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Fourteen Year Follow Up of Patients with Parotid Tumours Underwent Superficial Conservative Parotidectomy in Karbala, Iraq

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A B S T R A C T

Salivary gland tumours account for 3% of all head and neck tumours, 70%-80% of these tumours are located in the parotid glands. Eighty percent of parotid gland tumours are benign. Physical examination is the first diagnostic tool. Ultrasonography, CT and/or MRI are useful tools for correct surgical planning. Fine-needle aspiration cytology is also indicated by some authors. The most-feared postoperative complication is facial nerve palsy, other complications includes infection, haemorrhage and haematoma, aesthetic problems, sensory changes, sialocele and salivary fistulas, Frey's syndrome, and tumour recurrence. To document our experience on parotid gland surgeries, and the occurrence of the long term postoperative complications and recurrence rate after superficial conservative parotidectomy. Methods: Data of 53patients who underwent superficial conservative parotidectomy at the departments of otorhinolaryngology and general surgery at Al-Hussian Teaching Hospital, Karbala over a 14 year period between 1st May 2007 to 30th September 2021 were analyzed retrospectively. All postoperative complications were recorded in follow-up visits at 1 week and 1, 3, 6 and 12 months then the follow-up visits depend on the patient's needs or appearance of any symptoms or signs of recurrence of previous disease. Fifty-three patients who underwent superficial conservative parotidectomy in this study, the age range was 7 to76 years with a mean age 38.08 years, a standard deviation of ± 15.279; there was a female gender predominance, right side parotid swellings were more common than left side swellings. Most of the cases were benign; pleomorphic adenoma was the most common benign tumour while mucoepidermoid carcinoma was the most common malignant tumour. Complications following surgery occurred in 19 (35.8%) patients: there were two cases of sialocele, four cases of transient facial nerve palsy, four patients with paresthesia of the pinna due to section of the greater auricular nerve; five patients with Frey's syndrome. Majority of our patients are still on follow‑up, there have been two cases with recurrence; and three cases of death until writing of this study with a mean follow up of 7.11 (SD 3.76) years. Conclusions: The results of our study suggest that superficial conservative parotidectomy is a safe procedure, with few complications at the long-term. This study was intended to review fourteen year clinical experience at Karbala with parotid neoplasms and parotid surgery. Improvement in surgical skills among surgeons that operate on the parotid gland could reduce the incidence of facial nerve weakness following parotidectomy. Pleomorphic adenomas, followed by Warthin's tumour are the most frequent benign histological types in our country while mucoepidermoid carcinoma and adenoid cystic carcinoma are the most common malignant parotid tumours.

Introduction

Salivary gland tumours account for 3% of all head and neck tumours (Ali A. Almubarak *et al.,* 2021), 70%-80% of these tumours are located in the parotid glands (Ajiya *et al.,* 2021). Eighty percent of parotid gland tumours are benign (Rahim Dhanani *et al.,* 2020; Masahiro Suzuki *et al.,* 2020), majority of them being pleomorphic adenoma, followed by Warthin's tumour and mono-morphic adenoma (Siddiqui *et al.,* 2020). Mucoepidermoid carcinoma is the most malignant parotid tumour, followed by adenoid cystic carcinoma (Ali A. Almubarak *et al.,* 2021). The treatment of the parotid gland tumours are surgical, partial superficial parotidectomy or even extracapsular dissection, superficial parotidectomy, total parotidectomy, radical and extended radical parotidectomy procedures are being performed for both benign and malignant tumours. Superficial parotidectomy with facial nerve preservation is the most often indicated surgical procedure (Vipul *et al.,* 2019). The most-feared postoperative complication after parotidsurgery is facial nerve dysfunction, other complications includes infection, haemorrhage and haematoma, aesthetic problems, sensory changes, sialocele and salivary fistulas, Frey's syndrome, and tumour recurrence (Vipul *et al.,* 2019; Daniel G. Deschler *et al.,* 2020; Charlotte Fog Nielsen *et al.,* 2020; Vahit Mutlu and Zulkuf Kaya, 2019).

