



Lesson of the month: Proactive multidisciplinary management of bone metastases in poor prognostic disease to optimise patient wellbeing and function

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Abstract

This case discusses a fit young man diagnosed with cancer of unknown primary. In the context of disease with a poor prognosis, his case highlights the challenges of weighing up the pros and cons of active and aggressive treatment options, including prophylactic orthopaedic surgery for long bones at high risk of pathological fracture, to maintain function and quality of life.

Received: Mar 20, 2019

Accepted: May 31, 2019

Published Online: June 06, 2019

Journal: Journal of Orthopedics and Muscular System

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

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Keywords: Bone metastases; Mirels score; Pathological fracture; Metastatic spinal cord compression; Function; Prognosis

Case summary

A 48 year old amateur triathlete presented to the orthopaedic team with 6 weeks of lower back and right hip pain. Imaging showed bone (pelvis, hip and spine) and liver metastases with no obvious primary. Liver biopsy confirmed poorly differentiated carcinoma.

Pain from a right hip lytic metastasis (Figure 1) was limiting his mobility. It was at high risk of pathological fracture with a Mirels score [1] of 12/12 [Table 1]. He was very keen to maintain his mobility and functional status as long as possible. He had a prophylactic right total hip replacement, in keeping with current British guidelines [2] despite having incurable disease with a poor prognosis. The surgery enabled him to regain his mobili-

ty and three weeks later he started palliative chemotherapy and zoledronate with the intention to treat the cancer and decrease likelihood of skeletal related events [3].

Shortly before the second cycle of chemotherapy was due, he presented with lower back pain radiating down his left leg. He was in the immediate risk group for metastatic spinal cord compression as per NICE Guidelines [4] and started high dose oral dexamethasone. MRI whole spine within 24 hours showed cauda equina compression at L4 vertebral level (Figure 2). Urgent radiotherapy (20 Gy in 5 fractions) improved his pain with no neurological deficit.



Cite this article: Green E, Price M, Wells T. Lesson of the month: Proactive multidisciplinary management of bone metastases in poor prognostic disease to optimise patient wellbeing and function. *J Orthop Muscular Syst.* 2019; 2(1): 1008.

Seven months after initial cancer diagnosis, he had left thigh and groin pain impairing mobility. MRI showed lytic bone metastases in left femoral neck and shaft (Figure 3) with Mirels score [1] of 10/12. He went on to have a prophylactic left hip replacement. He was switched from zoledronate to denosumab because denosumab has been shown to be superior in decreasing time to first, as well as risk of multiple skeletal related events [5,6].

One month later, he had neck pain and left arm paraesthesia in C7 dermatome. He was started on high dose dexamethasone and urgent MRI whole spine showed bone metastases with C7 nerve root compression. Urgent radiotherapy (20 Gy in 5 fractions) again improved his pain with no neurological deficit.

He had further treatment with chemotherapy until imaging showed worsening liver metastases. Denosumab had helped improve his bone pain and he continued this for symptomatic benefit until he presented with clinical evidence of worsening disease burden, liver failure (jaundice, ascites and fatigue) and clearly did not have long to live. Up until this point he had been keen to continue active treatment and still wished to be for CPR. After long conversations an escalation plan was put into place at this time including a DNACPR. He died in the community three weeks later. This was more than 2 years from initial cancer diagnosis and for the majority of that time he had managed to continue to work and maintain a good quality of life.



Figure 1: Coronal magnetic resonance scan of right hip showing lytic lesions.



Figure 2: Sagittal magnetic resonance scan of the spine showing cauda equina compression at L4 level.



Figure 3: Coronal magnetic resonance scan of left hip showing lytic lesions.

Discussion

Cancer of unknown primary is defined as metastatic epithelial disease with no identifiable primary at the time of diagnosis and currently represents 2-5% of new cancer diagnoses [7]. Cancer of unknown primary with liver metastases confers a poor prognosis with a median survival of only 3 to 4 months. When considering treatment options for this patient, he had some features that favoured a more positive outcome (young age, excellent pre-morbid fitness) and some that favoured a negative outcome (diagnosis following emergency hospital admission and liver metastases at diagnosis) [8,9].

Prognosis is an important factor when considering the management of any acutely unwell patient. This man was likely to have only a few months to live at presentation and even though the pain from his hip was impacting on his ability to mobilise, one had to question whether hip replacement surgery with routine recovery period of 4 to 6 weeks was appropriate. The Mirels score was greater than 8, which gave a high statistical likelihood of imminent pathological fracture, and prophylactic surgery is felt to be indicated in most cases [1,10]. On top of the fracture risk, the patient was in significant, constant pain which was impacting on his mobility and quality of life. He was a young healthy man until then and was extremely keen to maintain his independence for as long as possible. The second surgery for his left hip was a similar clinical scenario, although being 7 months further on and with worsening disease; it could be argued that his life expectancy was even worse at that stage. Interestingly he suffered no complications from the surgeries, such as infections, despite having received immunosuppression in the form of chemotherapy and high dose steroids. However, surgery on both occasions allowed him to regain his mobility and performance status, which in turn enabled him to continue working for the majority of his illness, and this was very important to his mental wellbeing.

Metastatic spinal cord compression is an oncological emergency occurring in 3-5% of all cancer patients [4]. Early diagnosis and treatment are key in preventing or at least limiting long term neurological sequelae and maintaining function. Treatment options include surgery and radiotherapy, with choice of which option to offer being based on extent and duration of neurological deficit, prognosis and pre-morbid status [4]. Median survival is just 2 to 3 months and therefore the recovery from surgery must be taken into account when making a deci-

sion about treatment options. Timely treatment on both occasions in this patient with dexamethasone and radiotherapy was key in allowing him to maintain a good functional status and quality of life late into his illness.

One important influence on his management was his enthusiasm for active management for as long as possible. In cases where prognosis is poor but treatment options may significantly influence quality of life, patient involvement and opinion in decision making is crucial.

Conclusion

At diagnosis cancer of unknown primary with liver metastases has a prognosis of only several months [1] There may have been an argument at that time against right hip replacement, with recovery time of 4 to 6, weeks unless a fracture occurred. This was even truer when he presented with symptoms in his left hip seven months later. However, proactive decision-making and proceeding with orthopaedic surgery enabled him to maintain his ambulation and continue to lead a full life. Metastatic spinal cord compression is an oncological emergency with permanent neurological compromise occurring without timely management. Prompt investigation with MRI whole spine and treatment with dexamethasone and radiotherapy in this case allowed the patient to maintain his independence. A multidisciplinary approach is needed when making decisions about treatment in these cases. Clear communication and a collaborative approach with the patient are key.

Consent to publish

Consent to publish was obtained from the patient's next of kin

Score	1	2	3
Site	Upper Limb	Lower Limb	Peri-trochanteric
Pain	Mild	Moderate	Functional
Lesion	Blastic	Mixed	Lytic
Size	<1/3	1/3-2/3	>2/3
Score ≤ 7 (<4% fracture risk)			
Score 8 (15% fracture risk)			
Score > 8 (33-100% fracture risk)			
Score > 8 → prophylactic internal fixation is indicated			

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