

Dorsal Spine Giant Cell Tumor with paraplegia: A Case Report

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Abstract:

Patients of Giant cell tumors (GCT) of the spine is rarely seen . We reported a case of GCT of the eleventh dorsal vertebra presented by severe backache with paraplegia in a 30 year old woman. Imaging showed an osteolytic lesion invading the vertebral body, the posterior arch and compression of the spinal cord. Neurological decompression was performed but pain recurred after 2 months. The MRI of spine revealed recurrence of tumor and again surgical decompressions was done along with long segment transpedicular fixation and patient was significantly improved. A surgical biopsy was obtained at the same time to confirm the diagnosis. Giant cell tumor is not so common in thoracic region. We believe that the gross removal of tumor provide good outcome for the patient.

Key word: Giant cell tumors, dorsal spine, tumor recurrence

Abbreviation: GCT (Giant cell tumors)

Introduction:

Osteolytic lesions are seen in the giant cell tumors of the bone, which are usually located in the epiphysis. This is a benign tumors and frequently recurs. Surgery is the treatment of choice¹. Except for the sacrum, spinal forms of GCT are rare². The more severe forms of this entity result in recurrence, malignant degeneration and neurotoxicity³. The percentage of local recurrence in the literature is approximately 30%¹. We present a case of GCT of the eleventh dorsal vertebra initially treated by laminectomy and was taken biopsy may be tumor removal was incomplete. The aim of this study is to present the clinical and radiographic characteristics of these tumors and tumor recurrence with immediate outcome after surgery.

Case report:

The patient was a 30-year-old woman, a housewife. She had developed severe pain in the mid dorsal region that radiated to her low back and also to both lower limbs (right> left). Pain was dull, progressively increasing and more marked after 8-10 pm daily and disturbed her sleep despite in any posture. She was evaluated to have spine tumor at D11 vertebral body and underwent a surgery to

remove which was a Giant cell tumor (laminectomy Dorsal11).

She received 45Gy post operative radiotherapy and was pain free with no weakness for the next 2 months. 2 months after the surgery pain was reappeared and became more unforgiving and was aggravated by the slightest of movement in the mid dorsal spine. Pain was only minimally relieved with injectable analgesics and started developing weakness of both lower limbs which was rapidly progressive, requiring support for basic needs and became bedridden, the cause of which she states to be pain more than weakness. Clinical examination showed partial loss of dorsal lordosis and pain during palpation of the D11 vertebrae with paravertebral dorsal contraction. Neurological examination revealed gross motor deficit in both lower limbs (muscle power grade 2 in right and 1 in left) with sensory level at D12 level. Genito-sphincter area also involved. The rest of the clinical tests and the biological results were normal except high ESR. Xray dorsal spine showed osteolytic lesion with decrease of height of body of D11 (Fig. 1). MRI of dorsal spine revealed expansion of the residual tumor at D11 which affected the whole body and the pedicles(right>left) partially, forming an anterior

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epidural compression on the spinal cord (Fig. 2, 3). Then posterior decompression was done with gross total removal of tumor including vertebral body and cavity filled up with bone chips at D11 and transpedicular fixation D9,10 with D12 and L1 vertebra (figure 4) . Just after surgery dorsal pain was significantly improved and muscle power

became normal within very short period. 10 Days after surgery she was normal and able to walk independently (Fig. 5).We referred her to radiotherapy department for further treatment.

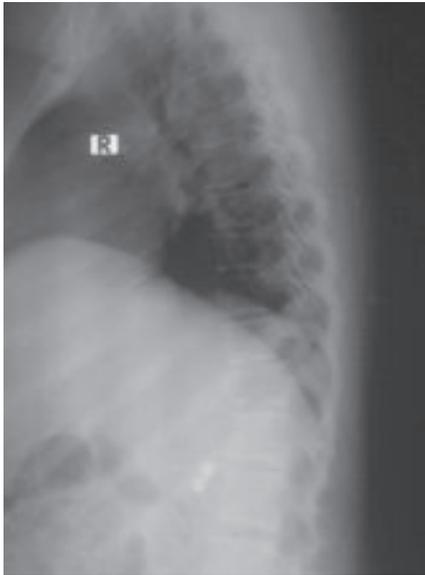


Fig.-1: X-ray dorsal spine lateral view shows osteolytic lesion in the body of D11 vertebra including posterior arch.

