

Rare subtype of multiple myeloma presenting as sacroiliac joint pain in an avid golfer: a case report

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Objective: Kappa (κ) light chain multiple myeloma can be disguised as low back pain (LBP), and as such may present to a primary contact provider such as a chiropractor. The rarity and non-specific nature of the clinical presentation of this condition typically lead to a delayed diagnosis.

Case presentation: A 53-year old male avid golfer presented to a chiropractor with a chief complaint of LBP. He was diagnosed with sacroiliac joint dysfunction. His pain was initially improving with chiropractic management. The character of his pain changed, and the chiropractor referred for further imaging. He was subsequently diagnosed with κ light chain multiple myeloma.

Summary: This case presentation highlights that spinal malignancy is a possible cause of LBP. It reminds the clinician to investigate signs and symptoms that

Objectif : Un myélome multiple à chaîne légère (kappa) (κ) peut se cacher derrière des lombalgies qu'un fournisseur de soins primaires, comme un chiropraticien, peut ne pas reconnaître. En raison de la rareté et de la nature imprécise des symptômes cliniques, ce type de myélome est souvent diagnostiqué tardivement.

Exposé du cas : Un fervent golfeur de 53 ans s'est présenté dans une clinique de chiropratique en se plaignant de lombalgies. Le chiropraticien a diagnostiqué un trouble de l'articulation sacro-iliaque. Au début, le traitement de chiropraxie a soulagé la douleur. Mais comme sa nature évoluait, le chiropraticien a recommandé un examen par imagerie, qui a révélé un myélome multiple à chaîne légère κ.

Résumé : Les tumeurs de la colonne vertébrale peuvent être une cause de lombalgies. Le présent exposé de cas rappelle au clinicien de rechercher les causes des signes et des symptômes pouvant faire soupçonner

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could lead to a suspicion of malignancy, to monitor patient progression, and consider further evaluations if the expected response to treatment is not achieved.

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KEY WORDS: chiropractic, differential diagnosis, golf, low back pain, multiple myeloma, sacroiliac joint

Introduction

Low back pain (LBP) is one of the most common musculoskeletal problems reported by recreational and professional golfers.¹ In one study of 402 recreational golfers, approximately half of the respondents reported having received chiropractic care and nearly all of those participants had positive experiences with their treatments.² Low back pain in golfers is most commonly secondary to non-complicated mechanical pain.¹ However, this does not preclude the possibility of these athletes presenting with a more sinister pathology mimicking back pain, such as a malignancy. In the general population, low back pain complaints account for approximately 50% of the reasons patients seek chiropractic care.³ Five percent of these have serious underlying diseases or neurological impairments.⁴ Less than one percent will have spinal malignancy⁴, of which, multiple myeloma (MM), a malignant monoclonal plasma cell disease, is the most common bone marrow cancer in the adult population⁵. MM accounts for approximately one percent of all cancer types⁶, and in industrialized countries, the incidence is estimated to be four per 100,000 people⁷. This condition is characterized by plasma cells that produce excessive amounts of immunoglobulins; these immunoglobulins (Ig) are composed of heavy chains (A, G, M, D and E) and light chains (kappa (κ) or lambda (λ))⁷ (Figure 1). Of all the isotopes associated with MM disease, approximately 52% are IgG, 21% IgA, 20% Light chain, 3% Biclonal, 2% IgD, 2% Non-secretory, and 0.5% IgM.⁸ In light chain multiple myeloma (LCMM), the light chain immunoglobulins are secreted in excess⁸ and predispose the patient to complications such as bone disease, renal failure, and amyloidosis⁹. Although LCMM is rare⁹, it may present in a patient seen by a primary

un cancer, de surveiller l'état du patient et d'envisager des examens plus approfondis si le traitement ne donne pas les résultats attendus.

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MOTS CLÉS : chiropratique, diagnostic différentiel, golf, lombalgie, myélome multiple, articulation sacroiliaque

contact provider, such as a chiropractor, in the form of back pain. We present a case of a 53-year old avid golfer who was diagnosed with κ light chain multiple myeloma after presenting to a chiropractor with a chief complaint of sacroiliac (SI) joint pain.

