CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Impact of great auricular nerve preservation status post parotidectomy on quality of life
Authors	Shdaifat, M.;Van Den Berg, N. H.;Sheahan, P.
Publication date	2026-11-10
Original Citation	Shdaifat, M, Van Den Berg, N H & Sheahan, P 2026, 'Impact of great auricular nerve preservation status post parotidectomy on quality of life', European Annals of Otorhinolaryngology, Head and Neck Diseases, vol. 143, pp. 466-469. https://doi.org/10.1016/j.anorl.2026.04.009
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.scopus.com/pages/publications/105042586183 - 10.1016/j.anorl.2026.04.009
Rights	© 2026, authors. Published by Elsevier Masson SAS. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/) - https://creativecommons.org/licenses/by/4.0/
Download date	2026-11-14 00:07:03
Item downloaded from	https://hdl.handle.net/10468/19617

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

European Annals of Otorhinolaryngology, Head and Neck diseases 143 (2026) 466–469

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Original article

Impact of great auricular nerve preservation status post parotidectomy on quality of life

M. Shdaifat[a], N.H. Van Den Berg[a], P. Sheahan[a,b,*]

[a] Department of Otolaryngology – Head & Neck Surgery, South Infirmary Victoria University Hospital, Cork, Ireland
[b] ENTO Research Unit, College of Medicine, Health, University College Cork, Cork, Ireland

INFO ARTICLE

Keywords :
Parotidectomy
Great auricular nerve preservation
Quality of life

ABSTRACT

Aims: Parotidectomy is a common surgery to treat parotid neoplasms. While much discussion has been invested in complications such as facial nerve injury and Frey syndrome, outcomes arising from great auricular nerve (GAN) sacrifice are not well studied. The present study aims to investigate quality of life outcomes post-parotidectomy according to GAN preservation status.
Materials and methods: A cross-sectional study of parotidectomy patients between 2011–2020 for benign tumours was performed. Data on quality of life (QoL) was collected through a composite questionnaire (Douleur Neuropathique 4 [DN4] and Leeds Assessment of Neuropathic Symptoms and Signs [LANSS]).
Objectives: To assess patient quality of life post-parotidectomy according to GAN preservation status.
Results: Among the contacted patients, 76/205 (37.1%) responded. Of these, 38/76 were categorised as GAN-preserved, 34/76 as GAN-sacrificed and 4/76 were excluded as GAN status could not be ascertained. All patients were > 6 months post-operation. On a scale of 0–10, for pain, the mean values were 2.21/10 (GAN-sacrificed) and 1.32/10 (GAN-preserved) ($P = 0.645$), and for numbness 4.47/10 (GAN-sacrificed), and 4.34/10 (GAN-preserved) ($P = 0.645$). The angle of mandible was the most reported area for neuropathic sensations (42.1% (16/38) of GAN-preserved; 50.0% (17/34) of GAN-sacrificed). Tingling sensation was the most frequent sensation described. On a scale of 0–10 for effect on general QoL, the mean was 1.08/10 for GAN-preserved, and 1.62/10 GAN-sacrificed cohort ($P = 0.29$). No statistical differences for specific QoL measures were found.
Conclusion: Our results suggest that GAN sacrifice is not associated with increased sensory defects and does not negatively impact on quality of life.
Level of evidence: III.

1. Introduction

The great auricular nerve (GAN) is a sensory nerve originating from the second and third cervical nerves. It travels posterior to the sternocleidomastoid (SCM) muscle and ascends the muscle, dividing into anterior and posterior branches at the inferior margin of the parotid gland. The anterior branch passes through the inferior pole and innervates the skin overlying the angle of mandible and parotid region. The posterior branch supplies the area over the mastoid process and the posteroinferior surface of the auricle. Fine branches pass through the auricle to reach the collateral aspect, innervating the lobule and concha [1–4].

