

## Reflex Anuria: A rare cause of acute renal failure

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### Abstract

#### *Presentation*

We present a case of reflex anuria (RA) following preoperative bilateral ureteric stenting (PUS) with total abdominal hysterectomy and bilateral salpingoophorectomy (TAH/BSO) for a large leiomyoma.

#### *Diagnosis*

Postoperatively, she developed anuria/ acute renal failure (ARF).

#### *Treatment*

Therapeutic ureteric re-stenting was considered whilst being managed conservatively. However, urine output started to improve spontaneously, eventually resolving ARF.

#### *Discussion*

A retrospective review of 25 patients who underwent PUS prior to gynaecological surgery was performed. Only one (4%) developed RA. PUS helps in early identification of ureteric injuries but can cause complications like RA, urinary tract infections, haematuria. RA has been reported to resolve spontaneously with conservative management and or by placing therapeutic ureteric stents.

A high index of suspicion of RA as a cause of ARF following PUS is important to prevent morbidity.

### Introduction

Rate of acute complication following ureteral catheter placement is 12%<sup>2</sup>. Reflex anuria (RA) is a rarely reported cause of postoperative anuria. Most cases of reflex anuria occurred after surgical interventions. Preoperative ureteric stenting (PUS) in gynaecological surgeries has

gained familiarity but it is not devoid of complications. Gynaecologist might be unaware of this rare entity.

### **Case Report**

A 51-years old, presented with abdominal pain and heavy menstrual bleeding. Examination showed 24 weeks sized uterus. MRI revealed a large fibroid (Figure 1).

She underwent Total Abdominal Hysterectomy and bilateral salpingo-oophorectomy (TAH/BSO )with PUS. Stents were removed at conclusion of procedure.

On postoperative day 1, haematuria was seen with normal urine output. IV antibiotics were commenced for an isolated spike of pyrexia.

On day 2, patient developed oliguria with significant rise in Renal function tests (RFTs) (Figure 2). There were no signs of improvement despite fluid resuscitation. Patient was hemodynamically stable. After extensive evaluation by urologist, no organic cause was found. USG revealed normal kidneys and bladder. Later on she developed frank haematuria and anuria for 12 hours. Therapeutic ureteric stenting was being considered to prompt diuresis if no clinical improvement was seen.

However, on day 3 urine output started to improve. She passed 2L of urine on day 4, eventually self-resolving renal failure. She was discharged home on day 5.

### **Discussion**

RA is often missed when considering possible causes of ARF in postoperative patients. A retrospective review was conducted to evaluate the procedure related risks with preoperative ureteric stenting in complex gynaecological surgeries in one institution for a period of 7 years. 25 patients were included . 1/25(4%) developed RA. 8 patients (32%) had postoperative hematuria, 4 patients(16%) got pyrexia while 1 patient(4%) had confirmed urosepsis. A literature review for ARF post gynaecological procedures revealed few cases of stent induced anuria, a term called as Reflex Anuria. It was defined by Hull in 1980 as 'cessation of urine output from both kidneys in response to irritation or trauma to one kidney or its ureter<sup>3</sup>. The pathogenesis of RA is still unclear. Two mechanisms have gained acceptance. One is neuromuscular, which can be secondary to renorenal or uretorenal reflex. In renorenal reflex, renal parenchymal injury leads to reflex renal arteriolar vasoconstriction<sup>4</sup>. In uretorenal reflex, ureteral manipulation stimulates sensory fibres causing renal arteriolar vasoconstriction<sup>5</sup>. The other mechanism suggests ureteric oedema causing obstruction and anuria. This theory explains how re-stenting bypasses the oedema and restores renal function<sup>1</sup>. RA is a diagnosis of exclusion. In our patient pre-renal and renal causes were excluded with no obvious signs of hypovolemia, heart failure and sepsis. Absence of urinary