Case presentation

Initial visit – case history

A 53-year old lawyer and avid golfer presented to a chiropractor with a chief complaint of low back pain which began two weeks prior while working with a personal trainer. He was pushing a sled loaded with weights and subsequently felt pain in his left SI joint and buttock the next day. Two days prior to consulting the chiropractor, he saw his general practitioner (GP) and was diagnosed with

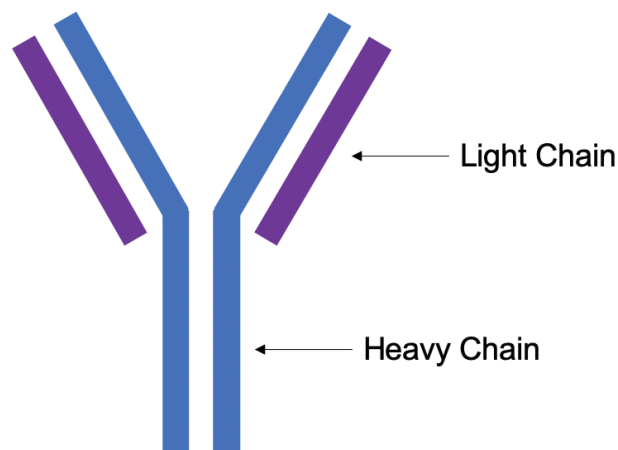


Figure 1.

Heavy and light chain components of immunoglobulins.

a low back strain. At the time of his initial chiropractic assessment, he reported his pain progressively worsened throughout the day, and was aggravated when sitting for extended periods of time. For the first few days of this new onset of LBP, he also experienced pain with forward flexion at the lumbar spine. He reported some relief with ibuprofen. The character of his pain was described as dull and achy, with constant pressure. He initially rated the pain as a 7-8/10. He did not report any radicular symptoms such as numbness, tingling, or sharp pain, and no changes to his bowel or bladder habits were noted. He also reported no abnormalities or changes to his gait; however, he felt more stiffness in his lower back when ambulating.

The patient reported an episode of low back pain a few years ago resulting from falling on his tailbone. Over the course of the last year he had also been seeing a physiotherapist for occasional LBP and plantar fasciitis. His past health history included Crohn's disease, which was managed with corticosteroids from the age of 13-20 and a subsequent small bowel resection at the age of 20. He was being monitored annually with no recent evidence of Crohn's disease activity. His only known family history was maternal diabetes and various other benign conditions associated with aging. He was not on medications at the time of the initial evaluation by the chiropractor. He was physically active, attended sessions once a week with his personal trainer and golfed two to three times per week on average.

Physical examination

On physical examination, gait evaluation was normal. A lower limb neurological exam evaluating deep tendon reflexes, sensation, and motor strength were all normal bilaterally. Plantar response was down-going bilaterally. Range of motion in the lumbar spine was unremarkable, except for pain in the low back with left lateral flexion. Kemp's tests caused pain bilaterally in the low back. Functional testing, such as Trendelenburg's stance, quarter-squat and body weighted squat, were unremarkable. Straight leg raise (SLR) testing was painful in the area of chief complaint on the left at 60 degrees. Open book test, psoas palpation, Patrick's FABER and seated SLR were all unremarkable bilaterally. SI joint palpation revealed pain on the left and restricted movement bilaterally. Joint challenge (Maigne's) was restricted bilaterally in the

lower lumbar spine. Scour test revealed lack of mobility in the hips bilaterally (greater on the left) without pain or clicking. Muscle palpation revealed tenderness and hypertonicity of the bilateral lumbar spine erectors, gluteus muscles, tensor fascia latae, and piriformis. Pain was also elicited with the palpation of the dorsosacral ligaments and iliotibial bands bilaterally.

Diagnosis and treatment

This patient was diagnosed with SI joint dysfunction. Differential diagnoses included discogenic low back pain, dorsosacral ligament sprain and, given the patient's gastrointestinal history, enteropathic arthritis. The plan of management (POM) included spinal manipulative therapy (SMT) of the SI joint, soft tissue therapy (STT), rehabilitative exercises and stretches, as well as heat. On the initial visit, heat and soft tissue therapy were applied to the affected musculature, and the patient was given rehabilitative exercises to perform at home. This included single and double knee to chest stretches and pelvic tilts.

Follow-up visits

This patient was managed by the chiropractor in several follow-up visits detailed in Appendix 1.

