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Case Report

Periacetabular Solitary Myeloma: A Case Report and Literature Review

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Abstract

We present a 59-year-old male who suffered from severe hip joint pain due to periacetabular lytic lesion caused by solitary myeloma. A modified Harrington technique was performed. At the latest follow-up the patient had a functional hip joint with no pain. The follow-up radiographs showed a stable construct with no signs of aseptic loosening, instability or mechanical failure.

Keywords: Myeloma bone disease; Periacetabular bone lesions; osteolysis

Introduction

Multiple Myeloma (MM) is a neoplastic malignant proliferation of B-lymphocyte line indicated by infiltration of Bone Marrow (BM) by plasma cells [1-3]. MM's clinical symptoms vary; the spectrum of bony disease ranges from diffuse osteopenia to severe lytic lesions [1-7]. Impending Fractures (IF) or Pathologic Fractures (PF) resulting from osteoclasts interaction are common complications [5,8,9]. PF at diagnosis seem to correlate with decreased overall survival rate, while survival decrease by 20% in patients with MM and fractures [3,6]. The pelvis and proximal femur are common locations either for solitary plasmacytoma or myeloma's manifestations [9,10]. We present a case of a 59 year old male with periacetabular lesion type III according to Harrington classification caused from myeloma cells infiltration, surgically treated with a modified Harrington's procedure [11].

Case Description

A 59 years old man was referred elsewhere due to severe hip joint pain precipitated by activity, sciatica, limited range of motion and inability to bear weight. The patient was assessed and antero-posterior (AP) and lateral (L) radiographs of his pelvis revealed an extensive done destruction of his right ilium leading to protrusion of the femoral head (Figure 1). Computed Tomography (CT) scans and Magnetic Resonance Imaging (MRI) depicted an expansible lesion with soft tissue mass involvement. Skeletal survey, serum and urine electrophoresis, monoclonal spike levels measurement, bone marrow aspiration and soft tissue biopsy were indicative for solitary myeloma. External beam Irradiation (EbI) was applied with a typical dose of approximately 30Gy administered in fractions, while pathological region of myeloma received 45Gy in total. The patient was then discharged with a scheduled follow-up in outpatient clinic. At the latest follow-up, four months post diagnosis, skeletal survey revealed ipsilateral femoral lesion and periacetabular lesion type III according to Harrington classification. No satisfactory response to irradiation was noted, and bone marrow aspiration was decided to perform, revealing plasmacytosis of 20% clonal plasma cells. In urine electrophoresis the presence of Bence-Jones abnormal proteins was detected; findings attributing to progression to MM [12-16].

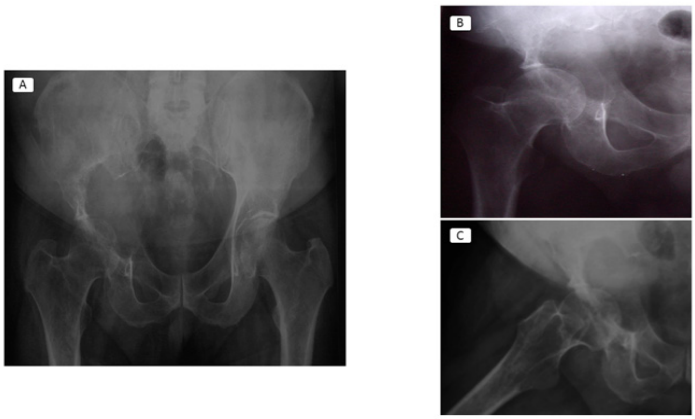

Figure 1A and B: Anteroposterior radiographs of the right hip showing a Harrington type III defect (A&B). C: lateral view.