Physical examination is the first diagnostic tool in patients with parotid mass. Ultrasonography is the first diagnostic imaging in assessment of patients with parotid tumours, low cost with high sensitivity in detection masses in the superficial lobe of parotid gland while computerized tomography (CT) and/or magnetic resonance imaging (MRI) are useful in diagnosis masses in deep lobe. Fine needle aspiration cytology (FNAC), sometimes guided by ultrasound, helps to differentiate neoplastic from non-neoplastic lesions, as well as benign from malignant tumours. These are essential for planning treatment protocol in patients with parotid masses. Nonetheless, FNAC sometimes fails to determine a definitive histological diagnosis, so postoperative histology is still considered the gold standard for identifying the tumour type when a malignancy is suspected (Schmidt *et al.,* 2011; Liu *et al.,* 2016; Maahs *et al.,* 2015; Zbaren *et al.,* 2001; Sergi *et al.,* 2004; Contucci *et al.,* 2003). The present study aims to document the long term postoperative complications and recurrence rate after superficial conservative parotidectomy, and to review fourteen year clinical experience with parotid swellings and parotid surgery.

Patients and Methods

This is a retrospective study was carried out on 53 patients who underwent superficial parotidectomy at the departments of otorhinolaryngology and general surgery at Al-Hussian Teaching Hospital, Karbala over a 14 year period between 1st May 2007 to 30th September 2021. After approval from the hospital ethics committee and all patients gave their informed consent to participate. Focusing on patient's age at diagnosis, sex, clinical features, definitive histology, surgical complications and recurrence rate. All operations were done by same surgical team, cervicomastoidfacial (Lazy S) incision were used and the main trunk of the facial nerve was identified where it exit from stylomastoid foramen and all its branches where followed in an antegrade manner, then the superficial lobe of parotid gland containing the tumour was excised completely. Neuromonitoring was not performed to identify the facial nerve and electrocautery (bipolar, monoppolar) only used far from branches of the facial nerve. All postoperative complications such as facial paresis or paralysis, local complications (wound infection, salivary fistula, hemorrhage, hematoma, sialocele/seroma), numbness around the earlobe, aesthetic deformity, and Frey's syndrome, were recorded in follow-up visits at 1 week and 1, 3, 6 and 12 months then the follow-up visits depend on the patient's needs or appearance of any symptoms or signs of recurrence of previous disease. Facial nerve function was assessed the day after surgery by asking the patient to wrinkle up the forehead, close eyes tightly, purse the lips into a whistling posture and show the teeth. The assessment was done using

the House–Brackmann grading system (House and Brackmann, 1985) that classifies the grade of clinical paresis from grade I (no paresis) to grade VI (total paresis). For this study, it was considered that an affectation of grade II or above in either of the nerve branches had a clinical paresis of the facial nerve. IBM SPSS for window, version 24 was used for statistical analysis, Chi-squared test were used and every mean should have a standard deviation (SD). P value less than 0.05 was considered statistically significant.

Results and Discussion

The data of 53 patients presented with parotid swelling were collected; there were 24 (45.3%) males and 29 (54.7%) females patients (M/F ratio 1:1.2). The age ranged from 7 to76 years, with a mean age of 38.08 years, a standard deviation of ±15.279. The peak age of occurrence was in the age group 31-40 year (Table 1). In 30 patients the swellings were on the right side (56.6%), and in 23 patients the swellings were on the left side (43.4%). There were 47 (88.7%) benign lesions, while 6 tumours (11.3%) were malignant. The final histological diagnoses of the included cases are listed in table (2). Pleomorphic adenoma was the most common benign tumour (56.6%) followed by Warthin's tumour (7.5%) while mucoepidermoid carcinoma was the most common malignant one (5.7%). There was a predominance of male gender for malignancy and females for benign neoplasms. In cases of benign tumours, the clinical presentation was a swelling of the gland, slowly growing or apparently stable in dimensions. In cases of malignancy, the clinical presentation was an asymptomatic parotid mass sometime associated with pain. Complications following surgery occurred in 19 (35.8%) patients: no postoperative bleeding within 36 hours after parotidectomy, no haematoma, infection, and skin necrosis; there were two (3.77%) cases of sialocele (which is a self-limiting problem); four (7.54%) cases of transient facial nerve palsy, that improved within two weeks; four (7.54%) patients with paresthesia of the pinna due to section of the greater auricular nerve; five (9.43%) patients with Frey's syndrome. Majority of our patients are still on follow‑up, there have been two (3.77%) cases with recurrence; and three (5.66%) cases of death until writing of this study with a mean follow up of 7.11 years, a standard deviation of ± 3.76) as shown in table (3).

