Case Report

Acute intrapelvic cup migration: advantages of adjuvant Stoppa approach for implant removal/reconstruction. A case report

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1. Presentation of the case

Here we present a case of a 70 year-old lady, with a medical history of cerebrovascular accident with residual gait instability, osteoporosis and depression that was admitted to the hospital after a fall. Before the fall, she was able to perform the daily activities but needed additional support (walking frame). The patient received chronic treatment with aspirin, escitalopram, simvastatin, valsartan and lorazepam. She had no cognitive dysfunction. She complained for pain in her right hip with inability to walk. The physical exam showed shortening and slight external rotation of her right limb without vascular damage. The x-rays revealed a femoral neck fracture. Four days after admission, she received a total hip replacement (Corail[®] stem, Corail[®] double mobility cemented cup, ceramic 28 mm-diameter +8.5 mm-neck head). At the postoperative period the patient had mental disorientation with inability to rest properly.

The postoperative x-rays showed fracture of the lamina quadrilatera and intrapelvic migration of acetabular component (Fig. 1).

The CT scan findings were comminuted fracture of the acetabulum with medial displacement of lamina quadrilatera, intrapelvic migration of prosthesis, hemitransverse posterior fracture, and medial displacement of intrapelvic structures (bowel loops and cecum) (Fig. 2A).

The patient was prepared for revision surgery under general anesthesia. The surgical procedure was performed in 2 stages.

For the first stage, the patient was placed in supine position. Stoppa approach was carried out. The cup and attached cement fragments were safely removed from the pelvis (Fig. 2B). The prosthesis was in close vicinity of the intrapelvic vascular structures (Fig. 2C).

The polyethylene liner of the double mobility device was pushed laterally and the remaining lamina quadrilatera was reduced and fixed by applying a Matta plate (Stryker[®]) with cortical screws (Fig. 2D).

Second stage was done in left lateral decubitus. A postero-lateral approach was performed. The head with the double mobility liner implants were removed. The hemitransverse fracture of the acetabulum was stabilized by using a 7-hole reconstruction plate (Synthes[®]) with screws (Fig. 3A and B).

Severe bone loss of the posterior wall of the acetabulum was assessed intraoperatively. To solve this problem, morsellized bone allograft was impacted on a flexible medial wall metal mesh (X-Change, Stryker[®]) (Fig. 3B). A pressfit Delta cup (Lima[®]) was set in place, reinforced with 2 screws at the site of the superior flanges

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Fig. 1. A: postoperative radiological image with intrapelvic migration of hip prosthesis. B: CT scan image showing the prosthetic protrusion with displacement of intrapelvic structures (arrow).

(Fig. 3C). A double mobility metal insert with posterior elevated rim and a new standard-neck metal head with double mobility polyethylene liner were used. The intraoperative maneuvers for assessing stability and abductor tension were correct. There were no neurovascular complications. The postoperative x-rays revealed correct position of the cup with adequate restoration of the center of the hip (Fig. 3D).

In the postoperative period the patient needed blood transfusion (two red pack cells the day after the operation and another two 3 days after the operation). The patient was not allowed to load on the operated side and is discharged 9 days after the second operation. The patient was allowed to walk with partial weight

bearing at 3 months. 6 months after the surgery, the patient had returned to the same level of activity that she had before the fracture.

2. Discussion

Migration of prosthetic cup beyond the ilio-ischial line can be considered a life-threatening condition as the migrated components are often in close vicinity to intrapelvic structures and can cause damage of vascular,^{1,2,6} neural³ and visceral^{4,5} structures. This type of complication is usually described in cases of bone

Fig. 2. A: CT scan 3d reconstruction showing intrapelvic penetration with displacement of lamina quadrilatera. B: intrapelvic removal of double mobility cup. C: intrapelvic image showing the relationship of the prosthetic liner with intrapelvic vascular structures (obturator neurovascular bundle). D: intrapelvic image after restoring the lamina quadrilateral by using the Matta plate.

Fig. 3. A: image of the flexible metallic mesh to reinforce the postero-medial wall of the acetabulum. B: image of the acetabulum after impactation of morsellized bone allograft. C: image of the acetabulum after the setting in place of the Delta cup. D: postoperative x-ray.

deficiency associated with septic/aseptic loosening of implants. Nevertheless, few reports exist about acute/subacute migration of hip prosthesis.^{7,8} Our case represents an acute migration, probably as a consequence of unrecognized intraoperative fracture of the acetabulum and uncontrolled weight bearing of the operated limb during the immediate postoperative period.

