

**BLADDER PERFORATION AFTER THA REVISION WITH ACETABULAR
PROTRUSION: CASE REPORT AND LITERATURE REVIEW****Karim El Hammiri*, Tarik El Mountassir, Anass Lahlou, Yassine Moubadi, Moncef Boufettal, Reda Allah Bassir, Mohamed Kharmaz, Moulay Omar Lamrani and Mohamed Saleh Berrada**

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ABSTRACT

Intrapelvic protrusion is a severe complication that can occur during acetabular loosening of total hip arthroplasty. Cement, screws and the cup may threaten noble organs and expose to vascular lesions and damage to the pelvic organs. To be secure, the removal of intrapelvic material is based on a precise preoperative assessment, safeguarding of the muscle and bone stock and reconstruction of the pelvic anatomy. We present the clinical observation of a 52-year-old woman with protruse total hip arthroplasty, the postoperative complications with review of the literature.

KEYWORDS: Bladder perforation- septic loosening- Pelvic protrusion- THA revision.**INTRODUCTION**

Intrapelvic protrusions occur more frequently in chronic infection. The protrusion is most often progressive. Vascular or pelvic organ ulcerations have been reported, it concern vessels, urogenital tract, digestive system and nerves.

The management of these protrusions is based on clinical exam, x-rays, computed tomography (CT) angiography and further exams depending on suggestive clinical signs.

The aim of this work is to show the complications and the importance of preoperative assessment to avoid postoperative morbidity.

CASE REPORT

The case is about a 52-year-old woman first operated in 2011 for a cervical cancer with pelvic radiotherapy. She developed an avascular necrosis (AVN) of the left femoral head within 2 years. In 2014, a primary cemented total hip arthroplasty (THA) had been placed by a posterolateral approach.

Over the following 4 years, the patient had a septic loosening of a protruse THA. Physical examination revealed severe pain in the left hip, a persistent fistula on surgical wound, 2 cm shortening of the left limb and severe stiffness of the left hip. The patient also reported

recurrent urinary tract infections requiring antibiotic therapy with long-term indwelling urinary catheter.

X-ray showed acetabular component loosening with intra-pelvic protrusion involving the cup and prosthetic head (figure 1). Wrongly, a preoperative computed tomography (CT) urogram and CT angiography were not performed.

The severity and duration of the infection, the patient's age and the general condition led us to propose a two-stage revision arthroplasty. Removal of the prosthesis was performed by posterolateral Moore approach. Ablation of the acetabulum component of the prosthesis was difficult and laborious.

The postoperative period were marked by hematuria. The CT urogram showed a left bladder perforation responsible for a hydroaeric level and a pneumo bladder flowing towards the soft parts of the left hip with significant subcutaneous emphysema, a pneumoperitoneum, a perihepatic effusion, an important infiltration of the soft parts of the left hip (figure 2). It was a bladder perforation caused by the removal of the protrusive prosthetic acetabulum.

There was no indication for surgery for the bladder perforation or peritoneal effusion. The patient required a three-way bladder catheter. The outcome was favorable with resolution of the hematuria within 9 days.

At 3 months of the procedure, the fistula still persist bringing serosities, there were no more urinary tract infections, the patient is walking with crutches and the hip is no longer painful.

After 1 year, the patient presents with drying of the fistula with a negative infectious assessment due to prolonged targeted antibiotics. She is a candidate for the second stage of THA revision.

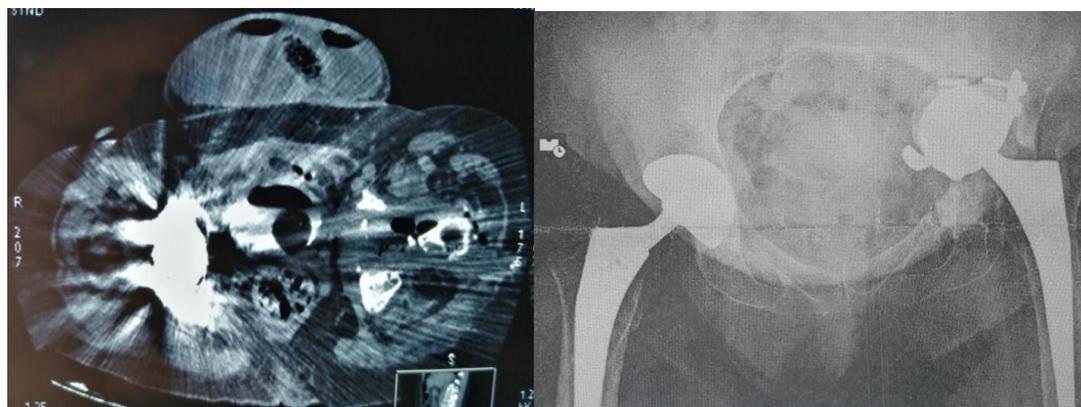


Figure 1:

