

Endoscope-assisted partial–superficial parotidectomy through a concealed postauricular skin incision

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Abstract

Background This study evaluated the feasibility of endoscope-assisted partial–superficial parotidectomy through a concealed postauricular skin incision.

Methods Endoscope-assisted partial–superficial parotidectomy through a concealed postauricular skin incision was performed for 18 cases of benign tumor located in the superficial lobe of the parotid gland.

Results All 18 operations were successfully performed endoscopically. This new approach provided safe dissection of the facial nerve and exposed working space. Two patients had transient facial paresis and recovered in 1 and 2 months, respectively. The duration of the procedure was 90 to 120 min. The patients were satisfied with the almost invisible scar.

Conclusions Endoscope-assisted partial–superficial parotidectomy is a feasible method for treatment of benign tumors located in the superficial lobe of the parotid gland. The main advantage of this procedure is that the small operative scar is concealed in the postauricular area, resulting in improved cosmesis.

Keywords Endoscope · Invisible scar · Parotidectomy · Partial–superficial · Tumor

Benign parotid gland tumors account for the majority of parotid gland neoplasms [1, 2]. The recommended treatment for small benign tumors located in the superficial lobe of the parotid gland is partial–superficial parotidectomy [3]. However, the traditional incision leaves a large scar after the surgery. Endoscopic surgery such as endoscopic cosmetic surgery and endoscopic thyroidectomy has been used more frequently in head and neck area since the end of the 1990s [4, 5]. One of its advantages is that it leaves a minimal postoperative scar compared with the conventional approach [6–11].

In this report, we present a new approach of endoscope-assisted partial–superficial parotidectomy through a concealed postauricular skin incision.

Materials and methods

Patients

From February 2005 to October 2006, 18 patients with benign parotid tumors were selected to undergo endoscopic-assisted partial–superficial parotid surgery. The group consisted of 13 men and 5 women ranging in age from 17 to 62 years.

The method of endoscope-assisted parotid surgery was explained to all the patients and their families before the operation, and their consent was obtained. The Institutional Review Board (IRB) of our hospital had already approved the entire study.

All the patients underwent computerized tomographic (CT) scan or magnetic resonance imaging (MRI) before the operation. The indication for endoscopic parotidectomy was a benign neoplasm with a maximum diameter of 30 mm located in the superficial lobe of the parotid gland.

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The neoplasms in this study included 16 parotid tail tumors and 2 parotid superficial lobe tumors located at the anterior border of the auricular lobule (Table 1). Suspected cases of malignant parotid tumor, sialoadenitis in the acute inflammatory stage, and revision surgery were excluded from the study.

Instruments

The endoscope (angle, 0°; diameter, 4 mm), television monitor, and equipment for endoscopic thyroid surgery were purchased from the Karl-Storz Corporation (Tuttlingen, Germany). The Harmonic Scalpel was purchased from Ethicon Corporation (Shanghai, P.R.China).

Surgical technique

All the patients were placed in supine position with a pillow under their shoulder. General anesthesia was administered to 12 patients, whereas 6 patients received sedation and local anesthesia. The operating team consisted of four people: the chief surgeon, the endoscope assistant, an assistant surgeon who helped to maintain the working cavity using two small retractors, and a scrub nurse. The positioning of the patient with a right-side benign parotid tumor and the surgical team are shown in Fig. 1.

A 30- to 35-mm skin incision was started from the anterior or lower border of the earlobe. It traveled along the postauricular crease, then extended to the mastoid tip (Fig. 2A). The incision was carried down to the parotid fascia, and the skin flaps were dissected from the surface of the gland under the 4-mm-diameter, 0° angle endoscope. The surgical plane was developed after the skin flaps were elevated using two small retractors (Fig. 2B).

Next, the skin was dissected posteriorly to expose the cartilaginous auditory canal, the mastoid tip, and the upper portion of the sternocleidomastoid muscle. At this stage, elevation of the skin flaps for surgical exposure was complete. The next phase came with identification of landmarks for the main trunk of the facial nerve. Magnification of the monitor and endoscope views can be helpful for this portion of the procedure. The facial nerve close to the stylomastoid foramen was identified first (Fig. 2C and D), and then each of the peripheral nerve branches was dissected using the Harmonic Scalpel. Good illumination and magnified viewing enabled the whole course of each facial nerve branch to be separated clearly and safely from the glandular and subcutaneous tissues (Fig. 3).

