Case Report

Primary Ewing's Sarcoma of the Spine: Four Case Report.

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Abstract

Ewing's sarcoma is a common malignancy of the bone and soft tissues in pediatric patients. It mostly affects the long bones and pelvis, and less commonly the flat bones and vertebrae. Primary Ewing's sarcoma affecting the spine is very rare. The patient has non-specific symptoms for a prolonged period of time before the correct diagnosis is given. Patients can present with acute paraplegia due to spinal cord compression, which needs prompt surgical intervention. Early diagnosis and treatment are important for neurological recovery. The definitive management includes three main modalities: surgery, radiotherapy and combination chemotherapy. Adequate surgical excision may not be feasible because of anatomical limitations and local control is mainly achieved by radiotherapy. Because of the low incidence of these tumors, a multitude of therapeutic strategies have been employed with varying success. Currently there are no clinical guidelines outlining optimal management.

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Introduction

Ewing's Sarcoma is a malignant condition which is the Ewing family tumors (Ewing's sarcoma (EWS), extra skeletal EWS, primitive neuro ectodermal tumor (PNET) of bone and soft tissue, and chest wall tumor "Askin tumor"). The peak ages are between 10 and 20, but younger children and older adults can also get Ewing's sarcoma[1]; primary sites are most often in bone but can also be in soft tissues. Since it was first described by James Ewing in 1921, Ewing's sarcoma represented a strange kind of malignancy. Poorly di erentiated tumor of uncertain histogenesis with a variable biologic behavior, it presents heterogeneity inside. Ewing's sarcoma (ES) is the second most common primary bone tumor in pediatric patients, accounting for approximately 4% of pediatric malignancies.[2] The incidence peaks in the second decade of life. The most commonly affected bones are the long bones of the extremities and pelvis; the vertebrae are affected in less than 5% of cases.[3] The patient, presents with non-specific symptoms such as low back pain, muscle aches and vague paresthesias which lead to diagnostic delays.[2] During the later phase, spinal cord compression or intraspinal extension can produce neurological deficits that include rapidly progressing paraplegia. Early diagnosis and prompt treatment can lead to recovery or preservation of neurological function and aggressive multimodality treatment with chemotherapy, surgery and radiotherapy may translate into better outcome of these patients.[4] So, the definitive management of Ewing's sarcoma of the spine, as in other locations, could include three main modalities: surgery, radiotherapy, and combination chemotheraphy.

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Case Report

First case was 9 years old boy presented with a 2-3 months history of mild intermittent low back pain for which he was treated with analgesics at a local hospital. He was presented with weakness of both lower limbs and unable to walk for 1 month with progressive loss of bowel and bladder function. There was antecedent history of trauma. He had no history of failure to thrive. No constitutional symptoms were present. He had no significant past, personal or family history. All developmental milestones were achieved for his age. On clinical examination there was a swelling over lumber spinal region measuring about (6x7) cm which is hard, fixed and tender with paraspinal fullness. He had also complete loss of power below the level of the knee joint in both lower extremities. Hip flexion and knee extension was grade 5; ankle dorsiflexion, great toe extension and ankle planter flexion were grade zero. Bulk of muscle and tone was reduced. There were decreased sensations below the level of L2 dermatome in both the lower limbs. Perianal sensations were reduced. Ankle reflex and planter (Babinskis) response were absent bilaterally. The laboratory parameters were normal except for a raised erythrocyte sedimentation rate (110 mm1st prour). Initially X-rays of the whole spine, chest, and abdomen were normal. Ultrasonography of the abdomen and pelvis showed abnormal distension of the bladder suggestive of the possibility of neurogenic bladder. Initial MRI of the lumbosacral spine revealed Pott's disease at level L2 with left paravertebral abscess involving the left psoas with left sided epidural extension causing marked compression on cauda equina. Then USG guided FNAC was done and revealed Ewing's Sarcoma. Immunohistochemistry showed tumour cells staining positive for CD-99: specific stain for ES. Gene-testing showed an EWS-FLI 1 chimera. Patient received 6 cycles chemotherapy with "VAC/IE(Inj.Vincristine 1.7mg,Inj.Doxorubicin 60mg,Inj.Cyclophophamide 1000 mg, inj. Ifosfamide 1500mg,Inj.etoposide 70 mg) regimen"3 weekly intervals. Follow up MRI of Lumbo-Sacral spine revealed post chemotherapy state of Ewing's Sarcoma from spinal mass, residual disease in left paravertebral region extending from L1 to L3 with invasion of left psoas, quadratus lumborum, both erector spinae muscles around spinous process of L2, L3, intradural extramedullary extension along left exiting nerve root, infiltrating cauda equina, metastatic involvement of L2 vertebral body and left L4 exiting nerve root (Illustration 1). The patient was without the evidence of metastasis at presentation as found by chest and abdominal radiographs and chest computed tomography scan. The diagnosis of Ewing's Sarcoma was confirmed on histopathology, immunohistochemistry, and cytogenetic analysis. Histopathology showed small round cells packed in nests.

