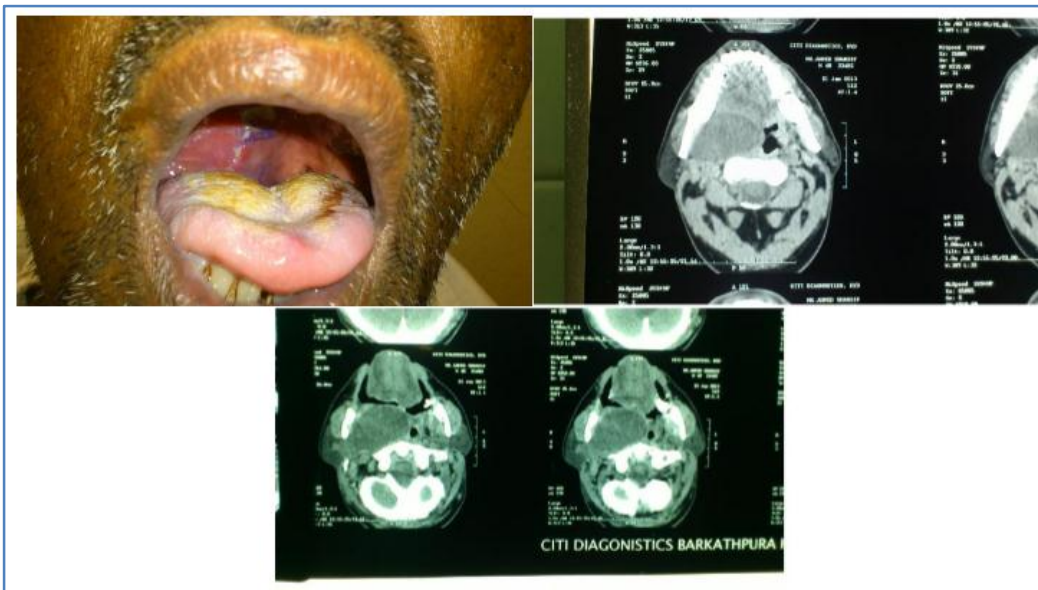


Fig. 8: Showing the C T Scan picture and the Post-operative picture of Parapharyngeal tumor



Fig. 9: Showing the post-operative picture of a patient with Parapharyngeal tumor

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Fig. 10: Showing the Parapharyngeal tumor

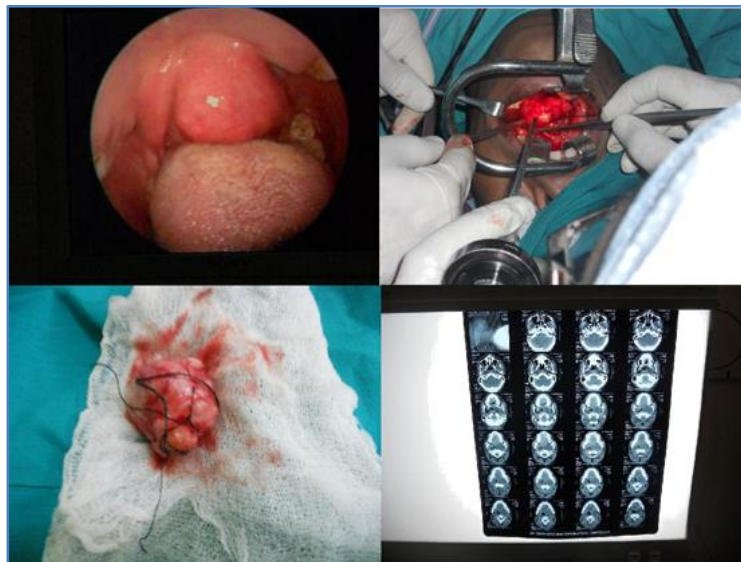


Fig. 11: Showing the parapharyngeal tumor: Pre-operative picture; during surgery and CT Scan picture

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