

Temporal bone resection for non-melanoma skin cancer: predictive factors of recurrence and survival Douglas P. Cavalcanti, MD<sup>1</sup>;Terence P. Farias, MD, PhD<sup>1</sup>;Izabella C. Santos<sup>1</sup>, MD, PhD<sup>1</sup>; Bernando C. Peryassú, MD, MsC<sup>1</sup>; Fernando L. Dias, MD, PhD, F.A.C.S.<sup>1</sup> <sup>1</sup>Brazilian National Cancer Institute



# Abstract

Temporal bone resection may be needed in the treatment of skin cancer in areas of head and neck near the auricle or periauricuar skin. We have studied 30 patients which underwent this treatment, and classified the temporal bone resection according to lateral, subtotal and total, according with Medina classification. We have found a more common incidence of basal cell skin cancer and low rate of neck and parotid metastasis. We made Kaplan - Meier curves of overall survival and disease free survival and we have found specific risk factors for recurrence and survival.

# Introduction

Temporal bone resection is the treatment for malignant lesions of temporal region, peri-auricular, external auditory canal and auricle and has its origin in our population mainly in cutaneous lesions that are near or invade the bone. The objective of this study is to define factors predictive of recurrence and survival in patients who

### Discussion

The main site of origin for the tumors treated in our study was the periauricular skin, accounting for 43.3%, which is similar to an Australian group (45.5%) (Schachtel et al., 2021). This result is higher than that of other centers, where the main site of origin is the external auditory canal, which in our study accounted for 26.7% of cases, compared to 62.5% reported by Lee, Jeong, and Chung (2023).

In contrast to other literature where squamous cell carcinoma (SCC) is the most common histology of skin tumors requiring temporal bone resection, the predominant histology in our study was basal cell carcinoma (BCC). (63.3%) (Leedman, Wormald, Flukes, 2021: 67.5% SCC; Seligman et al., 2020: 64% SCC and 36% BCC).

underwent temporal bone resection for head and neck cancer at the Brazilian National Cancer Institute.

# Methods and Materials

This was a retrospective study of 30 medical records of patients who underwent temporal bone resection to identify predictive factors associated with recurrence, and survival (age, sex, skin color, smoking and drinking history, comorbidities, previous oncologic treatment, tumor histology, primary site, facial nerve paralysis, staging, lymph node and distant metastasis, type of temporal bone resection, parotidectomy, mandibulectomy, neck dissection, craniotomy, facial nerve sacrifice, reconstruction, adjuvant radiotherapy, bone invasion, perineural invasion, lymphatic invasion, vascular invasion, parotid invasion and margins).

### Results

The studied epithelial histologies included basal cell carcinoma (BCC) - 63,3% and squamous cell carcinoma (SCC) - 36,7% of peri-auricular skin, external auditory canal and auricle. Neck metastases were found in 4 patients (three SCC and one BCC) and 11 patients underwent neck dissection. Parotid invasion and positive lymph nodes in parotid was found in one patient with SCC (13,3%). The overall survival in 5 years was 54,6%. Disease free survival in 5 years was 55%. The Specific mortality for the disease was 47,6%. A higher risk for recurrence was found in patients with 6 or more of the following factors: male sex, alcohol abuse history, previous tobacco use, peri-auricular skin tumor, paralyzed facial nerve, preserved facial nerve, histology positive for SCC, N+, perineural invasion, parotid invasion, parotidectomy, adjuvancy with radiotherapy. The recurrence in advanced tumores was 30,8%. The overall survival was 54.6%.

#### Table 1. Cause of death

### Discussion

Most of the tumors treated with temporal bone resection in our study were advanced cases (Pittsburgh: T4 30%, T3 50%). Schachtel et al. (2022) reported T4 25.3% and T3 47.3%. Patel et al. (2023) reported 3.1% T4 and 58.3% T3. Regarding N+, it was found in 13.3% of cases, with one BCC and three SCCs. Patel et al. (2023) found 14.3% for pN+. A low incidence of lymph node metastasis was noted, despite a 6-year decrease in disease-free survival for patients with cervical metastasis, according to this study. This raises significant controversy over the indication for elective parotidectomy and neck dissection in patients staged NO.

Recurrence occurred in 36.7% of cases: 33,4% locoregional and 3.3% distant. Schachtel et al. (2022) reported a 39.8% recurrence at 5 years, with 29.9% locoregional and 19.9% distant. Kline et al. (2021) reported 38.4% recurrence, with 23% locoregional and 15.4% distant. Of the recurrent cases, 54.5% originated from the periauricular skin, supporting the idea that tumors originating from this location tend to behave more aggressively than those from other sites, as noted by Kovath et al. (2019) and Schachtel et al. (2022; 2023). It was identified a 100% mortality rate in cases of recurrence. In the meta-analysis conducted by McCracken et al. (2023), recurrent disease was identified as a predictor of poorer survival in multivariate analysis.

Overall survival rate and 5-year disease-free survival of 54.6% and 55%, respectively, were identified. Schachtel et al. (2021) found a 5-year global survival of 46.6% and disease-free survival of 52.2%.