The patient was admitted to our department for further management. He was assessed pre-operatively at the oncological multi-disciplinary conference. Taking into consideration his prolonged life expectancy, surgical intervention was proposed. Preoperative angiography and selective embolization was performed to minimize intraoperative bleeding (Figure 2). Within 24 hours the patient was taken to the operating room and underwent reconstruction of the periacetabular lesion with a modified Harrington's technique. The technique was performed free handed. Two threaded large diameters Steinman pins were drilled through an anti-protrusion cage initially placed into position. The pins were directed through the superior acetabulum into the remaining ilium up to close to the sacroiliac joint. Having ensured that the whole construct was solid and in the correct position, additional screws were positioned into place in aggregation of the already placed screws and followed by cementation of a polyethylene liner in accordance with the Lewineck safe zones. On the femoral side a cemented long stem was inserted to bridge the femoral lesions (Figures 3,4). The postoperative course of the patient was uneventful and the patient was discharged home after one week.

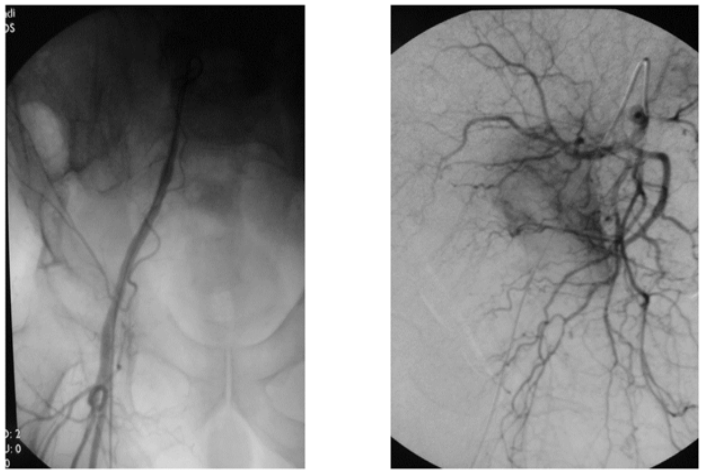

Figure 2: Preoperative angiography and selective embolization for minimizing bleeding loss.

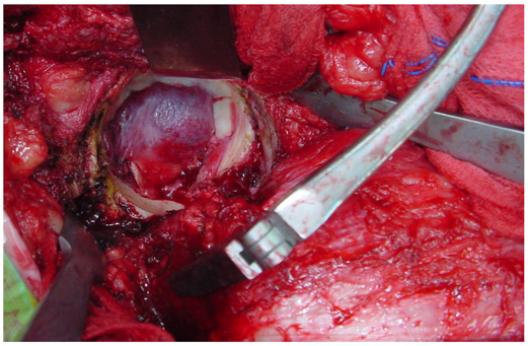

Figure 3: Intraoperative image of the acetabular lesion.

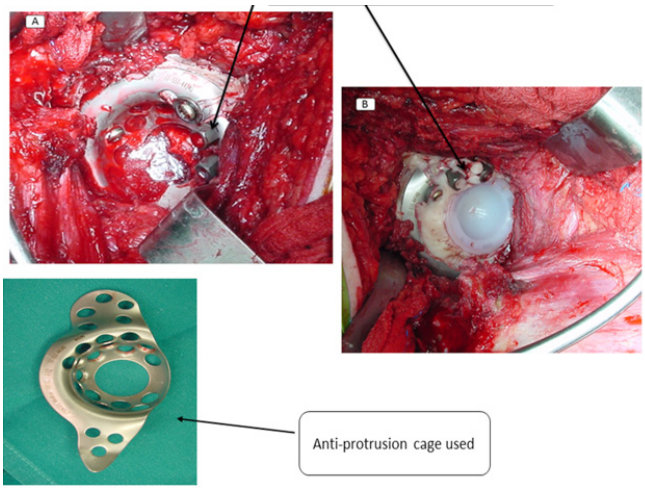

Figure 4: Intraoperative image showing the cannulated screws, the cage with the cement and the polyethylene linear.

The patient was scheduled for routine follow-up in outpatient basis at 6 weeks, 3 months, 6 months and 12 months postoperative (Figure 5). At his latest follow-up twelve months postoperative, the patient was doing well with a functional hip joint. The surveillance follow-up radiographs showed a stable construct lacking of any sign of aseptic loosening, instability or mechanical failure (Figure 6).

