Section: ENT

Original Research Article

A STUDY ON BENIGN TUMORS OF PAROTID

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Received : 03/02/2025
Received in revised form : 22/03/2025
Accepted : 08/04/2025

Keywords:
Salivary glands, Parotid, Benign tumours, Superficial Parotidectomy, Partial superficial Parotidectomy.

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DOI: 10.47009/jamp.2025.7.2.147

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (2); 726-735

Abstract

Background: Salivary gland tumors were divided into more than 30 histological sub-types. 70% of Salivary gland tumors are in Parotid gland and 75% of parotid gland tumors are benign, 85% among them are pleomorphic adenomas. Their evaluation and treatment require a thorough knowledge of the relevant anatomy and pathology. An understanding of the anatomy and physiology of the parotid gland leads to a surgical treatment with less complications. Most benign parotid tumors present as slowly enlarging, painless, un-explained persistent lump are taken to an accurate diagnosis and successful surgical treatment. Pleomorphic adenoma was the predominant histopathological type observed in these cases. Most benign parotid neoplasm, their origin and pathological classification remains subjects for speculation and is complicated by its intimate relationship with facial nerve causing threat of disfiguring and paralysis. Accurate per-operative diagnosis by evaluation of a parotid mass by FNAC and imaging studies (Ultrasonography (USG), Computed Tomography (CT)) is critical for surgical planning and appropriate management in adequate tumor removal and preventing complications. Despite the myriad of histologies, surgical excision via parotidectomy is the most common treatment. Parotidectomy for benign tumors is undergoing constant evaluation, the potential for recurrence and malignant trans-formation of pleomorphic adenomas creates complexities that have forced head and neck surgeons to undertake more comprehensive parotid surgery with facial nerve dissection. Superficial parotidectomy is the most common procedure done for benign parotid pathology. Superficial parotidectomy also known as partial parotidectomy is especially useful for lesions in the lower pole of the gland. This involves not dissecting the upper division of the nerve with consequently, minimal of trauma to the facial nerve. Extracapsular dissection (ECD) may be considered an alternative surgical modality for select benign parotid neoplasms. **Materials and Methods:** This study is a prospective observational study carried out in the department of otorhinolaryngology, Osmania medical college and hospital, Hyderabad, Telangana over a period of two years in all patients with history and symptoms suggestive of deep neck space infections. A sample size of 94 patients with history, symptoms suggestive of deep neck space infections were included in the study. Patients with neoplasms of oral, nasal and Pharynx were excluded from the study. Data was collected including detailed history, local and systemic examination, Laboratory, Microbiology, Radiological Investigations, Management etc Data was analysed and expressed in percentages and fractions. **Result:** This study is a prospective observational study of management of benign parotid tumours done in the period of 2years. Female to male ratio was found to be 1.77:1. Most of the patients in the series were in the age group 41-60. The mean age was 38.4 years. Right parotid: Left parotid was 3:2. Superficial Parotidectomy (SP) was the most common surgery performed (44%) and second most common surgery performed was Partial superficial Parotidectomy (PSP) (40%). Pleomorphic adenoma was the most common tumour encountered in the study (88%). Temporary Facial nerve palsy was observed in 2 patients (8%) and no permanent facial nerve palsy was found. Two patients (8%) with Hematoma, 1 patient (4%) with wound infection and 1 with ear numbness (4%) was found. **Conclusion:** Benign Parotid gland tumors are very rare and are less frequently encountered in clinical practice. Any patient presenting with a swelling in the region of parotid region should be suspected of parotid neoplasm. Most of the salivary gland tumors arise in the parotid gland. Most of them are benign and most of the benign tumors are pleomorphic

ISSN (O): 2687-5365; ISSN (P): 2753-6556

adenoma. FNAC is a good tool in diagnosing benign parotid gland tumours. Surgery is the main stay of treatment of benign parotid tumors and superficial parotidectomy is the most commonly performed surgery. Total parotidectomy is needed for benign tumors with deep lobe involvement. Early detection and treatment is very essential to prevent disease morbidity and mortality.