Parotidectomy is most commonly performed to treat parotid neoplasms. While the anterior GAN branch is usually sacrificed at the inferior margin of the sternocleidomastoid, the posterior branch can often be preserved [2]. Cutaneous sensory disturbances are common complaints post-parotidectomy. This is usually attributed to injury of GAN fibers, and the distribution of sensory symptoms are typically found over the angle of mandible, postauricular, and lobular areas [3]. Symptoms associated with GAN injury include discomfort when putting on earrings, wearing glasses, laying on the operated side, and painful sensations when exposed to changes in weather [2].

While much discussion has taken place in relation to other complications such as facial nerve injury and Frey syndrome, outcomes arising from GAN sacrifice are presently not well understood. There is conflicting evidence in the literature on the clinical significance of GAN sacrifice and subsequent post-operative sensory disturbance [5–8]. This research aims to ascertain the sensory defects associated with sacrifice of the posterior branch of the GAN, as well as assess the outcomes of nerve preservation. Research in this area would contribute to developing knowledge on the impact of GAN preservation and if it is surgically rele-

* Corresponding author. Department of Otolaryngology – Head & Neck Surgery, South Infirmary Victoria University Hospital, Cork, Ireland.
Adresses e-mail : patrick.sheahan@ucc.ie, sheahan.patrick@sivuh.ie (P. Sheahan).

https://doi.org/10.1016/j.anorl.2026.04.009

1879-7296/© 2026 The Authors. Published by Elsevier Masson SAS. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

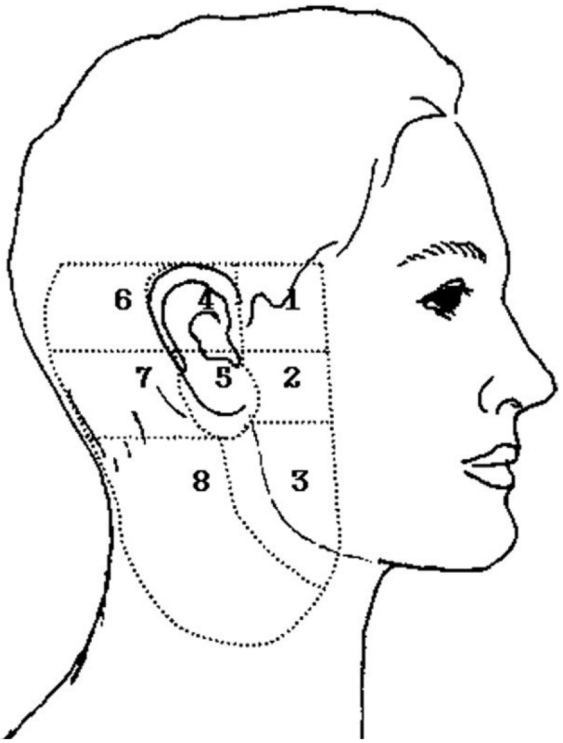


Fig. 1. Accompanying figure attached to the distributed questionnaire dividing the skin innervated by the GAN into seven regions (modified from the study of Min et al. [5]).

vant. The present study aims to explore the sensory defects and quality of life post-parotidectomy with regards to GAN preservation status.

2. Materials and methods

This study is a quantitative cohort study with retrospective review of a prospectively kept database and evaluation of patient outcomes through a composite questionnaire. Inclusion criteria were patients over the age of 18 with English literacy who underwent parotidectomy for benign tumours from January 2011 to March 2021 under a single surgeon. Exclusion criteria included patients who were less than 6 months post-op, malignant tumours; patients who underwent neoadjuvant therapy; those without sufficient cognitive ability to complete the questionnaire, revision parotidectomies, and patients with preoperative facial nerve dysfunction. Ethical approval was obtained from the Cork Clinical Research Ethics Committee.