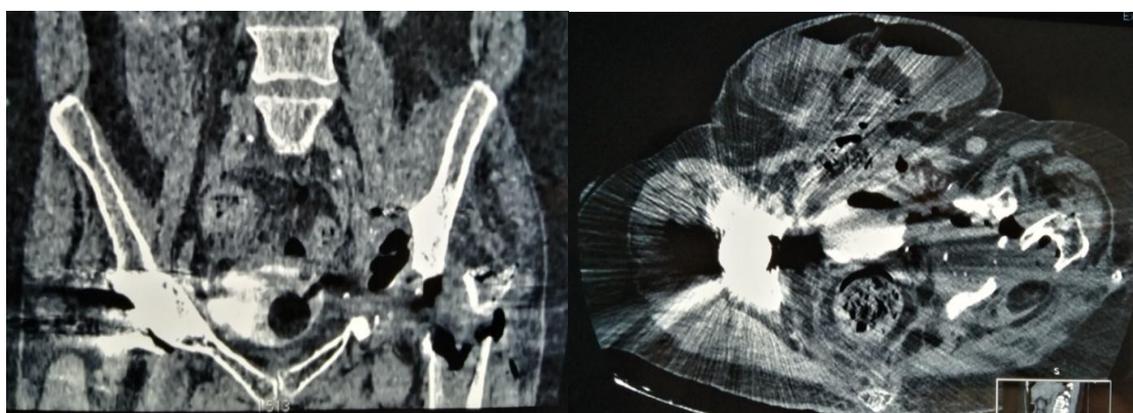


Figure 2: bladder perforation.

DISCUSSION

Intrapelvic protrusions are a rare but severe complication that can occur during acetabular loosening of THA.^[1-5] Intrapelvic protrusions occur more frequently in chronic infection.^[6-10] However, some protrusions exist in the context of strictly aseptic mechanical loosening,^[3,8] in particular, major failing in the surgical technique.^[11] or in the context of rheumatic disease.^[6,8,12]

The structures threatening noble organs are most often cement and screws than the cup itself.^[8] The complications that can occur depend on the level of pelvic wall involvement and the orientation of the protrus material.^[13]

The protrusion is most often progressive, which allows healing and the formation of a thick capsule around the components. This capsule provides “relative” protection of the nearby noble structures.^[3,8,10] but vascular.^[14-16] or pelvic organ ulcerations.^[7,17] have been observed. Symptoms related to the inclusion of noble organs in this neocapsule have also been reported.^[10,18]

Revision of acetabular loosening with intrapelvic material expose to vascular lesions.^[1,19,20] and damage to the pelvic organs.^[7,21]

In a meta-analysis involving 50 complications during the revision of acetabular components in intrapelvic position, Bach,^[8] identified 22 complications concerning the vessels,^[14,22-26] 17 concerning the urogenital tract (including 13 for the bladder),^[27-31] 6 concerning the digestive system,^[26,31-34] 3 concerning the sciatic nerve,^[35,36] and two cases involving the formation of intrapelvic mass.^[37,38]

The structures most frequently affected in each category were the external iliac artery (16 cases),^[14,23-26] the bladder (13 cases),^[28-30] the sigmoid colon (4 cases),^[31-34] the sciatic nerve (3 cases),^[35,36] and the iliopsoas muscle.^[37,38] The most frequent lesions of the urogenital tract after THA revision are hematuria,^[30] vesico-acetabular fistulas,^[18,39,40] ureteroarticular fistulas,^[41-43] arthrovascular fistulas,^[21] fistulas ureteroacetabular and ureterovaginal.^[44-46] In addition to a complete clinical examination including pelvic examinations and urinary opacifications, their diagnosis is not easy,^[9,46] and one must therefore be particularly attentive to the functional

urinary signs and to the proximity of the implants to the ureter.^[47]

