



# Nodal Metastasis Patterns in Carcinoma of the Temporal Bone

Powell, Kayla, BA<sup>1</sup>, Ye, Michael, MD<sup>2</sup>, Vadhul, Raghav, MD<sup>3</sup>, Sim, Michael, MD<sup>2</sup>

<sup>1</sup>Indiana University School of Medicine, <sup>2</sup>Department of Otolaryngology-Head and Neck Surgery, Indiana University, <sup>3</sup>Department of Ophthalmology-The Ohio State College of Medicine

## Background

- Carcinoma involving the temporal bone is rare and notoriously aggressive.<sup>1</sup>
- High risk features of temporal bone carcinoma include nodal metastasis and mandibular or parotid invasion.<sup>2</sup>
- Local treatment involving temporal bone resection followed by postoperative radiation has become standard of care for carcinomas involving the temporal bone.<sup>3</sup>
- There have been challenges in identifying prognostic factors for overall survival (OS) and disease-free survival (DFS) for the disease.<sup>1</sup>
- The extent of surgery and the necessity of lymph node dissection has yet to be fully characterized.

## MATERIALS & METHODS

- Retrospective review was performed on patients who have undergone lateral temporal bone resection and neck dissection at Indiana University School of Medicine, a tertiary referral center.
- Preoperative examination and imaging, surgical notes, and pathological reports were reviewed.
- Patients were divided into groups based on clinical, radiological, and pathological nodal status, and features between each group were compared.

- Survival and recurrence curves were generated using Microsoft Excel.

| Characteristics                         | Overall Population, N = 46 (100%) |
|-----------------------------------------|-----------------------------------|
| <b>Patient</b>                          |                                   |
| Mean age (y)                            | 66.9 (91.3%)                      |
| <b>Sex</b>                              |                                   |
| Male                                    | 42 (8.7%)                         |
| Female                                  | 4 (8.7%)                          |
| <b>Ethnicity</b>                        |                                   |
| Caucasian                               | 45 (97.8%)                        |
| Asian                                   | 1 (2.2%)                          |
| <b>Disease</b>                          |                                   |
| <b>Histologic Type</b>                  |                                   |
| Squamous cell carcinoma                 | 28 (60.9%)                        |
| Basal cell carcinoma                    | 6 (13%)                           |
| Melanoma                                | 2 (4.3%)                          |
| Other                                   | 10 (21.7%)                        |
| <b>T stage</b>                          |                                   |
| T0                                      | 1 (2.2%)                          |
| T1                                      | 1 (2.2%)                          |
| T2                                      | 9 (19.6%)                         |
| T3                                      | 7 (15.2%)                         |
| T4                                      | 12 (26.1%)                        |
| N/a                                     | 16 (34.8%)                        |
| Average primary tumor size (cm)         | 4.5                               |
| <b>Parotid invasion</b>                 |                                   |
| Yes                                     | 26 (56.5%)                        |
| No                                      | 20 (43.5%)                        |
| <b>Extent of temporal bone invasion</b> |                                   |
| Auricle                                 | 14 (30.4%)                        |
| External auditory canal                 | 14 (30.4%)                        |
| Internal auditory canal                 | 5 (10.9%)                         |
| Mastoid                                 | 3 (6.5%)                          |
| Dura mater                              | 1 (2.2%)                          |
| No invasion                             | 16 (34.8%)                        |
| <b>Treatment</b>                        |                                   |
| <b>Operative variables</b>              |                                   |
| <b>Type of Reconstruction</b>           |                                   |
| ALT free flap                           | 41 (89.1%)                        |
| Latissimus dorsi muscle flap            | 2 (4.3%)                          |
| Other                                   | 3 (6.5%)                          |
| <b>Adjuvant therapy</b>                 |                                   |
| None                                    | 20 (43.5%)                        |
| Radiation therapy                       | 20 (43.5%)                        |
| Chemotherapy                            | 1 (2.2%)                          |
| Chemoradiation therapy                  | 5 (10.9%)                         |

Table 1: Patient, disease, and treatment characteristics for all patients who underwent lateral temporal bone resection (N=46).

| Recurrence              | N (%)      |
|-------------------------|------------|
| <b>Recurrence?</b>      |            |
| Yes                     | 10 (21.7%) |
| <b>Ipsilateral</b>      |            |
| Level II-III            | 1 (2.2%)   |
| Dermis                  | 1 (2.2%)   |
| External auditory canal | 3 (6.5%)   |
| Rib                     | 2 (4.3%)   |
| Humerus                 | 1 (2.2%)   |
| <b>Bilateral</b>        |            |
| Lungs                   | 2 (4.3%)   |
| No                      | 36 (78.3%) |

Table 3: Patient recurrence organized by location and laterality. 80% of recurrence occurred ipsilateral to primary tumor, with the EAC as the most common location. Notably, two patients demonstrated recurrence bilaterally.