In this study, the following factors were identified as risk factors for recurrence when six or more factors were present in a patient: male sex, alcohol use, former smoking, tumor at the periauricular skin, facial nerve paralysis, preserved facial nerve, SCC histology, N+, perineural invasion, parotid involvement, parotidectomy, and adjuvant therapy. Parotid invasion was the only isolated risk factor for recurrence. Morris et al. (2011) reported that pathological parotid invasion is one of the strongest predictors of worse survival and recurrence. Schachtel et al. (2022) identified tumors in the external ear and periauricular skin, salvage surgery, tumors larger than 4 cm, nodal disease, and compromised margins as poor prognostic factors for survival. Kline et al. (2021) reported that preoperative facial nerve dysfunction, facial nerve sacrifice, and prior radiation were negative predictors of survival and recurrence.





### Conclusions

The factors most associated with recurrence were male sex, alcohol abuse history, previous tobacco use, peri-auricular skin tumor, paralyzed facial nerve, preserved facial nerve, histology positive for SCC, N+, perineural invasion, parotid invasion, parotidectomy, adjuvancy with radiotherapy, suggesting a possible use of these factors as predictive factors for recurrence and survival. The use of elective neck dissection would be questionable since there was low incidence of lymph node metastasis. Despite in the patients with cervical recurrence the average survival was 6 years lower. In the patients which presented recurrence, 100% died.



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### References

BH. Lateral temporal bone resections. Am J Surg. 1990 Oct;160(4):427-33. doi: 10.1016/s0002-9610(05)80559-8. PMID: 2221249.

Schachtel MJC, Gandhi M, Bowman JJ, Erian C, Porceddu SV, Panizza BJ. Malignancies requiring temporal bone resection: An Australian single-institution experience. ANZ J Surg. 2021 Jul;91(7-8):1462-1471. doi: 10.1111/ans.16931. Epub 2021 May 12. PMID: 33982375.

McCracken M, Pai K, Cabrera CI, Johnson BR, Tamaki A, Gidley PW, Manzoor NF. Temporal Bone Resection for Squamous Cell Carcinoma of the Lateral Skull Base: Systematic Review and Meta-analysis. Otolaryngol Head Neck Surg. 2023 Feb;168(2):154-164. doi: 10.1177/01945998221084912. PMID: 35290141.

Seligman KL, Sun DQ, Ten Eyck PP, Schularick NM, Hansen MR. Temporal bone carcinoma: Treatment patterns and survival. Laryngoscope. 2020 Jan;130(1):E11-E20. doi: 10.1002/lary.27877. Epub 2019 Mar 15. PMID: 30874314; PMCID: PMC6745298.

Patel TR, Prince ADP, Benjamin WJ, Basura GJ. Role of the otologist/neurotologist in managing auricular and periauricular cutaneous malignancies: A 10-year otologic oncology experience. Laryngoscope Investig Otolaryngol. 2023 Oct 17;8(6):1637-1647. doi: 10.1002/lio2.1171. PMID: 38130268; PMCID: PMC10731494.

Lee YJ, Jeong IS, Chung JW. Treatment outcomes of the external auditory canal and temporal bone malignancy with dura invasion. Laryngoscope Investig Otolaryngol. 2023 May 30;8(4):1021-1028. doi: 10.1002/lio2.1083. PMID: 37621272; PMCID: PMC10446266.

Schachtel MJC, Gandhi M, Bowman JJ, Porceddu SV, Panizza BJ. Epidemiology and treatment outcomes of cutaneous squamous cell carcinoma extending to the temporal bone. Head Neck. 2022 Dec;44(12):2727-2743. doi: 10.1002/hed.27185. Epub 2022 Sep 9. PMID: 36082824; PMCID: PMC9826480.

Leedman S, Wormald R, Flukes S. Lateral temporal bone resection for cutaneous carcinomas of the external auditory canal and peri-auricular region. The Journal of Laryngology & Otology. 2021;135(12):1057-1062. doi:10.1017/S0022215121002607

Kline NL, Bhatnagar K, Eisenman DJ, Taylor RJ. Survival outcomes of lateral skull base tumors following temporal bone resection. Head Neck. 2021 Aug;43(8):2414-2422. doi: 10.1002/hed.26707. Epub 2021 Apr 13. PMID: 33851465. Kovatch KJ, Smith JD, Birkeland AC, Hanks JE, Jawad R, McLean SA, Durham AB, Srinivasan A, McHugh JB, Basura GJ. Institutional Experience of Treatment and Outcomes for Cutaneous Periauricular Squamous Cell Carcinoma. OTO Open. 2019 Sep 13;3(3):2473974X19875077. doi: 10.1177/2473974X19875077. PMID: 31656941; PMCID: PMC6791998.

Schachtel MJC, Gandhi M, Bowman JJ, Panizza BJ. Patterns of spread and anatomical prognostic factors of pre-auricular cutaneous squamous cell carcinoma extending to the temporal bone. Head Neck. 2023 Nov;45(11):2893-2906. doi: 10.1002/hed.27521. Epub 2023 Sep 22. PMID: 37737376.

Morris LG, Mehra S, Shah JP, Bilsky MH, Selesnick SH, Kraus DH. Predictors of survival and recurrence after temporal bone resection for cancer. Head Neck. 2012 Sep;34(9):1231-9. doi: 10.1002/hed.21883. Epub 2011 Sep 23. PMID: 21953902; PMCID: PMC4126564.