CASE REPORT

A rare presentation of haematuria: hip prosthesis in the bladder

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SUMMARY

An 80-year-old woman presented to our department with visible haematuria and stage II acute kidney injury (AKI). She had stage IIB cervical cancer, for which she received chemotherapy and external beam radiotherapy in 2003. Four years later, she had a left dynamic hip screw for an extracapsular neck of femur fracture following a fall. In 2010, she underwent a right total hip replacement owing to osteoarthritis, and it was subsequently revised in 2012 owing to a right acetabular component failure. In this admission, her AKI improved with intravenous fluid administration and her haematuria settled following catheterisation with a three-way catheter and bladder irrigation with saline. She underwent a flexible cystoscopy which revealed that a part of her right hip prosthesis was in the bladder, having eroded through the right bony pelvis. However, she declined any surgical interventions.

BACKGROUND

Haematuria is a common presentation in urology. Common causes include urinary tract infections, renal calculi, malignancy of the urinary tract, radiation cystitis, bleeding disorders and nephrological causes. Vascular abnormalities such as iliac artery–ureteral fistula, renal arteriovenous malformation and ruptured renal artery aneurysm are among the rare causes of haematuria.¹

Urological complications following total hip replacement are well documented and recognised in the literature. Such complications could present acutely or be delayed. Immediate complications are usually intraoperative injuries while delayed complications can be a result of intrapelvic herniation of cement or migration of prosthesis.² There are a small number of reports describing hip prosthesis migration to the bladder as a complication of total hip replacement.^{3,4} The presenting complaints in O'Sullivan *et al* case report were symptoms of cystitis and urinary tract infections.³ With the use of CT imaging, the patient's hip prosthesis was subsequently seen in the bladder. They did not report any haematuria which was the presenting symptom of our index patient. Bach *et al* reported a case of haematuria owing to a dislocated right hip prosthesis. In their report, however, the hip prosthesis was not visualised in the bladder during cystoscopy.⁴ To the best of our knowledge, we report the first ever case of haematuria with a hip prosthesis that had eroded into the bladder.

CASE PRESENTATION

We present the case of an 80-year-old woman who was admitted to our urology ward with visible haematuria and acute kidney injury (AKI) stage II. There was no recent report of fall or trauma to her hips. She had a history of stage IIB cervical cancer, for which she received chemotherapy and external beam radiotherapy in 2003. Following a fall in 2007, she had a left dynamic hip screw inserted for an extracapsular neck of femur fracture. In 2010, she underwent a right total hip replacement for osteoarthritis. Her right hip was revised in 2012 owing to a right acetabular component failure. The revision procedure was noted to be difficult, resulting in distal right femoral fracture which required additional plating.

Six months prior to her admission, she was investigated for a single episode of visible haematuria. Flexible cystoscopy performed on her at that time showed telangiectasia in keeping with previous pelvic radiotherapy treatment for cervical cancer. A CT urography (CT-U) was performed and it showed a complicated right hip replacement in which the articulation was medially displaced into the pelvis, compressing the pelvic structures including the right ureter. A follow-up mercaptoacetyl triglycine renogram was performed and an obstruction of the right kidney was confirmed.

While in hospital, her haematuria cleared up following saline irrigation, and she underwent a flexible cystoscopy which revealed that a significant part of her right hip prosthesis had eroded into her bladder. This was subsequently determined to be the cause of her haematuria.

At the same time, she was also noted to have a critical left lower limb ischaemia. A multidisciplinary team (MDT) discussion involving the orthopaedic, vascular and urological surgeons agreed that any surgical intervention carried a significant risk of death given her comorbidities. This decision was in line with the patient's wish to avoid surgery.

INVESTIGATIONS

Owing to her haematuria and AKI, she had regular blood tests including full blood count, urea and electrolytes. She was transfused packed red blood cells whenever her haemoglobin level dropped below 8.0 g/dL, after appropriate consent was obtained.

In view of her recurrent visible haematuria, ultrasound scan (USS) of her renal tract and CT-U were performed. USS showed right hydronephrosis and CT-U confirmed the finding. Artefacts from her

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Figure 1 CT pelvis showed medialisation of the right hip prosthesis.

hip prosthesis did not allow adequate visualisation of the pelvis. It did, however, show a significant medial displacement of the prosthesis with compression of pelvic structures ([figure 1](#)).

She underwent flexible cystoscopy when her haematuria settled and it showed that part of her right hip prosthesis was in her bladder, having eroded through the right bony pelvis into the bladder causing haematuria ([figure 2](#)).