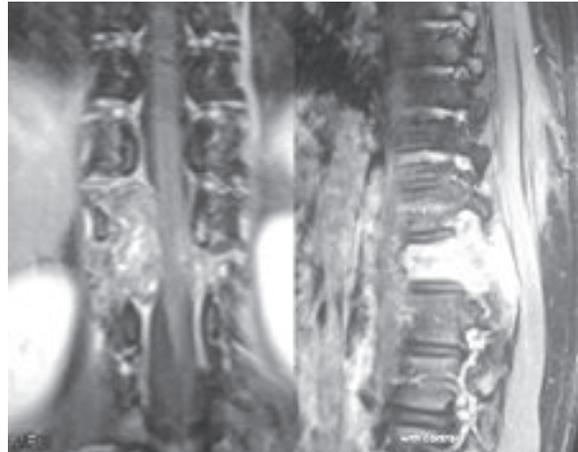


Fig.-3 : MRI Dorsal spine with contrast coronal and lateral view (After first operation) revealed expansion of the residual tumor at D11 which affected the whole body and the pedicles (right > left) forming an anterior epidural compression on the spinal cord.

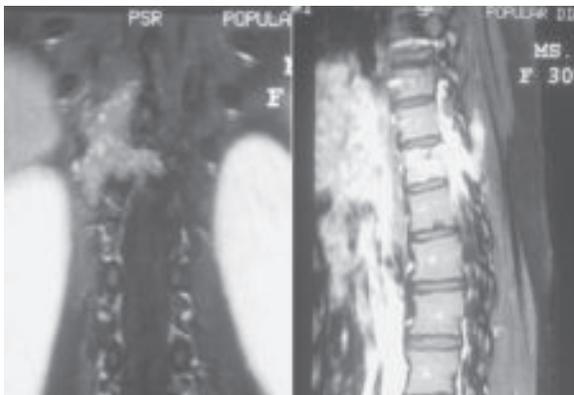


Fig.-2: MRI Dorsal spine with contrast coronal and lateral view (Before first operation) revealed contrast enhancing lesions at D11 which affected the body of vertebra and arch (right > left) partially, forming an anterior epidural mild compression on the spinal cord.

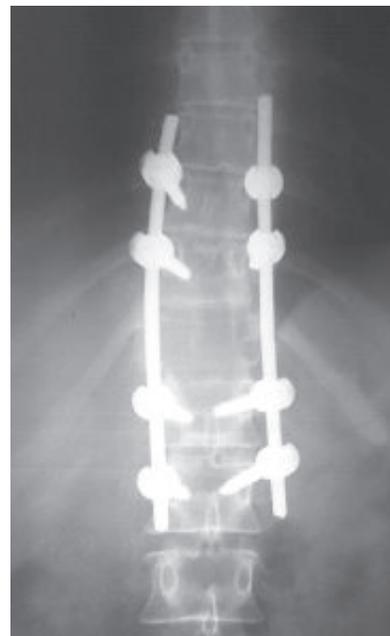


Fig.-4: X-ray dorsal spine anterior and lateral view shows transpedicular screws and rods fixed with above and below two vertebral body from affected D11.



Fig.-5: Patient could walk independently on 10 days after operation.

Discussion:

According to the Mayo clinic, Spinal GCTs are rare; they represent 6.5% of bone GCTs³ and 1—9% of bone GCTs according Bedwell et al.⁴. In 1993, Sanjay et al.³ reported 24 cases of spinal giant cell tumors from cases in the Mayo Clinic between 1955 and 1989. Although this lesion often only involves one vertebra, Kos et al.⁵ published a case of multifocal thoracic and sacral spine GCT and Erdogan et al.⁶ published a case of GCT in the sixth cervical vertebra. The different reported cases often occurred in patients between 20 and 30 years old and especially in women⁷.

