Rare Intradural, Cervical Nerve Root Metastasis of Follicular Thyroid Carcinoma

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Introduction

Intradural, nerve root metastasis is extremely rare, with only a few cases ever reported, most commonly in the lumbar region. We report a case of metastasis to and invasion of a ventral cervical nerve root in a patient previously diagnosed with low-grade follicular thyroid carcinoma, who presented with right upper extremity radiculopathy and weakness after being in remission for 10 years.

Methods

C-spine MRI showed a ventral, intradural mass at C4-5 resembling a nerve sheath tumor compressing the cord (Fig 1A-D). A posterolateral cervical approach was used to resect the tumor, followed by C3-5 posterior instrumented fusion. Intraop, tumor had clearly invaded the ventral C5 nerve root but was completely resected without changes in monitoring.

MR Imaging

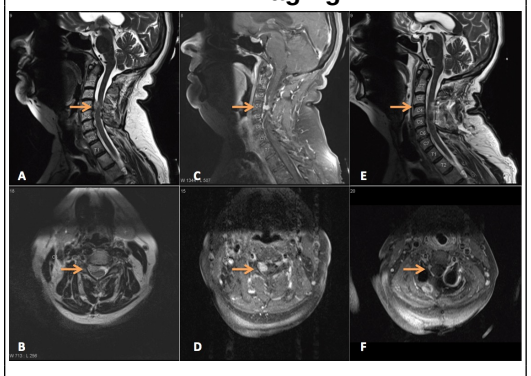

Figure 1. A) Preop T2 sagittal shows ventral C4-5 intradural mass w/ cord compression, B) Preop T2 axial shows C5 nerve root displacement, C+D) Preop T1+con shows avid enhancement, E+F) Postop T2 shows gross total resection

Results

Post-op MRI shows gross total resection (Fig 1E,F) and histopathology revealed metastatic thyroid carcinoma (follicular vs. anaplastic type - Fig 2A,D,E), with high Ki-67 labeling indices (Fig 2F). Positive immunohistochemical staining with NFP (Fig 2B) and S-100 (Fig 2C) confirmed invasion of nerve fibers. A whole-body radioactive iodine scintigraphy revealed multi-organ metastases, advancing her diagnosis to Stage 4. Right deltoid strength improved from 2/5 to 3/5 but patient died within 8 months, despite salvage radioactive iodine treatment.

Histopathology

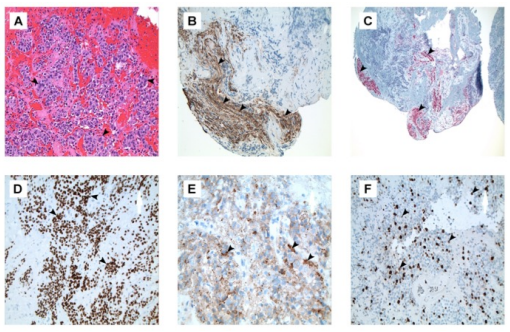

Figure 2. A) H&E stain reveals poorly differentiated cells w/ mild nuclear pleomorphism (arrowheads) suggestive of carcinoma, B) NFP (Neurofilament Protein) staining (arrowheads) highlights invasion of nerve fibers, C) S-100 staining (arrowheads) confirms nerve infiltration, D) TTF-1 (Thyroid Transcription Factor) and E) Thyroglobulin staining (arrowheads) confirms metastasis of thyroid origin, F) High Ki-67 labeling indices (arrowheads) support malignant transformation.

Discussion

Intradural metastasis is rare; and nerve root invasion even rarer, especially for follicular thyroid carcinoma in a patient considered in remission for several years. This case is unique because intradural metastasis occurred via hematogenous spread to a nerve root as opposed to local expansion from the vertebra. To our knowledge, this is the first report of follicular thyroid cancer with malignant transformation that metastasized to and invaded a ventral cervical nerve root.

Conclusion

Intradural metastasis with invasion of a nerve root is extremely unusual, especially in a patient with low grade thyroid carcinoma thought to be in remission. This is the first report of follicular thyroid cancer with malignant transformation that metastasized to and invaded a ventral cervical nerve root. Any history of thyroid carcinoma, regardless of staging, grading, or remission status, should raise the suspicion of metastasis, as it can mimic other spine and nerve sheath tumors and represent malignant transformation. Gross total resection can be safely achieved with intra-operative neuromonitoring and result in improved function; however, treatment is likely only palliative.

References

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Learning Objectives

By the conclusion of this session, participants should be able to:

1) Recognize that any history of malignancy, regardless of staging, grading, or remission status, should raise the suspicion of metastasis and may represent malignant transformation.

2) Recognize that although rare, metastases can mimic other spine or nerve sheath tumors.

3) Recognize that a posterolateral cervical approach followed by instrumentation, can be utilized safely to achieve a gross total resection with the aid of neuromonitoring.