



## Case report

## Metastatic endometrial carcinoma invading bilateral total knee arthroplasties

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## ABSTRACT

We present a case of a 64-year old female with bilateral knee pain several months after undergoing staged bilateral TKA. Radiolucencies surrounding the keels of bilateral tibial components were found to represent metastatic poorly differentiated endometrial carcinoma. PET scan showed adrenal, pulmonary and tibial foci consistent with metastatic disease. No other cases of bilateral periprosthetic metastasis of endometrial carcinoma have been described in the literature. Metastases around orthopedic implants are a rare occurrence. The possibility of periprosthetic metastasis should remain in the differential diagnosis for any patient with a painful total joint arthroplasty, especially in the setting of a patient with a known diagnosis of cancer elsewhere in their body.

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## Introduction

Pain after total knee arthroplasty has several etiologies, which are often categorized as intra-articular or extra-articular. The most common causes include infection, loosening, instability, patellar mal-tracking, or osteolysis [1]. Routine work-up includes plain radiographs, WBC, ESR, CRP, aspiration of the joint and occasionally bone scan. Rarely, however, has metastatic disease been reported as a source of pain after total joint arthroplasty [2].

We report the case of a patient who presented to our clinic with bilateral knee pain several months following total knee arthroplasty. It was noted the month prior that she developed a vague radiolucency around bilateral tibia prostheses of her total knee arthroplasties. One month later the radiolucent area had drastically worsened. Coincidentally, she was scheduled for robotic assisted laparoscopic hysterectomy and lymph node dissection for endometrial carcinoma four days after her clinic visit. During her stay, CT guided biopsy was performed of the radiolucent area of the left

proximal tibia, which demonstrated metastatic poorly differentiated carcinoma, morphologically similar to the patient's known endometrial carcinoma. The patient gave verbal consent for the use of the data concerning her case for publication.

## Case history

A 64 year-old Egyptian female with bilateral knee osteoarthritis underwent bilateral staged total knee arthroplasty (TKA) with cemented, posterior stabilized implants (Vanguard PS; Biomet, Warsaw, Indiana). Cementation was performed by coating the implants and pressurizing the tibia using a cement gun using Biomet Cobalt cement with gentamycin. The left side was performed in March 2012. Her initial post-operative course was complicated by multiple deep venous thromboses (DVT), in the operative extremity, and bilateral pulmonary emboli, in June of 2012. She was diagnosed having Factor V Leiden and Methyl-entetrahydrofolate reductase (MTHFR) mutations, which resulted in her coagulopathy. These were treated with Heparin bridged to Coumadin, and she has been followed in our anticoagulation clinic. With regards to her TKA, she did extremely well with very little knee pain on the left side, and wished to proceed with the right TKA approximately 18 months later. She was seen by her primary care physician and cleared for surgery. Her increased risk for surgery was discussed at length with the patient, and she elected to

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undergo right total knee arthroplasty in September 2013. Meanwhile, in March of 2014, the patient presented to her primary care physician with complaints of approximately seven months of postmenopausal bleeding. An endometrial biopsy, done in April 2014, showed endometrial carcinoma with serous type features, and she was referred to the Gynecologic-Oncology (Gyn-Onc) service for further management. Their team recommended robotic assisted total laparoscopic hysterectomy, bilateral salpingoophorectomy, omentectomy, and lymph node dissection. She was amenable to this and scheduled for surgery in late April 2014.

Her initial post-operative course was uncomplicated, and she continued to progress very well with minimal right knee pain until April of 2014, when she presented to the Orthopaedic clinic complaining of new onset left knee pain and worsening right knee pain (7 months post-operative from her right side, 25 months post-operative from her left). Serologic laboratory tests were ordered, which showed a slight elevation of the C-reactive protein (CRP) 2.6 mg/dL, (ref range 0.0–0.3 mg/dL) with a normal white blood cell count and erythrocyte sedimentation rate. She returned to the Orthopaedic clinic for follow up on her serologic tests 4 days before her planned Gyn-Onc procedure. Radiographs were obtained during that visit which showing a large area of radiolucency with cortical destruction surrounding both tibial components (Figs. 1 and 2). This demonstrated a drastic change from her prior radiographs of her left and right knees performed three months and eleven months prior (Figs. 3 and 4). Her left knee was aspirated at that clinic visit to rule out infection. A cell count of the synovial fluid showed a white blood-cell count of 518 cells/cm<sup>2</sup> with 20% polymorphonucleocytes. Further analysis of the fluid demonstrated: no crystals identified, and negative aerobic, anaerobic, fungal cultures and with negative AFB stain. Given the results of her arthrocentesis, we recommended that she undergo bilateral computed tomography (CT)-guided tibial bone biopsies to rule out the possibility of metastasis during the same hospital stay as her

gynecologic surgery. She underwent robotic total laparoscopic hysterectomy, bilateral salpingoophorectomy, sentinel lymph identification and biopsy, complete pelvic, common iliac, and periaortic lymphadenectomy, omentectomy, extensive lysis of adhesions with Gyn-Onc service. Pathology showed Grade 3 serous carcinoma confined to the uterus with clear margins and no involvement of ovaries, fallopian tubes, omentum, or any of the multiple lymph nodes sent (Fig. 5). During the same hospital stay, a CT-guided tibial bone biopsy was preformed. This biopsy demonstrated “metastatic poorly differentiated carcinoma, morphologically similar to the patient’s known previous endometrial carcinoma” (Fig. 6). Given the rarity of this condition, the specimens were sent to the Mayo clinic for further review. Their assessment supported the diagnosis, “metastatic adenocarcinoma with morphologic features similar to those present in the patient’s hysterectomy specimen.” The tumor cells were also positive for cytokeratin AE1/AE3 and negative for S100 and Melan A, which further supported the diagnosis of metastatic carcinoma.

The patient was presented to our tumor board, and a unanimous recommendation was to obtain a positron emission tomography (PET) scan to identify possible additional metastatic disease to gain further insight into her prognosis. The PET scan demonstrated further adrenal, pulmonary, and tibial foci concerning for further metastatic disease. Unfortunately, the PET scan was performed at an outside facility and the patient is now out of the country and unable to consent to obtaining these images. Collaboration with our Gyn-Onc, Medical Oncology and Radiation Oncology colleagues allowed us to discern that our patient’s prognosis is approximately 6 months. Given her additional comorbidities, extensive reconstruction is not a likely alternative in this case and palliative treatment was discussed with our patient and her family. Measures that were discussed included extensive curettage with cementation around bilateral tibial components versus local radiation therapy. The patient and her



**Figure 1.** AP and lateral X-rays 7 months post-operative following right total knee arthroplasty demonstrating a radiolucency about the distal portion of the tibial component.

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