

# Septic arthritis of the hip as a late complication of radiation therapy: A case report and review of literature

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## Abstract

Septic arthritis of the adult hip is an uncommon condition, usually presenting in the setting of direct or local contamination next to a nearby abscess, or following acute septicemia. Local risk factors include preexisting inflammatory or non-inflammatory arthritis and aseptic necrosis. Septic arthritis in a hip that has been previously irradiated is very rare and to our knowledge has been reported only three times in the English literature. We present an 83 year old man with septic arthritis of the hip joint that appeared two months following irradiation of the same hip. This patient was treated successfully by surgical drainage and antibiotherapy. Radiation therapy seems to be a risk factor for septic arthritis and positive history of irradiation should raise its possibility.

## INTRODUCTION

Hematogenous septic arthritis of the hip is an uncommon entity in the adult population (<sub>32</sub>), occurring in up to 13.4% of all non-tuberculous septic arthritis (<sub>26</sub>). Patients present with fever, hip or groin pain, and an inability to bear weight. Most of them manifest leukocytosis and have an elevated erythrocyte sedimentation rate (<sub>32</sub>). If not detected and treated early on, septic arthritis of the hip often results in joint destruction, serious functional impairment, and a high mortality rate (<sub>9,32</sub>). Established risk factors include older age, diabetes mellitus, immune deficiency, and rheumatoid arthritis (<sub>9</sub>). Septic arthritis of the hip following irradiation was reported only three times in the English literature. We present a fourth case, discuss the possible etiologies and risk factors, and review the documented cases of irradiation-related septic arthritis.

## CASE REPORT

An 83 year-old male patient presented to our department with right hip pain and high grade fever of three days duration. He had started a course of per os second generation cephalosporin two days prior to presentation. Systemic physical examination was unrevealing. The right hip had a limited and painful range of motion. Relevant medical history included prostate cancer metastatic to the right hip for which a single session of radiation therapy was given two months earlier. Initial blood work up revealed a normal white blood cell count but C reactive protein and erythrocyte

sedimentation rate were elevated (18.4 and 125 respectively). Chest plain radiography, urine analysis and gram stain were normal. Aspiration of the hip joint revealed purulent material and gram stain revealed gram positive cocci. A hip arthrotomy was done on an emergency basis through an anterior approach and 50 ml of purulent fluid were drained. Samples were sent for culture and cell count. The patient was then started on teicoplanin empirically until culture and antibiotic sensitivity were determined. The fluid cell count showed WBCs of 120,000/?l with 90% neutrophils. Cultures did not grow any pathogen, however. The patient continued a six week course of intravenous teicoplanin. He recovered uneventfully with no complications. On latest follow up, six months later, the patient had recovered completely and is walking full-weight bearing.

## DISCUSSION AND REVIEW OF LITERATURE

A literature review of the etiology of septic arthritis of the hip in the adult patient reveals four categories of patients:

In the first group, the insult is due to direct contamination of the hip joint by intra-articular injection. At least four documented cases belong to this group after steroid and/or hyaluronate injections (<sub>7,17,22,23</sub>).

In the second group, local area contamination is confirmed and incriminated. This occurred in the setting of vascular access procedures involving the femoral artery(<sub>3,27</sub>) or vein

(<sub>12</sub>); urologic intervention/ trauma (<sub>2,24,30</sub>); rectal injury (<sub>20</sub>); and vaginal injury (<sub>29</sub>).

In the third group, local/ regional infections have already been established leading to the spread of infection into the hip joint. Documented cases include ipsilateral psoas abscess (<sub>1</sub>), retroperitoneal abscess (<sub>28</sub>), adductor pyomyositis (<sub>11</sub>) and ischial osteomyelitis (<sub>25</sub>). In these cases, distinguishing intracapsular and extracapsular infections may be clinically difficult and require advanced imaging techniques (<sub>11</sub>).

The fourth group includes those with distant foci of infection, causing hematogenous spread to the hip joint. Two cited examples are cholangitis (<sub>19</sub>) and appendicitis (<sub>21</sub>).

Local predisposing factors were reported in 37% of cases with septic arthritis of the hip (<sub>26</sub>). Among these are established aseptic necrosis of the femoral head as reported in six cases (<sub>14,15,28</sub>), and inflammatory or non-inflammatory arthritis (<sub>8,9,13</sub>). It is considered that the already damaged tissues of the joint facilitate invasion by microorganisms, particularly if the patient is immunosuppressed (<sub>14,15</sub>).

History of local irradiation has been linked to septic arthritis in only four reports including the shoulder and hip joints. Chaudhuri et al. reported on five patients with septic arthritis of the shoulder as a late complication of local radiation therapy for breast cancer (<sub>6</sub>). The infections had subacute onsets, and led to destruction of the joint in all but one patient. Chanet et al. reviewed 282 cases of septic arthritis and found 10 patients with previous history of local radiation therapy (<sub>5</sub>). Nine of them were in the shoulder following breast cancer radiation therapy, and one was in the hip following cervical cancer radiation therapy. The average time to septic arthritis was 16 years (range 3-34 years) following irradiation.

Blom et al. reported a case of bilateral septic arthritis of the hip in a 49 year old male patient associated with radiotherapy to the pelvis due to anal carcinoma. Time to onset of septic arthritis was delayed to 3 years (<sub>4</sub>). He was also successfully treated by surgical drainage and antibiotherapy.

Yang et al. also reported three cases of septic arthritis of the hip joint in cervical cancer patients after radiotherapy (<sub>31</sub>) but only one of these can be truly attributed to radiation therapy because the infection in the other two cases followed total hip arthroplasty after avascular necrosis of the irradiated femoral head (<sub>31</sub>). Two years elapsed before the appearance

of septic arthritis in this 58 year old female patient.

Our patient would be the fourth patient with documented septic arthritis of the hip following local radiation therapy; he would be the first to develop such infection in less than a year following treatment. The clinical picture of recent onset of fever and systemic symptoms, negative systemic evaluation, and positive findings pointing towards the hip joint all provide indirect clues toward the focus of infection. Unfortunately, the patient had already started empiric oral antibiotics for two days prior to presentation. This explains the negative results of the fluid culture. The main reason for false negative culture results is prior use of antibiotics (<sub>16</sub>). The cell count strongly suggests the diagnosis, and the rapid improvement upon surgical drainage and response to intravenous antibiotics confirm it. Prompt treatment will eradicate the infection and reduce morbidity. Antibiotic treatment should be started as guided by history, clinical presentation, and results of Gram's stain (<sub>16</sub>). Any undue delay increases the risk of joint destruction and increases the morbidity and mortality of the patient.

Bone is susceptible to radiation either by damage to osteoblasts and osteoclasts, or by damage to microvasculature that supplies the bone, and this may lead to avascular necrosis as reported by Lee et al. (<sub>18</sub>), and Fica et al. (<sub>10</sub>). Necrotic bone, with its poor blood supply, is susceptible to secondary bacterial infection. This might explain septic arthritis following radiation therapy.

## CONCLUSION

Radiation therapy seems to be a risk factor for septic arthritis. Although the radiation therapy session might be remote, a positive history should raise the index of suspicion in cases of new onset pain and limping related to the irradiated joint. Delay in the diagnosis of septic arthritis of the hip can have detrimental effects on the morbidity and mortality, and it should be minimized by prompt joint fluid aspiration and culture, and urgent drainage and antibiotic therapy.

## AUTHORS' CONTRIBUTIONS

All authors have substantially and equally contributed to preparation, review of the topic, and drafting the manuscript.

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