

## ORIGINAL RESEARCH

# A retrospective clinical study of effectiveness of extracapsular dissection of parotid tumors in adults

<sup>1</sup>Dr. Shalabh Vaish, <sup>2</sup>Dr. Vipin Kumar, <sup>3</sup>Dr. Kiran Kumar Chaudhary

<sup>1</sup>Associate Professor, Department of Oto-rhino-laryngology, Government Medical College, Budaun, Uttar Pradesh, India

<sup>2</sup>Associate Professor, Department of General Surgery, Government Medical College, Budaun, Uttar Pradesh, India

<sup>3</sup>Associate Professor, Department of General Surgery, Government Medical College, Budaun, Uttar Pradesh, India

### Corresponding author

Dr. Kiran Kumar Chaudhary

Associate Professor, Department of General Surgery, Government Medical College, Budaun, Uttar Pradesh, India

Received: 11 July, 2023

Accepted: 04 August, 2023

### ABSTRACT

**Background:** A salivary gland tumor can enlarge either a major or small gland without causing any discomfort. Advances in preoperative and intraoperative diagnostics have reduced the invasiveness of surgically excising benign parotid gland tumors. Comparatively speaking, extracapsular dissection (ECD) has grown in popularity. There aren't many publications, nevertheless, on clinical results in the Indian population.

**Objective:** To analyze the surgical results of ECD was the goal of this retrospective investigation.

**Methods:** Thirty-six individuals who received treatment between 2017 and 2022 were gathered into a retrospective cohort. Demographic, clinical, and cost-effectiveness data were all documented.

**Results:** An examination of the 36 instances of unilateral parotidectomy including ECD revealed that the duration of stay, anesthesia duration, and surgery time were all considerably reduced for ECD patients. The most frequent kind was pleomorphic adenoma, which was far more common to have positive margin status than Warthin tumors. In 61.1% of ECD cases, the tumor's near proximity exposed the facial nerve. Patients with ECD experienced fewer postoperative problems, such as temporary facial nerve paralysis and haemorrhage formation, which may indicate a reduced impact on their quality-of-life following surgery. There was no evidence of a recurrence.

**Conclusion:** ECD is a viable treatment option for superficial benign parotid gland tumors following a thorough preoperative clinical, pathological, and radiological examination. ECD will probably result in fewer surgeries, anesthesia, and hospital stays, all of which will save costs.

**Keywords:** Parotid gland tumors, Parotidectomy, extracapsular dissection, Clinical outcomes

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution- Non Commercial- Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

### INTRODUCTION

Roughly 3% of all head and neck cancers are salivary tumors, the majority of which are found in the parotid glands [1]. The parotid gland is where around 80% of salivary gland tumors arise. Between 75 to 80 percent of these are benign [2]. The rate at which a tumor grows does not always correspond with its malignant or benign nature. Epithelial tumors account for the bulk of benign parotid gland tumors. There are eleven different types of benign epithelial SGTs included in the fourth edition of the World Health Organization's (WHO) Classification of Head and Neck Tumours (current version, 2017). Pleomorphic adenoma is the most common type, accounting for 65% of benign

tumours, while Warthin tumours, accounting for 25%, are the second most common type [3]. The majority of benign parotid tumors manifest as slowly expanding, painless masses, frequently located in the parotid gland's tail. Physical examination is the first diagnostic technique used in the presence of a parotid tumor since it often points the doctor in the appropriate direction (benign versus malignant). Dissection of the facial nerve's branches necessitates time and close attention to landmarks and details, even in the presence of normal anatomy and adjacent parotid tissue [4]. Because most primary parotid salivary tumors are located directly adjacent to at least one facial nerve branch, experience has shown that

