Case report

Ureterocolic fistula detected by mercaptoacetyltriglycine (MAG-3) diuretic renography including single photon emission CT and low-dose CT (SPECT–CT)

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SUMMARY

We describe the case of a 60-year-old man with a ureterocolic fistula following laparoscopic sigmoid resection. The fistulous tract between the left ureter and sigmoid colon was detected by mercaptoacetyltriglycine diuretic renography including single photon emission CT with low-dose CT. Ureteroneocystostomy was successfully performed.

BACKGROUND

This article has been written to illustrate that a ureterocolic fistula may develop after colorectal surgery, and that dynamic renography may be an adjunct for the diagnosis of ureterocolic fistula, when conventional diagnostic methods have been exhausted.

CASE PRESENTATION

A 60-year-old man, known with a malignant collapse caused by myocardial fibrosis and non-sustained ventricular tachycardia, had laparoscopic surgery because of an obstructive sigmoid carcinoma. A rectosigmoid resection with primary anastomosis was performed, and the operation was uncomplicated. There were no metastases. Two weeks later, the patient developed fever and rigours. Abdominal CT showed an intra-abdominal abscess with a maximum diameter of 4 cm, adjacent to the anastomosis, which could not be percutaneously drained (figure 1). Furthermore, there was an asymptomatic dilatation of the left pyelocaliceal system with normal contrast enhancement of the left kidney, suggestive of mild hydronephrosis which was managed conservatively (figure 2). The ureter could be followed as far as the region of the abscess. After successful treatment with antimicrobial therapy,

Figure 2 Abdominal CT. The hydronephrosis of the left kidney both at the first (left-side image) and the second (right-side image) episode of fever. Note the decrease in contrast enhancement.

the patient returned home. Almost 3 weeks later he again developed fever, rigours and this time also pain in the left flank. Repeated abdominal CT showed a small remaining abscess of about 1 cm in diameter (figure 1). The degree of hydronephrosis was unchanged, but the left kidney showed decreased contrast enhancement (figure 2). Again, the ureter could be followed as far as the region of the abscess, with a possible little fistula between the ureter and the intestinal wall.

INVESTIGATIONS

Dynamic renography was performed to assess both the function of the left kidney as well as to detect whether there was significant post renal obstruction or urinary leakage. After injecting 75 MBq (2.0 mCi) of Tc-99m-mercaptoacetyltriglycine (MAG-3) along with 20 mg of furosemide, posterior dynamic images were acquired for 30 min. These showed a good function of the left kidney with a slow excretion. After 21 min, some activity was seen outside the urinary tract (figure 3). Additional late imaging showed a good further decrease (44%) of activity in the left kidney, but a further increase of activity outside the urinary tract. Single photon emission CT with low-dose CT (SPECT–CT) images clearly showed this activity to be urine in the descending and transverse colon from the junction of the left ureter and the rectal anastomosis upwards, without activity in the retroperitoneal tissue or in the abdominal cavity (figures 4 and 5).

Figure 1 Abdominal CT. The abscess adjacent to the bowel anastomosis both at the first (left-side image) and the second (right-side image) episode of fever.

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Figure 3 Mercaptoacetyl triglycine renography: MAG-3 renography showing good function of the left kidney with initially slow excretion but good further decrease on the late image. However, from 21 minutes onward there activity was seen outside the urinary tract, which increased on the late image.

Figure 4 Single photon emission CT with low-dose CT. Maximum intensity projection of the MAG-3 SPECT-CT nicely showing the urinary activity from the junction of the left ureter and the rectal anastomosis upwards in the descending and transverse colon. Green: left kidney, yellow: left renal pelvis and ureter, red: descending and transverse colon.

Figure 5 Single photon emission CT with low-dose CT. Fusion of the SPECT and CT images clearly localizes the activity within the lumen of the colon and not in the retro peritoneal or intra-abdominal area. From left to right: low-dose CT, SPECT and fused images.

TREATMENT

The left kidney was temporarily drained with a nephrostomy tube, and 2 months later the left ureter was successfully reimplanted into the bladder by performing a Boari flap ureteroneocystostomy.

OUTCOME AND FOLLOW-UP

More than 4 months later, no further complications have occurred, and the patient has a normal micturition and defecation.

DISCUSSION

Ureterocolic fistulae are very rare and can be iatrogenic or caused by urinary calculi or diverticulitis.¹ Case reports of iatrogenic ureterocolic fistulas are described following laparoscopic oophorectomy, nephrectomy and a laparoscopic ileostomy.²⁻⁴ There are no published case reports of ureterocolic fistulae after colorectal surgery. After studying the video recordings of the laparoscopic surgery thoroughly by several laparoscopic surgeons, it was clear that the fistula was due to ureteric injury. Ureteral injuries caused by colorectal surgery were identified in 0.28% of the patients.⁵ Risk factors were rectal cancer, adhesions, weight loss/malnutrition and teaching hospital. Prospective factors included the use of laparoscopy. There was a higher incidence of anastomotic leak in the patients with ureteral injury. The complication of ureterocolic fistula was not mentioned in this article.