A composite questionnaire was created by combining two validated questionnaire tools (Douleur Neuropathique 4 [DN4] and Leeds Assessment of Neuropathic Symptoms and Signs [LANSS]) (Appendix 1). A figure (Fig. 1) was attached to the distributed questionnaire dividing the skin innervated by the GAN into seven regions (modified from the study of Min et al. [5]). The locations were as follows: 1) preauricular superior; 2) preauricular inferior; 3) angle of the mandible; 4) helix and concha; 5) lobule; 6) retro-auricular; 7) mastoid-lateral neck. Patients were contacted to participate by post. Written and informed consent was obtained from all participants.

Statistical analysis was performed using SPSS. The Mann-Whitney U test was used to compare two categorical variables on one continuous variable. Comparisons of patient characteristics and outcomes (categorical variables and frequency data) were performed using Pearson's chi-square test. A *P*-value of < 05 was considered to be statistically significant with a 95% confidence interval.

Table 1
Incidence of abnormal sensations reported.

	GAN-Preserved ($n = 38$)	GAN-Sacrificed ($n = 34$)	*P*-value
Tingling	19	15	0.618
Tightening	15	15	0.690
Itching	7	8	0.594
Pins & Needles	7	3	0.240
Painful Cold	4	6	0.383
Electric Shock	2	6	0.095
Burning	2	2	0.909

Table 2
Patient reporting frequency of abnormal neuropathic sensation.

Frequency	GAN-Preserved ($n = 38$)	GAN-Sacrificed ($n = 34$)
Always	5	8
Often	9	10
Occasional	18	8
Never	6	8

3. Results

Among those who underwent parotidectomy for benign tumours, 76/205 (37.1%) completed the questionnaire. The male to female ratio was 23:49 with a mean age of 52 ± 13.9 years (range 20–82). Majority of parotidectomies were performed for pleomorphic adenomas (57/76, 75.0%) followed by Warthin's tumours (9/76, 11.8%) and other benign tumours (6/76, 7.9%). 4/76 (5.3%) responders were excluded from analysis as GAN status could not be ascertained from retrospective review. In majority of those included, the GAN was preserved (38/72, 52.8%). Average tumour size was $20.31\,mm \pm 8.28$ (range: 5–35 mm).

A number of patients–61/72 (84.7%)–reported experiencing numbness post-operatively. Thirty-one of 38 patients in the GAN-preserved group reported numbness (81.6%), and 26/34 (76.5%) in the GAN-sacrificed group ($P = 0.59$). The average value when rating numbness on a scale of 0–10 was 4.39/10 (GAN-sacrificed mean value of 4.47/10; GAN-preserved group mean value of 4.34/10) (*P*-value = 0.645).

Among the patients, 38.9% (28/72) reported experiencing pain as a complication of their surgery. Majority were in the GAN-sacrificed group (15/34, 44.2%); however there was no statistical significance between the two groups. (*P*-value = 0.389). When scoring pain on the rating scale, the mean value for all patients was 1.64/10. The GAN-sacrificed group reported a mean value of 2.21/10 while the GAN-preserved group reported a mean value of 1.32/10 (*P*-value = 0.645).

Most patients (51/72, 70.8%) reported experiencing abnormal sensations post-operatively, with 71.1% of both groups describing altered sensation (27/38 GAN-preserved; 24/34 GAN-sacrificed). Statistical analysis between the two groups showed no statistical significance ($P = 0.965$). The most common sensations reported were tingling (GAN-preserved 19/38, GAN-sacrificed 15/34) and tightening (GAN-preserved 15/38, GAN-sacrificed 15/34) respectively. Table 1 outlines the description and incidence of the remaining abnormal sensations reported. There was no statistical difference between the two groups for any of the altered sensations. Table 2 demonstrates the reported frequency of abnormal sensations for the two cohorts of this study. A Mann-Whitney U test revealed no significant relationship between frequency of dysesthesia and GAN status (*P*-value = 0.431).

Table 3 illustrates the prevalence of dysesthesia by location. The angle of mandible was the most frequent location of abnormal sensation in both GAN-preservation and GAN-sacrifice groups 33/51 (64.7%). No statistically significant relationship was identified between dysesthesia location and GAN status (*P*-value > 0.05 for all anatomical sites).