To be secure, the removal of intrapelvic material is based on several principles: identification of potential risks by a precise preoperative assessment, surgical tactics for the ablation of the protrus material while respecting the noble elements, safeguarding of the muscle and bone stock, reconstruction of the pelvic anatomy (including osteosynthesis of the pelvis). In practice, the preoperative paraclinical assessment of pelvic migration of THA must therefore systematically include:

- X-rays of the pelvis from the front and the hip from the front and side.
- CT angiography which shows precise distances between noble organs and prosthetic components. This CT angiography must also include late phase for venous exploration and exploration of the lower urinary tract;
- Complete blood test.

Other examinations are performed depending on the previous assessment and the existence of suggestive clinical signs. Thus, in case of a functional urinary sign or when the CT angiography shows a close proximity between the intrapelvic material and the urinary tract, or in the case of a persistent infection of the surgical site, a lesion of the urinary tract must be suspected.^[39]

In practice, it may be the late phase on CT angiography, or CT urogram.^[8,9,11] CT urogram can be used to establish the lesion level and assess its renal impact.^[18] It allows to consider a preoperative ureteral catheterization just before the procedure to secure the dissection when there is a close proximity after opacification and to facilitate the identification of the ureter which is sometimes very deviated (mass effect, tissue retraction) during this type of revision.^[18]

The choice of the approach is important in order to prevent injuries of noble structures during the ablation of protrus THA. If the protrusion is moderate and if there is no proximity between the protrus elements and the noble structures, removal and reconstruction can be carried out by a conventional approach,^[9,10,39,40] but, the infected nature of the protrusion must encourage greater caution because of the more inflammatory reactions and the possible retraction of noble structures in contact with infected tissues. A THA with severe protrusion or the identification of a close contact with the noble structures on the preoperative assessment justifies elective approaches which allow the control of the vessels and the pelvic structures.^[6,8,9] Four types of surgical approach are possible: subperitoneal approach,^[10,3] Mears triradiate approach,^[48,49] transabdominal approach by laparotomy,^[39] and the simultaneous combined approaches.^[10,49]

For our patient, the approach was a posterolateral approach. Removal of the acetabular prosthesis was

laborious and complicated with bladder perforation probably due to an old adhesion between the acetabular prosthesis and the bladder. Furthermore, there were no vascular or digestive complications.

CONCLUSION

The management of THA loosening with severe protrusion requires a complete preoperative evaluation in order to clarify the relationship with the pelvic structures. The paraclinical assessment includes x-rays and CT angiography.

CT angiography is the gold standard, but it must be completed on demand (suggestive clinical signs, or threatening proximity) with a CT urogram or digestive exams to determine the appropriate surgical strategy.

Consent

The patients have given their informed consent for the case to be published.

Competing Interests

The authors declare no competing interest.

Authors' Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

REFERENCES

1. Beguin L, Feugier P, Durand JM, Chalencou F, Gresta G, Fessy MH. Risque vasculaire et prothèse totale de hanche. *Rev Chir Orthop*, 2001; 87: 489–98.
2. Nolan DR, Fitzgerald RH, Jr., Beckenbaugh RD, et al. Complications of total hip arthroplasty treated by reoperation. *J Bone Joint Surg (Am)*, 1975; 57: 977–81.
3. Grigoris P, Roberts P, McMinn DJ, et al. A technique for removing an intrapelvic acetabular cup. *J Bone Joint Surg (Br)*, 1993; 75: 25–7.
4. Jasty M, Harris WH. Results of total hip reconstruction using acetabular mesh in patients with central acetabular deficiency. *Clin Orthop*, 1988; 237: 142–9.
5. Wooten SL, McLaughlin RE. Iliacus hematoma and subsequent femoral nerve palsy after penetration of the medial acetabular wall during total hip arthroplasty. Report of a case. *Clin Orthop*, 1984; 191: 221–3.
6. Stiehl JB. Acetabular prosthetic protrusion and sepsis. Case report and review of the literature. *J Arthroplasty*, 2007; 22: 283–8.
7. Bach CM, Nogler M, Wimmer C, Stoeckel B, Ogon M. Fistula between a total hip arthroplasty and the rectum: a case report. *Clin Orthop*, 2001; 388: 143–6.
8. Bach CM, Steingruber IE, Ogon M, Maurer H, Nogler M, Wimmer C. Intrapelvic complications