dissecting the nerve is rarely, if ever, futile. For these reasons, we also think that superficial parotidectomy is the most conservative procedure to perform, even when the mass is obviously benign. Additionally, the danger to the facial nerve grows dramatically in the case of a recurrence, especially in the relatively common event of a multi-nodular relapse of pleomorphic adenoma [5]. Historically, up to 45% of unacceptably high recurrence rates were the consequence of intracapsular enucleation, or the removal of SGT within its capsule. As a result, novel surgical methods were created to remove benign parotid salivary gland tumors [6, 7]. These include the total parotidectomy, which involves removing both the superficial and deep lobes of the parotid gland along with the facial nerve, and the superficial parotidectomy (SP), which entails removing the superficial lobe of the parotid gland in its entirety along with the facial nerve dissection or transection. The surgeon may now do surgery in the parotid area with greater safety thanks to intraoperative facial nerve monitoring, optical magnification, and improved preoperative diagnostics (ultrasound, fine needle aspiration cytology (FNAC), computed tomography, and magnetic resonance imaging (MRI)). In an effort to lower postoperative complications, these advancements have made it possible to decrease the scope of benign SGT surgery from SP to extracapsular dissection (ECD), in which the SGT is removed with a margin of healthy salivary gland tissue [6]. SP is currently the preferred method for removing benign parotid tumors [8–9], while ECD has been suggested as a substitute. Positive features of the ECD instances included being tiny ( $\leq 2.5$ –4 cm), mobile, single, and located far from the nerve in the lateral and lower lobes. When there is no nerve involvement and the lesion is benign ( $\leq 4$  cm) in the superficial lobe, ECD is a good alternative [10]. The standards by which to select ECD or SP remain highly contentious, and there is a clear lack of information in the literature about cost-effectiveness analyses comparing the two types of treatment. ECD is one of the least invasive techniques for the successful management of superficial parotid tumors. For benign parotid tumors, ECD was more cost-effective than SP; however, they noted that bigger sample sizes and longer follow-up times were required to ascertain if these benefits would continue over time [11].

## MATERIALS AND METHODS

**Study design:** This was a retrospective evaluation. In collaboration with the Department of Ear, Nose, and Throat, the Department of Surgery conducted a retrospective review of parotid tumor removal surgery spanning the years 2017–2022.

**Inclusion and exclusion criteria:** Patients who had undergone parotid surgery using either the ECD or SP surgical method, who had access to preoperative FNAC and postoperative pathology reports, and who

had at least a year of clinical follow-up were considered for inclusion. Individuals with deep parotid lobe-originating SGTs, malignant primary SGTs, secondary/metastatic malignancies, revision surgery, or total parotidectomy were not eligible to participate.

**Preoperative evaluation:** A clinical assessment was done to determine the SGT's stiffness and movement. Clinical research was also done on facial nerve paresis and discomfort. To rule out malignancy after the initial clinical inquiry, MRI and ultrasound-guided FNAC were performed.

**Surgical procedure:** Under general anesthesia, all parotid procedures were carried out with facial nerve monitoring and loupe magnification worn by the operator. Dissecting the facial nerve's plane antegrade and excising the whole parotid mass above allowed for the execution of the SP. The facial nerve branches were not intentionally exposed or dissected during the ECD procedure. Instead, a 2–3 mm margin of healthy tissue was excised along with the tumor. Till the patient's release, a daily assessment was conducted.

**Post-surgical care and functional evaluation:** Then, based on the histological results, surgical problems, and kind of tumor, an individualized follow-up plan was put into place. During follow-up sessions, facial nerve function was assessed; potential gustatory sweating was only looked into after six to twelve months. Benign lesions did not receive postoperative radiation.

**Study parameters:** Data on the type and location of the tumor, the surgical method, the duration of the follow-up period, and the tumor's recurrence were retrieved. Positive margins were those that, in the histological study, reached the resection margin or, in the event that during surgery there was a report of a tumour leak, capsule rupture, capsule perforation, or incomplete capsule. Additionally, a collection of prognostically significant intraoperative events was made, such as nerve sacrifice, tumor spilling, etc.