In these cases, preoperative planning is of paramount importance. A contrast enhanced helical CT scan is advisable, not only to evaluate the fracture lines/bone deficiency, but also to assess the integrity of iliopsoas muscle.^{9,10} Angio-CT is also very useful to determine the proximity of the migrated implants to the vascular structures.

To safely remove the migrated components, it has been recommended a 2-stage operation in one surgical session. The initial stage includes direct view of neurovascular and visceral structures allowing retraction in order to prevent damage and to reconstruct the pelvic deficiency when needed, and the 2nd stage consists on cup revision by using the conventional approaches.¹

The classic options for removing intrapelvic migrated components include classic retroperitoneal approach,^{7,11–13} transabdominal approach¹⁴ or combined.^{11,13} Tazawa et al. suggested the indications for subperitoneal versus transabdominal approach based on the iliopsoas condition. If the iliopsoas is intact, it can be assumed that there is a good protection so a subperitoneal approach would be suitable. In cases the iliopsoas is altered and the components are in contact with the peritoneum, it would be advisable a transabdominal approach.⁹ Recently, the intrapelvic extraperitoneal “Stoppa approach” described by Rives and Stoppa¹⁵ has been proposed to safely remove the intrapelvic migrated components.^{16,17} This approach has gained popularity in the last

years for the treatment of acetabular fractures above all in cases in which lamina quadrilateral is involved.^{18–20} We previously reported a case of aseptic loosened implant with intrapelvic cup migration in which Stoppa approach was employed not only for removal but also for stabilization of the pelvis with strut-plate construct.¹⁷ Following the same principles, in this case we used a Matta reconstruction plate to take advantage of the good visualization of the lamina quadrilatera and the inner ring of the pelvis in order to stop the protrusion of bone/remaining components minimizing the risks in the second stage of procedure and allowing at the same time impactation of allografts to improve bone stock. Then we stabilized the posterior column of the acetabulum with a reconstruction plate by a conventional extended postero-lateral approach (Fig. 4).

We consider this approach very helpful for treating this type of lesions with advantages over classic approaches. It allows the removal of migrated cup with very good control of intrapelvic structures. It also permits good access to the pubic body, the superior ramus, pubic root, lamina quadrilatera, medial part of posterior column, sciatic buttress and anterior sacroiliac joint, allowing at the same time reconstruction of existing bone deficiency/fracture. It is less invasive than the transperitoneal approach with low morbidity. The stabilization of the medial wall of the acetabulum by using a plate facilitates the hip revision at the second stage of the procedure and makes it safer as the pelvic structures remain “sealed” and therefore protected to an eventual migration of bone/prosthetic implants during the position change and the second stage of the surgery. Due to the risk of preexistent/intraoperative intrapelvic structure damage, collaboration with general and/or vascular surgeon would be recommended during the intrapelvic time.

Fig. 4. schematic representation of the bone deficiency (A) and the reconstruction strategy in the inner (B) and outer (C) aspects of the acetabulum.

Conflict of interest

The authors have none to declare.