INTRODUCTION

The Salivary glands are located around the mouth. They produce saliva, which moistens food to help chewing and swallowing. There are three pairs of major Salivary glands. The largest are the Parotid glands, are located in each cheek over the jaw in front of the ears. The parotid gland is the most common site for salivary gland tumors.[1] The majority of tumors arises in the superficial lobe and present as slowly growing masses below the ear, in front of the ear or sometimes in the upper aspect of the neck.[2] Less commonly, they arise from accessory parotid tissue and then present as swellings in the cheek. Rarely tumors arise from the deep lobe and then present as para pharyngeal masses with a diffuse bulge in the soft palate and tonsillar region.[3] Salivary gland tumors are rare accounting for 2 to 4% of head and neck cancers. According to the histological classification of World Health Organisation in 1991, Salivary gland tumors were divided into more than 30 histological sub-types.[4] 70% of Salivary gland tumors are in Parotid gland and 75% of parotid gland tumors are benign, 85% among them are pleomorphic adenomas.[5] Their evaluation and treatment require a thorough knowledge of the relevant anatomy and pathology. An understanding of the anatomy and physiology of the parotid gland leads to a surgical treatment with less complications.[6] Most benign parotid tumors present as slowly enlarging, painless, un-explained persistent lump are taken to an accurate diagnosis and successful surgical treatment. Pleomorphic adenoma was the predominant histopathological type observed in these cases.[7] Most benign parotid neoplasm, their origin and pathological classification remains subjects for speculation and is complicated by its intimate relationship with facial nerve causing threat of disfiguring and paralysis.[8] The primary duty of the surgeon is to identify and preserve the facial nerve trunk and its branches to prevent postoperative facial palsy. Accurate per-operative diagnosis by evaluation of a parotid mass by FNAC and imaging studies (Ultrasonography (USG), Computed Tomography (CT)) is critical for surgical planning and appropriate management in adequate tumor removal and preventing complications.[9] Despite the myriad of histologies, surgical excision via parotidectomy is the most common treatment. Parotidectomy for benign tumors is undergoing constant evaluation, the potential for recurrence and malignant trans-formation of pleomorphic adenomas creates complexities that have forced head and neck surgeons to undertake more comprehensive parotid surgery with facial nerve dis-section. This systematic approach carries inherent morbidities, including facial nerve injury, Frey syndrome and recurrence. Surgery of the parotid gland is challenging because the VII cranial nerve, which emerges at the stylomastoid foramen, enters the gland and branches out inside the parotid, defining the superficial and the deep lobe, and must always be identified and dissected when performing parotidectomy.[10] Even in the presence of normal anatomy and normal surrounding parotid tissue, dissection of the branches of the facial nerve requires patience and special attention both to detail and to landmarks.[11] Always seek and dissect the facial nerve under magnification. When the course of a nerve is distorted and attenuated by a tumour, preservation of facial nerve fibres can be very difficult. Experience shows that most of the primary salivary tumors of the parotid are found directly adjacent to at least one branch of the facial nerve, and rarely, if ever, will the surgeon feel that dissection of the nerve has been useless; also for these reasons and it is believed that the most conservative operation should be superficial parotidectomy, also in the case of a clearly benign mass.[12] Superficial parotidectomy is the most common procedure done for benign parotid pathology. Superficial parotidectomy also known as partial parotidectomy is especially useful for lesions in the lower pole of the gland. This involves not dissecting the upper division of the nerve with consequently, minimal of trauma to the facial nerve. Extracapsular dissection (ECD) may be considered an alternative surgical modality for select benign parotid neoplasms. Furthermore, in the event of recurrence, the risk to the facial nerve increases exponentially, particularly in the relatively frequent event of a multi-nodular relapse of a pleomorphic adenoma. Enucleation alone is, therefore, inadequate for tumors of the parotid gland, on account both of the increased risk of facial nerve lesions and the increased risk of recurrence. Some Authors believe that the only exception to this rule could be Warthin's tumors especially when presenting posterior to the facial nerve, In the present report, data are described emerging from a prospective study of personal experience in this setting, evaluating the pathological, prognostic and surgical parameters (including complications) of a consecutive series of 25 patients who underwent parotidectomy in the Institution between 2015 and 2017 years.

Aims and Objectives of the Study

The aims and objectives of this study are

- To determine the incidence and risk factors in population, gender and age predilection.
- to diagnose the type and site of tumor (superficial / deep).
- To analyse clinical presentations, diagnostic methods (FNAC, U/S, CT scan), surgical

ISSN (O): 2687-5365; ISSN (P): 2753-6556

treatment modalities and complications of patients operated for a benign tumour of parotid gland and analysed by histopathological examination to confirm the tumor.

- To asses prognosis and
- To asses incidence of facial nerve palsy, recurrence, risk of malignancy etc.

MATERIALS AND METHODS

This is a clinic histopathological study of benign tumors of parotid and its surgical ent by parotidectomy and to evaluate these procedures that is extracapsular partial superficial parotidectomy. superficial parotidectomy. and complete parotidectomy and to study their effects and cause of failure and nature of complications. It is a prospective observational study conducted at Dept of ENT at Govt E.N.T Hospital Osmania Medical College for 2 years. Clinicopathologic data of parotid tumors were reviewed including age, sex, symptoms, duration of symptoms, results of histopathologic tumor examination. Surgical procedures and complications.

All patients had FNAC, ultrasonography, computed tomography (CT) scans performed before the operation to assess the extent of the lesion and help in planning treatment The type of surgery performed depended on the per-operative diagnosis based on FNAC and radiological scans as well as the clinical presentation of the parotid tumor. Partial superficial parotidectomy was performed if a tumor located in the parotid tail. Superficial parotidectomy was performed if a tumor was located in the superficial lobe, and deep lobe parotidectomy was performed if it was in the deep lobe. Tumor enucleation was performed which is less invasive and the tumor is removed carefully without exposing the facial nerve. Drainage was performed and maintained by aspiration. All cases of benign parotid tumors were confirmed histopathologically. The complication of postoperative facial palsy was evaluated by the House Brackmann grade. The study group consisted of 25 patients, aged between 18 to 68 years with the average age of 38.4 years. Among them 16 were females and 9 males.