Table 3
Prevalence of dysesthesia by anatomical location.

Location	GAN-Preserved (n = 38)	GAN-Sacrificed (n = 34)	% of total (n = 51)	P-value
Preauricular superior	2	3	9.8%	0.553
Preauricular inferior	8	8	31.4%	0.801
Angle of the mandible	16	17	64.7%	0.863
Helix and concha	5	7	23.5%	0.236
Lobule	10	15	49.0%	0.113
Retro-auricular	0	1	0.0%	0.287
Mastoid-lateral neck	6	4	0.2%	0.622
Post-auricular	5	9	27.5%	0.341

Table 4
Measure of quality of life factors in both cohorts.

Measure	GAN-Preserved (n = 38) Mean Rating (0–10)	GAN-Sacrificed (n = 34) Mean Rating (0–10)	P-value
Sleep	1.45	2.62	0.94
Relationship	0.29	1.15	0.74
Work	0.71	1.38	0.99
Mood	0.84	1.65	0.25
General QoL	1.08	1.62	0.29

Neuropathic sensations were most commonly provoked by light touch in both groups (14/38 GAN-preserved; 14/34 GAN-sacrificed). Other provoking factors included exposure to hot or cold temperatures (11/38 GAN-preserved; 11/34 GAN-sacrifice) and weather change (8/38 GAN-preserved; 7/34 GAN-sacrificed). Chi-square test shows no statistical difference between the results for the two cohorts (P-value = 0.702).

The impact of sensory disturbance on patient quality of life was assessed using a rating scale of 0-10. Impact on sleep quality had the highest mean value in both groups (2.62/10 for GAN-sacrificed; 1.45/10 for GAN-preserved). The remaining areas of quality of life assessed are outlined in Table 4 . No statistical difference was found between the two groups for all areas of quality of life assessed.

4. Discussion

At present there is disparity in the literature surrounding the significance of preserving the GAN during parotidectomy [5–8]. Traditionally, although attempt is made to preserve the posterior branch of the nerve during dissection, if sacrificed, the loss of this cutaneous nerve may not always be regarded as a serious complication of parotidectomy by the operating surgeon, as the nerve has no motor or special sensory function. However, to the patient, the consequences of GAN sacrifice has been postulated to have a significant impact on quality of life [9].

In a prospective non-randomised multicentre controlled trial, Grosheva et al. found that hypoesthesia was subjectively experienced equally by both GAN-preservation and GAN sacrificed groups. However, they found statistical significance between the two groups when assessing patients objectively with the TouchTest device. Patients in the GAN-preserved group were found to have objective improved sensation of only the antitragus and lobule regions after two years. In neither group was complete restoration of sensation achieved [10]. This suggests that although patients may have objective improvement in nerve function when preserving the GAN, this may not translate to subjective sensation by the patient. This is supported by this present study, which found no statistical correlation between nerve preservation status and developing subsequent numbness. There was also no statistically significant difference in severity of numbness between the two cohorts when applying Mann-Whitney U test (P-value = 0.645).

Grammatica et al. divided the GAN territory into seven regions, and assessed tactile sensitivity, pain, and thermal sensitivity between GAN-preserved and GAN-sacrificed patients at 3-month intervals, over a one-year period. They found no statistical significance between the two cohorts for any of the factors [3]. Similarly, in the present study no statistical difference was found when assessing pain or severity of pain between the two cohorts, when tested with Mann-Whitney U test (P-value = 0.645). However, duration of follow up may be a key factor when assessing for post-operative pain. In current literature, most studies evaluating this cohort of patients are carried out retrospectively, and short and long-term follow up is variably defined, with follow up ranging from 2-weeks post-operatively to 13 years [8,11]. Results suggest post-operative pain may be worse in the short-term follow up, with no statistical significance in pain in long-term follow up [11]. In the present study, all patients were evaluated at a minimum of six months post-operatively, however patients were not further sub-categorised based on duration of follow up post-operatively.