The specimens were sent for frozen section, and the results showed that all the tumors were benign. Subsequently, each tumor was excised together with a 1- to 2-cm margin of normal parotid parenchyma, and each peripheral

Table 1 Location and size of the parotid superficial tumor in 18 patients

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9
Tumor location	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail
Tumor size (maximum diameter) (cm)	3.0	2.7	3.0	2.2	2.5	2.0	2.6	2.8	3.0
	Case 10	Case 11	Case 12	Case 13	Case 14	Case 15	Case 16	Case 17	Case 18
Tumor location	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Parotid tail	Anterior border of the auricular lobule	Anterior border of the auricular lobule
Tumor size (maximum diameter) (cm)	2.8	3.0	1.6	2.4	2.0	2.5	2.6	2.0	1.8

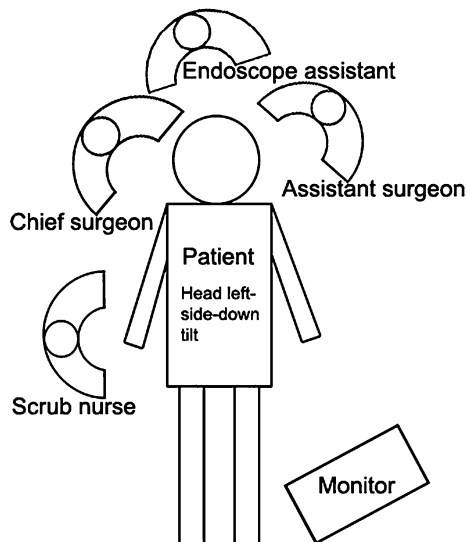


Fig. 1 Positioning of patient, operating team, and monitor

nerve branch was exposed clearly after the tumor was pulled out through the surgical wound (Fig. 4A). For the final histologic examination, all the specimens were sent

for paraffin section. Finally, the wound was closed using subcuticular suture with 4 to 0 Dexon, and a small hemovac was placed for drainage.

Results

Partial–superficial parotidectomy was performed by means of endoscopic surgery for 13 men and 5 women with benign parotid tumor. The patients ranged in age from 17 to 62 years. Postoperative pathologic examination showed pleomorphic adenoma in 13 cases and Warthin’s tumor in 5 cases. It also proved that the tumor removal was complete in all cases.

The incisions ranged from 30 to 35 mm in length (average incision length, 32 mm). All of the resection margins were 1 to 2 cm free of tumor invasion. The operating time was 98.7 ± 19.4 min (range, 90–120 min), and the bleeding volume was 14.7 ± 4.5 ml (range, 10–20 ml).

The patients were discharged on the next postoperative day after removal of the hemovac. All the incisions healed

Fig. 2 **A** The concealed incision, started from the anterior or lower border of the earlobe, travels the postauricular crease, then is extended to the mastoid tip. **B** The working space is constructed after tissue under the platysma is undermined by blunt and sharp dissection. **C** The main trunk of the facial nerve (FN) is situated in the notch formed by the superior edge of the posterior belly of the digastric muscle (DM) and the inferior border of the auditory canal cartilage (ACC). **D** The main trunk of the facial nerve is dissected and then exposed