Two and a half weeks (and five treatments) after his initial evaluation by the chiropractor, he reported a 60% improvement in his pain, but reported that at the end of the day his pain in the midline of his buttock area felt very tight, and "like it [was] being separated". However, he stated he could comfortably golf while taking ibuprofen and methocarbamol. The patient was reassessed at four and a half weeks, at which time he reported the pain in his SI joints was almost resolved, though his hamstring was now bothersome. Following the reassessment, the patient's diagnosis for SI joint dysfunction was unchanged and an additional diagnosis of hamstring tendinopathy was included. The patient was treated with STT and rehabilitative stretches for his hamstring.

Seven weeks after the initial presentation to the chiropractor, he reported that his pain was worse and aggravated with sitting, standing and lying down. The patient described his pain was as pulsating in nature, but did not present with radicular symptoms, night sweats, changes in gait, or changes to bowel or bladder function. He was still able to play golf if he took ibuprofen and metho-

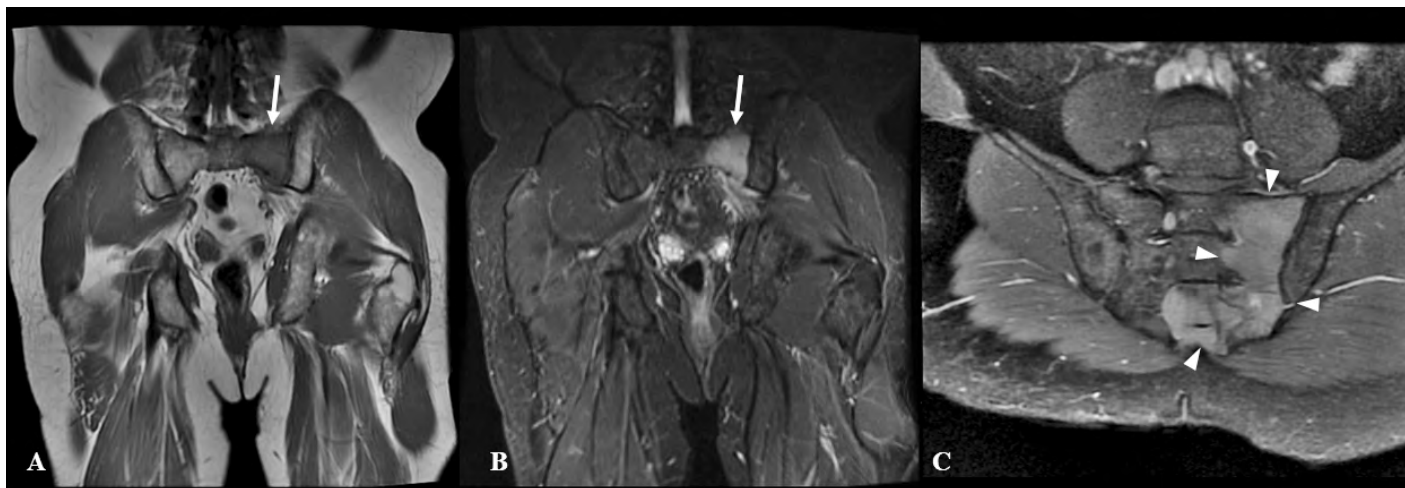


Figure 2.

T1-weighted (A) and STIR (B) coronal MRI sequence of the pelvis demonstrating hypointense T1 and hyperintense STIR signal signifying marked bone marrow edema in the left sacral ala (arrows). T1-weighted fat sat C+ coronal MRI sequence (C) of the sacrum demonstrating avid enhancement of the left-sided sacral lesion (arrowheads).

carbamol prior to playing. Electroacupuncture was incorporated into the POM at this time along with STT and SMT to the SI joints. Nine weeks after his initial presentation to the chiropractor, he reported terrible pain at the end of the day. He constantly felt pressure and discomfort in his upper gluteal and sacral areas. He still did not report radicular symptoms, night sweats, malaise, lethargy or fatigue. The chiropractor continued with the patient's POM (acupuncture, STT and SMT to the SI joints). However, at this time the chiropractor referred the patient to his GP suggesting a requisition for imaging. The GP requisitioned a magnetic resonance image (MRI) of the pelvis.

Imaging and further evaluations

The MRI revealed a large diffuse hypointense T1-weighted and hyperintense short tau inversion recovery (STIR) lesion of the left sacrum, extending into the coccyx and crossing midline at S3 and the remaining caudad segments. Cortical violation of the anterior sacrum and coccyx was present with spread of the lesion into the presacral soft tissue, extending approximately 50mm in the cephalad to caudad dimension. The lesion enhanced with intravenous gadolinium and was concerning for a malignant neoplastic process (Figure 2 and 3). The right



Figure 3.

