

## Case Report

# Pelvic Pseudotumor

## An Unusual Presentation of an Extra-Articular Granuloma in a Well-Fixed Total Hip Arthroplasty

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**Abstract:** A 76-year-old woman developed a pelvic mass and abdominal pain 12 years after cementless total hip arthroplasty. The mass was a cystic granuloma that communicated with the hip joint via a soft tissue herniation under the inguinal ligament. There was no acetabular lysis or defects. The shell and femoral component were well fixed, the polyethylene was worn, and a liner exchange was undertaken. The cyst was debrided, and follow-up computed tomography demonstrated resolution of the granuloma and no recurrence of the cyst. Removal of the source of the particle wear debris via liner exchange or revision surgery combined with cyst debridement via a single incision is recommended. **Key words:** pelvic pseudotumor, total hip joint arthroplasty, granulomatous mass, particle wear debris.

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Aseptic loosening is a well-recognized complication of total hip arthroplasty. Mechanical wear leads to the formation of particle wear debris (PWD). Inflammatory cells phagocytose this debris, and a long-term granulomatous reaction may result. Usually located at the bone cement or implant cement interface, extra-articular mass effect is an

unusual occurrence and may lead to atypical symptoms. We report the case of aseptic loosening of an uncemented prosthesis that developed an extra-articular granulomatous mass, which presented with acute abdominal pain.

### Case Report

A 76-year-old woman underwent an uncemented right total hip arthroplasty in 1992. She had symptomatic osteoarthritis of her hip and had failed conservative management. A porous-coated anatomical (Howmedica, Rutherford, NJ) system was used, with a size 4 E series femur, with a 32-mm head and a 52 shell with a polyethylene liner. She made an uneventful recovery and remained well for 11 years.

She noticed a gradual onset of right groin discomfort over the following year but did not

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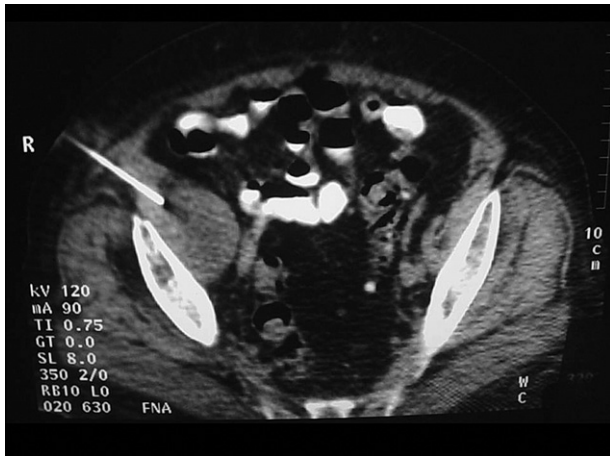
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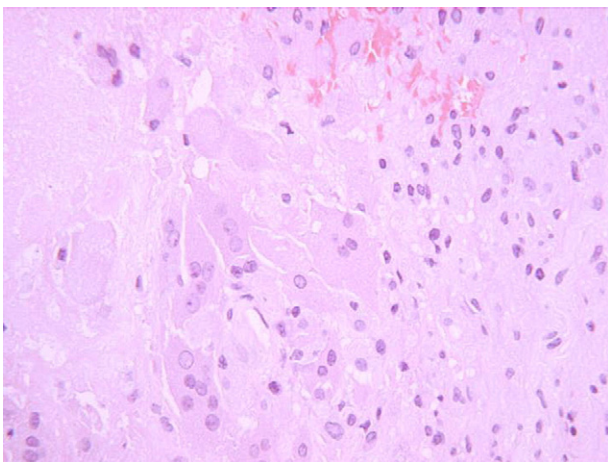
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**Fig. 1.** Computed tomography scan of the pelvis showing a space-occupying mass in the right iliac fossa along the iliopsoas muscle adjacent to anterior aspect of acetabulum. The needle used in the biopsy of the cyst is seen in this slice.