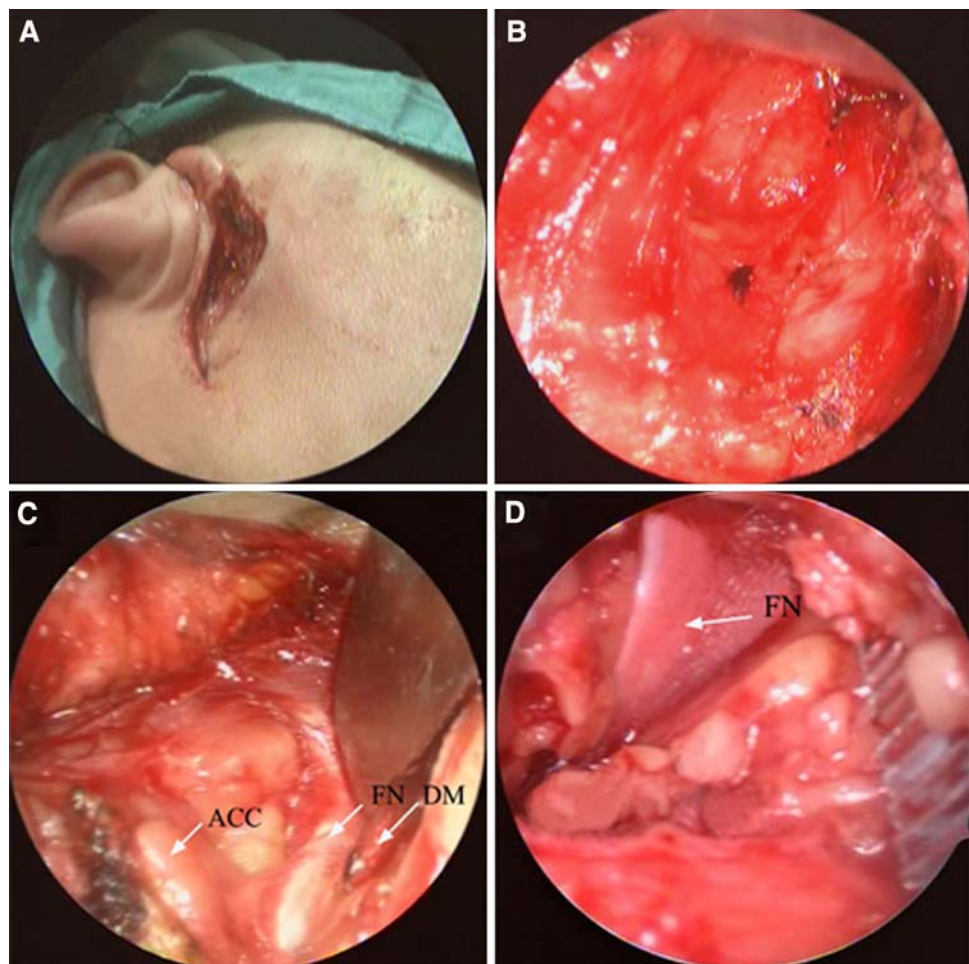
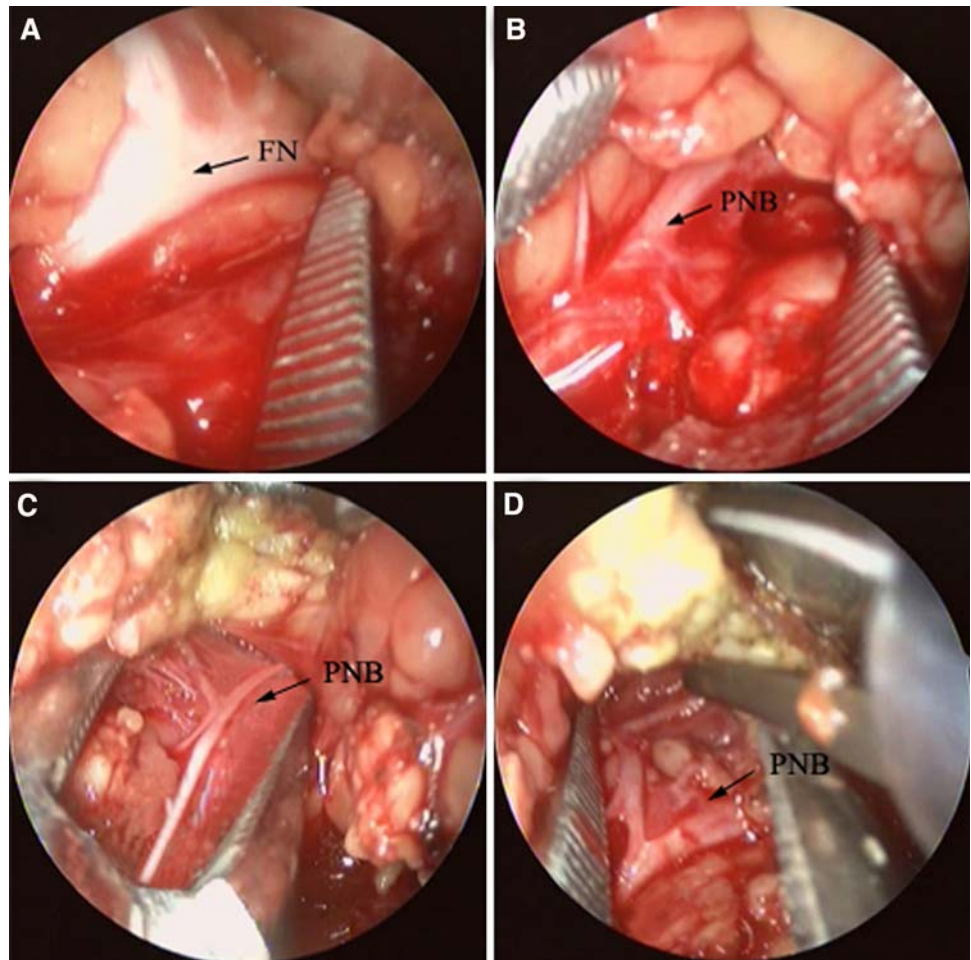