House Brackmann Scale

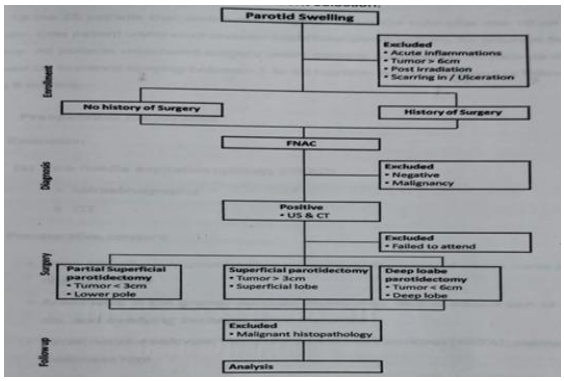
Grade	Appearance	Forehead	Eye	Mouth
I	Normal	Normal	Normal	Normal
II	Slight weakness normal resting tone	Moderate to good movement	Complete closure minimal effort	Slight asymmetry
III	Non disfiguring weakness normal resting tone	Slight to moderate movement	Complete closure maximal effort	Slight weakness maximum effort
IV	Disfiguring weakness normal resting tone	None	Incomplete closure	Asymmetry with maximal effort
V	Minimal movement asymmetric resting tone	None	Incomplete closure	Slight movement
VI	Asymmetric	None	None	None

Inclusion Criteria

The criteria for selection for the study group included patients with well defined. slow growing, painless pre-auricular mass. Included patients with benign tumors of the superficial and deep lobe of the parotid gland.

Exclusion Criteria

Included malignant and suspicious tumors proved by the fine needle aspiration cytology (FNAC), facial nerve palsy, tumors larger than six centimetre in diameter, and scarring in or irradiation to the parotid area. For detailed exclusion criteria refer to the algorithm given below.



Methods: This study is a prospective observational study carried out in the department of otorhinolaryngology, Osmania medical college and hospital, Hyderabad, Telangana over a period of two years in all patients with history and symptoms suggestive of deep neck space infections. A sample size of 94 patients with history, symptoms suggestive of deep neck space infections were included in the study. Patients with neoplasms of oral, nasal and Pharynx were excluded from the study. Data was collected including detailed history, local and systemic examination, Laboratory, Microbiology, Radiological Investigations, Management etc Data was analysed and expressed in percentages and fractions

RESULTS

This study is a prospective observational study of management of benign parotid tumours done in the period of 2years at department of ENT, Government ENT hospital, Osmania medical college, in which 25 patients were taken up for study.

Sex Incidence: In the study, 16(64%) patients were female and 9(16%) were males. Female to male ratio was found to be 1.77:1

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 1: Sex distribution.

Gender N %	
Male	16 64
Female 9 36	
Total 25 100	

Age Incidence: The age incidence of the patients in the study group ranged from 18-68 years. Most of the patients in the series were in the age group 41-60. The mean age was 38.4 years.

Table 2: Age distribution

Age (years)	N	%
0-20	3	12
21-40	8	32
41-60	13	52
>60	1	4
Total	25	100

Side (Right/Left) 0f surgery in this study, 15(60%) patients were having tumour on right side and 10(40%) patients were having tumour on left side. Right to Left ratio was found to be 3:2

Table 3: Location of the Tumour

Location of the tumour N %
Right 15 60
Left 10 40
Total 25 100

Evaluation of symptoms in benign parotid tumours All patients were with complaints of painless, mobile, palpable, firm solitary pre-auricular mass.
Duration of symptoms in this study 24(96%) patients had symptoms of duration 0.1-5 years. One patient (4%) had symptoms for more than 5 years duration.

Table 4: Duration of symptoms

Duration in years Number of patients
0-0.5 5
0.5-1 7
1-2 8
2-3 3
3-5 1
5-8 1

Clinical findings (signs) Skin fixity was found only in 1 patient (4%). Deep lobe involvement was found in 3 patients (!2%) and no patient was diagnosed with facial nerve involvement. 21 patients (84%) were found with superficial lobe involvement.

Table 5: Signs of parotid gland tumours

Signs No. of patients %
Deep lobe involvement 3 12
Facial nerve involvement 0 0
Superficial lobe involvement 21 84
Recurrent superficial lobe 1 4 involvement with skin fixity

Investigations All patients in the study group were subject to investigations specific and non-specific prior to undergoing surgery.
Efficacy of FNAC in diagnosing benign parotid tumours In FNAC exact histological correlation was found in 84% of all cases. Four (16%) report was given as parotid cyst. HPE turned out to be Pleomorphic adenoma.

Table 6: Frequency of cases diagnosed in FNAC

FNAC +ve Number % FNAC -ve Number %
21 84 4 16

Anaesthesia for Parotidectomy All cases were operated under general anaesthesia
Type of surgery Superficial Parotidectomy (SP) was the most common surgery performed (44%) and second most common surgery performed was Partial superficial Parotidectomy (PSP) (40%). Selective deep lobe Parotidectomy (SDP), Total Parotidectomy (TP), Enucleation (E).