STIR sagittal MRI sequence of the sacrum revealing high signal intensity of the S3 and caudal segments (arrows) with anterior soft tissue extension (arrowheads).

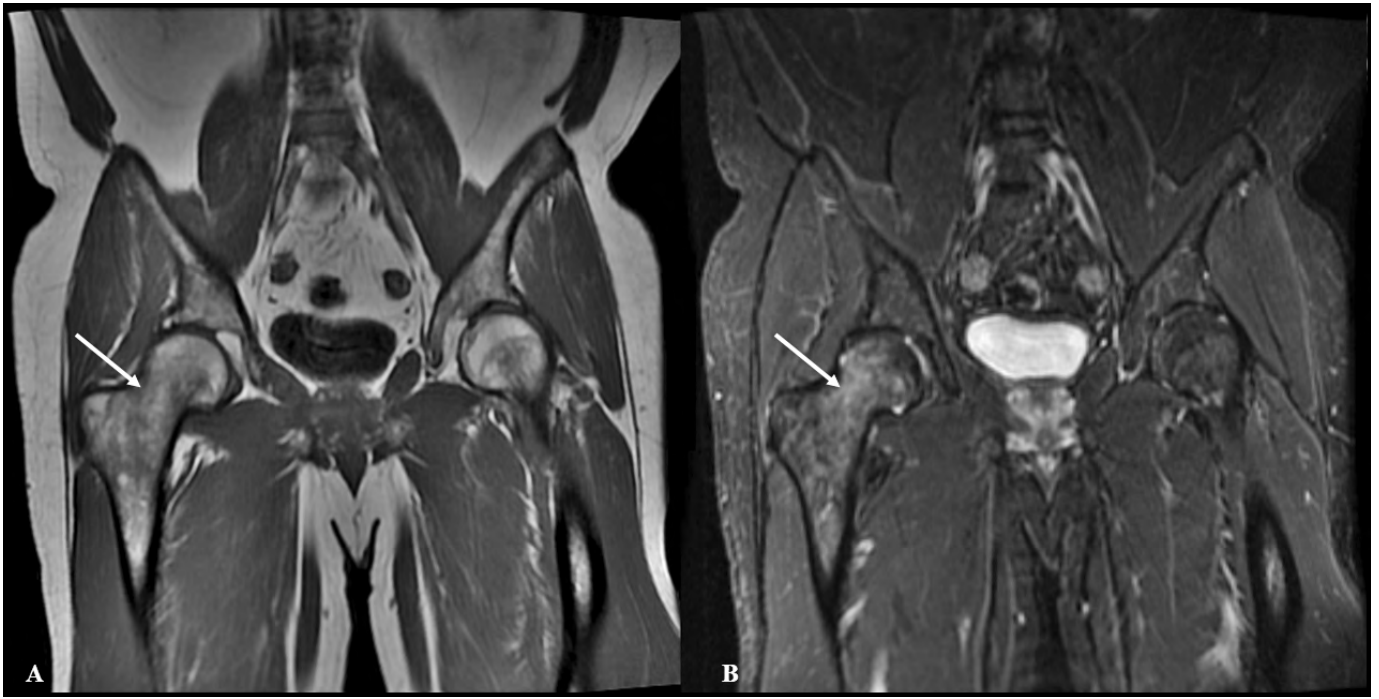


Figure 4.

T1-weighted (A) and STIR (B) coronal MRI sequence of the pelvis demonstrating hypointense T1 and hyperintense STIR signal signifying marked bone marrow edema in the right femoral head and neck (arrows).

femoral head and neck also demonstrated diffuse hypointense T1-weighted and hyperintense STIR signal (Figure 4). These signals are consistent with either bone marrow edema from an infiltrative process or, less likely, arthritic changes or marrow reconversion. Unfortunately, any sequences which included intravenous gadolinium did not provide visualization of the right femur to allow proper assessment of enhancement patterns. However, given the unilateral femoral presentation, the spread of the marrow changes beyond the physal scar and the presence of the existing sacral lesion, the signal characteristics of the right femur was also suspicious to be neoplastic in nature. There was no evidence of pathological fractures within the pelvis and femurs.