Fig. 3 A, B, C, D The main trunk of the facial nerve (FN) and each peripheral nerve branch (PNB) are dissected step by step. Finally, the tumor and the normal parotid tissue around it are excised by means of the Harmonic Scalpel



completely. Two patients had transient facial paresis (H-B grade 2) and recovered in 1 to 2 months. No permanent facial paralysis, salivary fistula, or Frey's syndrome occurred. The patients were satisfied with the almost invisible scar caused by the endoscopic surgery (Fig. 4B–D). All the patients were disease free at the follow-up visit in 26 to 42 months.

Discussion

Endoscopic surgery is suitable for places that have natural cavities. The endoscopic technique has several benefits including reduced tissue damage, improved cosmesis, and fewer wound-related complications. Because of these benefits, head and neck surgeons have performed this procedure by creating a working space in thyroidectomy, parathyroidectomy, selective neck dissection, submandibular gland dissection and nasopharyngeal angiofibroma, and the like. All these surgeries have resulted in patients satisfied with the results [4–13].

To date, the most common and distressed complication of parotidectomy is transient, partial, or complete paresis of

the facial nerve. Therefore, surgeons take painstaking efforts to minimize the risk of facial paresis during parotidectomy. Despite this, an incidence of early transient facial paresis ranging from 9.3% to 64.6% occurs, which carries a significant risk of corneal exposure and potential loss of sight.

In addition, an incidence of permanent paralysis ranging from 0% to 0.9% has been reported [14]. Thus, to facilitate frank exposure of the facial nerve trunk and branches, a long incision is conventionally made. This incision starts from the level of the crus helix and continues in front of the tragus to the lobule and toward the mastoid, then curves downward following the wrinkle lines on the upper neck to the level of the hyoid.

Although this approach provides a good surgical field, it can result in a visible and prominent scar that many patients find troublesome. Surgeons try to improve the cosmetic result by using an endoscopic technique [15]. Lin et al. [15] reported the first endoscope-assisted parotidectomy in addition to the classic procedure. The preliminary result of applying the endoscope to the classic parotidectomy was satisfactory except that the skin incision needed 60 to 81 mm of additional length.

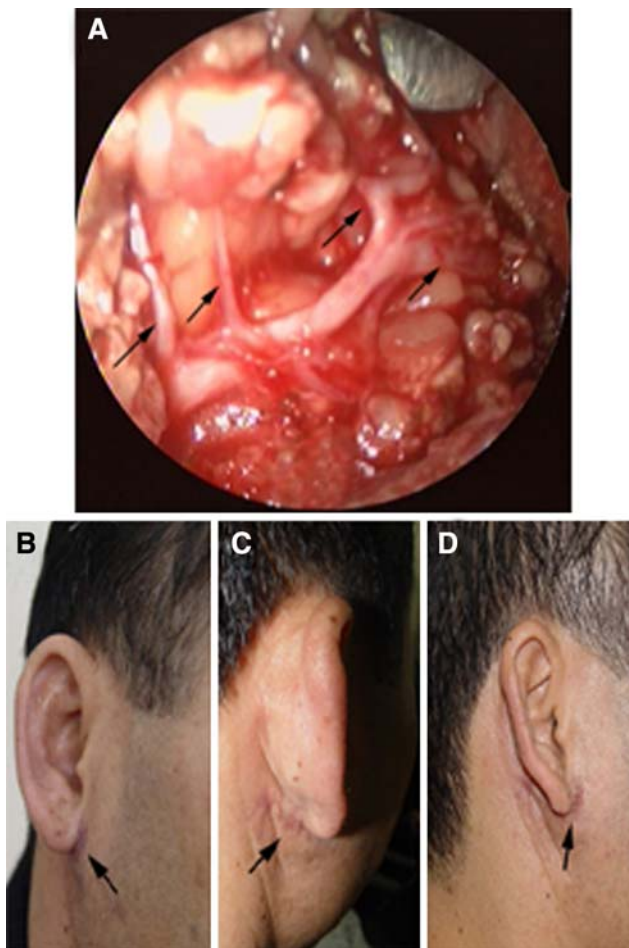


Fig. 4 **A** Each peripheral branch of the facial nerve is exposed clearly after the tumor is excised. **B, C, D** The small postoperative scar is concealed in the postauricular area, resulting in an improved cosmetic result