Table 7: Types of Surgical treatment adopted in the study

Procedure Number of Patients %
PSP 10 40
SP 11 44
SDP 3 12
TP 0 0
E 1 4

Histopathological types Pleomorphic adenoma was the most common tumour encountered in the study (88%). 4% of patients had retention cyst and 4% with Keratin cyst and 4% with Lymphadenoma.

Table 8: Histopathological types of benign Parotid tumours

Tumour Number of patients %
Pleomorphic adenoma 22 88
Retention cyst 1 4
Warthin's tumour 0 0
Basal cell adenoma 0 0
Keratin cyst 1 4
Lymphadenoma 1 4

Postoperative All patients were followed up post operatively for assessment of symptomatic control and evaluation of any postoperative complications.
Complications of Surgery Temporary Facial nerve palsy was observed in 2 patients (8%) and no permanent facial nerve palsy was found. Two patients (8%) with Hematoma, 1 patient (4%) with wound infection and 1 with ear numbness (4%) was found.

Table 9: Complications of Surgery

Complications Number of Patients %
Temporary facial nerve palsy 2 8
Permanent facial nerve palsy 0 0
Hematoma 2 8
Wound infection 1 4
Fistula 0 0
Frey's syndrome 0 0
Recurrence 0 0

Follow up All patients were followed up, the follow up period ranging between 1-12 months (mean: 6 months).

DISCUSSION

A prospective study of management of benign parotid tumours were done in the period of 2 years at Govt.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

E.N.T. Hospital, Osmania Medical pen college. For this study 25 cases were evaluated.

Incidence: Approximately 2500 new cases of salivary gland neoplasms are diagnosed each year. -Neoplasms of salivary glands accounts 3% of head and neck cancers. — Benign salivary gland neoplasms are relatively common and can manifests in both the major and minor salivary glands in the sites of head and neck region. -Approximately 80% of salivary gland tumours occurs in parotid gland. Of parotid masses, 75% are neoplastic; the remaining 25% are nonneoplastic infiltrative processes, such as cysts and inflammation. -Of parotid neoplasms, 70-80% are benign.[13] Except for Warthin tumours, benign tumours of the parotid gland are more likely to occur in women than in men. -The median age for occurrence of these tumours is in the fifth decade of life. Parotid tumors occur most commonly in Caucasians. -The most common benign parotid tumour in children is the mixed tumor. -In our study the female to male sex ratio incidence was 64% and 36% respectively noticed. In other studies,[14] the female to male ratio for benign parotid tumours are equal. Some other studies show slight female predominance. -Most of benign parotid tumours were found in 41 to 50 year age group and mean age - 43 years,[14] whereas in our study age incidence of the patient ranged from 18-68 years, 52% of patients were in age group of 41 to 60 years (mean age - 38.4 years), 32% of patients were in the age group of 21 40 Years (mean age - 32 years) which is comparable with reference study. No sing le feature or group of features leads to a clinical diagnosis of a specific tumour type. Parotid tumours occur at any age. The peak incidence being in third. fourth and fifth decades.

Aetiology: Radiation Several studies implicate radiation as an etiological factor

• Dose-response pattern
• Mostly parotid
• Commonly mucoepidermoid carcinoma

-Epstein-Barr virus

* The consistent association of EBV with lymphoepithelial carcinoma of the salivary gland suggest the virus probable plays casual role
* Similar pathogenesis of nasopharyngeal carcinoma
* No evidence of a casual role of EBV in other primary tumours of the salivary gland.

- Genetic factors Many genetic alternation may be responsible for increased likelihood of developing salivary gland neoplasm as

• Allelic loss
• Structural rearrangement
• Monosomy and polysomy

- Other factors

*Silica dust or wood dust
*Using Kerosene as cooking fuel
*wathin's tumour is strongly associated with cigarette smoking.

-Etiological factors for benign parotid tumours are not well understood, but the possibility of adenoma gene for the development of pleomorphic adenoma which is under investigation.[15] Exposure to ionizing radiation and smoking are high risk factors in the development of Warthin's tumour.[16,17]

Pathogenesis- Multi-cellular theory Salivary gland tumour arise from the adult differentiated counter part of salivary gland unit:

*Acinar cell: acinous tumour
*Striated duct cell: oncocytic tumour Intercalated duct cell: mixed tumour Excretory duct cells: mucoepidermoid carcinoma & squamous cell carcinoma - Bicellular theory
*The basal cell of excretory and intercalated duct act as stem cells
*Intercalated duct stem cell: acinous cell carcinoma, adenoid cystic carcinoma. mixed tumour and oncocytic tumours
*Excretory duct stem cell: squamous cell carcinoma and mucoepidermoid carcinoma Diagnosis - History and Physical examination
*A clear understanding of the clinical presentation and natural history of benign parotid tumours is essential for their proper management. Approximately 88% of all benign parotid tumours are classified as benign mixed tumours or pleomorphic adenomas as was seen in our series, The term benign mixed tumour was first proposed by Minssen in 1874 to de-scribe- the two components of the tumour, mesenchymal and epithelial. A mass in the pre-auricular or infra-auricular area should he regarded as neoplasm until proved otherwise.
*A thorough history and physical examination are important in the workup of parotid masses. The major goal in the evaluation is to determine or exclude the diagnosis of malignancy. History often is the most useful tool in distinguishing inflammatory from neoplastic masses. Characteristics of inflammatory conditions are sudden onset, pain, and systemic infection.
*The most common presentation is that of asymptomatic mass (81%) noted incidentally, all our patients with parotid tumours presented with swelling in the lateral region of the face, only two of our patients (8%) exhibited symptoms of pain in the swelling which is in accordance with the other published reports.[18] The presence or absence of pain does not distinguish benign from malignant lesions.
* The absence of preoperative facial nerve palsies in our patients strengthens the value of this symptom as an indication of advanced malignancy and also shows the considerable mechanical tolerance of the facial nerve to elongation. Facial nerve paralysis is more commonly due to malignancy in the presence of a parotid mass, but most facial nerve paralysis is due to Bell palsy.
* Parotid masses occur most commonly in the lower pole, or tail, and in the superficial lobe of the gland. Physical examination most often reveals a mobile nontender mass that is firm and solitary.
* In our study 96% (24 cases), all the patients are presented with pain-less, mobile, pre-auricular mass with the duration of 0.1 to 5 years except one patient

ISSN (O): 2687-5365; ISSN (P): 2753-6556

(4%) out of 25 cases given history of more than 5 years

* one patient had given history of recurrent mass in pre-auricular region who underwent surgery in the past, 7 years back.

* In out study 84% (21 cases), the tumours were found in superficial lobe, in three cases (16%) the tumours were found in deep lobe. There is no facial palsy in our study. On clinical examination in one case there was skin fixity with superficial lobe Involvement diagnosed as recurrent benign tumour as is commonly seen in malignant cases.

* Our results are comparable with F. BUSSU, C. PARRILLA studies19 - Oral cavity examination

*Evaluate the possibility of a deep tumour by irritants) examination with attention directed to the tonsillar fossa and soft palate. Inspect the Stensen duct for the character of the salivary flow (clarity, consistency, purulence) and notation of redness, bulging, and irritation of the ductal orifice as part of physical examination. Evaluate the skin, oral cavity, oropharynx, and neck for possible primary lesions or nodal disease - Facial nerve examination

* Facial movement

• Temporal branches Wrinkle forehead Elevate eyebrow

• Zygomatic branches Close the eyes

• Mandibular branches Show teeth Blow cheek Cervical grimacing to whistle. -Locating the Facial Nerve

*It is useful lo know preoperatively whether a parotid tumour is situated deep or superficial to the facial nerve, this facilitates surgical planning and facilitates preoperative consent relating to the likelihood of a temporary postoperative facial nerve weakness - Laboratory studios • Haematological and serological trod am of little importance in diagnosis of benign parotid tumours, - Correlation between preoperative predictions and surgical findings in the parotid surgery for benign tumors

*The main investigations required for diagnosing benign parotid tumors are U/S, FNAC, CT Scan and MRI. In this study U/S, FNAC and CT scan were done in all cases.

* Fine Needle Aspiration Cytology (FNAC) Fine needle aspiration cytology is a widely practiced technique in the diagnosis of parotid lump. Fine needle aspiration cytology (FNAC) is a simple, quick, inexpensive and minimally invasive technique used to diagnose different types of masses. They are easily accessible by FNAC, also cytology can provide a distinction between parotid and non-parotid lesion, benign and malignant lesions, and specific and nonspecific inflammation. 25 patients were studied prospectively over 2 years. FNAC was done using 10 cc syringes and 20-22 G. needle and stained with papanicular stain, Histopathology was assessed on routine H & E (haematoxylin and eosin) stained paraffin sections. Fine-needle aspiration cytology is useful in the preoperative assessment of parotid tumours as it is more reliable than clinical examination to diagnose malignant parotid tumours. FNA Cytology is useful in avoiding surgery (inflammatory lesions) or limiting surgical procedures (benign tumours).

• Its overall accuracy is >96% with a sensitivity for BPT - 88 to 98% and specificity of 94%.

*The correlation of FNAC and histological diagnosis is significant by doing the preoperative cytological diagnosis, the clinician can start the initial treatment and plan the mode of treatment. Also, it can prevent excess morbidity associated with over treatment.

• Post operatively 25 cases were confirmed by histopathological ex-amination.

• In FNAC, exact histological correlation was found in 84% of all cases. Most of the benign tumour are pleomorphic adenoma (88%). 4 FNAC (16%) were reported as cystic lesion but histopathologically report turned out to be pleomorphic adenoma. In one case, FNAC re-ported as lymphadenitis and histopathological report came as lymphadenoma.

• The standard biopsy approach is a superficial parotidectomy with preservation of the facial nerve. For 80-90% of parotid neoplasms, this procedure is both diagnostic and therapeutic. For this rea-son, preoperative fine-needle aspiration biopsy is recommended,[20,21] since it can change the clinical approach in up to 35% of patients. Lymph nodes can be enucleated, as can Warthin tumours, and sialadenitis does not require surgical intervention in most cases. - Imaging modalities Radiologic studies are involved minimally in the workup of an asymptomatic mass.