The patient was subsequently sent for a bone scan, computed tomography (CT) scan of the head, and CT-guided skeletal bone biopsy. The bone scan further revealed multifocal skeletal abnormalities in the left orbit and right subarticular femoral and humeral heads. The nature of these lesions was unknown with these images. The pa-

tient's CT head scan revealed a soft tissue mass centered within the left frontal bone extending intracranially into the left orbit.

The patient's cytopathology report from left sacral skeletal fine needle aspiration revealed scant amounts of plasmacytoid cells, and cell block containing rare tissue fragments with plasma cells.

Laboratory reports revealed that his initial beta 2 microglobulin was 1.5mg/L, albumin 47g/L, and lactate dehydrogenase 240 U/L. His immunology profile showed a κ light chain of 32.4, λ light chain of 10.1, κ/λ ratio of 3.21 with a diffuse gamma region pattern on electrophoresis. His free light chain measurements revealed a free κ of 130.4mg/L (reference 3.3-19.4), free λ of 12 mg/L (reference 5.7-26.3) and κ/λ ratio of 10.87 (reference 0.26-1.65).

Diagnosis

This patient was diagnosed with κ light chain multiple myeloma, that was negative for bone marrow involve-

MM is defined by having both of the following: ⁹
Clonal bone marrow plasma cells $\geq 10\%$ or biopsy-proven bony or extramedullary plasmacytoma
Any one or more of the following myeloma defining events: <ul style="list-style-type: none"> ○ Evidence of end-organ damage that can be attributed to the underlying plasma cell proliferative disorder <ul style="list-style-type: none"> ▪ Hypercalcemia: serum calcium $>0.25\text{mmol/L}$ ($>1\text{mg/dL}$) higher than the upper limit of normal or $>2.75\text{mmol/L}$ ($>11\text{mg/dL}$) ▪ Renal insufficiency: creatinine clearance $<40\text{ mL/min}$ or serum creatinine $>177\text{ }\mu\text{mol/L}$ ($>2\text{ mg/dL}$) ▪ Anemia: hemoglobin value of $>2\text{ g/dL}$ below the lower limit of normal or a hemoglobin value $<10\text{ g/dL}$ ▪ Bone lesions: one or more osteolytic lesions on skeletal radiography, computerized tomography (CT), or positron emission tomography–CT (PET–CT) ○ Clonal bone marrow plasma cell percentage $\geq 60\%$ ○ Involved: uninvolved serum free light chain (FLC) ratio ≥ 100 (involved FLC level must be $\geq 100\text{mg/L}$) ○ >1 focal lesion on magnetic resonance imaging (MRI) studies (at least 55 mm in size)

Figure 5.
The International Myeloma Working Group Diagnostic Criteria

ment (Figure 5). He presented with a painful bone lesion in his sacrum, and asymptomatic lesions in the femurs and left orbit. His MM was classified as International Staging System (ISS) Stage 1, and revised International Staging System (RISS) Stage 1.¹⁰

Management

The chiropractor followed up with treatment for the patient’s ongoing musculoskeletal complaints, including myofascial pain, with treatment that included heat, STT, spinal mobilizations, and rehabilitative stretches of gluteus muscles and hamstrings. SMT was excluded from the POM moving forward due to the spinal malignancy.¹¹

The medical POM for this patient’s MM included three rounds of CYBOR-D (cyclophosphamide, bortezomib, and dexamethasone) induction therapy, and a subsequent autologous stem cell transplant. On last follow-up with this patient, he had nearly completed his Phase 1 induction therapy and was due to start stem cell transplantation. His induction therapy was extended for three more rounds (total of six rounds) due to the COVID-19 pandemic. So

far, the patient reported a decrease of his pain following induction therapy. He currently rates his pain at a 1/10 though he reported that he feels less vital and quick. The patient’s written consent was obtained to use his information for the purposes of this report.

Discussion

MM can be challenging to diagnose, especially in the current case study, where the initial report of symptoms only included LBP. Early detection of MM is associated with a 14% better overall survival rate.¹² Out of 24 common cancers, patients with MM experience the greatest diagnostic delays in primary care¹² with one study reporting an average of 137 days elapsing between the initial signs and symptoms and MM diagnosis¹³. The strongest predictor of diagnostic delay was the presence of at least one comorbidity in addition to anemia and back pain prior to diagnosis.¹³ This delay may be directly related to primary care providers focusing on acute problems and therefore overlooking myeloma symptoms.¹³ The challenging nature of diagnosing MM is further complicated by the lack of certainty and specificity around indications for MM in a clinical examination.¹⁴ In the present case, the patient presented with Crohn’s disease and back pain, however, his physical examination was very indicative of SI joint dysfunction. Chiropractors may play a part in the detection of MM, as they can and should routinely assess for signs and symptoms of malignancy in their clinical evaluation to determine when further investigations are warranted.