Figure 5: Anteroposterior radiographs of the pelvis at the 6 week post-operative.

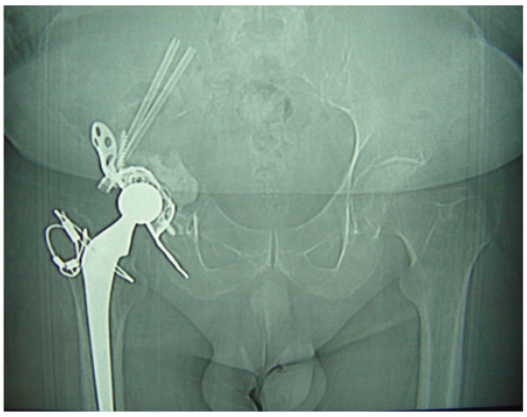

Figure 6: Anteroposterior view of the pelvis at 12 months post-operative.

Discussion

During the recent years, life expectancy of patients suffering from neoplastic disease has been elongated due to achievements of adjuvant therapies of radiotherapy and chemotherapy. Therefore, the importance of a long-lasting durable reconstruction, that permits immediate weight bearing with no functional limitation and independence in daily life has emerged. MM should be included in the diagnosis of any osteolytic lesion in adults over 60 years of old. Even though Myeloma Bone Disease (MBD) is among the frequent manifestations of MM, that can be addressed with myeloma-directed therapy or agents inhibiting bone resorption. However, impending or pathologic fractures require surgical intervention to achieve a quality of life. Pelvic surgery for acetabular metastatic disease is very challenging as it is associated with a high incidence of immobilization and severe pain [17]. The complexity of acetabular and pelvic anatomy along with the increased biomechanical demands implicates the technical challenges of the reconstruction. Harrington in 1981 and Levy et al in 1982 reported classification systems for periacetabular bone lesions due to metastatic malignant disease [1,11,18,19].

Although various techniques are described in the literature to address the complex reconstruction in that area, several authors have favored the Harrington's proposal. Harrington stated the use of Steinmann pins to reallocate forces to adequate bone stock in the illium over the periacetabular lytic lesions and to restore hip articulation with anti-protrusion cages or revision acetabular cups [11,20]. Although various modifications of this technique have emerged, the idea of transferring the weight load has remained [17,21-25]. In cases of dislocation, constrained megaprosthesis have been also proposed [26]. Khan et al in 2012 has introduced the porous tantalum for reconstruction of destructive non primary periacetabular tumors, with good functional results and low complication rate [27]. Cemented ice-cream cones have been described as a potential option in 2011 by Fisher et at for pelvic reconstruction, providing encouraging preliminary results as they direct forces through the iliolumbar bar to healthy bone [1,20,28]. Aboulafia et al in 1995 and later Kitaganwa et al in 2006 reported the use of saddle prosthesis while Menendez et al in 2009 presented 84% implant survivorship at two years with the use of modular saddle prosthesis [29-31]. In lesions with no reconstruction options, resection arthroplasty should be considered [32]. In 2014, Shahid et al reported the outcomes of 81 patients with periacetabular metastases treated with an "ice-cream cone" implant in cases of pelvic discontinuity and Harrington rods for severe bone loss [33,34].

This case report presents a relatively simple, safe and reproducible technique that has been performed to reconstruct a periacetabular lytic defect, type III according to Harrington classification. Harrington reconstructed these defects by using 4.8mm Steinmann pins in a retrograde fashion [32]. In our patient we used only two partially-threaded 6.5 mm cannulated screws [11,32]. In that way, loading forces were directed to the remaining supportive viable host bone in an attempt to provide a mechanical stable and solid construct. This method provides the initial stability necessary to increase the likelihood of a durable reconstruction, although the biological potential and the mechanical strength of the remaining bone is difficult to be evaluated. We are aware of the possibility of pin migration as already mentioned in the literature [20]. Preoperative embolization for elimination of intraoperative blood loss has been widely considered in such cases, not only for hypervascular histology [32].