## RESULTS

| Nodal disease                  | N (%)      |
|--------------------------------|------------|
| <b>Intraoperative</b>          |            |
| <b>Pathologically positive</b> |            |
| Levels II-IV                   | 4 (8.7%)   |
| Level V                        | 1 (2.2%)   |
| Intra- and/or periparotid      | 13 (28.3%) |
| Periauricular                  | 1 (2.2%)   |
| Mean primary tumor size (cm)   | 6.3        |
| <b>Preoperative</b>            |            |
| <b>Radiologically positive</b> |            |
| Levels II-IV                   | 6 (13%)    |
| Level V                        | 2 (3.4%)   |
| Intra- and/or periparotid      | 6 (13%)    |
| Internal jugular vein          | 1 (2.2%)   |
| <b>Clinically positive</b>     |            |
| Parotid tail                   | 1 (2.2%)   |
| Neck                           | 2 (4.3%)   |

Table 2: Nodal disease divided by pathologic, radiologic, and clinical detection. Most pathologically proven neck metastases occurred in the ipsilateral levels 2-4 and parotid region. There was one case of ipsilateral level 5 metastasis.

| Occult disease characteristics        | N = 3 (100%) |
|---------------------------------------|--------------|
| <b>Pathology</b>                      |              |
| Adenoid cystic carcinoma              | 1 (33.3%)    |
| Basosquamous carcinoma                | 1 (33.3%)    |
| Squamous cell carcinoma               | 1 (33.3%)    |
| <b>T stage</b>                        |              |
| T3                                    | 1 (33.3%)    |
| T4                                    | 2 (66.7%)    |
| Mean primary tumor size (cm)          | 6.7          |
| <b>Perineural invasion</b>            |              |
| Present                               | 3 (100%)     |
| <b>Location of metastasis</b>         |              |
| Periparotid and/or intraparotid nodes | 3 (100%)     |

Table 4: Disease characteristics in patient with occult disease (N=3). All patients exhibited metastasis to the parotid region.

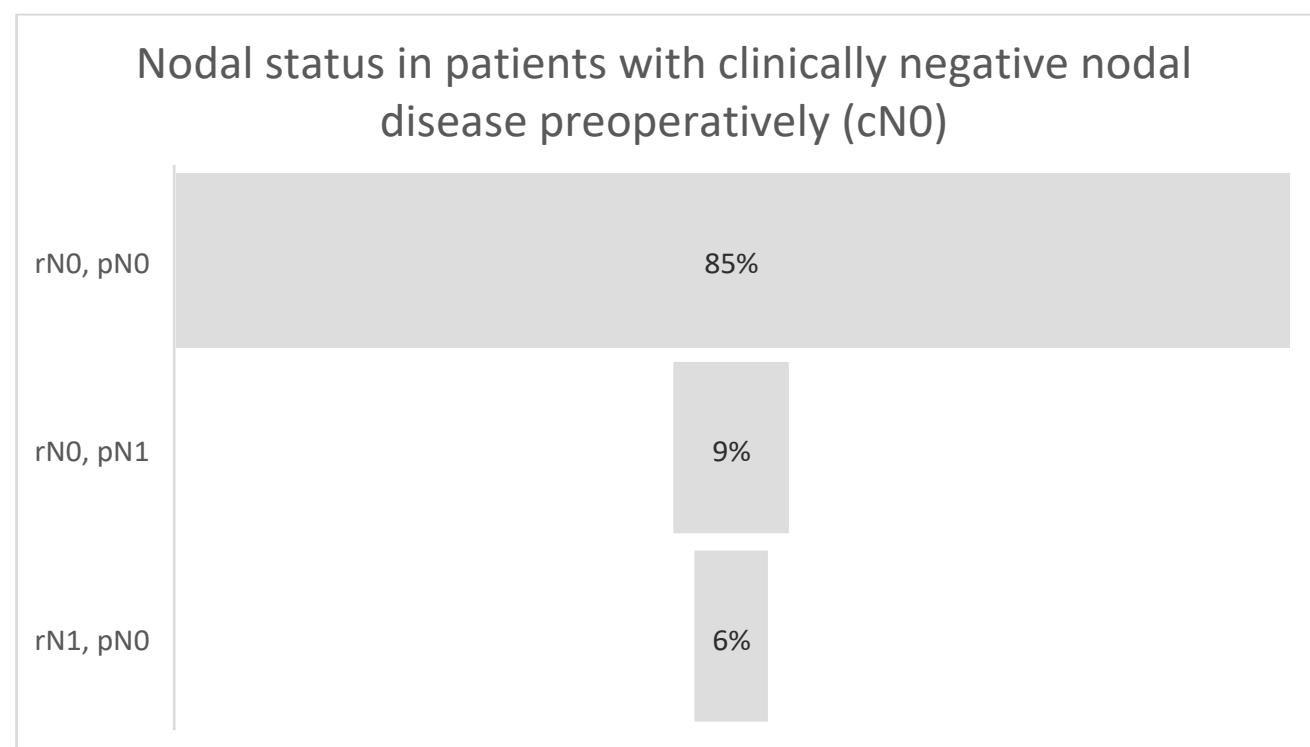


Figure 1: Assessment of preoperative radiologic (rN1) and intraoperative pathologic nodal disease (pN1) in patients with preoperative clinically negative nodal disease (cN0). 3 out of 33 clinically N0 patients (9.1%) had positive lymph nodes on pathology.