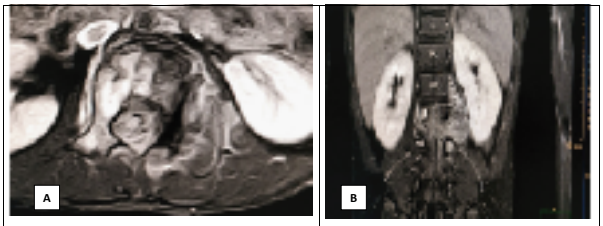

Illustration 1: (A) Contrast enhance T1WI axial image showing heterogenous enhancing lesion involving body, lamina, pedicle of L2 Vertebral body and adjacent paraspinal masses. (B) Coronal contrast enhance T1WI image showing left paravertebral involvement up to L1 to L3 vertebra.

Second case was 12 -years-old girl presented with a 3 months history of mild intermittent pain in the back of chest for which she was treated with analgesics at a local hospital. There was no antecedent history of trauma. She had no history of failure to thrive. No constitutional symptoms were present. She had no significant past, personal, or family history. All developmental milestones were achieved for her age. On clinical examination there was a swelling over thoraco-spinal region measuring about 8x5 cm which was hard, fixed and tender with paraspinal fullness. Ankle reflex and planter (Babinskis) response were present bilaterally. Laboratory parameters were normal except for leukocytosis and raised erythrocyte sedimentation rate (95 mmst prour). Initially X-rays of the whole spine, chest, and abdomen were normal. CT scan of chest revealed mass lesion involving D6 to D8 thoracic vertebra with paravertebral region (Illustration 2A). The diagnosis of Ewing's Sarcoma was confirmed on histopathology, immunohistochemistry, and cytogenetic analysis. On histopathology from vertebral lesion was revealed malignant round cell tumor. Then the child underwent a decompressive laminectomy at D6-D8 level with debulking of tumor as the first line of management. Immunohistochemistry showed tumour cells staining positive for CD-99: specific stain for ES. Fluorescence in-situ Hybridization showed positive for 22q12 (EWSR1) gene rearrangement. Then Patient received 3 cycles chemotherapy with "VAC/IE (Inj.Vincristine, Inj. Doxorubicin, Inj. Cyclophosphamide, inj. Ifosfamide, Inj. Etoposide) regimen" at 3 weekly intervals. Follow up MRI chest with contrast revealed plaque like soft tissue along costal pleura in relation to 8th rib on right side with laminectomy at D6-D8 level in thoracic region (Illustration 2B). Isotope of bone scan showed normal. The patient was the evidence of metastasis at chest described in chest computed tomography scan.

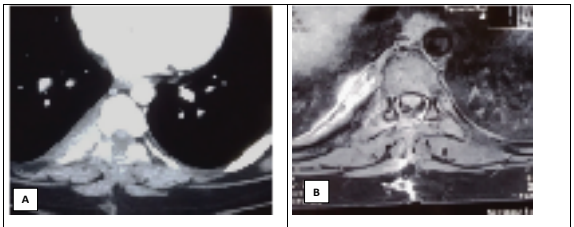

Illustration 2: (A) Contrast enhance CT scan of chest in axial plane showing enhancing right paraspinal mass with erosion of adjacent rib and posterior element. (B) Post operative contrast enhance T1WI axial image showing contrast enhancing area adjacent to rib along costal pleura and at postoperative site.