Conclusion

Reconstruction of periacatabular lesions due to myeloma is challenging. Different reconstruction techniques have been proposed with different outcomes. We present a modified Harrington technique based on the use of two partially-threaded 6.5 mm cannulated screws. The patient twelve months postoperative was pain free with a stable construct radiographically.

References

1. Sakellariou VI, Mavrogenis AF, Savvidou O, Sim FH, Papagelopoulos PJ (2015) Reconstruction of multiple myeloma lesions around the pelvis and acetabulum. Eur J Orthop Surg Traumatol 25: 643-653.

2. Kyle RA, Gertz MA, Witzig TE, Lust JA, Lacy MQ, et al. (2003) Review of 1027 Patients with Newly Diagnosed Multiple Myeloma. Mayo Clinic Proceedings 78: 21-33.

3. Stavropoulos N, Papadoyiannis A, Maltezas D, Stavrou P, Babis G, et al. (2014) Biology and Treatment of Skeletal Manifestations in Multiple Myeloma. Journal of Cancer Therapy 5: 387-402.

4. Roodman GD (1997) Mechanisms of bone lesions in multiple myeloma and lymphoma. Cancer. 80(8 Suppl) 1557-1563.

5. Yeh HS, Berenson JR (2006) Treatment for myeloma bone disease. Clin Cancer Res 12: 6279-6284.

6. Durie BG, Salmon S (1975) A Clinical Staging System for Multiple Myeloma. Correlation of Measured Myeloma Cell Mass with Presenting. Clinical Features, Response to Treatment, and Survival. Cancer 36: 842-854.

7. Roodman GD (2008) Skeletal Imaging and Management of Bone Disease. Hematology American Society of Hematology Education Program 2008: 313-319.

8. Li SD, Wang YF, Qi JY, Qiu LG (2010) Clinical Features of Bone Complications and Prognostic Value of Bone Lesions Detected by X-Ray Skeletal Survey in Previously Untreated Patients with Multiple Myeloma. Indian Journal of Hematology and Blood Transfusion 26: 83-88.

9. Papagelopoulos PJ, Galanis EC, Greipp PR, Sim FH (1997) Prosthetic Hip Replacement for Pathologic or Impending Pathologic Fractures in Myeloma. Clinical Orthopaedics and Related Research 341: 192-205.

10. Kyle RA, Jowsey J, Kelly PJ, Taves DR (1975) Multiple myeloma bone disease. The comparative effect of sodium fluoride and calcium carbonate or placebo. N Eng J Med 293: 1334-1338.

11. Harrington KD (1981) The management of acetabular insufficiency secondary to metastatic malignant disease. J Bone Joint Surg (Am) 63: 653-664.

12. Kilciksiz S, Karakoyun-Celik O, Agaoglu FY, Haydaroglu A (2012) A Review for Solitary Plasmacytoma of Bone and Extramedullary Plasmacytoma. ScientificWorldJournal 2012: 895765.

13. Ozsahin M, Tsang RW, Poortmans P, Belkacémi Y, Bolla M, et al. (2006) Outcomes and patterns of failure in solitary plasmacytoma: a multicenter Rare Cancer Network study of 258 patients. International Journal of Radiation Oncology Biology Physics 64: 210-217.

14. Holland J, Trenkner DA, Wasserman TH, Fineberg B (1992) Plasmacytoma: treatment results and conversion to myeloma. Cancer 69: 1513-1517.

15. Knobel D, Zouhair A, Tsang RW, Poortmans P, Belkacémi Y, et al. (2006) Rare Cancer Network. Prognostic factors in solitary plasmacytoma of the bone: a multicenter Rare Cancer Network study. BMC Cancer 6, article 118.