A plain X-ray of her pelvis performed after the flexible cystoscopy showed that the right hip prosthesis cup and the medial wall of the acetabulum had migrated medially into the pelvis ([figure 3](#)).

TREATMENT

During her in-hospital stay, she received analgesia and intravenous fluid hydration. Her creatinine and estimated glomerular filtration rate improved from $196\mu\text{mol/L}$ and 21 mL/min to $71\mu\text{mol/L}$ and 69 mL/min , respectively. While in hospital, her haemoglobin levels dropped significantly and hence she received 4 units of packed red blood cells. Her last checked haemoglobin level was 8.6 g/dL .

With saline irrigation through a 24F three-way catheter, her haematuria stopped and the three-way catheter was changed to a long-term two-way catheter. Owing to the severity of prosthetic hip erosion, she unfortunately became bedbound.

Figure 2 Flexible cystoscopy revealed part of the right hip prosthesis has migrated into the bladder.

Figure 3 Pelvis X-ray showed a right hip arthroplasty failure.

The orthopaedic lower limb team was involved in her care to prepare a long-term rehabilitative plan. Following an MDT meeting and due consultation with the patient, it was agreed that her case was best managed conservatively owing to her comorbidities and age.

OUTCOME AND FOLLOW-UP

The patient opted for non-operative management in agreement with MDT outcome. She was planned for discharge to a nursing home with the relevant support required. Unfortunately, she declined rapidly on the ward and passed away with lower limb ischaemia and fragility of old age before the planned discharge date.

DISCUSSION

With advances in medicine and technology, there is a significant increase in life expectancy as well as the population of elderly patients. According to the 13th National Joint Registry Annual Report 2016, there were 800 683 primary hip operations and 89 023 revision hip operations performed in England, Northern Ireland and Wales from 1 April 2003 to 31 December 2015.⁵ Majority of these cases were performed in elderly patients. Needless to say, the numbers are expected to increase in the coming years with the ever-increasing ageing population.

Common complications owing to hip surgeries include hip dislocation and subluxation, infections and aseptic loosening. Urological injuries and complications due to hip replacement surgeries are well documented and recognised in the literature. More often than not, the group of patients prone to pelvic complications usually have a history of hip surgeries or pelvic radiotherapy.

Grauer *et al* reported bladder tear following a revision of a total hip replacement. They hypothesised that the reason behind it was adhesion of the bladder to the pelvic floor owing to previous multiple hip procedures.⁶ Kinmont also reported a fatal bladder injury owing to a medially placed acetabular screw in a patient with rheumatoid arthritis who underwent a revision hip surgery.⁷ Similarly as observed in our patient, her right hip revision was made difficult and complex owing to her previous hip surgery.

Complications of hip surgery are also associated with previous pelvic radiotherapy. O'Sullivan *et al* reported a patient whose hip prosthesis had migrated into the bladder.³ Previously, this patient had pelvic radiotherapy as part of the treatment for ovarian cancer. Our patient also received radiotherapy for cervical cancer treatment. It was noted intraoperatively that she had poor bone quality which in her case was likely owing to her previous pelvic radiotherapy insult.

Felden *et al* followed up 45 patients who had previous pelvic radiotherapy with a mean duration of 51 months following their hip surgeries.⁸ Using their novel technique of using a cemented acetabular component with a reinforcement cross, they concluded that the technique was excellent and provided a satisfactory outcome. Being a novel technique, this was not adopted in our patient when she underwent her hip operations.

Besides the aforementioned urological injuries and complications owing to hip replacement surgeries, cases of vesicocutaneous fistulae,⁹ vesicoacetabular fistulae,^{10 11} vesicoacetabular cutaneous fistulae,^{12 13} bladder pseudo tumours^{14 15} and ureteral injuries^{16 17} have also been reported following hip replacement surgeries.

In the case reports by O'Sullivan *et al* and Bach *et al*, two patients underwent successful operations and convalesced.^{3 4} We could only hypothesise that their patients were medically fit to undergo major surgeries. As for our patient, she was not fit owing to her other comorbidities. She therefore elected for conservative treatment in line with MDT advice. Unfortunately,

she passed away with lower limb ischaemia and fragility of old age on the ward before the planned discharge date.

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Learning points

- Urological complications owing to hip surgery are well documented and recognised.
- Migration of hip prosthesis can occur especially in patients with previous complex hip surgery or pelvic radiation.
- Management of hip prosthesis migration into the bladder is complex, and certainly it is a morbid surgical procedure.
- Always exercise great caution in interpreting images with artefacts; do not always dismiss it as a negative investigation entirely.
- Do not always assume visible haematuria is always owing to radiation cystitis in patients who previously had pelvic radiotherapy.

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