## RESULTS

Thirty-six parotidectomies executed by ECD satisfied the requirements for inclusion. When compared to other surgical methods, there was a relative rise in the frequency of ECD over the research period. Comparatively speaking, 58.3% of patients with parotidectomies were male. With a median age of 56.6 years at surgery, almost 50% of the patients had smoked in the past or were now smokers. Lesion on right side in 55.6% of patients (Table 1). The lesion size ( $48.3 \text{ cm}^3$ ) was discovered to be much greater. There was a 100% 5-year disease-specific survival rate. Lesions of other types were less prevalent; pleomorphic adenoma was the most common kind,

followed by Warthintumors. In the ECD group, the status was much greater. The intraoperative events during the ECD for parotidectomy are displayed in Table 2. The facial nerve was exposed in 61.1% of ECD instances because of the tumor's close proximity; in these cases, the nerve was unharmed. In one instance, the facial nerve was transected. In three cases, the greater auricular nerve was transected. In 75.2% of the patients, the final pathological diagnostic supported the preoperative FNAC diagnosis. In ten cases, preoperative FNAC was not conclusive. There was one reactive lymph node and two probable occurrences of cystic lesions. It was unable to determine with certainty which of the two instances were Warthintumors and which were pleomorphic adenomas. For each patient who had a parotidectomy, we assessed the duration of hospital stay, the surgery

frequency of positive margin time, and the anesthesia time (Table 3). It was discovered that the ECD group's operating time was substantially shorter— $74 \pm 23$  min. This resulted in a significantly reduced duration of anes the sia ( $109 \pm 37$  min). Following the procedure, it was discovered that patients in the ECD group spent much less time in the hospital ( $1.4 \pm 0.9$  days). Patients' post-ECD complication rates were assessed (Table 3). Two individuals had temporal facial nerve palsy, although none of them had chronic damage. Three patients experienced transient increased auricular nerve dysesthesia, whereas four individuals experienced chronic dyses the sia. Three individuals had hematomas, two patients had infections, and one patient developed salivary fistulas.

**Table 1: Demographic characteristics**

Demographic Parameters (N=36)	Mean or n	%
Age at surgery (years), mean (range)	56.6 (19-71)	
Male	21	58.33
<b>Lesion side</b>		
Right	20	55.56
Left	16	44.44
<b>Smoking</b>	20	55.56
Current	9	25
Former	11	30.56
<b>Histopathological diagnosis</b>		
Pleomorphic adenoma	15	41.67
Warthin tumour	11	30.56
Warthin tumour	3	8.333
Basal cell adenoma	2	5.556
Lymphadenoma	3	8.333
Ductal salivary cyst	1	2.778
retention cyst	1	2.778
<b>Lesion size (cm<sup>3</sup>), mean (range)</b>	48.3 (1.6-218)	
<b>Margin status</b>		
Positive	12	33.33
Negative	24	66.67

**Table 2: Intraoperative events**

Intraoperative events	n	%
Greater auricular nerve transected	3	8.333
Facial nerve branch transected	1	2.778
Facial nerve branch exposed	22	61.11
Retromandibular vein sacrificed	1	2.778

**Table 3: Complication rates in patients following parotidectomy with ECD**

Post-operation parameters (N=36)	Mean	%
Operation time (Min)	$74 \pm 23$	
Anesthesia time (Min)	$109 \pm 37$	
Length of stay (days)	$1.4 \pm 0.9$	
Frey syndrome (gustatory sweating)	2	5.556
Facial nerve palsy		
Temporal	2	5.556
Permanent	0	0
Dysesthesia of the greater auricular nerve		

Temporal	3	8.333
Permanent	4	11.11
Seroma formation	0	0
Salivary fistula formation	1	2.778
Haematoma	3	8.333
Infection	2	5.556