seek medical attention at that time. In 2004, she developed acute abdominal pain and presented to the accident and emergency department. She was found to have a painful mass in her right iliac fossa and was admitted under the care of the general surgical service. Pelvic ultrasound identified a hypoechoic mass along her right psoas muscle. A contrast computed tomography (CT) scan (Fig. 1) demonstrated a large intrapelvic cyst 90 mm in length; CT-guided biopsy demonstrated abundant acellular eosinophilic materials, giant cells, and debris; no organisms were cultured and no malignant cells seen (Fig. 2). Leukocyte count at that time was  $7.17 \times 10^9/L$ , erythrocyte sedimentation rate was 48 seconds, and C-reactive protein was 12. A plain radiograph of her right hip demonstrated



**Fig. 2.** Histophotomicrograph of the cyst demonstrating giant cells at the edge of necrosis with foamy eosinophilic cytoplasm. Consistent with a long-term granulomatous reaction.



**Fig. 3.** Anteroposterior radiograph of the pelvis. There is eccentric wear of the right polyethylene liner. The acetabular and femoral components do not show evidence of loosening.

eccentric wear of the polyethylene liner with no evidence of cup loosening. The femoral stem was well fixed (Fig. 3).

It was decided to explore the hip and decompress the cyst. An anterolateral approach was used; the acetabular shell and femoral components were solidly fixed. The neck of the cyst was located anteriorly to the acetabulum at the 4 o'clock position. This was decompressed, and curettings were sent for histology and culture. The acetabular liner was worn superiorly and was exchanged, as was the femoral head. The patient made a good recovery, and her abdominal pain was resolved. At a 2-year follow-up, in 2006, she was well and pain free, and repeat CT scan demonstrated no recurrence of the cyst, and the granuloma was resolving (Fig. 4).



**Fig. 4.** Follow-up CT scan shows that the granuloma has been resolved, and there has been no recurrence of the cyst.

## Discussion

Wear-induced osteolysis is a well-recognized complication of total joint arthroplasty. The presence of a symptomatic soft tissue mass in response to PWD is less common. Wear debris are phagocytosed by macrophages and inflammatory cells. In certain situations, an aggressive granulomatous reaction may occur, with features of a foreign body-type reaction, which is characterized clinically by progressive cyst formation and osteolysis [1-3]. Santavirta et al [4] suggested that this granulomatosis involves an uncoupling of the normal sequence of monocyte-macrophage-mediated clearance of foreign material and tissue debris that is normally followed by fibroblast-mediated synthesis and remodeling of the extracellular matrix. This is a separated entity to what he described as common

loosening. This aggressive lysis may occur anywhere throughout the effective joint space as described by Schmalzried and Callaghan [5]. A defect in the joint capsule or bone may result in herniation or propagation of this joint space in an extraosseous or extra-articular manner [6,7].

A granulomatous mass in the pelvis may be asymptomatic. Identification may occur during routine investigations for another reason or may become evident during preoperative investigations for revision hip surgery [8]. The lesion may cause symptoms as a result of pressure on adjacent structures. In our case, the pelvic mass caused abdominal pain because of compression of the cecum.

Anteroposterior and lateral radiographs of the hip may demonstrate eccentric wear of a polyethylene liner. In this case, linear wear was calculated at 0.23 mm/y. Osteolysis of the acetabulum may be

