CASE REPORT

Recurrent clot anuria following laparoscopic pyeloplasty in a solitary functioning kidney: managing with double guide wire technique

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SUMMARY

Clot anuria in a solitary functioning kidney is an emergency situation. Haematuria with clot anuria in an early postoperative period represents a challenge, as treatment options are limited. Manipulation of the anastomotic site may lead to anastomotic disruption and urinoma while use of thrombolytic therapy poses the danger of increasing haematuria. We report a case of anuria due to clot retention in the upper tract following laparoscopic dismembered pyeloplasty in a solitary functioning kidney, managed successfully with double guide wire technique.

BACKGROUND

Clot anuria due to stent blockage following laparoscopic dismembered pyeloplasty in the case of a solitary functioning kidney is a rare complication. Early management to relieve obstruction is essential to prevent progressive renal damage. Techniques such as replacing the stent, ureteroscopic clot retrieval or using thrombolytic infusion therapy have limitations in the early postoperative period. We describe a case of anuria due to clot retention in the upper tract following laparoscopic dismembered pyeloplasty in a solitary functioning kidney managed successfully with endoscopic double guide wire technique.

CASE PRESENTATION

A 26-year-old man presented with a history of abdominal discomfort in his right flank region. His abdomen was soft with no palpable lump.

INVESTIGATIONS

On ultrasound and CT evaluation, he had a markedly dilated right renal pelvis with calyceal dilation and normal renal size while the left kidney was atrophic. On diethylene triamine pentaacetic acid (DTPA) scan, the left kidney was non-functional. His right kidney had preserved cortical perfusion and tracer uptake with delayed drainage. Glomerular filtration rate was 95 mL/min. His serum creatinine was 0.9 mg/dL. Haemogram and liver function tests were unremarkable.

TREATMENT AND MANAGEMENT OF POSTOPERATIVE COMPLICATION

The patient underwent right side laparoscopic dismembered pyeloplasty with 6 Fr DJ stent in situ and an abdominal drain. During surgery, anomalous crossing vessels were noted. The patient's

pelvis was thickened and vascular. They were safeguarded and dismembered pyeloplasty was performed. On the fourth postoperative day, the patient had intermittent mild haematuria. His haemodynamics, coagulogram and haemogram were normal, and he was kept under observation. His drain output was only 30 mL/day with serous fluid content. In an attempt to reduce bleeding, he was given an injection of tranexamic acid. The next day the patient had severe flank pain with anuria. Initial therapy with intravenous fluid hydration and diuretics did not resolve the condition. Ultrasound revealed dilated calyx and pelvis with empty bladder. The patient's serum creatinine rose to 2 mg/dL. On a suspicion of clot anuria, he was shifted to theatre. Cystoscopy revealed a clot of nearly 1 cm at the ureteric orifice that was dislodged and a flow of blood-mixed urinary efflux was noted (figure 1A, B). Owing to the early postoperative period and presence of haematuria, manipulation of stent or use of streptokinase injection was avoided. On observation, the patient again had clot anuria after 12 h. On repeat cystoscopy, clot occlusion of the vesicoureteric junction and stent was once more noted. On retrograde pyelography, mild contrast extravasation was noted although ultrasonography did not reveal urinoma. After stent manipulation the clot again got dislodged and diuresis started. The patient once more developed anuria after 24 h. To avoid anastomotic disruption, the native stent was neither manipulated nor was another stent introduction attempted. For the same reason, ureteroscopy was not performed. Because of the fear of aggravation of the mild bleeding, streptokinase injection was not given. Rather, an innovative idea of using a double guide-wire technique was considered. In this novel technical-concept, we first passed a 22 Fr/30° cystoscope into the bladder under local anaesthesia. Through the working channel of the cystoscope sheath, we passed a 5 Fr open-end ureteric catheter across the right vesicoureteric junction into the distal ureter. Through the lumen of the ureteric catheter, a 0.032-inch diameter, straight-end nitinol guide wire with hydrophilic coating was passed up to the renal pelvis. The procedure was again repeated with another guide wire. Positions were confirmed using fluoroscopy. Both the guide wires were secured with a preurethral Foley catheter with the help of silk suture (figure 1C). The patient was

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Figure 1 (A) On cystoscopy, haematuria evident from right ureteric orifice with DJ stent in situ. (B) Dislodged clot. (C) Double guide wires exiting from meatus and secured over Foley catheter.

kept on intravenous hydration with diuretics maintaining a urine output of 100–200 mL/h.

