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Research Article

Surgical management of follicular carcinoma of thyroid with spinal metastasis

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ABSTRACT

Background: Spine is the most common part of bone metastasis of follicular carcinoma and is primarily osteolytic. The primary concern with metastasis is pathologic fracture and/or spinal cord compression, which may lead to intractable pain, sensory alterations, weakness, and/or paralysis. Management is curative or palliative and includes surgery, radioiodine ablation, selective embolization, medical management. In this study, we present a retrospective analysis of five patients with follicular carcinoma of thyroid with spinal metastasis treated surgically.
Methods: With the approval of the institutional review board, we retrospectively analyzed all the patients who underwent surgery for follicular carcinoma of thyroid with spinal metastasis from Jan 2011 to Jan 2015 at Sri Ramachandra Medical Centre. Patients were considered for spine surgery, when they had severe pain and/or neurological deficit, spinal instability and Tokuhashi score of at least 9. Total of 5 patients with follicular carcinoma underwent spinal surgery.
Results: Three patients had improvement in KPS scores; one had no change and remaining one had lower KPS score at final follow up. Four out of the five patients (80%) had improvement in VAS pain scores.
Conclusions: Even though there are no established regimens in treating spinal metastasis from follicular carcinoma of thyroid and very few reports published in this regard, curative/palliative spine surgery along with radioiodine ablation gives short to midterm remission and clinical improvement in this patient group.

Keywords: Spinal metastasis, Thyroid carcinoma, Tokuhashi score, Radioiodine

INTRODUCTION

Differentiated thyroid cancer (DTC) account for the vast majority (90%) of all thyroid cancers and includes papillary (70–75%) and follicular (15–20%) cancers.[1,2] Follicular carcinoma of thyroid is a slow growing tumour with peak incidence in fifth decade and three times more common in females.[3] Differentiated thyroid cancer metastasis to the lung (49%) followed by bone (25%). Bone metastasis is commonly seen in follicular carcinoma (7-28%) than in papillary carcinoma (1-7%).[4,5]

Spine is the most common part of bone metastasis of follicular carcinoma and is primarily osteolytic. The primary concern with metastasis is pathologic fracture and/or spinal cord compression, which may lead to intractable pain, sensory alterations, weakness, and/or paralysis.[6,7] Management is curative or palliative and includes surgery, radioiodine ablation, selective embolization, and medical management.[8,9] In this study, we present a retrospective analysis of five patients with follicular carcinoma of thyroid with spinal metastasis treated surgically.

METHODS

With the approval of the institutional review board, we retrospectively analysed all the patients who underwent surgery for follicular carcinoma of thyroid with spinal metastasis from Jan 2011 to Jan 2015 at Sri Ramachandra Medical Centre. Patients were considered for spine surgery, when they had severe pain and/or neurological deficit, spinal instability and Tokuhashi score [10] of at least 9. Total of 5 patients with follicular carcinoma underwent spinal surgery. All the patients underwent FNAC/biopsy for thyroid swelling and MRI evaluation of the spine. All patients had total/subtotal thyroidectomy with radical neck nodal dissection for the primary tumour after cytological evaluation. Post operatively; patients were put on thyroid and calcium replacement therapy. In each case, tumour pathology was confirmed to be follicular carcinoma, from both the primary lesion and spinal metastatic lesion. Number of factors such as, age, sex, presenting symptoms, characteristics of primary tumour, spinal and extra spinal metastasis and co morbidities was analysed. Type of spinal procedure performed, use of adjuvant therapy, pre and postoperative functional status (measured by karnofsky performance score) [11], neurological status (measured by modified JOA score) and pain status (using VAS scores) were assessed. Intra operative and postoperative complications, Length of survival, Recurrence and repeat surgery for recurrence were also assessed.

The demographic details and clinical presentation of all the five patients were described in Table 1. The mean age at the time of surgery was 63.4 years. One patient was a male (20%) and four patients (80%) presented with neck swelling with back/neck pain. Three of the five patients (60%) presented with neurological deficits. One patient presented without neck swelling and with isolated back pain (lumbar spine involvement) and right lower limb weakness. Thyroid swelling was only diagnosed on physical examination. One patient had dorsal spine involvement with motor weakness of both lower limbs and was wheelchair bound. One patient had both cervical and dorsal involvement with right upper limb weakness. Two patients had neck swelling along with neck and back pain with cervical and lumbar spine involvement respectively, without neurological deficits. Two of the five patients had skull metastasis with no intra cranial extension. The surgical procedure and clinical outcome for each patient was given in Table 2.

RESULTS

Of the three patients with neurological deficits, 2 patients had improvement of JOA scores. One patient with paraparesis had deterioration and developed complete weakness. Three patients had improvement in KPS scores, one had no change and remaining one had lower KPS score at final follow up. Four out of the five patients (80%) had improvement in VAS pain scores. Four patients underwent radioactive iodine therapy after surgery. Two patients in our series expired and the mean survival after primary surgical procedure is 3.06 years including the three patients who are alive. No implant or surgery related complications were noted. One patient had recurrence of thyroid and vertebral disease. The patient did not undergo revision surgery.

Table 1: Demographic details of patients.