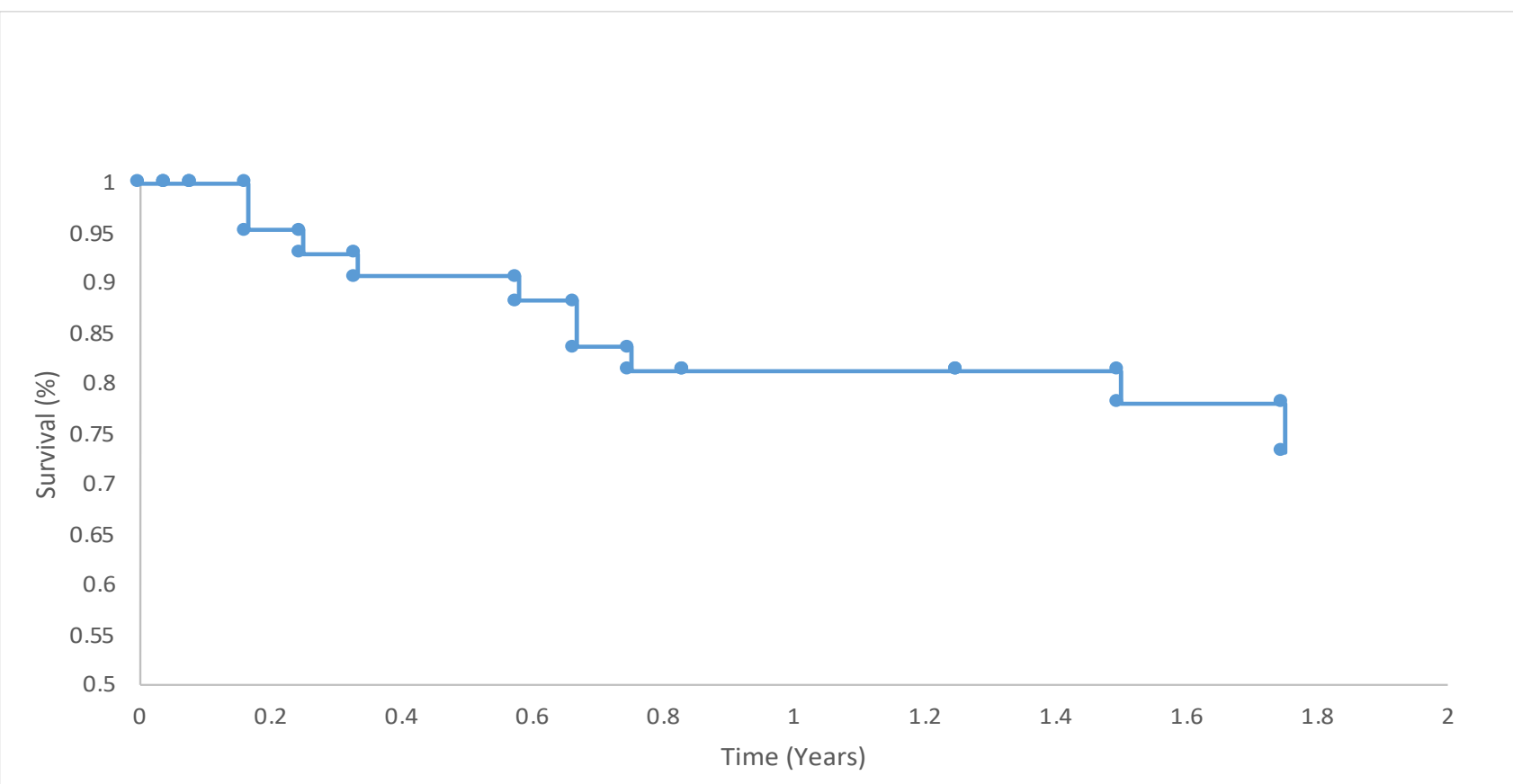
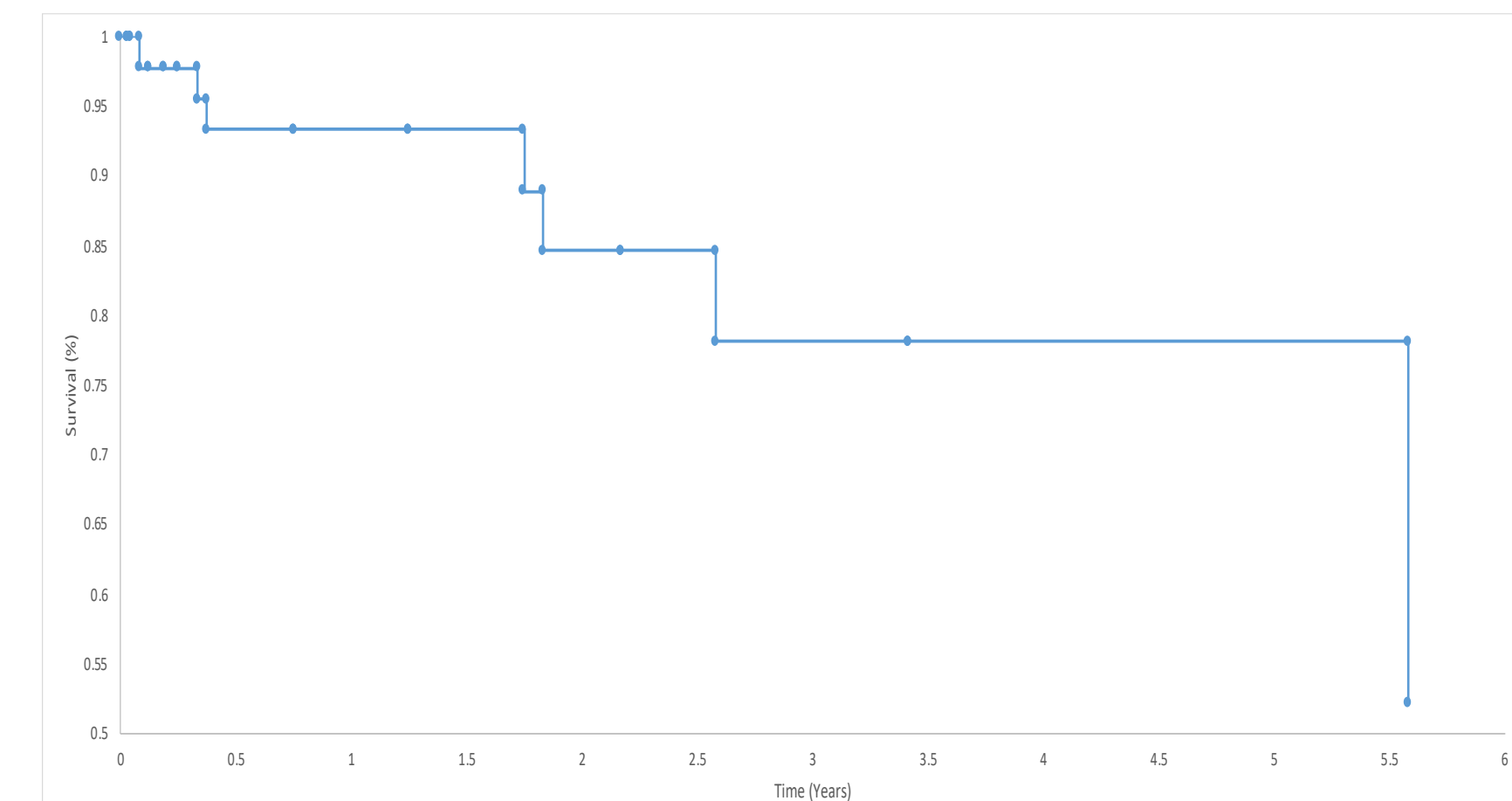


Figure 2: Overall survival (A) and disease-specific survival (B) relative to time for all patient cases.

## DISCUSSION

- The most common locations for nodal metastasis in our data set of 67 patients with carcinoma of the temporal bone were the parotid nodes (28.3%) and ipsilateral levels II-IV (8.7%).
- 1 patient (2.2%) had level V disease on final pathology. No disease was detected at level I. On follow-up, there were no regional failures or recurrences at this level.
- Out of 33 clinically and radiologically N0 patients, the occult metastatic rate was 9.1%. All occult metastases occurred in the parotid bed with none occurring in the lateral neck.
- Among the 3 patients with occult metastatic disease, the average T stage was 3.7, and all metastases occurred in the parotid region.

## CONCLUSION

In patients with carcinoma of the temporal bone, consideration can be given to limiting neck dissection in the setting of N0 disease. Level I can possibly be spared. Parotidectomy is recommended due to a higher metastatic rate and facial nerve morbidity in the setting of recurrence. Future investigation is warranted to further elucidate the role of neck dissection in this disease.

## REFERENCES

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