Clinical evaluation

When determining the level of concern for a serious spinal pathology, it is imperative that the clinician take into consideration all available information, including red flags, patient history and the physical examination.¹⁵ Information gathering does not end at the initial assessment. The patient should be continuously reassessed for changes in signs and symptoms. Chiropractors are trained to screen for red flags. However, there are limitations to the utility of screening red flags based on current available evidence in the literature.¹⁶ Many guidelines cite history of malignancies/cancer, and unexplained/unintentional weight loss as red flags for malignancies.¹⁶ Still, when evaluating red flags, only “history of cancer” was determined to be of acceptable validity.¹⁶ Another aspect of in-

investigative questioning in developing a diagnosis is the determination of the character, frequency and duration of pain. Some signs of nonmechanical pain origins are unrelenting pain at rest, constant or progressive signs and symptoms.¹⁷ In this patient's case, the initial report of pain did not seem sinister in nature. However, as time went on, there was a change in symptomatology and the patient's description of the pain, leading the chiropractor to investigate the patient's condition further.

To investigate other associated symptoms that may or may not be related to the presentation, a systems review is typically performed. Although this patient did not report any additional symptoms, MM patients often present with nonspecific symptoms, such as: malaise, weakness, recurrent infections, weight loss, nausea, or vomiting and more specific symptoms such as blood hyperviscosity (e.g. dyspnea, transient ischemic attack, deep vein thrombosis, retinal hemorrhage), peripheral neuropathy, or bone disease (e.g. pain from fracture, spinal cord compression).¹⁴ Unfortunately, the nonspecific nature of some of these signs and symptoms may also account for the delayed diagnosis.¹³ In one study, of those who had a delayed diagnosis, the time between the initial visit with a sign or symptom of MM and the cancer diagnosis exceeded 30 days.¹³ The patient in the current report experienced less pain but more discomfort in general as time went on and continued his physical activities, including personal training sessions and golfing.

The last challenge of diagnosing MM in a timely manner is the lack of specific physical examination findings for this condition. Most patients with MM will have normal physical examination findings upon initial presentation.¹⁴ This occurred in the current case. With each assessment and follow-up visit, his physical examination findings were normal or deemed to be related to a musculoskeletal condition. Nonetheless, if the patient is not recovering in the expected manner and/or time frame, laboratory evaluations and diagnostic imaging should be considered to rule out a more sinister pathology, such as MM.¹⁵

Further investigations

If a patient is not responding to treatment as expected or there is a clinical suspicion of malignancy, laboratory evaluations and diagnostic imaging may be warranted for further investigation.^{15,17} The patient in this case under-

went an MRI, CT and bone scintigraphy for lesion follow-ups, the last modality performed as a means to distinguish between metastatic and MM disease.¹⁸

Diagnostic Imaging Practice Guidelines for chiropractors recommend that imaging may provide gainful information in adult patients with musculoskeletal complaints that demonstrate failure to respond to expected treatment outcomes or worsening of symptoms after four to six weeks.¹⁷ In addition, co-management or specialist referral is recommended if the radiographs are unremarkable and if any one of the following is present:¹⁷

- Presence of a potentially serious pathology as suggested by the patient history, examination, and/or radiograph
- Failed conservative therapy (four to six weeks)
- Patient's neurological status is deteriorating (progressive deficit, disabling leg pain)
- Clinical signs suggest instability
- For preoperative planning

The National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines suggest that Positron Emission Tomography (PET)/CT and MRI are more sensitive than plain film radiographs and are still indicated when symptomatic areas in patients with suspected MM show no radiographic abnormalities.¹⁹ MRI is the gold standard imaging modality for the detection of bone marrow involvement in MM as they detect plasma cell infiltrations, and the pathomorphological features of plasma cell clusters.⁴ PET/CT scans are useful to determine the response to therapy and provide prognostic data.²⁰ Bone scintigraphy, an imaging modality that relies heavily on the rate of new bone formation, is sensitive for metastatic bone disease, however, offers limited value in the detection of MM.^{21,22} The osteoblastic response in MM is significantly low and thus often results in a normal or decreased uptake on bone scans.¹⁸