No	Age	sex	Primary tumour	Extra spinal metastasis	Presentation	Spinal level
1	57	F	T1 N0 M1	Nil	Low back pain, right lower limb weakness	L3
2	71	M	T4N1M1	Skull	Neck and skull swelling, neck and upper back pain, right upper limb weakness	C5, D4
3	62	F	T3N1M1	Nil	Neck swelling, skull swelling, upper back pain, paraparesis	D7, D8
4	59	F	T2N0M1	Nil	Neck swelling, neck pain	L2
5	68	F	T2N1M1	skull	Neck swelling, upper back pain	C6

DISCUSSION

Spinal metastasis in thyroid carcinoma indicates advanced disease and causes significant morbidity[12]; they have a favourable prognosis compared to metastatic disease from other tumours.[13,14] Since tumour invasion compromises structural integrity of spine, treatment of spinal metastasis should help preserve its anatomy, thereby reducing pain and neurological complications. Radioiodine therapy is the mainstay of treatment of thyroid carcinoma and its metastasis.[15,16] Studies have shown that, radioiodine ablation reduces pain scores and improve functional outcome in metastatic thyroid disease.[17] Radioiodine absorption is an important prognostic factor, and patients with avid uptake should receive radioiodine therapy.[18]

In our study, four patients had radioiodine ablation, initiated 1 month after primary surgery and was

associated with clinical and improvement in most patients. Selective embolization therapy offers rapid but transient symptomatic therapy and has synergistic benefit when used along with radioiodine ablation but is rarely curative.[17,19] It also would help reduce intra operative blood loss when done pre operatively, though none of our patients had selective embolization.[20]

Table 2: Surgical procedure and clinical outcomes.

No	Surgery	Clinical outcome	Recurrence	Survival after primary surgical procedure (Yrs)
1	Anterior corpectomy pf L3 through anterolateral retroperitoneal approach with fusion of L2-L4	Improved lower limb mJAO score (3 to 6), VAS pain score (7 to 2) and Karnofsky score(50 to 80)	nil	5.1
2	Posterior spinal stabilization cervical and dorsal spine followed by anterior corpectomy of C5 with fusion of C4-C6	Improved upper limb mJAO score (2 to 4), and VAS pain score (9 to 3), no change in Karnofsky score	Recurrence of primary and spinal lesions.	1.8 (expired)
3	Posterior spinal decompression of D7 and D8 with fusion of D6-D9	Loss of sphincter control, decreased lower limb mJAO score (2 to 0), and karnofsky score (40 to 20), no change in VAS pain score of 8	nil	1.2 (expired)
4	Percutaneous posterior stabilization from L2-L4 with vertebroplasty of L3	Resumed ambulation immediately, improved karnofsky and VAS pain scores (8 to 2)	nil	4.4
5	Anterior corpectomy of C6 with fusion of C5-C7	Resumed ambulation immediately, improved karnofsky and VAS pain scores (9 to 2)	nil	2.8

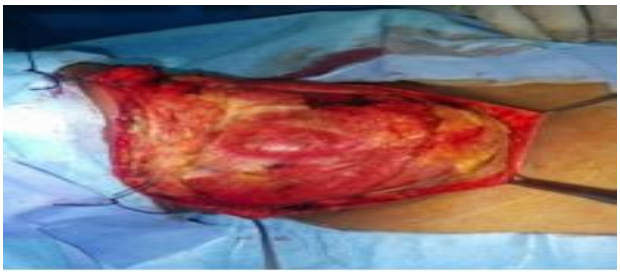

Figure 1: Intra op pictures thyroid.

Figure 2: Anterior corpectomy with fusion implant in situ.

Figure 3: C arm picture showing both anterior and posterior implants.

Figure 4: MRI picture of metastasis.

Figure 5: Percutaneous stabilization with vertebroplasty lateral view.

Figure 6: Post op AP view.

Quan et al suggests that surgery is indicated for patients with intractable pain, cord compression, neurological deficit or cervical instability.[13] Cervical metastasis can produce severe pain and neurological deficits due to instability and pathological fracture, affecting the activities of daily living.[9] Management includes anterior reconstruction and stabilisation, which is done in two of our patients (patients 2 and 5).[21] Demura et al suggested that total en bloc spondylectomy (TES) might provide better local control of thyroid cancer spinal metastasis, compared with debulking surgery and improve survival rates and decrease recurrence.[22] One of our patients who had recurrence (patient 2) underwent of debulking cervical corpectomy (Figure 1, 2, 3) rather than a radical spondylectomy due to his age, but revision surgery was deferred due to medical issues.

There were few reports regarding initial presentation of a patient with distant metastasis leading to the diagnosis of follicular thyroid carcinoma.[26,27] Metastasis of thyroid carcinoma presenting as distant spinal cord compression is extremely rare. We had a patient in our series that had similar presentation (patient 1). Patient had complete remission as well as improvement of neurological deficit after surgery. Although percutaneous vertebroplasty/kyphoplasty has been successfully used in osteolytic metastatic lesions, complications in this group are higher compared to its use in osteoporotic and myeloma patients.[23] There is an increased risk of symptomatic leakage of polymethylmethacrylate into the spinal canal and neural foramina in metastatic lesions.[24] Fourney et al in one of the largest series of cement augmentation for metastatic spinal disease found that significant reduction of pain was seen in 84% of procedures with asymptomatic leakage of cement seen in less than 10% of levels operated.[25] They concluded that, percutaneous cement augmentation provided considerable, lasting relief from pain with a corresponding decrease in the narcotic requirements in the patients treated. One of our patients (Patient 4- Figure 4, 5, 6) who underwent percutaneous stabilisation and vertebroplasty had significant clinical improvement, although there was minimal cement extravasation.

CONCLUSION

Even though there are no established regimens in treating spinal metastasis from follicular carcinoma of thyroid and very few reports published in this regard, curative/palliative spine surgery along with radioiodine ablation gives short to midterm remission and clinical improvement in this patient group. Further studies with larger sample size and longer follow up are needed to formulate regimens in managing these patients.

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