In the current study, endoscope-assisted partial–parotidectomy was feasible for benign tumors with a maximum diameter of 30 mm located in the superficial lobe of the parotid gland. Only two patients (11.1%) had transient facial paresis. With this procedure, the 30- to 35-mm skin incision is not far from the parotid gland, and the working space can be created without carbon dioxide insufflation. All the patients were satisfied with the concealed postauricular scars because they were almost invisible. Another advantage with this incision is that it is easy to convert the surgery to conventional open resection by extending the incision directly, although we have not encountered the difficult cases during endoscopic surgery.

The endoscopic technique provides good illumination and magnification of surgical procedures under the video monitor. Tissues, including the facial nerve branches, are identified and visualized clearly and can be dissected efficiently. Watanabe et al. [16] used a microscope while operating on the facial nerve, and thereby decreased the

incidence of injury considerably. The study of Watanabe showed that magnification of tissues during surgical procedures is helpful in the prevention of surgical trauma.

Damage to tissues during the surgery is minimized also by use of the Harmonic Scalpel [17]. The Harmonic Scalpel cuts and coagulates via ultrasonic vibrations of the blade at 55,000 Hz, denaturing proteins and forming a coagulum that seals the vessels. Vessels up to 5 mm in diameter can be sealed by coaptation [18]. Thus, the operative field is clean and bloodless, and accidental injury or abrasion of the facial nerve branches can be avoided.

Among the facial nerve branches injured during parotidectomy, the marginal mandibular branch has a relatively high incidence of injury [19, 20]. Direct dissection and identification of each nerve branch's full course from its exit through the stylomastoid foramen to the peripheral border of the parotid gland is the best method for protecting and preserving the facial nerves.

Because of the small skin incision in our series, damage to the facial nerve (11.1%) was not greater than with conventional surgery, in which injury to the facial nerve is a common complication. The incidence of early transient facial paresis in conventional surgery reportedly ranges from 9.3% to 64.6% and permanent total paralysis from 0% to 0.9%.

In the current study, the parotid benign tumors were removed by endoscope-assisted partial parotidectomy. All the resection margins were 1 to 2 cm free from tumor invasion.

A parotidectomy can be classified in terms of resection extent as “partial–superficial,” “superficial,” or “total.” A partial–superficial parotidectomy is defined as excision of a tumor together with a 2-cm margin of normal parotid parenchyma except at the point where the tumor abuts the facial nerve. The candidates for this procedure are patients with small (<3 cm) benign tumors that are mobile and predominantly involve the superficial lobe.

No consensus exists among doctors on the exact margin of the parotid tissue that must be resected to avoid recurrence. O'Brien [3] reported 363 limited (partial) superficial parotidectomies for benign neoplasms. The rate of recurrence was only 0.8% in this series during a median postoperative period of 6 years. O'Brien [3] concluded that limited superficial parotidectomy is associated with very low rates of morbidity and recurrence and that complete superficial parotidectomy is therefore not warranted for the treatment of benign localized parotid tumors.

Witt [21] reported that a 1-cm area of normal parotid parenchyma around a benign pleomorphic adenoma was a safe margin. The outcomes (capsular exposure, tumor–facial nerve interface, capsular rupture, recurrence, facial nerve dysfunction, and Frey's syndrome) for surgical treatment of a mobile, superficial lobe of the parotid gland

smaller than 4 cm are not significantly altered by the surgical approach (total-superficial parotidectomy, partial-superficial parotidectomy, or extracapsular dissection) [22]. From their pathologic study, Lam et al. [23] concluded that partial parotidectomy is adequate treatment for pleomorphic adenoma of the parotid gland.

Currently, endoscopic parotid surgery still is in its infancy. Only a few studies have been reported, and the surgical method is far from perfect [15]. Our experience indicates that this technique can be used for a benign tumor with a diameter less than 30 mm located in the superficial lobe of the parotid gland.

Conclusions

The advantages of endoscope-assisted partial parotidectomy through a postauricular skin incision include an almost invisible scar and magnification of key structures. This new operative method is feasible for benign parotid tumors with a diameter less than 30 mm located in the superficial lobe of the parotid gland. This initial study may extend the current realm of parotid surgery.

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