- after total hip arthroplasty failure. *Am J Surg*, 2002; 183: 75–9.
9. Evans RP, Nelson JP. Intrapelvic extraction of a total hip prosthesis. A case report. *Clin Orthop*, 1992; 282: 154–7.
 10. Eftekhari NS, Nercessian O. Intrapelvic migration of total hip prostheses. Operative treatment. *J Bone Joint Surg (Am)*, 1989; 71: 1480–6.
 11. Tomak Y, Gulman B, Malazgirt Z, Karaismailoglu TN. Severe pelvic pain and extrinsic compression of the rectum: late complication of total hip arthroplasty. *J Orthop Sci*, 2001; 6: 282–5.
 12. Shoenfeld NA, Stuchin SA, Pearl R, Haveson S. The management of vascular injuries associated with total hip arthroplasty. *J Vasc Surg*, 1990; 11: 549–55.
 13. Fehring TK, Guilford WB, Baron J. Assessment of intrapelvic cement and screws in revision total hip arthroplasty. *J Arthroplasty*, 1992; 7: 509–18.
 14. BACH CM, STEINGRUBER I, WIMMER C, OGON M, FRISCHHUT B. False aneurysm 14 years after total hip arthroplasty. *J Arthroplasty*, 2000; 15: 535–538.
 15. BECHET FR, HIMMER O, MAIRY Y, LOOTVOET L. Faux anévrysme artériel sur arthroplastie totale de hanche : à propos d'un cas. *Rev Chir Orthop*, 2004; 90: 365–368.
 16. BechetFr, Himmer O, Mairy Y, Lootvoet L. Arterial false aneurysm after total hip arthroplasty: a case report. *Rev Chir Orthop Reparatrice Appar Mot*, 2004 Jun; 90(4): 365–8. PubMed | Google Scholar
 17. THOMPSON NW, COLLEARY G, WILSON DS, CRONE MD, BEVERLAND DE. Migration of intrapelvic cement after total hip arthroplasty. *J Arthroplasty*, 2002; 17: 382–383.
 18. Lem S, Nolan RL. Complications of hip arthroplasty simulating pelvic or bladder pathology: sonographic and radiographic findings. *Abdom Imaging*, 2000 Jul-Aug; 25(4): 440–3. PubMed | Google Scholar
 19. Barrack RL. Neurovascular injury: avoiding catastrophe. *J Arthroplasty*, 2004; 19(Suppl 1): 104–7.
 20. Isiklar ZU, Lindsey RW, Tullos HS. Sciatic neuropathy secondary to intrapelvic migration of an acetabular cup. A case report. *J Bone Joint Surg (Am)*, 1997; 79: 1395–7.
 21. Palmer SW, Luu HH, Finn HA. Hip-vagina fistula after acetabular revision. *J Arthroplasty*, 2003; 18: 533–6.
 22. Bakker KW, Gast LF. Retroperitoneal hemorrhage from the superior gluteal artery: a late complication of total hip arthroplasty. *Clin Rheumatol*, 1990; 9: 249–53.
 23. Eriksson I, Erikson U, Johansson H, et al. Late hemorrhage produced by arterial erosion following orthopaedic surgery. *Injury*, 1971; 3: 104–6.
 24. Hennessy OF, Timmis JB, Allison DJ. Vascular complications following hip replacement. *Br J Radiol*, 1983; 56: 275–7.
 25. Hopkins NF, Vanhegan JA, Jamieson CW. Iliac aneurysm after total hip arthroplasty. Surgical management. *J Bone Joint Surg (Br)*, 1983; 65: 359–61.
 26. Korovesis P, Siablis D, Salonikidis P, et al. Abdominal-hip joint fistula. Complicated revision of total hip arthroplasty for false aneurysm of external iliac artery. A case report. *Clin Orthop*, 1988; 231: 71–5.
 27. Evanski PM, Waugh TR, Orofino CF. Total hip replacement with the Charnley prosthesis. *Clin Orthop* 1973;95:69–72.
 28. Gallmetzer J, Gozzi C, Herms A. Vesicocutaneous fistula 23 years after hip arthroplasty. A case report. *Urol Int*, 1999; 62: 180–2.
 29. Hattrup SJ, Bryan RS, Gaffey TA, et al. Pelvic mass causing vesical compression after total hip arthroplasty. Case report. *Clin Orthop*, 1988; 227: 184–9.
 30. Nonomura M, Kanaoka T, Soeda A, et al. A case of a methylmethacrylate foreign body in the bladder wall. *Int J Urol*, 1994; 1: 278–80.
 31. Ridley MG, Price TR, Grahame R, et al. Colocutaneous fistula as late complication of total hip replacement in rheumatoid arthritis. *J R Soc Med*, 1985; 78: 951–2.
 32. Arnold DM, Shives TC. Enterocutaneous fistula complicating total hip arthroplasty. *Clin Orthop*, 1992; 278: 108–10.
 33. Levin JS, Rodriguez AA, Luong K. Fistula between the hip and the sigmoid colon after total hip arthroplasty. A case report. *J Bone Joint Surg (Am)*, 1997; 79: 1240–2.
 34. Switzer PJ, Cooperberg PL, Knickerbocker WJ. Defects in the sigmoid colon caused by placement of a left hip prosthesis. *J Can Assoc Radiol*, 1974; 25: 151–3.
 35. Fischer SR, Christ DJ, Roehr BA. Sciatic neuropathy secondary to total hip arthroplasty wear debris. *J Arthroplasty*, 1999; 14: 771–4.
 36. Stiehl JB, Stewart WA. Late sciatic nerve entrapment following pelvic plate reconstruction in total hip arthroplasty. *J Arthroplasty*, 1998; 13: 586–8.
 37. Korkala O, Syrjanen KJ. Intrapelvic cyst formation after hip arthroplasty with a carbon fibre-reinforced polyethylene socket. *Arch Orthop Trauma Surg*, 1998; 118: 113–15.
 38. Matsumoto K, Hukuda S, Nishioka J, et al. Iliopsoas bursal distension caused by acetabular loosening after total hip arthroplasty. A rare complication of total hip arthroplasty. *Clin Orthop*, 1992; 279: 144–8.
 39. Tazawa A, Nakamura S, Otsuka K, Nishida K, Matsushita T. Transabdominal approach for intrapelvic migration of a total hip prosthesis component. *J Orthop Sci.*, 2001; 6: 362–5.
 40. Salvati EA, Bullogh P, Wilson PD. Intrapelvic protrusion of the acetabular component following