* Plain radiography findings can help the clinician exclude calculi. They were used to determine salivary gland abnormalities before the development of more sophisticated imaging techniques. It is the least sensitive of all the imaging modalities. It is least expensive and readily avail-able. It will readily demonstrate calculi. It also helps in differentiating bony / cartilaginous lesions that may mimic salivary gland pathology.

*Ultrasonography U/S is the first-choice image technique required in salivary gland tumours. This method is inexpensive. fast, easy to perform. free of complications and no radiation exposure. It allows simultaneous evaluation of other glands and lymph nodes in the neck. It improves the accuracy of FNAC. Patients with benign parotid lesions for whom surgery was planned were examined using ultrasound. Ultrasound is the traditional and most frequently used imaging method in patients with benign parotid masses. Sometimes it is the only imaging method employed before surgery. The US-guided FNAC is considered the golden standard in preoperative diagnosis despite its widely recognised limitation. All the patients were examined in supine position by only experienced head and neck radiologist with a 4 - 15 MHz compact linear array transducer. The recorded conventional US features of lesions were as follows: size in three mutually perpendicular dimension, margin quality (clearly delineated or blurred), shape (lobular or not), homogeneous echogenicity (yes / no) presence of

ISSN (O): 2687-5365; ISSN (P): 2753-6556

microcalcifications (yes / no) and cystic areas (yes / no), bilaterality (bilateral / unilateral), distal acoustic enhancement (yes / no), acoustic shadow (yes / no). The parotid gland is located in the retromandibular fossa, anterior to the ear and sternocleidomastoid muscle. The border between the superficial and deep parotid lobes is created by a plane in which the facial nerve and its branches are located but they are not visible on ultrasound. Thus. the retromandibular vein. which usually lies directly above the trunk of the facial nerve, is used as a landmark in USG examination. The normal echogenicity of parotid gland, is homogeneous and vanes from very bright and markedly hyperechoic to only slightly hyperechoic in comparison to adjacent muscles. Salivary glands with high fat content are hyperechoic in corn-parison to surrounding muscles and markedly suppress ultrasound wave. Along the course of the Stenson duct. an accessory parotid gland may be found. Lymph nodes are identified by the presence of characteristic hyperechoic hilum. Ultrasound in hands of an experienced physician may have fairly good specificity (97%) and sensitivity (79%) in preoperative diagnosis of benign parotid tumours. Clear delineation of the tumour alone proved to be an excellent predictor. The limitations by U/S study 1) to differentiate between benign and malignant 2) the density or discreteness of masses and their deep boundaries and masses behind the bony structures cannot be determined.[22] - CT scan In this study, it was analysed preoperative CT based predictions with real surgical findings for benign tumour removal (2015 to 2017). CT scan has revolutionized salivary gland imaging. It provides precise anatomical detail - location, size, shape, margins, extent etc. and is routinely used as a primary imaging modality in salivary gland lesion. It is very useful in evaluating salivary gland calculi and associated adnexal inflammation. Parotid gland CT density is highly variable. It tends to be Intermediate between fat and muscle. The submandibular glands have less fat than the Parotids. Their density is closer to that of muscle. CT of parotid gland is obtained by using thin section slices in axial and rarely coronal images. This is usually performed after intravenous injection of contrast solution. Mild enhancement of parotid gland takes place after contrast injection. Images are usually filmed with conventional soft tissue windows. Bone windows are useful for evaluating calcification, calculi formation, or adjacent bone involvement. Before CT scanning, for all the patient’s diagnosis was confirmed by ultrasonography and FNAC. Smoothly marginated or tabulated homogeneous small spherical mass is the most common appearance. When larger, they can be heterogeneous with foci of necrosis. Small regions of calcification are common. When the tumour is small the enhancement tends to be prominent. In larger tumours enhancement is less marked (delayed enhancement). The precise identification of location of benign tumours of the parotid gland in the superficial or deep lobes can help to avoid total parotidectomy. In addition to gland preservation, in cases when only the deep lobe is affected selective parotidectomy can help to preserve the facial nerve, avoid Frey's syndrome (gustatory sweating), and provide better aesthetic/cosmetic results. Various landmarks were used in computed tomography (CT) investigation for precise localization of the tumour and of the facial nerve. Among these landmarks. the facial nerve line (FNL) is the line between the lateral surface of the posterior belly of m. digastricus and the lateral surface of the cortex of the ramus part of the mandible. The Utrecht line (UL) runs from the most dorsal point of the ipsilateral half of the first vertebra to the most dorsal point of the retromandibular vein. The Conn's arc (CA) is a 8.5 mm radius semicircle with the centre on the most distant point of the posterior edge of the ramus. In addition to these lines, the retromandibular vein (RV), the styloid process, the lateral border of the masseter, the lateral border of the mandible, and the Stensen's duct were used as landmarks also. Definitely some disagreement exists on the question which landmark or line is the most reliable for preoperative diagnostics. While some authors name FNL as the most reliable landmark, the other suggest UL or the Stensen's duct. The facial nerve, the Utrecht line, the Conn's arc, and the retromandibular vein were used as land marks for CT presurgical evaluation of patients. CT is almost 100% sensitive in detecting salivary gland tumours but it can not help the surgeon to differentiate between benign and malignancy. It helps in specifying the size and anatomic extent of tumour. MRI is superior in demonstrating benign parotid tumours because of its greater contrast than CT. But MRI scan is more useful in malignant cases than benign tumours.[23] None of these tools provide definite information regarding the nature and precise histology of parotid mass.