Approximately 75% of parotid masses are neoplastic, whereas the remaining 25% are non-neoplastic. The most frequent manifestation in our population was a painless, often growing asymptomatic massin the parotid region. Some patients relate pain associated with the parotid mass, but this number was higher in malignant cases. This is in accordance with data reported by Egils Kornevs *et al.,* (2005); Croonenborghs *et al.,* (2020); Spiro *et al.,* (1986) and by Tryggvason *et al.,* (2013), leading us to conclude that a history of pain should raise suspicion of a potentially malignant parotid-related tumour. Salivary gland neoplasms constitute 5% of all head and neck neoplasms, and parotid gland neoplasms constitute 75% of the salivary gland neoplasms (Ho *et al.,* 2011). In this 14 year period study, parotid gland neoplasms were found in patients with the age from 1st to 8th decade, and this in tandem with other similar studies worldwide (Diom *et al.,* 2015; Altin *et al.,* 2019; Stathopoulos *et al.,* 2018; Tuckett *et al.,* 2015). There was a slight overall female predominance with a male to female ratio of 1:1.2. This finding is different from other studies (Altin *et al.,* 2019; Tuckett *et al.,* 2015; Venkatesh *et al.,* 2019; Otoh *et al.,* 2005; Jaber, 2006; Mantsopoulos *et al.,* 2015; Al Salamah *et al.,* 2005; Bron *et al.,* 1997) and similar to others as far as an association between the male sex and malignant neoplasms and the female sex and benign neoplasms is concerned (Toida *et al.,* 2005; Satko *et al.,* 2000; Alves *et al.,* 2002; Jansisyanont *et al.,* 2002; Takahama Junior *et al.,* 2009; Maahs *et al.,* 2015; Okoturo and Osasuyi, 2016; Bittar *et al.,* 2016; Ruohoalho *et al.,* 2017; Musani *et al.,* 2014; Wong and Shetty, 2018; Graciano *et al.,* 2018; Jim *et al.,* 2019; de Ru *et al.,* 2006). Benign tumours were more common than malignant tumours in all salivary glands (Venkatesh *et al.,* 2019; Otoh *et al.,* 2005; Jaber, 2006; Toida *et al.,* 2005; Satko *et al.,*

2000; Alves *et al.,* 2002; Sousa and De Sa, 2001; Ito *et al.,* 2005; Wang *et al.,* 2007; Ethunandan *et al.,* 2003). Pleomorphic adenoma followed by Warthin's tumours are the most common benign parotid tumours while mucoepidermoid carcinoma is the most common malignant parotid tumour worldwide (Venkatesh *et al.,* 2019; Satko *et al.,* 2000; Takahama Junior *et al.,* 2009; Sousa and De Sa, 2001; Ito *et al.,* 2005; Lin *et al.,* 2008; Drivas *et al.,* 2007; Musani *et al.,* 2008), and this in similar with our study. About 90% of all parotid tumours arise from the superficial lobe. Superficial parotidectomy is an appropriate surgical approach for malignancies confined to the superficial lobe (Vahit Mutlu and Zulkuf Kaya, 2019; Friedman *et al.,* 1986; Gallegos, 1991; Malata *et al.,* 1997; Townsend *et al.,* 2001). Most of our patients with parotid lesions underwent superficial conservative parotidectomy. Studies worldwide have reported a wide variation on the incidence of facial nerve palsy immediately after parotidectomy, ranging from 7% to 56.5% (Stathopoulos *et al.,* 2018; Tuckett *et al.,* 2015; Al Salamah *et al.,* 2005; Bron and O'Brien, 1997; Maahs *et al.,* 2015; Bittar *et al.,* 2016; Ruohoalho *et al.,* 2017; Musani *et al.,* 2014; Wong and Shetty, 2018; Graciano *et al.,* 2018; Jim *et al.,* 2019; de Ru *et al.,* 2006), and also being reported in 46% of the Cleveland Clinic's experience (Mehle *et al.,* 1993). Other, often specialized centers, report a clinically detectable but transient facial weakness in up to 25% of cases (Rodriguez-Bigas *et al.,* 1991; Yamashita *et al.,* 1993; Mra *et al.,* 1993; Watanabe *et al.,* 1993). The majority resolve, palsy present for longer than 3 months occurring in 0.7-7% of cases (Mehle *et al.,* 1993; Rodriguez-Bigas *et al.,* 1991; Mra *et al.,* 1993; Watanabe *et al.,* 1993; Kota *et al.,* 1991; Al-Naqeeb *et al.,* 1992; Afify and Maynard, 1992). Facial nerve weakness was noted in 7.54% of our patients undergoing parotidectomy which resolved within two weeks, no permanent facial nerve palsy was noted in our study; this could be due to differences in study design, techniques of surgery, histology of lesions and use of intraoperative facial nerve monitoring devices. Surgeon's experience and surgical techniques could possibly play a vital part in having a decreased occurrence of facial nerve palsy in post-parotidectomy patients (Gordon T Deans *et al.,* 1995). The incidence of Frey's syndrome or gustatory sweating after superficial parotidectomy varies widely from 2-43% in the literatures (Rodriguez-Bigas *et al.,* 1991; Yamashita *et al.,* 1993; Kota *et al.,* 1991; Al-Naqeeb *et al.,* 1992; Debets and Munting, 1992; Prichard *et al.,* 1992; Mantsopoulos *et al.,* 2015; Kadletz *et al.,* 2017; McGurk *et al.,* 2003; Rustemeyer *et al.,* 2008). This is at least partly related to the enthusiasm with which the gustatory sweating is sought either actively questioned or passively assessed. Frey's syndromes were evident in 9.43% of our patients as the symptoms were passively assessed because only patients suffering from symptoms were treated and the time interval after surgery; as symptoms become manifested about 2 years after surgery (Rustemeyer *et al.,* 2008; Lafont *et al.,* 2015), no more of our patients present till now, with a mean follow up of 7.11, with Frey's syndrome, yet careful follow-up of the patients may identified more possible cases.