**Table 1.** Summary of Diagnosis and Management of Similar Cases

Authors	Age (y)	Prosthesis Type	Years Since THA	Presentation	Diagnosis	Communication Between THA and Cyst	Management of Cyst	Incisions	Management of THA
Hattrup et al [11]	59	Cemented revision for infection	7 y since revision	Dysuria, frequency, and nocturia	Loosening and migration of cup	Acetabular defect	Laparotomy and excision of cyst, with ovary and fallopian tube	2	Revision of THA
Reigstad and Rokkum [12]	78	Cemented revision for loosening	6 y since revision	Right iliac fossa mass	Intrapelvic migration of cup	Acetabular defect	Extraperitoneal excision of cyst	2	Revision of THA
DeFrang et al [13]	57	Uncemented	3	Leg swelling, painless mass in groin	Polyethylene wear	Anterior herniation of hip joint capsule	Ilioinguinal excision of cyst	2	Revision of hip 1 y later
Matsumoto et al [14]	58	Cemented	21	Painful hip, ileocecal mass	Loosening and migration of cup	Acetabular defect	Retroperitoneal excision	2	Revision of THA, mesh and bone graft
Fischer et al [15]	84	Uncemented	5	Leg pain and weakness	Compression of sciatic nerve	Herniation of capsule between abductors and piriformis	Debridement	1	Revision of THA
Madan et al [16]	83	Cemented revision for loosening	14 y since revision	Acute recurrent lower limb swelling	Femoral artery and vein compression	Acetabular defect	Inguinal and, later, a retroperitoneal excision	3	Revision and grafting of THA
Hisatome et al [8]	46	Cemented Charnley	16	Painful hip	Acetabular defect	Medial wall defect	Resection of mass	1	Revision of cup
Hisatome et al [8]	46	Bipolar hip arthroplasty	15	Subsidence of stem, loose cup	Osteolysis of acetabulum	Medial wall defect	Resection of mass	1	Cementless revision of THA
Korkala and Syrjanen [17]	56	Cemented	10	Right inguinal painful mass	Osteolysis of acetabulum	Medial wall defect	Aspirated	1	Revision and grafting of cup
Wang and Lin [18]	50	Uncemented revision	5 y since revision	Painful mass in left pelvis	Medial wall defect in acetabulum	Medial wall defect	Debridement of mass	1	Revision and grafting of cup
Mak et al [6]	52	Uncemented	11	Suspected ovarian tumor	Eccentric wear of liner	Anterior hip joint under inguinal ligament	Pfannenstiel incision and excision of cyst	1	Refused revision

THA indicates total hip arthroplasty.

noted; the pattern of this lysis is different in cemented and uncemented cups. In uncemented cups, balloon osteolysis may occur in areas where the cup is still well fixed by bony bridges. Debridement and grafting of these lesions combined with a liner exchange, without recourse to a full revision, is described. In cemented cups, a radiolucent line at the bone cement interface is more commonly described [9,10]. In cases of wear between a metal head and metal acetabular shell, metal debris may give a disuse shadow to the intrapelvic cyst.

Reliance on plain radiology alone will not detect intrapelvic granulomatous cysts, and the use of CT may aid in preoperative planning and approach. Computed tomography is part of the routine workup before revision hip surgery in some units [8].

Resection of an asymptomatic intrapelvic granuloma may not always be necessary. If revision surgery is planned, the cyst may be debrided via the same operative approach, or a second extra peritoneal route may be required (Table 1).

In our case, the fact that the pelvic cyst had occurred without pelvic osteolysis is unusual. The effective joint space had herniated out under the inguinal ligament into the pelvis. Pressure on the cecum and ascending colon caused abdominal pain, which was resolved after resection of the cyst. The acetabular shell and femoral stem were well fixed, and therefore, only a liner exchange was undertaken. The decision to retain the cementless socket and femur was based on clinical and radiographic criteria as described by Beaulé et al [19]. The cyst was debrided through the same approach, and in the absence of continued stimulation from PWD, the granuloma was resolved.

The presence of an abdominal or pelvic mass in a patient with a total hip arthroplasty requires a multidisciplinary team approach. Plain radiographs may reveal eccentric wear or loosening. The presence of an extra-articular granulomatous mass needs to be included in the differential diagnosis. An arthrogram and aspiration, in conjunction with a CT scan, should be considered before revision surgery in these cases. The cyst does not need to be excised completely, and debridement may be accomplished through the same approach as the revision surgery. Removal of the source of the wear debris by liner exchange or revision of the components should result in resolution of the granuloma [20,21].

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