Initial laboratory testing for MM typically includes a complete blood count with differential and serum albumin, calcium, creatinine, electrolytes and urea nitrogen. Confirmatory lab tests include 24-hour urine protein, Beta-2-microglobulin, lactate dehydrogenase, serum free light chain assay, serum protein electrophoresis, serum immunofixation electrophoresis, serum quantitative immunoglobulins, urine immunofixation electrophoresis,

and urine protein electrophoresis.¹⁴ Laboratory testing can aid in the confirmation of the diagnosis of MM using diagnostic criteria, and can track the progression of the disease over time.

Management

The treatment regimen by the patient's oncologist included four rounds of CYBOR-D (cyclophosphamide, bortezomib, and dexamethasone) induction therapy, followed by an autologous stem cell transplant. The preferred primary therapy regimens for patients eligible for transplants include bortezomib-based 3-drug regimens.²³ Cyclophosphamide is an alkylating agent with common adverse events including nausea, gastrointestinal toxicity, immune suppression, mucositis, and alopecia. Bortezomib is a proteasome inhibitor, with common adverse events including peripheral neuropathy, autonomic neuropathy, thrombocytopenia, and reactivation of varicella-zoster virus. Dexamethasone is a corticosteroid, with common adverse events including gastrointestinal toxicity, hyperglycemia, immune suppression, insomnia, altered mood, and fluid retention.¹⁴ When following up with a patient with MM, it is important to be aware of the possible adverse effects from medication in addition to their signs and symptoms of MM, due to the potential for mimicry of musculoskeletal complaints (e.g. peripheral neuropathies). In addition to induction therapy, certain patients with MM such as the patient in this case, will undergo an out-patient autologous stem cell transplant. This is the process by which stem cells will be obtained from the patient themselves.⁴

Prognosis

Median survival outcomes in the literature for patients treated with modern therapy for MM have been reported to be approximately six years.²⁴ The prognosis can vary depending on many factors, including stage of the disease, cytogenic abnormalities, and response to therapy.²⁴ Patients eligible for treatment with an autologous stem cell transplant have a four-year survival rate of greater than 80%, and a median overall survival of approximately eight years.²⁴ Unfortunately, all forms of LCMM appear to have a poorer prognosis when treated with chemotherapy compared to IgG and IgA subtypes.⁹

Over time, this patient's ability to golf could be affected as it has been reported that patients with MM report

a lack of endurance and energy, as well as pain.⁶ Both the physical challenges associated with this condition such as fatigue, pain and lack of endurance, as well as the impact of MM treatment can lead to patients describing themselves as having a "different body".⁶ In order to address their distress, patients use strategies including both physical and emotional coping mechanisms.⁶ In MM patients, there are reported patient perceived benefits of physical activity, including: psychological health, recovery from treatment, social factors, and enjoyment.⁶ Exercise has been shown to be beneficial for patients undergoing treatment for MM by increasing muscle mass and physical performance as well as decreasing fatigue and depression.²⁵ A regular aerobic exercise program has also been shown to improve quality of life in patients with hematologic malignancies.¹⁴ The patient in the current report continued to exercise after his diagnosis. Exercise therapy is something most chiropractors are well-versed in and can help initiate or continue to advise the patient on.

Patients with MM are also at an increased risk of pathological fractures. The primary lytic lesions can affect the axial skeleton, with the main pathological feature (uncoupling of bone resorption from bone formation) leading to a state of predominant bone resorption.²⁶ This is an important consideration when treating a patient with MM, as extra caution must be taken to avoid fractures. This patient was treated with bisphosphonates, which are used in the management of MM to inhibit the progression of osteoclastic activity and subsequent skeletal morbidity and mortality.²⁷ Nevertheless, the World Health Organization (WHO) guidelines on basic training and safety in chiropractic reports malignancy of the spine as an absolute contraindication to SMT in area of the pathology and the immediate vicinity.¹¹ In addition, the WHO also deems spinal mobilizations inappropriate for this population as it may place patients at undue risk for injury.¹¹ Soft tissue manipulation may be safely used in patients with an absolute contraindication for SMT, such as those with spinal malignancy, if indicated for a musculoskeletal complaint.¹¹

Limitations

The major limitation of this report is by nature the type of report being presented. With respect to the hierarchy of evidence, case studies are considered a lower level of evi-

dence and information such as rates, incidence and generalizability cannot be generated or inferred.²⁸ However, case reports help detect novelties²⁸ and in the current case report, we highlight a rare case presentation which may act as a reminder to practitioners to consider these serious pathologies.