Third case was a lady of 30 years age old was diagnosed case of Ewing's sarcoma in cervico-thoracic spine on 2011. She was presented with progressive weakness of both lower limbs. MR imaging revealed intradural extramedullary soft tissue compressing spinal cord from C6 to D3. After operation, biopsy and IHC revealed Ewing's sarcoma. She was treated with 6 cycle of chemotherapy with "VAC/IE (Inj. Vincristine 1.7mg, Inj. Doxorubicin 60mg, Inj. Cyclophophamide 1000 mg, Inj. Ifosfamide 1500mg, Inj. Etoposide 70 mg) regimen" at 3 weekly intervals. Now on follow up on 2019, Contrast enhances CT scan of neck chest region revealed no residual disease with evidence of laminectomy (Illustration 3).

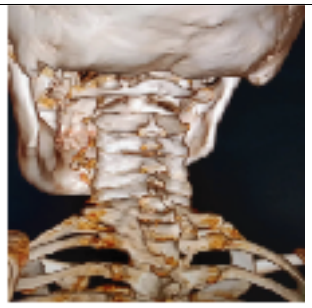

Illustration 3: 3D reformatted CT image showing evidence of laminectomy from D1 to D3vertebrallevel.

Fourth case was a lady of 26 years age old presented with 3 months history of intermittent pain in lateral aspect of left leg which was radiated towards left thigh. She was presented with loss of weight for 3 months and weakness of left lower limb for 15 days. He had no significant past, personal or family history. On clinical examination there was a swelling over lumbo-sacral spinal region measuring about (9x9) cm which is hard, fixed and tender with paraspinal fullness. Bulk of muscle and tone was reduced. The laboratory parameters were normal except for a raised erythrocyte sedimentation rate (55mm/hour). MRI of the lumbosacral spine revealed heterogenous enhancing soft tissue mass lesion in left side of pelvis arising from left ilium, infiltrating left side of sacrum adjacent left meso-rectal soft tissue and muscles (Illustration-4). Histopathology showed malignant round cell tumour favoring Ewing's sarcoma (Illustration-5).

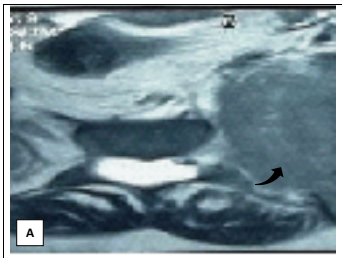

Illustration 4 (A): Non contrast T1W1 axial image showing hypointense soft tissue involving left side of ilium and sacrum (Curver arrow).

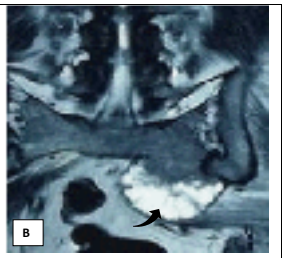

Illustration 4 (B) : Coronal T2W1 image showing heterogenoushyperintense lesion involving left side of sacrum and adjacent soft tissue (Curver arrow).

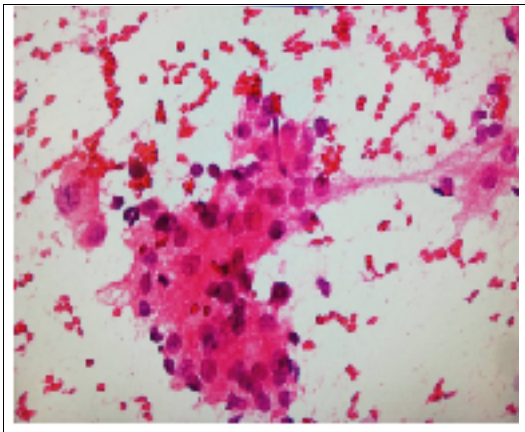

Illustration (5): Photo micrograph (After staining H&H stain x 20) showing malignant round cell tumour.