Spinal pain with or without radiculalgia is the most frequent cause for consulting³. However, the diagnosis of GCT is often made after a neurological deficit has developed with medullary compression can also be obtained⁸. At present, MRI is the gold standard for evaluating locoregional invasion in spinal GCT, to determine the size of the tumor and look for intracanal extension. The signal is usually mixed, with a low intensity signal on T1 and a high intensity signal on T2-weighted images⁹.

Histological confirmation of the diagnosis requires a surgical biopsy² or a CT scan guided puncture biopsy, whose reliability is 65%¹⁰. In this report we performed a surgical biopsy at the same time as decompressive laminectomy with transpedicular fixation. A CT scan guided puncture biopsy is safe¹¹, and was performed to confirm tumor recurrence. In most cases, the histological examination confirms the diagnosis of GCT and excludes the main differential diagnoses, in particular aneurysmal cyst¹. Sanerkin is the reference classification for the histological grading of a bone GCT¹. Grade I is the benign form of the disease, while grade III is osteosarcoma, and grade II is a borderline form. Treatment of these tumors must take into account three problems: mechanical because of the extensive osteolysis of the vertebral body, neurological and tumoral with the risk of recurrence³. Treatment of spinal GCT is usually surgical^{1,2,7}. The possibilities of extratumoral surgery are extremely limited¹². An isolated lesion of the vertebral body can be treated by total spondylectomy by the anterolateral approach¹³. Unfortunately, extension into one of the two pedicles makes extratumoral resection impossible¹². Partial spondylectomy, corporectomy or resection of the posterior arch is a viable option in well-circumscribed lesions¹⁴. Lafarge et al.² filled bone defects with autologous grafts alternating with slices of allograft strengthened with transversal screws and screw plate osteosynthesis. Li et al.³ used fibular grafts to strengthen vertebrae above and below with compression screws. Smartis et al.¹³ performed posterior resection and short-term osteosynthesis, then anterior corporectomy with a cage implant for filling, then a posterior approach for pedicular reconstruction. The use of adjuvant radiotherapy is considered to be a factor favoring the development of sarcoma in an estimated 10% of cases³. It can be indicated in inoperable GCT⁷, incomplete GCT resections, recurrent GCT³ or as adjuvant therapy to surgery¹⁵. The role of biphosphonates in the prevention of recurrent bone GCT was confirmed in a study by Tse et al.¹⁶. Its efficacy in spinal forms was reported by Fujimoto et al.¹⁷ but in association with radiotherapy. Bleeding during surgery of spinal GCT is a severe complication, which can make it

impossible to complete the surgical procedure¹⁸. Preoperative embolisation can prevent this complication and reduce the size of the tumor, facilitating resection¹⁹.

Recurrent GCT after surgery is a serious complication, and treatment is a problem. Most authors believe that it is due to marginal surgical resection³. Sanjay et al.⁶ reported 10 cases of recurrence in 24 spinal GCT. According to Campanacci et al.²⁰, 90% of recurrence developed in the first three years after surgery. He noted that recurrence had not occurred in total spondylectomy 13 years after surgery. The complication in our report is mainly explained by insufficient resection, which was limited to simple anterior curettage. Recently, Junming et al.¹⁵ published a series of 22 cervical spine GCTs. The rate of recurrence with subtotal spondylectomy was 71% while for total spondylectomy it was only 7.7%.

Conclusion:

Dorsal spine GCTs are rare and their clinical and radiographic characteristics are not specific. MRI is indispensable to evaluate local extension and especially to identify nerve compression. If the vertebral body and the posterior arch are affected, curettage of the lesion is insufficient to prevent tumor recurrence. This occurred in the present report, where a total spondylectomy should have been performed with autologous graft of bone chips and transpedicular stabilisation to minimise this risk.