16. Dimopoulos MA, Moulopoulos LA, Maniatis A, Alexanian R (2000) Solitary plasmacytoma of bone and asymptomatic multiple myeloma. Blood 96: 2037-2044.

17. Vielgut I, Sadoghi P, Gregori M, Kovar FM, Pichler K, Maurer-Ertl W, Leithner A (2013) The modified Harrington procedure for metastatic peri-acetabular bone destruction. Int Orthop 37: 1981-1985.

18. Levy RN, Sherry HS, Siffert RS (1982) Surgical management of metastatic disease of bone at the hip. Clin Orthop Relat Res 169: 62-69.

19. Damron TA, Sim FH (2000) Instructional Course Lectures, The American Academy of Orthopaedic Surgeons - Operative Treatment for Metastatic Disease of the Pelvis and the Proximal End of the Femur. The Journal of Bone & Joint Surgery 82: 114-126.

20. Tillman RM, Myers GJ, Abudu AT, Carter SR, Grimer RJ (2008) The three-pin modified 'Harrington' procedure for advanced metastatic destruction of the acetabulum. J Bone Joint Surg Br 90: 84-87.

21. Kotwal SY, Finn HA (2011) A 17-year follow-up of modified "Harrington" reconstruction after acetabular resection. J Arthroplasty 26: 1570.

22. Nieminen J, Pakarinen TK, Laitinen M (2013) Orthopaedic reconstruction of complex pelvic bone defects. Evaluation of various treatment methods. Scand J Surg 102: 36-41.

23. Allan DG, Bell RS, Davis A, Langer F (1995) Complex acetabular reconstruction for metastatic tumor. J Arthroplasty 10: 301-306.

24. Kunisada T, Choong PF (2000) Major reconstruction for periacetabular metastasis: early complications and outcome following surgical treatment in 40 hips.Acta Orthop Scand 71: 585-590.

25. Nilsson J, Gustafson P, Fornander P, Ornstein E (2000) The Harrington reconstruction for advanced periacetabular metastatic destruction: good outcome in 32 patients. Acta Orthop Scand 71: 591-596.

26. Ueda T, Kakunaga S, Takenaka S, Araki N, Yoshikawa H (2013) Constrained total hip megaprosthesis for primary periacetabular tumors. Clin Orthop Relat Res 471: 741-749.

27. Khan FA, Rose PS, Yanagisawa M, Lewallen DG, Sim FH (2012) Surgical technique: Porous tantalum reconstruction for destructive nonprimary periacetabular tumors. Clin Orthop Relat Res 470: 594-601.

28. 2Fisher NE, Patton JT, Grimer RJ, Porter D, Jeys L, et al. (2011) Ice-cream cone reconstruction of the pelvis: a new type of pelvic replacement:early results. J Bone Joint Surg Br 93: 684-688.

29. Aboulafia AJ, Buch R, Mathews J, Li W, Malawer MM (1995) Reconstruction using the saddle prosthesis following excision of primary and metastatic periacetabular tumors. Clin Orthop Relat Res 314: 203-213.

30. Kitagawa Y, Ek ET, Choong PF (2006) Pelvic reconstruction using saddle prosthesis following limb salvage operation for periacetabular tumour. J Orthop Surg (Hong Kong) 14: 155-162.

31. Menendez LR, Ahlmann ER, Falkinstein Y, Allison DC. (2009) Periacetabular reconstruction with a new endoprosthesis. Clin Orthop Relat Res 467: 2831-2837.

32. Issack PS, Kotwal SY, Lane JM (2013) Management of metastatic bone disease of the acetabulum. J Am Acad Orthop Surg 21: 685-695.

33. Shahid M, Saunders T, Jeys L, Grimer R (2014) The outcome of surgical treatment for peri-acetabular metastases. Bone Joint J 96: 132-136.

34. Brown TS, Salib CG, Rose PS, Sim FH, Lewallen DG, et al. (2018) Reconstruction of the hip after resection of periacetabular oncological lesions: a systematic review. The bone & joint journal 2018.