Postoperatively, ureterocolic fistulae can be diagnosed by urological or gastrointestinal imaging studies.⁶ An intravenous pyelogram or CT intravenous urography scans may identify the fistula by showing contrast material entering the bowel, but results may not always be convincing. Furthermore, a poorly functioning kidney will make this less valuable.¹ Gastrointestinal imaging studies may show the barium enema entering the urinary tract, but sensitivity is limited. Traditionally, dynamic renal scintigraphy had no place

Patient's perspective

As a paediatrician I became a patient myself. Again, I was diagnosed with an obstructive sigmoid carcinoma. For this I was referred to the surgical oncologist. He discussed the options for treatment with me and my wife. He said that he would prefer a laparoscopic approach. I agreed without asking for further explanation, although as a paediatrician I constantly try to make a shared decision with my patients and (most often) parents of patients. I even publish on the topic of shared decision-making during counselling. Moreover I even ignored the discussion about whether or not epidural pain treatment. I wanted to be helped! So I had a laparoscopic sigmoid resection. Two days after the operation I developed fever, but there was also spontaneous stool. The C-reactive protein was high, but the leucocyte count almost normal. Probably, there was a little abdominal abscess. Given the spontaneous stool, a wait-and-see policy was pursued, and no further diagnostics were conducted. I thought by myself, I would do this differently, but I have no experience with adults and the treatment of sigmoid carcinoma. And the surgeon was right, because the following day the fever diminished and I slowly started to feel better again. However, I never felt all right, but as I was assured, this was normal. I did not ask for further explanation, but I accepted this with certainty. The week after the operation the message that there were no lymph node metastases was a relief.

About 2 weeks later I got fever and chills. However, these lasted only for a short time. The next day, however, I got fever and chills again for a short time. I thought would this be abscess fever? Would my body be strong enough to clear this up? Because I got fever and chills again the next day, my wife and I decided to go to the emergency department. When arrived on the emergency department, I felt very ill and had only one wish: to be treated. I did not argue at all. The CT-scan made indeed showed an abscess and a hydronephrosis, for which antibiotics already had been started. Fortunately I recovered quickly. I did not have a conversation about the duration and type of antibiotics, nor about the cause and follow-up of the hydronephrosis, but I liked that I was recovered and was discharged within 5 days. The following weeks, things were really going a bit better, but I still didn't feel completely well. Three weeks later, the same story. This time, I directly went to the emergency department, where I felt so sick that I cannot remember much of this event. Antibiotics were started and it was decided that a new CT scan had to be made the next day with proper preparation. The next day, I felt a little better and the preparation was going well. Strangely enough, the abscess had become smaller, the degree of hydronephrosis however was unchanged, but the kidney showed decreased contrast enhancement. How could this be explained? I could not think about it: clinical reasoning did not work! But I did support the suggestion that it might be useful to perform a MAG-3 renography. During the procedure, I could follow the activity coming outside the kidney region. How could that be explained? Additional diagnostic research was done and a ureterocolic fistula appeared to have emerged. How was this possible? Did the surgeon hit the ureter during surgery or did the fistula occur secondary to the abscess? I was not concerned about that, but would like to see this problem solved. The urologist proposed a double J-catheter or nephrostomy catheter, depending on whether the ureter was still passable. I agreed, but only under general anaesthesia. When I woke

Continued

Patient's perspective Continued

up, I noticed to have a nephrostomy catheter. So it was... But how now further? The urologist suggested to take the time to let the fistula dry, to allow the inflamed area to come to rest, and to perform a continuity recovery after about 2 months. Of course I agreed. When preparing for this, the ureter appeared to be possibly passable. This could be a reason to try a stent or continuity recovery with surgery in this recently inflamed area. The urologist advised not to do this, but to stay outside of this inflamed area, and to perform a ureteroneocystostomy outside the inflamed area. I accepted the proposal immediately, without questions about literature data or checking the literature myself. Fortunately, this operation was going well and I am back to work 6 months after my initial operation. Very tired still, but it goes.

I had a long time to think about why I avoided taking decisions. In the two periods with fever and chills, I was just to sick for it my only question and hope then was for help. But there was plenty of time for shared decision-making before the initial operation and also before the last operation. Why didn't I do want a shared decision-making? Was I hiding behind the fact that I didn't understand the problems, or had I always felt that I was in good hands (although the surgical oncologist might have hit the ureter)? Or did I really not want to be the person in charge about the policy to be followed? Or didn't I want to interfere, just to let the professionals do their job, so that they didn't deviate from the routine (which might lead to complications more easily)?

It is still not clear to me what my motives have been to avoid co-decision-making and to give up my autonomy for a while. But for sure this had to do with the fact that I had cancer! I hope that this lecture may help professionals to use (MAG-3) diuretic renography including SPECT-CT to diagnose a ureterocolic fistula.

in the diagnosis of ureterocolic fistulae. But the addition of late images facilitates the visualisation of activity outside the urinary tract by allowing accumulation of activity in the bowel increasing sensitivity. Moreover, by adding SPECT-CT the activity can be objectively located in the bowel. In 2012, Poyraz *et al* demonstrated the additional value of SPECT-CT in the diagnosis of a patient with ureteroileal fistula.⁷

Only very recently, a case report was described in which renography with SPECT-CT was used in evaluation of a patient with suspected ureterocolic fistula.⁸ In the present case report, we confirm that MAG-3 renography with SPECT-CT is a simple technique to objectively diagnose ureterocolic fistula.

In summary, ureterocolic fistulae are extremely rare, and dynamic renal scintigraphy with SPECT-CT may be an adjunct for the diagnosis of ureterocolic fistula, when conventional diagnostic methods have been exhausted.

Learning points

- ▶ Ureteral injuries caused by colorectal injury are rare, but may occur. Even a ureterocolic fistula may develop.
- ▶ In patients with recurrent fever after colorectal surgery, a ureterocolic fistula should be included in the differential diagnosis.
- ▶ Dynamic renal scintigraphy may be an adjunct for the diagnosis of ureterocolic fistula, when conventional diagnostic methods have been exhausted.

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