- total hip arthroplasty. *Clin Orthop*, 2006; 453: 8—12.
41. Tripp BM, Tanzer M, Laplante MP, Elhilali MM. Vesico-acetabular fistula. *J Urol*, 1995; 153: 1910—1.
 42. Roberts JA, Loudon JR. Vesico-acetabular fistula after total hip replacement. *J Bone Joint Surg (Br)*, 1987; 69: 150—1.
 43. Steg A, Boccon-Gibod L, Vialatte J. Ureteral complications of orthopedic surgery. *Rev Chir Orthop*, 1974; 60: 169—74.
 44. Schafer D, Mattarelli G, Morscher E. Uretero-articular fistula after total hip replacement. A case report. *Arch Orthop Trauma Surg*, 1994; 114: 35—6.
 45. Gabrion A, Mertl P, Gaullier O, Villamizar J, Vives P. Ureteroacetabular fistula after removal of a septic total hip prosthesis. *Rev Chir Orthop*, 1999; 85: 735—9.
 46. Villamizar J, Devoldere G, Tourneur G, Richard L, Abourachid H. Uretero-acetabular fistula: report of a case. *Prog Urol*, 1996; 6: 950—4.
 47. Kinmont JC. Penetrating bladder injury caused by a medially placed acetabular screw. *J South Orthop Assoc*, 1999; 8: 98—100.
 48. Mears DC, Rubash HE, Sawaguchi T. Fractures of the acetabulum. *Hip*, 1985; 95—113.
 49. Stiehl JB, Harlow M, Hackbarth D. Extensile triradiate approach for complex acetabular reconstruction in total hip arthroplasty. *Clin Orthop*, 1993; 294: 162—9.