## DISCUSSION

Depending on the degree of the lesion, the conventional surgical approach for treating parotid tumors ranges from superficial parotidectomy to complete parotidectomy. The removal of the whole parotid gland next to the facial nerve is known as a complete superficial parotidectomy. On the other hand, after identifying the facial nerve trunk, partial superficial parotidectomy is restricted to dissection, depending on the extent of the tumor's involvement, and the removal of 1-2 cm of normal parotid gland tissue next to the tumour. The removal of all parotid gland tissue, medially and laterally, to the facial nerve is known as a total parotidectomy. On the other hand, ECD makes a cruciate incision just above the tumor in order to precisely conduct a blunt prosection across the parotid gland tissue [12]. Because of its low morbidity, ECD is becoming increasingly and more popular as a treatment option for tiny, mobile superficial tumors [13]. It is crucial to comprehend the many ideologies that go beyond superficial parotidectomy and ECD. A parotidectomy, or surgery to dissect the facial nerve, often occurs after the peripheral facial plexus plane [14]. Instead of allowing a formal nerve dissection, ECD carefully dissects the area surrounding the tumor [12]. Therefore, with ECD, a face nerve evaluation is unavoidable. Since the tumor in our instance is superficial and modest in size, ECD was performed without causing any complications during or after surgery. On the other hand, recurrent disease was much more common following ECD than following superficial parotidectomy, and ECD may have positive resection margins [12]. The result of ECD for superficial parotidectomy will thus depend on the patient's cautious selection and the experience of the surgeon. This study found that patients who had parotidectomy performed using ECD procedures had significantly shorter operating, anesthetic, and hospital stay periods. The fact that the ECD group's mean operation time was much shorter can be ascribed to the lesser time needed for facial nerve identification. Consequently, the ECD group had a considerable reduction in the mean anaesthesia time. The ECD group's postoperative hospital stay was shorter, and the majority of its patients were discharged the same day with an in-situ drain. After the drain was removed, they saw one another for an outpatient examination. The mean anesthesia and surgery periods in the ECD patient group reported by Kato et al. were 148 min and 83 min, respectively, which is similar to the results of our investigation [11]. Lower health care expenditures for the patient

and society are probably going to follow from a shorter hospital stay and operation. Only 5.5% of patients experienced transitory facial nerve palsy, which is similar to findings from studies that have been published recently in the literature and that have also shown reduced rates of both transient and permanent facial nerve palsy when using the ECD approach [8]. Following ECD, Frey syndrome was shown to be far less common. According to one meta-analysis [15], Frey syndrome was observed in 2 (5.5%) of the ECD cases in the current investigation. In ECD, the rate of hemotome production was likewise quite low. The quality of life might be negatively impacted by the reported consequences, demonstrating the advantage of ECD due to its decreased incidence of complications. It is important to take quality of life into account when comparing the two surgical techniques. This investigation did not find any recurrence instances, most likely as a result of the scant follow-up. To accurately assess the recurrence rate, a follow-up period of at least ten years is required; this was not met in the current investigation. Even though the ECD approach has the benefits indicated above, not every case can be handled by this method. The location is crucial, as any size tumor in the posterior lower lobe is better suited for excision via electrocardiography. Although benign tumors are the main indication for secondary ECD, false-negative preoperative assessments should be taken into account [16]. When compared to the superficial parotidectomy procedure in the study's chosen patients, the extracapsular dissection technique demonstrated superior clinical results and fewer problems. Therefore, in well-informed and appropriately located tumors, namely benign well-defined superficial mobile lesions, particularly in the posterior lower lobe, the extracapsular dissection technique is a suitable alternative to superficial parotidectomy after careful preoperative examination using FNAC, ultrasound, MRI, and clinical evaluation. It is imperative that surgeons possess the ability to transition between the two surgical modes in cases when intraoperative data suggest a more comprehensive debulking.