Discussion

Ewing's sarcoma mostly occurs in childhood when the bones are growing. It commonly affects the metaphyseal plates of long bones and rarely involves the spine where the most common location is the sacrum. Although there have been Primary Ewing's sarcoma affecting the spine is very rare. Ewing's sarcoma is a common malignancy of the bone and soft tissues in pediatric patients. It mostly affects the long bones and pelvis, and less commonly the flat bones and vertebrae. So, from these case reports, it could be concluded that in case of spinal tumour with above described clinical, imaging features, radiologist should think about Primary Ewing's sarcoma of spine as one of the differential diagnoses and also oncologist who is dealing patient with spinal tumour should exclude Ewing's sarcoma. reports of nonsacral spinal involvement but these are rare.[5] In our four cases, there was involvement of lumbar spine in first case, thoracic spine in second case and cervico-thoracic region in third case and sacrum in fourth case. So, all three cases were of rare variety. Ewing's sarcoma is often a multifocal disease and a proper pre staging workup including bone scan is required before institution of therapy and for follow-up.[6] Involvement of non-sacral spine usually presents with features of spinal cord compression which is often late in the course of disease. Presentation as acute paraplegia without significant localized pain and swelling has not been reported in the literature. The presence of benign musculoskeletal symptoms often leads to a delay in diagnosis with many patients being misdiagnosed and treated for disc disease. Unlike other malignant spinal lesions that cause progressive and continuous pain that increases with recumbence, in majority of non-sacral spinal Ewing's sarcoma pain is often intermittent, without nocturnal exacerbation.[7] This intermittent progression versus an expected rapid course is a reason for further delay in diagnosis. Thus, it is clear that diagnosis of non-sacral spinal Ewing's sarcoma will require a high index of suspicion. A detailed patient history and a careful physical examination supplemented by imaging are essential to minimize the delay. When deciding about the treatment of Ewing's sarcoma of the mobile spine, the most important determinant is the presence of neurological

deficits, which once present are often rapidly progressive. In such circumstances, only a prompt surgical decompression can provide maximum chance of recovery.[8] The approach is defined by the type of involvement. Anterior decompression is warranted in cases where cord compression is due to extension from the body. Ewing's sarcoma often tends to invade the spinal canal from the paravertebral soft tissue component through the intervertebral foramen, compressing the cord circumferentially. This makes laminectomy an effective approach for cord decompression.[9] In either of the cases, postoperative chemotherapy for control of micro metastases and local control by radiotherapy is warranted. In this cases where the diagnosis is being anticipated prior to neurological compromise, it is advisable to confirm it by needle biopsy and once made, the patient should be subjected to a three- or four-drug neoadjuvant chemotherapy regimen.[10] This would not only help shrink the primary tumor, thereby increasing chances of total excision, but also take care of micro metastasis and give an idea about responsiveness of the tumor to adjuvant therapy.[9] This is followed by surgery or radiotherapy or both. Primary radiotherapy is not advocated in these cases because the post treatment edema will lead to development or progression of neural compression. The purpose of this study was to report the incidence of such a rare tumour in young children. In our both cases, patients were young and non-sacral spine was involved which was rarer variety. However, Orthopaedic surgeons, Radiologists and Oncologists may encounter such conditions and should have a high index of suspicion to diagnose this rare tumour at its early stage for a better prognosis.

Conclusion

Primary Ewing's sarcoma affecting the spine is very rare. Ewing's sarcoma is a common malignancy of the bone and soft tissues in pediatric patients. It mostly affects the long bones and pelvis, and less commonly the flat bones and vertebrae. So, from these case reports, it could be concluded that in case of spinal tumour with above described clinical, imaging features, radiologist should think about Primary Ewing's sarcoma of spine as one of the differential diagnoses and also oncologist who is dealing patient with spinal tumour should exclude Ewing's sarcoma.

Acknowledgement

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