Transient sialoceles were evident in 2 (3.77%) of our patients; this were treated on an outpatient basis by repeated punctures; these figures are comparable with those generally described in the literatures (Wax and Tarshis, 1991). One of our patients underwent enucleation for small dermoid cyst. We accept that a significant proportion of cysts turn out to be neoplasms, so that there is a theoretical risk of recurrence. However, this has not occurred to date in our limited experience. In our study superficial parotidectomy was done for all patients, and the local recurrence was observed in two patients (3.77%) during follow-ups, one young female with cystic hygroma (lymphangioma) the other old man with mucoepidermoid carcinoma (high grade) and he dienine years after the operation due to recurrence and intracranial extension.

Table.1 Age groups distribution

Age (years)	Benign			Malignant		
	Male	Female	total	Male	Female	Total
1-10	0	2	2	0	0	0
11-20	3	3	6	0	0	0
21-30	1	7	8	2	0	2
31-40	6	5	11	1	0	1
41-50	4	6	10	0	1	1
51-60	5	3	8	1	0	1
61-70	0	2	2	0	0	0
71-80	0	0	0	1	0	1
Total	19	28	47	5	1	6

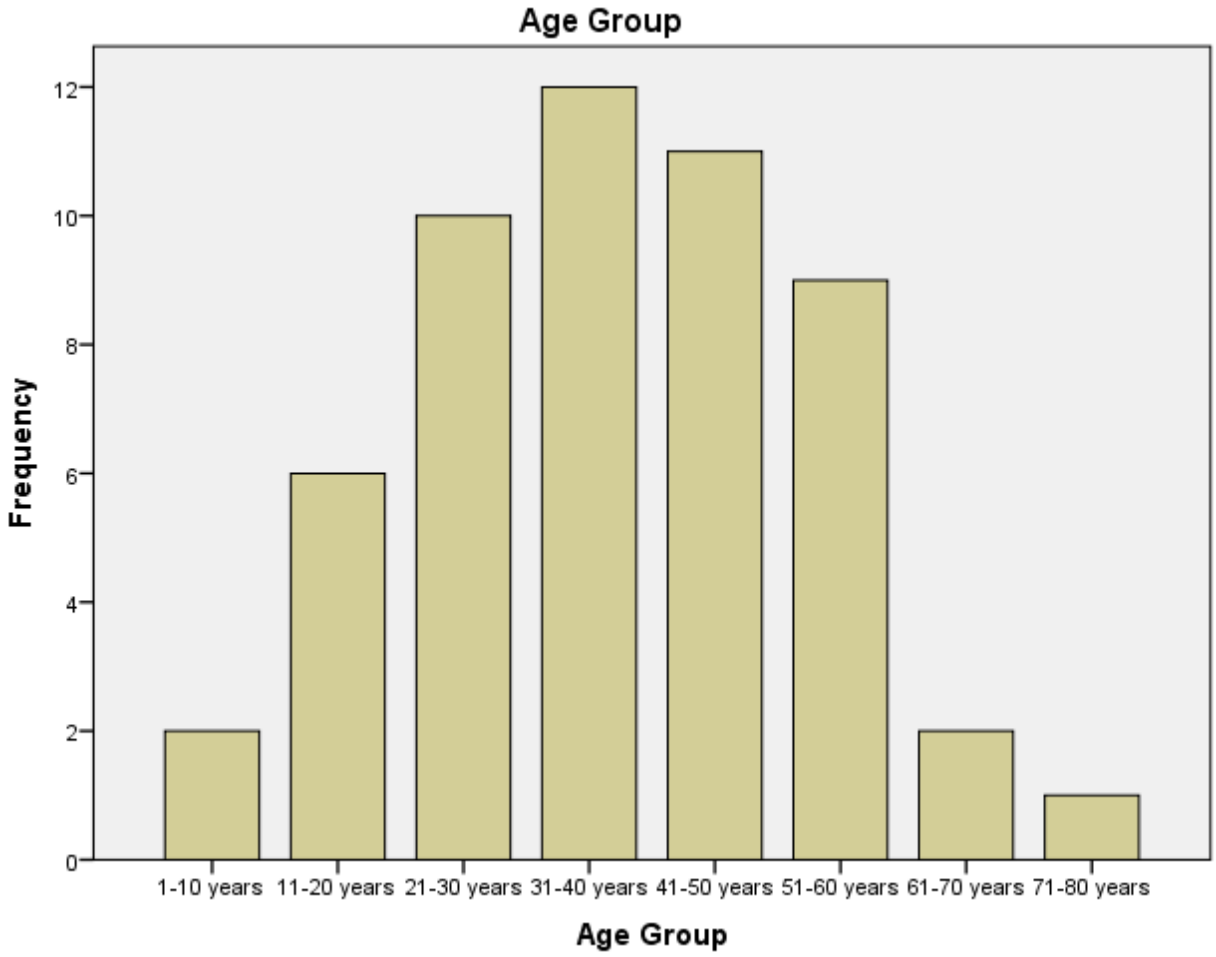
Table.2 Histological diagnosis

Histological diagnosis	No.	Percentage
Pleomorphic adenoma	30	56.6%
Warthin's Tumor	4	7.5%
Mucoepidermoid Carcinoma	3	5.6%
Lipoma	2	3.8%
Sialolithiasis	2	3.8%
Parotid Cyst	2	3.8%
Sialadenitis	3	5.6%
Cystic Hygroma	1	1.9%
Carcinoma Ex-Pleomorphic Adenoma	1	1.9%
Dermoid Cyst	1	1.9%
Malignant Melanoma	1	1.9%
Malignant Myoepithelioma	1	1.9%
Neurofibroma	1	1.9%
Tuberculosis	1	1.9%
Total	53	100%

Table.3 Surgical Complications

Transient facial nerve palsy	**4 (7.54%)**
Frey's syndrome	**5(9.43%)**
Paresthesia of the pinna	**4(7.54%)**
Sialocele	**2 (3.77%)**
Recurrence	**2 (3.77%)**
Death	**3 (5.66%)**
Total	**19 (35.82%)**

Fig.1