Summary

We present a case of a 53-year old avid golfer presenting with a chief complaint of low back pain, initially suspected to be SI joint dysfunction. Following the appropriate referral and advanced diagnostic imaging, the condition was determined to be ISS Stage 1 and RISS Stage 1 κ light chain multiple myeloma. With less than one percent of back pain presentations resulting in a spinal malignancy, and the non-specific nature of the clinical presentation, a delayed diagnosis is typical. This was a challenging and rare case. The patient's most recent annual health assessment, carried out three months prior to his initial presentation to the chiropractor, revealed no abnormal findings. The only symptom he presented to the chiropractor was low back pain and he did initially respond to conservative management. Once his symptomatology changed, the chiropractor correctly identified the need for further evaluation and imaging. In doing so, the chiropractor referred this patient back to the MD allowing this patient to receive the diagnosis and treatment he required. This case presentation is a reminder to investigate signs and symptoms that could lead to a suspicion of malignancy, as well as to monitor patient progression and consider further evaluations if the expected response to treatment is not achieved.

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Appendix 1. Follow-up visits

Treatment 2: The patient returned five days after his initial visit and reported that there was some relief of his pain after the last treatment. However, three days prior to this appointment he had golfed ten holes and reported an exacerbation of his low back pain afterwards. Treatment was rendered as outlined above.

Treatment 3: At the third appointment, two weeks after his initial presentation, he reported his pain was reduced by 20%. At this time, SMT was incorporated into the treatment which previously included heat, STT, and rehabilitative exercises.

Treatment 4: The patient reported that his pain was improved between 40-50%. He could comfortably golf while taking ibuprofen and methocarbamol. He reported that he believed that the SMT from the previous appointment made a difference.

Treatment 5: Two and a half weeks after his initial evaluation by the chiropractor, he reports a 60% improvement in his pain, but describes that at the end of the day his pain in the midline of his buttock area feels very tight, and “like it is being separated”.

Treatment 6: Three and a half weeks after initial evaluation he reported he could not sit without discomfort, yet his pain had significantly improved. The POM remained the same, except SMT was not performed at this appointment.

Re-evaluation & Treatment 7: The chiropractor reassessed the patient four and a half weeks after his initial presentation. The patient reported being close to resolving the pain in his joints but his hamstring was bothersome. He reported pain in his low back when he would go to bed after sitting for a prolonged period of time. He was re-assessed by the chiropractor who found lumbar spine flexion and right sided Kemp’s test caused pain in the patient’s left hamstring. All other lumbar spine ranges of motion were unremarkable. Pain was reproduced on palpation of the insertion of the left hamstrings. Left sided resisted knee flexion and resisted prone leg extension were tender in the left hamstring. SI joint palpation was unremarkable bilaterally however, SI joint compression was restricted on the left. He was diagnosed with a SI joint dysfunction and hamstring tendinopathy, with a differential diagnosis of discogenic LBP or dorsosacral ligament sprain. No SMT was applied this day. The patient was treated with STT and rehabilitative stretches.

Treatment 8: Five weeks after his initial presentation, the patient reported that while his low back pain had improved, but the pain had not completely resolved. SMT was reintroduced during this appointment.

Treatment 9: Seven weeks after the initial presentation to the chiropractor, he reported that his pain was worse and aggravated with sitting, standing and lying down. The patient described that his pain was now pulsating in nature, but did not present with radicular symptoms, night sweats, changes in gait, or changes to bowel or bladder function. He was still able to play golf if he took ibuprofen and methocarbamol prior to playing. Electroacupuncture was incorporated into the POM at this time along with STT and SMT.

Treatment 10: Nine weeks after his initial presentation to the chiropractor, he reported terrible pain at the end of the day. He constantly felt pressure and discomfort in his upper gluteal and sacral areas. He still did not report radicular symptoms, night sweats, feeling of unwellness, lethargy or fatigue. The chiropractor continued with the patient’s POM (acupuncture, STT and SMT). However, at this time the chiropractor referred the patient to a general practitioner (GP) suggesting a requisition for imaging.