References

- Maeckelberg L, Simon JP, Naudie D, MacDonald S, Corten K. Removal of an intra-pelvic socket: description of a safe surgical algorithm. *Acta Orthop Belg.* 2012;78:152–158.
- Barbier O, Pierret C, Bazile F, De Kerangal X, Duverger V, Versier G. Vascular complications following total hip arthroplasty: a case study and a review of the literature. *Eur J Orthop Surg Traumatol.* 2012;22(Suppl 1):S121–S125.
- Isiklar Z, Lindsey R, Tullos HS. Sciatic neuropathy secondary to intrapelvic migration of an acetabular cup. A case report. *J Bone Joint Surg Am.* 1997;79:1395–1397.
- Palmer SW, Luu HH, Finn HA. Hip-vagina fistula after acetabular revision. *J Arthroplasty.* 2003;18:533–536.
- Gani R, Andronikou S, Truter R, Deale J. Protrusion acetabuli prosthetica—a cause of a pelvic mass presenting by the gynaecologist. *J Orthop Case Rep.* 2012;2:27–28.
- Bach CM, Steingruber IE, Ogon M, Maurer H, Nogler M, Wimmer C. Intrapelvic complications after total hip arthroplasty failure. *Am J Surg.* 2002;183:75–79.
- Foster S, Chaudhary H, Assenmacher B. Intrapelvic cementless component extraction with immediate triflange acetabular reconstruction using the retroperitoneal approach. *J Arthroplasty.* 2009;24(February (2)):323. <http://dx.doi.org/10.1016/j.arth.2008.04.024>. [e1–5, PubMed PMID: 18555657].
- Ahmad MA, Biant LC, Tayar R, Thomas PR, Field RE. A manoeuvre to facilitate acetabular component retrieval following intra-pelvic migration. *Hip Int.* 2009;19(April–June (2)):157–159. [PubMed PMID: 19462376].
- 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(4):362–365. [PubMed PMID: 11479767].
- Girard J, Blairon A, Wavreille G, Migaud H, Senneville E. Total hip arthroplasty revision in case of intra-pelvic cup migration: designing a surgical strategy. *Orthop Traumatol Surg Res.* 2011;97(April (2)):191–200. <http://dx.doi.org/10.1016/j.otsr.2010.10.003>. [Review PubMed PMID: 21371962].
- Eftekhari NS, Nercessian O. Intrapelvic migration of total hip prostheses. Operative treatment. *J Bone Joint Surg Am.* 1989;71(December (10)):1480–1486. Erratum in: *J Bone Joint Surg [Am]* 1990 Feb;72(2):310. PubMed PMID: 2687281.
- Grigoris P, Roberts P, McMinn DJ, Villar RN. A technique for removing an intrapelvic acetabular cup. *J Bone Joint Surg Br.* 1993;75:25–27.
- Petrera P, Trakru S, Mehta S, Steed D, Towers JD, Rubash HE. Revision total hip arthroplasty with a retroperitoneal approach to the iliac vessels. *J Arthroplasty.* 1996;11(September (6)):704–708. [PubMed PMID: 8884446].
- Gasiunas V, Plénier I, Hérent S, May O, Senneville E, Migaud H. Transabdominal removal of femoral and acetabular components of a severely protruded and infected hip arthroplasty with urinary tract complications. *Rev Chir Orthop Reparatrice Appar Mot.* 2005;91(June (4)):346–350. [French. PubMed PMID: 16158550].
- Rives J, Stoppa R, Fortes LN. Dacron patches and their place in surgery of groin hernia. 65 cases collected from a complete series of 274 hernia operations. *Ann Chir.* 1968;22:159–171 [Article in French].
- Chana-Rodríguez F, Villanueva-Martínez M, Crego-Vita D, Rojo-Manaute J, Vauquero-Martín J. Stoppa approach, an alternative for total hip arthroplasty in an intra-pelvic cup. *J Arthroplasty.* 2013;28:198[e1–e4].
- Murcia-Asensio A, Ferrero-Manzanal F, Lax-Pérez R, Fernández-Fairén M. Stoppa approach for intrapelvic damage control and reconstruction of complex acetabular defects with intra-pelvic socket migration: a case report. *Int J Surg Case Rep.* 2016;25:143–148. <http://dx.doi.org/10.1016/j.ijscr.2016.06.022> [PubMed PMID: 27372028 PubMed Central PMCID: PMC4932486].
- Collinge CA, Lebus GF. Techniques for reduction of the quadrilateral surface and dome impaction when using the anterior intrapelvic (modified Stoppa) approach. *J Orthop Trauma.* 2015;29(February (2)):S20–4. <http://dx.doi.org/10.1097/BOT.0000000000000271>. [PubMed PMID: 25486005].
- Chesser TJ, Eardley W, Mattin A, Lindh AM, Acharya M, Ward AJ. The modified ilioinguinal and anterior intrapelvic approaches for acetabular fracture fixation: indications, quality of reduction, and early outcome. *J Orthop Trauma.* 2015;29(February (2)):S25–S28. <http://dx.doi.org/10.1097/BOT.0000000000000268>. [PubMed PMID: 25486002].
- Kim HY, Yang DS, Park CK, Choy WS. Modified Stoppa approach for surgical treatment of acetabular fracture. *Clin Orthop Surg.* 2015;7(March (1)):29–38. <http://dx.doi.org/10.4055/cios.2015.7.1.29>. [PubMed PMID: 25729516 PubMed Central PMCID: PMC4329530].