The recurrence rate varied in other studies from no recurrence to 45% (Vahit Mutlu and Zulkuf Kaya, 2019; Johnson *et al.*, 2007; Piekarski *et al.*, 2004). It has been declared that the surgical methods (extracapsular dissection, partial superficial parotidectomy, or enucleation) cause inadequate excision due to pseudopodia or satellite nodule, leading to recurrence (Witt, 2002), but in our study the recurrences were due to histological type of primary disease not due to surgical method used or surgeon experience. The recurrence rate of cystic hygroma (lymphangioma) is high, ranging from 10% to 38% (Shah and Deshpande, 2010) and also high in mucoepidermoid carcinoma (high grade) because the clinicopathological behavior of mucoepidermoid carcinoma is highly variable, ranging from slow-growing indolent tumors to locally aggressive and highly metastatic carcinomas (Serena A Byrd *et al.*, 2013).

The results of our study suggest that superficial conservative parotidectomy is a safe procedure, with few complications at the long-term. The knowledge of the potential risks and complications associated with superficial conservative parotidectomy are important for preoperative planning, counseling to patients and to achieve better long-term outcomes. This study was intended to review fourteen year clinical experience at Karbala with parotid neoplasms and parotid surgery. Improvement in surgical skills among surgeons that operate on the parotid gland could reduce the incidence of facial

nerve weakness following parotidectomy. Pleomorphic adenomas, followed by Warthin's tumour are the most frequent benign histological types in our country while mucoepidermoid carcinoma and adenoid cystic carcinoma are the most common malignant parotid tumours.

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