Separate to numbness and pain, this current study aimed to measure the incidence of neuropathic sensations. Neuropathic sensations were defined as either dysesthesia “abnormal sensation that can become intense and/or painful” or paraesthesia, temporary “altered sensations,” including sensations of tingling and “pins and needles.” [12]. 71.1% (51/72) of patients reported experiencing one or more abnormal sensations. No statistical difference was established between the different GAN cohorts. In 2001, Patel et al. reported that 57% (30/53) of the patients of both cohorts experienced at least 1 abnormal sensation [13]. This finding was further reproduced in subsequent studies by Grammatica et al. and Powell et al. [3,14]. Similarly to the current study there was no statistical difference between the two cohorts in any of these studies.

In clinical practice when assessing patients post-parotidectomy, one of the main complaints noted by patients is the sensory disturbance of the auricle as well as the peri-parotid area, regardless of the preservation status of the GAN during operation [2,6–9,15]. In the present study, patients reported altered sensation over the angle of the mandible more than any other area for both cohorts. The lobule was the second most affected area for both groups, and although there is a higher incidence rate at the lobule for the GAN-sacrificed cohort, this is not statistically significant. Findings are similar to other studies where the angle of mandible and lobule were most commonly affected [1,3,16].

The impact of GAN sacrifice on patient quality of life remains contested in the literature. Several studies have indicated preserving the GAN provides a negligible impact on QoL [11,16] and long-term outcomes post-parotidectomy. Patel et al. reported 90% (27/30) of patients with symptoms expressed “little to no interference with daily activities” [13]. A systematic review by George et al. reported no statistically significant effect of sacrificing the GAN on overall QOL; however still advocated for preservation of GAN where feasible [17]. The results collected in this current study have shown that the daily activities of those in the sacrificed group were not impaired, and patients considered the distur-

bance very mild. Additionally, no statistical difference was established between the GAN cohorts in terms of provocative factors involved with sensory defects.

This study is limited by the sample size and limited patient response rate to the survey. Further limitations include the retrospective nature of the study, and collection of data from a single-surgeon, and single-centre. The patients were operated on over the span of ten years, (2011-2021) and the surgeries varied in their extent of resection (extracapsular versus superficial vs total). Although all patients included in this study were surveyed more than six months post-operatively, there is heterogeneity in duration after surgery at which time the patients were assessed, as patients were not further sub-categorised (i.e. 1 year post-operatively, 5-years post-operatively, 10-years post-operatively). This limits the findings of our study, as there may be a difference in symptomatology at 1 year post-operatively versus 10 years post-operatively. The use of the DN4 and LANSS questionnaires should also viewed with some caution, as although these are validated questionnaires, they are not validated for post-parotidectomy outcomes specifically. One of the main outcomes tested for was the effect on quality of life, which is a subjective measure and can differ based on the patient's interpretation and specific factors. There is a possibility that patients with increased symptomatology were more likely to respond resulting in selection bias. Finally, sensation changes detected may not be entirely contributed to the greater auricular nerve due to the overlap in innervation of this area. This in combination with the small sample size may explain why there is no statistically significant difference detected between the two groups.

Strengths of the present study include the use of a prospectively kept database, as well as being a easily reproducible study. Further strengths include prolonged follow up of patients adding to the literature and knowledge we have on extended post-parotidectomy follow up, and evaluation of patients with a patient centred questionnaire.

5. Conclusion

The authors conclude that based on the findings in the present study, GAN sacrifice is not associated with increased sensory defects and does not negatively impact on quality of life. Furthermore, the findings in this present study suggest that regardless of GAN preservation status, a cohort of patients post parotidectomy will develop altered neuropathic sensation. This finding is crucial in counselling patients pre-operatively. Often patients may be informed neural disturbance or altered sensation will only occur if the nerve is sacrificed. However, our findings suggest better informed consent practice would be to counsel regardless of preservation or sacrifice, altered sensation may be experienced in the operated area.