References:

1. Tomeno B, Forest M. Tumeurs à cellule géantes. Cahiers d'enseignement de Sofcot 1990;38:31-50.
2. Laffargue PH, Cotton A, Cortet B, Lecomte-Houcke M, Decoulx J. Tumeur à cellules géantes du rachis: à propos d'un cas. Acta Orth Belg 1997;63:28-34.
3. Sanjay BKS, Sim FH, Unni K, McLeod RA, Klassen RA. Giant cell tumors of the spine. J Bone Joint Surg Br 1993;75:148-54.
4. Bidwell JK, Young JWR, Khalil E. Giant cell tumor of the spine: computed tomography appearance and review of the literature. J Comput Tomogr 1987;11:307-11.
5. Kos CB, Taconis WK, Fidler MW, Ten Velden Jos JAM. Multifocal giant cell tumor in the spine. Spine 1997;22:821-2.
6. Erdogan B, Aydin MV, Sen O, Sener L, Bal N, In Y. Giant cell tumor of the sixth cervical vertebrae with close relationship to the vertebral artery. Clin Neurosci 2005;12:83-5.
7. Ozaki T, Liljenqvist U, Halm H, Hillman A, Gosheger G, Winkelmann W. Giant cell tumor of the spine. Clin Orthop 2002;401:194-201.
8. Zimmer WD, Berquist TH, McLeod RA, Sim FH, Pritchard DJ, Shives TC, Wold LE, May GR. Bone tumors: magnetic resonance imaging versus computed tomography. Radiology 1985;155:709-18.
9. Colombo N, Berry I, Norman D. Vertebral tumors. New York: Raven Press; 1992, p. 445-487.
10. Vieillard MH, Boutry N, Chastanet P, Duquesnoy B, Cotten A, Cortet B. Rentabilité de la ponction-biopsie percutanée dans le diagnostic des tumeurs osseuses vertébrales et périphériques. Rev Rhum 2005;72:59-67.
11. Murphy WA, Destouet JM, Gilula LA. Percutaneous skeletal biopsy: a procedure for radiologists. Results, review, and recommendations. Radiology 1981;139:54-59.
12. Enkaoua E, Saillant G. Tumeurs du rachis et du sacrum. In: Techniques chirurgicales-orthopédie. Encycl. Méd Chir, 1999; 44-165.
13. Samartzis D, Foster WC, Padgett D, Shen FH. Giant cell tumor of the lumbar spine: operative management via spondylectomy and short-segment, 3-column reconstruction with pedicle recreation. Surg Neurol 2008;69:138-41.
14. Shimizu K, Ido K, Fujio K, Tanaka K, Nakamura T. Total spondylectomy and spinal shortening for giant-cell tumor of spine. Lancet 1996;3:277-346.
15. Junming M, Cheng Y, Dong C, Jianru X, Xinghai Y, Quan H, Wei Z, Mesong Y, Dapeng F, Wen Y, Bin N, Lianshun J, Huimin L. Giant cell tumor of the cervical spine: a series of 22 cases and outcomes. Spine 2008;33:280-8.

16. Tse LF, Wong KC, Kumta SM, Huang L, Chow TC, Griffith JF. Bis-phosphonates reduce local recurrence in extremity giant cell tumor of bone: a case-control study. *Bone* 2008;42:68—73.
17. Fujimoto N, Nakagawa K, Seichi A, Terahara A, Tago M, Aoki Y, Hosoi Y, Ohtomo K. A new bisphosphonate treatment option for giant cell tumors. *Oncol Rep* 2001;8:643-7.
18. Shimada Y, Hongo M, Miyakoshi N, Kasukawa Y, Ando S, Itoi E, Abe E. Giant cell tumor of fifth lumbar vertebrae: two case reports and review of the literature. *Spine* 2007;7:499-505.
19. Broaddus WC, Grady MD, Delashaw JB, Erguson RDG. Pre-operative superselective arteriolar embolisation: a new approach to enhance respectability of spinal tumors. *Neurosurg* 1990;27:755-9.
20. Campanacci M, Baldini N, Boriani S, Sudanese S. Giant cell tumor of bone. *J Bone joint Surg Am* 1987;69:106-14.