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CLINICAL VIGNETTE

Acute Inpatient Rehabilitation Following Internal Hemipelvectomy with Lumbosacral Fixation Secondary to Primary Pelvic Chondrosarcoma

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Introduction

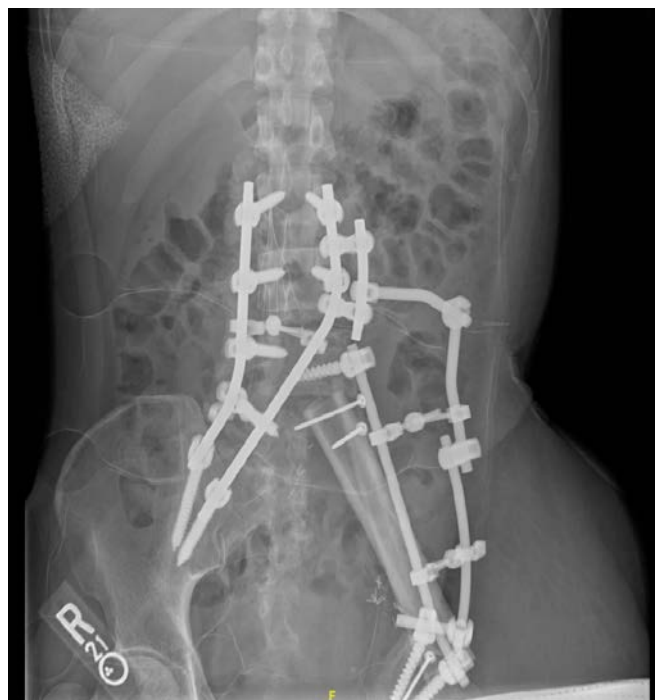
Chondrosarcomas are rare, malignant tumors derived from cartilage.¹ These tumors most commonly affect the pelvis, long bones, humerus and ribs.^{2,3} Depending on the nature of the tumor and whether it has metastasized, treatment may involve radiation and/or chemotherapy. However, surgical resection is the mainstay treatment.⁴ When chondrosarcoma involves the hip and wide margin excision is feasible, internal hemipelvectomy is an option. This procedure allows for limb salvage. On the other hand, external hemipelvectomy (hindquarter amputation) is used in cases of neurovascular involvement or when wide-margin excision is too challenging.⁵ Both procedures are associated with serious morbidity, including nerve damage, wound infection and poor healing.⁵ While internal hemipelvectomy is becoming a more viable option for pelvic chondrosarcoma treatment, there is limited data demonstrating rehabilitation outcomes on review of available literature.

Case Presentation

A 33-year-old man with a history of left pelvic chondrosarcoma, was admitted for acute inpatient rehabilitation. He completed 6 cycles of chemotherapy, and two-stage left internal hemipelvectomy with lumbopelvic fixation (see image 1). He had post-operative wound necrosis, infection, requiring debridement, multiple incision and drainages procedures and skin grafting. He also had DVT with IVC filter, severe AKI with hemodialysis.

The patient's left femoral nerve was sacrificed during surgery and a ten centimeter cable graft of the left sciatic nerve was performed. This led to decreased sensation and mobility in his left lower extremity.

Physical exam was remarkable for a surgical wound with exposed hardware and wound vac over the left anterolateral pelvic. Muscle Strength was 5/5 based on the Medical Research Council. Muscle Scale in bilateral upper extremities; and 3/5 throughout the tested muscle groups of right lower extremities. Muscle Strength 0/5 throughout left lower extremities (LLE), in all muscle groups tested. No pinprick or light touch sensation throughout the LLE.



Prior Level of Function

Patient reports that 9 months ago, before chondrosarcoma diagnosis, he was independent with all activities of daily living. While receiving chemotherapy, the patient used a front wheel walker, ultimately progressing to a single point cane, and finally ambulation without any assistive device prior to tumor removal. Ambulation was limited to short distances due to fatigue. Postoperatively, when he presented to the acute rehabilitation unit (ARU), he required maximum assistance/total for knee ankle foot orthosis placement, dressing, and transfers.

Management and Outcomes

The patient was given a left knee ankle foot orthosis (KAFO) to help with left leg instability and prescribed 15 hours of physical and occupational therapy weekly to improve activities of daily living, ambulation, and balance. His progress was

measured by the Functional Independence Measure (FIM). Scores were recorded on admission and at least once-twice weekly thereafter. Patient's total length of admission to ARU was 40 days.

Discussion

During initial assessment at the ARU, the patient had a number of musculoskeletal deficits. Occupational therapy (OT) goals were aimed to improve strength, coordination, performance of activities of daily living (ADLs), while physical therapy (PT) focused on bed mobility, balance with sitting/standing, gait training and fall prevention. Tables 1 and 2 present FIM scores on admission through discharge from rehabilitation.

OT FIM scores demonstrated improvement in toileting, hygiene, lower body dressing, donning/doffing shoes, bed mobility, sitting balance, and transfers. PT FIM scores showed improved ambulation, mobility on uneven surfaces, ascending stairs, wheelchair use, and the use of a custom KAFO.

The KAFO was essential for improving ambulation. Towards the end of his admission, the patient was able to ambulate safely with modified independence (one level below complete independence). However, he required an extra week to learn how to don and doff a new custom-fabricated KAFO. He required a new KAFO due to improvement in leg edema.

One barrier to improvement was poor wound healing. The patient had undergone multiple courses of antibiotics and chemotherapy, and was admitted to ARU wearing a wound vacuum over the anterolateral pelvis. He remained on chronic antibiotics until granulation tissue covered his hardware. The persistent wound affected his ability to fully engage in treatment, and the wound vacuum with KAFO was cumbersome and limited his mobility.

Another barrier to treatment was the femoral and sciatic nerve damage during surgery, leaving his left leg in total paralysis and insensate. He also required complex, interdisciplinary pain management. Neuropsychology consultation and follow up helped address his pain from a non-pharmacologic approach. Reduction of anxiety resulted in better participation, and the patient reported subjectively improvement in pain over time. With cognitive behavioral therapy, this patient developed a stable, positive outlook, which further facilitated his participation in PT and OT.

TABLE ONE: Occupational Therapy FIM Scores

Task	FIM Score on Admission	FIM Score Day 13	FIM Score Day 29
Eating	7	7	7
Oral Hygiene	7	7	7
Toileting Hygiene	3	5	5
Showering/Self Bathing	2	3	4
Upper body Dressing	1	4	6
Lower Body Dressing	1	3	4
Putting on/Taking Off Footwear	2	3	4
Roll Left and Right Assistance	4	5	6
Sit to Lying	4	5	6
Lying to sitting on Side of Bed	4	4	5
Sit to Stand	4	4	5
Chair/Bed to Chair Transfer	4	4	4
Toilet Transfer	4	4	4

TABLE TWO: Physical Therapy FIM Scores

Task	FIM Score on Admission	FIM Score Day 13	FIM Score Day 29
Using KAFO to maneuver from long to short sit on Edge of Bed	2	3-4	6
Walking	1	10 feet: 4 20-25 feet: 3-2	Ambulate with 3 point gait pattern and forearm crutches x 25'; 4
Wheelchair	2	300 feet: 5	300 feet: 6
One 4 inch step	1	2	5

follow-up of 56 months. *BMC Musculoskelet Disord.* 2015 Feb 18;16:33. doi:10.1186/s12891-015-0494-5. PubMed PMID: 25888345; PubMed Central PMCID:PMC4342034.

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