Funding

This research has not received any funding.

Disclosure of interest

The authors declare that they have no competing interest.

Acknowledgements

This study was not preregistered. This paper is an original study and has not previously been published and is not submitted for publication consideration elsewhere. All authors had complete access to the study data. All authors have seen and approved the final manuscript submitted for publication.

Appendix A. Questionnaire

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.anorl.2026.04.009.

Références

[1] Biglioli F, D'Orto O, Bozzetti A, Brusati R. Function of the great auricular nerve following surgery for benign parotid disorders. J Craniomaxillofac Surg 2002;30(5):308–17.
[2] Colella G, Rauso R, Tartaro G, et al. Skin injury and great auricular nerve sacrifice after parotidectomy. J Craniofac Surg 2009;20(4):1078–81.
[3] Grammatica A, Perotti P, Mancini F, et al. Great auricular nerve preservation in parotid gland surgery: long-term outcomes. Laryngoscope 2015;125(5):1107–12.
[4] Brennan PA, Webb R, Kemidi F, Spratt J, Standring S. Great auricular communication with the marginal mandibular nerve – a previously unreported anatomical variant. Br J Oral Maxillofac Surg 2008;46(6):492–3.
[5] Min HJ, Lee HS, Lee YS, et al. Is it necessary to preserve the posterior branch of the great auricular nerve in parotidectomy? Otolaryngol Head Neck Surg 2007;137(4):636–41.
[6] Moretti A, Citraro L, Petrucci AG, et al. Great auricular nerve preservation in parotid surgery: rationale and long-term results insights. Eur Arch Otorhinolaryngol 2015;272(11):3515–20.
[7] Porter MJ, Wood SJ. Preservation of the great auricular nerve during parotidectomy. Clin Otolaryngol Allied Sci 1997;22(3):251–3.
[8] Bulut OC, Hohenberger R, Oladokun D, et al. Long-term quality of life and sensory impact of great auricular nerve preservation in parotid surgery as measured with the parotidectomy outcome Inventory-8. Clin Otolaryngol 2019;44(5):743–8.
[9] Yokoshima K, Nakamizo M, Ozu C, et al. Significance of preserving the posterior branch of the great auricular nerve in parotidectomy. J Nippon Med Sch 2004;71(5):323–7.
[10] Grosheva M, Shabli S, Volk GF, et al. Sensation loss after superficial parotidectomy:a prospective controlled multicenter trial. Head Neck 2017;39(3):520–6.
[11] Plath M, Sand M, Cavaliere C, Plinkert PK, Baumann I, Zaoui K. Long-term outcomes and quality of life following parotidectomy for benign disease. Acta Otorhinolaryngol Ital 2022;42(3):215–22.
[12] Campbell JN, Meyer RA. Mechanisms of neuropathic pain. Neuron 2006;52(1):77–92.
[13] Patel N, Har-El G, Rosenfeld R. Quality of life after great auricular nerve sacrifice during parotidectomy. Arch Otolaryngol Head Neck Surg 2001;127(7):884–8.
[14] Powell ME, Clairmont AA. Complications of parotidectomy. South Med J 1983;76:1109–11.
[15] Infante-Cossio P, Gonzalez-Cardero E, Garcia-Perla-Garcia A, Montes-Latorre E, Gutierrez-Perez JL, Prats-Golczer VE. Complications after superficial parotidectomy for pleomorphic adenoma. Med Oral Patol Oral Cir Bucal 2018;23(4):e485–92.
[16] Christensen NR, Jacobsen SD. Parotidectomy. Preserving the posterior branch of the great auricular nerve. J Laryngol Otol 1997;111(6):556–9.
[17] George M, Karkos PD, Dwivedi RC, Leong SC, Kim D, Repanos C. Preservation of great auricular nerve during parotidectomy: sensation, quality of life, and morbidity issues. A systematic review. Head Neck 2014;36(4):603–8.