OUTCOME AND FOLLOW-UP

The patient's serum creatine levels gradually normalised and his haematuria settled down. After 1 week, the guide wires were

Figure 2 (A) On fluoroscopy, both guide wires were seen coiling in the right renal pelvis along with DJ stent in situ. (B) Illustration of how the guide wires along with DJ stent create crevices along the ureteric lumen and thus help in drainage of urine.

removed successively under fluoroscopic control. In the follow-up after 3 weeks, the patient was well with serum creatinine of 0.8 mg/dL.

DISCUSSION

Laparoscopic dismembered pyeloplasty is a safe and effective procedure with a reported success rate of around 95%.¹ Surgical repair of ureteropelvic junction obstruction in adults with solitary kidney has shown to result in symptomatic and renal functional improvement.² Surgical techniques have evolved from conventional open pyeloplasty to laparoscopic multiport, to laparoendoscopic single-site and robotic pyeloplasty. Kavoussi and Peters³ performed the first laparoscopic dismembered pyeloplasty in 1993. In an international multi-institutional review, LESS-P (Laparoendoscopic Single-Site Pyeloplasty) was found to have comparable results with conventional multiport laparoscopic surgery.⁴ Clots in the pelvicalyceal system or ureter can result from instrumentation, trauma or coagulopathy.^{5 6} Clot anuria following laparoscopic pyeloplasty in the setting of a solitary functioning kidney is a rare complication seldom reported in the literature. The literature regarding management of anuria due to nephroureteric clots is also sparse.

Minimally invasive techniques such as streptokinase injection,⁷ percutaneous nephrostomy insertion, nephroureteric stent insertion/replacement⁸ or use of a rheolytic mechanical thrombectomy device⁹ have been described in various settings. Managing clot anuria in the setting of an early postoperative period following pyeloplasty is challenging, as treatment options are limited. Immediate postoperative stent manipulation/replacement is associated with fear of anastomotic disruption. As our patient had ongoing intermittent haematuria, streptokinase injection and percutaneous nephrostomy were avoided because of increased risk of haematuria. Endogenous urokinase and tissue plasminogen activator lead to spontaneous dissolution of these clots.^{10–12} As the patient had a solitary functioning kidney with anuria and progressive azotaemia, waiting for spontaneous dissolution of the clot seemed unreasonable. Initial attempts with minimal stent manipulation resulted in recurrent clot anuria. Tranexamic acid has been shown to effectively reduce bleeding in transurethral resection of prostate,¹³ radical retropubic prostatectomy¹⁴ and in percutaneous nephrolithotomy.¹⁵ However, using tranexamic acid in the setting of a solitary functioning kidney for management of ongoing mild haematuria led to clot anuria in this case. Kumar *et al*,¹⁵ in 2013, also had two cases with solitary kidney that had clot anuria following use of tranexamic acid to reduce bleeding in percutaneous nephrolithotomy. Both of these cases were managed by stent replacement, as there was no issue of anastomotic disruption. This highlights the fact that tranexamic acid should be avoided in the management of haematuria in cases with a solitary functioning kidney in which reconstructive surgery has been recently performed. Finally, an innovative double guide wire technique was used. In this, with the help of a 22 Fr/30° cystoscope, we passed a 5 Fr, open-end ureteric catheter across the vesicoureteric junction into the distal ureter. We passed a 0.032-inch diameter hydrophilic nitinol guide wire through the ureteric catheter alongside the stent already present. The procedure was repeated

for another guide wire. Ultimately, the ureter had one 6 Fr DJ-stent and a pair of guide wires. Position in renal pelvis was confirmed fluoroscopically. The guide wires along with stent are expected to result in formation of multiple crevices along the ureteric lumen resulting in drainage of urine despite the blocked nephroureteric stent (figure 2A, B). Maintaining diuresis prevented further clot formation. The double guide wire technique is an innovative concept utilising routine endoscopic instruments for effectively managing this rare scenario of recurrent clot anuria following laparoscopic pyeloplasty in a solitary functioning kidney and has not, to the best of our knowledge, been described previously in the literature. This technique helped to manage uraemia due to recurrent anuria in the early postoperative period with minimal morbidity and helped to circumvent the need for dialysis, the risks of anastomotic disruption associated with stent replacement and increased haemorrhage in case thrombolytic therapy had been planned for the clots.

Competing interests None.

Patient consent Obtained.

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Learning points

- ▶ Clot anuria following laparoscopic dismembered pyeloplasty is a rare complication.
- ▶ Treatment options in cases of solitary kidney are limited because of early postoperative period with delicate anastomosis and progressive azotaemia.
- ▶ Tranexamic acid should be avoided in cases of solitary kidney to control intermittent haematuria not leading to haemodynamic instability or fall of haematocrit, as clot anuria can occur.
- ▶ Double guide wire technique alongside the nephroureteric stent effectively helped to overcome the problem without fear of disrupting anastomosis or increasing risk of haematuria and helped to circumvent the need for dialysis.

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