Classification of Benign parotid tumours

-Benign epithelial tumours
*Pleomorphic adenoma
*Myoepithelioma
* Basal cell adenoma
* Warthin's tumour
*Oncocytoma
* Canalicular adenoma
*Lymphadenoma Sebaceous lymphadenoma Nonsebaceous lymphadenoma
*Ductal papilloma Inverted ductal papilloma Intraductal papilloma Sialadenoma papilliform
*Cystadenoma
-Soft tissue tumours
*Haemangioma
- Haematolymphoid tumours
*Hodgkin lymphoma
*Diffuse large B-cell lymphoma
*Extra nodal marginal zone B cell lymphoma
-Others
*keratocystoma
*sialolipoma

The most common benign tumour of parotid gland is pleomorphic adenoma (80%) and Warthin's tumour

ISSN (O): 2687-5365; ISSN (P): 2753-6556

(5%). The most common involved site is superficial lobe 80% accounted in gland parenchyma.[24] Pleomorphic adenomas lack a complete capsule and are surrounded by healthy gland tissue which is compressed as they grow, they often present with very small out growths extending to ad- jacent tissue. It is commonly believed that this histological feature account for clinical behaviour and multicentricity and recurrence over time.[10] The close relationship between gland and facial nerve as well as high recurrence rate has shaped various surgical techniques for parotid gland neoplasms over the years.[25] The treatment of benign parotid tumours is challenging because of their infrequency, their unpredictable and varied biologic behaviour and their prolonged risk of recurrence. The basic approach to a benign parotid tumor is operative. Fit- teen years ago local excision or enucleation was acceptable surgical treatment for benign parotid tumours. Recurrence rates were exceedingly high. Kirklin et al reported a 325 recurrence in his review of the Mayo Clinic experience from 1907- 1944. The main aim of parotid surgery is to minimize the recurrence of disease and facial nerve palsy. There are various surgical techniques for parotid surgery, by review literature Enucleation was described by SENN in 1895 as the surgical technique of choice to excise benign tumour. Removal of tumour was incomplete as there was tissue left behind, recurrence of disease is drawback by this procedure in 1921 SISTRUNK modified this technique, he adopted Enucleation with retrograde dissection of mandibular branch of facial nerve,[24] The treatment of parotid pleomorphic adenomas remains substantially unsuccessful until 1940 due to high recurrence rate and facial nerve paralysis.[26] In 1940, JANES,[27] published his first article on salivary gland tumours, surgery by parotidectomy with dissection and preservation of main trunk and its branches of facial nerve. In this procedure the whole superficial lobe was removed along with the tumour. In 1947, BAILEYS,[8] published the first results of superficial parotidectomy with low recurrence rate with risk of facial nerve damage, in 1960, Beahrs et al, reported a 10 years recurrence of 10% of benign tumours locally excised or enucleated and no recurrence in 47 patients who underwent a subtotal parotidectomy. Since many years till today superficial parotidectomy considered as gold standard technique for benign parotid tumours (pleomorphic adenoma).

* In 1978, ILIZUKA & ISHI KAWA changed the technique of superficial parotidectomy and described partial superficial parotidectomy, in which the main trunk and the branches adjacent to the tumour were dissected and the tumour was removed with a 2cm resection margin (except for the case of tumour adhesion to the nerve), The resection margin was brought to 1cm by WITT in 2005.[28,29]

*In 1975, ANDERSON and 1979 GLEAVE popularised extracapsular dissection (ECD) of superficial lobe parotid tumours. In this approach, the removal of tumour from the parotid gland without exposure of the main trunk of the facial nerve,[30] where the tumour mass should be small (2cm) and mobile. FNAC should be confirmed as benign mass. Recently there have been significant change to these conservative techniques and many articles have been published as Minimally superficial parotidectomy. The main limitations by conservative approaches are the malignant histology tumour excision. *Superficial parotidectomy was done in all our patients (benign parotid neoplasms) as advocated by many authors. It seems that by excising the tumour together with normal tissue, which is done in superficial parotidectomy, injury of the capsule can be avoided and no cells are left in the gland tissue. The very low rate of permanent sequelae after superficial parotidectomy is another argument against total parotidectomy to treat pleomorphic adenoma as advocated by some authors.

• Prior to any surgical procedure involving the parotid gland the patient should be forewarned of possible facial nerve injury or sacrifice.