## REFERENCES

1. Alsanie I, Rajab S, Cottom H, Adegun O, Agarwal R, Jay A, Graham L, James J, Barrett AW, van Heerden W, de Vito M, Canesso A, Adisa AO, Akinshipo AO, Ajayi OF, Nwoga MC, Okwuosa CU, Omitola OG, Orikpete EV, Soluk-Tekkesin M, Bello IO, Qannam A, Gonzalez W, Pérez-de-Oliveira ME, Santos-Silva AR, Vargas PA, Toh EW, Khurram SA. Distribution and Frequency of

- Salivary Gland Tumours: An International Multicenter Study. *Head Neck Pathol.* 2022 Dec;16(4):1043-1054.
2. Stryjewska-Makuch G, Kolebacz B, Janik MA, Wolnik A. Increase in the incidence of parotid gland tumors in the years 2005-2014. *Otolaryngol Pol.* 2017 Apr 30;71(2):29-34.
  3. Vanroose R, Scheerlinck J, Coopman R, Nout E. Clinical outcomes and cost-effectiveness of superficial parotidectomy versus extracapsular dissection of the parotid gland: a single-centre retrospective study of 161 patients. *Int J Oral Maxillofac Surg.* 2023 Feb;52(2):191-198.
  4. Rea PM, McGarry G, Shaw-Dunn J, et al. The precision of four commonly used surgical landmarks for locating the facial nerve in anterograde parotidectomy in humans. *Ann Anat.* 2010;192:27–32.
  5. Redaelli de Zinis LO, Piccioni M, Antonelli AR, et al. Management and prognostic factors of recurrent pleomorphic adenoma of the parotid gland: personal experience and review of the literature. *Eur Arch Otorhinolaryngol.* 2008;265:447–452.
  6. Witt RL, Iro H, McGurk M. The role of extracapsular dissection for benign parotid tumors. *Curr Otorhinolaryngol Rep.* 2014; 2: 55-63.
  7. Klintworth N, Zenk J, Koch M, Iro H. Postoperative complications after extracapsular dissection of benign parotid lesions with particular reference to facial nerve function. *Laryngoscope.* 2010 Mar;120(3):484-90.
  8. Foresta E, Torroni A, Di Nardo F, de Waure C, Poscia A, Gasparini G, Marianetti TM, Pelo S. Pleomorphic adenoma and benign parotid tumors: extracapsular dissection vs superficial parotidectomy--review of literature and meta-analysis. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2014 Jun;117(6):663-76.
  9. Iro H, Zenk J. Role of extracapsular dissection in surgical management of benign parotid tumors. *JAMA Otolaryngol Head Neck Surg.* 2014 Aug;140(8):768-9.
  10. Xie S, Wang K, Xu H, Hua RX, Li TZ, Shan XF, Cai ZG. PRISMA—extracapsular dissection versus superficial parotidectomy in treatment of benign parotid tumors: evidence from 3194 patients. *Medicine.* 2015; 94e1237.
  11. Kato MG, Erkul E, Nguyen SA, Day TA, Hornig JD, Lentsch EJ, Gillespie MB. Extracapsular Dissection vs Superficial Parotidectomy of Benign Parotid Lesions: Surgical Outcomes and Cost-effectiveness Analysis. *JAMA Otolaryngol Head Neck Surg.* 2017 Nov 1;143(11):1092-1097.
  12. Witt RL, Iro H, McGurk M. The role of extracapsular dissection for benign parotid tumors. *Curr Otorhinolaryngol Rep.* 2014;2:55–63.
  13. Martin H, Jayasinghe J, Lowe T. Superficial parotidectomy versus extracapsular dissection: literature review and search for a gold standard technique. *Int J Oral Maxillofac Surg.* 2020;49:192–199.
  14. Thielker J, Grosheva M, Ihrler S, Wittig A, Guntinas-Lichius O. Contemporary management of benign and malignant parotid tumors. *Front Surg.* 2018;5:39.
  15. Mantsopoulos K, Koch M, Klintworth N, Zenk J, Iro H. Evolution and changing trends in surgery for benign parotid tumors. *Laryngoscope.* 2015 Jan;125(1):122-7.
  16. Deschler DG. Extracapsular dissection of benign parotid tumors. *JAMA Otolaryngol Head Neck Surg.* 2014 Aug;140(8):770-1.