• The surgical techniques for benign parotid tumour Excision can be classified as 1. by facial nerve dissection with removal of tumour mass

(a) Superficial parotidectomy - Removal of superficial parotid salivary tis- sue lies lateral to plane of facial nerve with dissection of complete facial nerve and its branches. -The role of Superficial Parotidectomy (SP)

*For the SP technique, the main facial nerve trunk was identified and traced to its branches. The parotid duct was then legated in all cases. Subsequently, the entire superficial parotid tissue region was excised with the tumour en bloc. Superficial parotidectomy where the cervicofacial and temporofacial nerves are dissected.

(b) Partial parotidectomy - Selective resection of tumour with a cuff of 0.5 .1cm normal tissue margins and incomplete nerve dissection (dissection nerve Fibers near to parotid mass). It is indicated for small benign tumours (less than 4cm) located in lateral lobe of parotid gland. The role of Partial Superficial Parotidectomy (PSP) Ideal criteria to avoid an adverse outcome using PSP Benign tumour by fine needle aspiration cytology Mobile neoplasm Neoplasm <4 cm Neoplasm in the superficial lobe Neoplasm in the tail of parotid Nerve integrity monitoring Palpable extent of tumour appreciated Surgeon trained to convert the procedure to a facial nerve dissection technique if necessary Experienced parotid surgeon 10. High volume parotid surgeon

(c) Selective deep lobe parotidectomy - Snow classification of 2001.[31]

- The role of Deep lobe Parotidectomy (DP)

*For the DP technique, the facial nerve will be dissected and identified its branches. The deep lobe of the parotid tumour is bordered medially by the fat of parapharyngeal space, and tumour delivered by blunt dissection between the splayed facial nerve branches. This technique is used for selective deep lobe benign parotid tu- mours with facial nerve preservation.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

(d) Total parotidectomy –
(1) Total parotidectomy with complete nerve dissection. Indicated for recurrent tumors and malignant tumors.
(2) non facial nerve dissection techniques (a) Extracapsular dissection - Selective resection of tumour with safe mar-gins. (b) Intracapsular Enucleation - Intracapsular removal of tumour without nerve dissection. In our study, after thorough above said investigations, confirm the diagnosis and plan parotid surgery by different techniques. According to it's location, size, re- FNAC report criteria were taken for selection of surgical techniques. Partial superficial parotidectomy was done in 10 case (40%) and superficial parotidectomy for 11 cases (44%) and selective deep lobe parotidectomy for 3 cases (12%) and Enucleation in 1 case (4%) with facial nerve preservation. In this study, 21 cases (84%, 1 case of recurrent tumour (4%)) of lateral lobe tumors excised by partial superficial parotidectomy or superficial parotidectomy technique. Three cases (12%) deep lobe tumour selective deep lobe parotidectomy technique done with facial nerve preservation. Enucleation done in one case for the small tumour of (2cm) lateral surface of parotid gland. In this study, the HPE report after excision shown as 88% of pleomorphic adenoma, 4% of retention cyst, 4% of Keratin cyst and 4% of Lymphadenoma, which is comparable with other studies.[32] The commonest complication of superficial parotidectomy are 1) recurrence (3%) 2) permanent facial nerve palsy (0.22%) 3) Frey's syndrome are not encountered in this study. For one case, of temporary /transient facial nerve palsy followed up for 8 weeks, observed complete recovery and in other case, followed up to 6 weeks with total recovery of facial nerve weakness. Fortunately, postoperative facial nerve palsy is most often transient as seen in our series. For Hematoma case, drained out the clot, for infection case-controlled antibiotics given after pus culture and sensitivity, no major com- plications encountered in this study. Long term follow up (10 to 20 years) is essential for evaluation of therapeutic results with benign parotid tumors but is seldom feasible. There has been no recurrence in our series till now probably because the follow up period is short and most benign tumors are characteristically slow growing and may recur late. Recurrence rate for the benign parotid tumors should be minimal if proper diagnostic approach and surgical techniques are employed.

CONCLUSION

Benign Parotid gland tumors are very rare and are less frequently encountered in clinical practice. Any patient presenting with a swelling in the region of parotid region should be suspected of parotid neoplasm and should be confirmed by complete investigations. Benign Parotid tumors most commonly occur in third and fifth decade with a female preponderance.
Most of the salivary gland tumors arise in the parotid gland. Most of them are benign and most of the benign tumors are pleomorphic adenoma. Swelling is the commonest symptom of parotid gland tumors. Most of the benign tumors exhibit a slow growth pattern. FNAC is a good tool in diagnosing benign parotid gland tumours. Surgery is the main stay of treatment of benign parotid tumors and superficial parotidectomy is the most commonly performed surgery. Total parotidectomy is needed for benign tumors with deep lobe involvement. The main complications of surgery were Hematoma, wound infection, facial nerve palsy (temporary). Other complications like Frey's syndrome and salivary fistulas are not encountered. Recurrence of the tumour is also possible, for which long term fallow up is required. But in a developing country like India, majority of the patients won't come for fallow up and is very difficult to calculate the incidence of recurrence. Long term randomized clinical trials are required for benign parotid tumour surgery. As majority of patients will have swelling without any other symptoms for a long time, they usually present late and chances of malignant transformation is very high. Early detection and treatment is very essential to prevent disease morbidity and mortality.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556