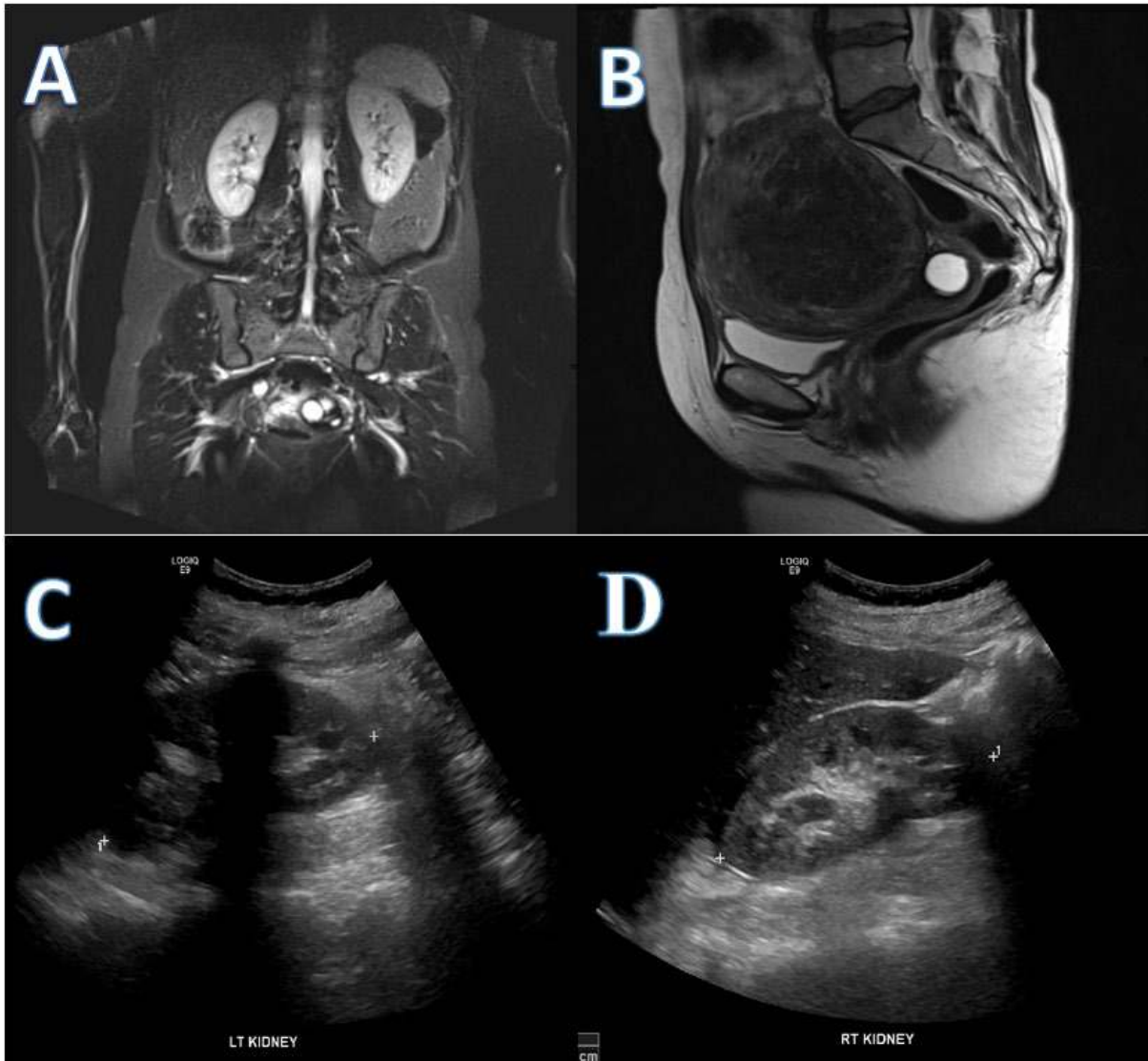
cast and protein made glomerular pathology unlikely. She received one dose of gentamicin and diclofenac that was immediately withheld. Imaging revealed normal kidneys and bladder precluding anatomical causes. Therefore, the diagnosis of RA was made.

Preventing long term renal impairment with RA requires early diagnosis and management. Avoiding unnecessary ureteral manipulation and selective use of stents can reduce the risk of RA as stenting itself increases the risk of complications. All patients undergoing pelvic surgery, should be monitored for urine output. If any reduction is observed, RFTs should be checked along with fluid challenge and review for nephrotoxic drugs. Early Nephrology input is recommended. When no obvious cause is suspected, diagnosis of RA should be considered. Management of RA involves maintaining blood pressure, electrolyte/fluid balance and haemodialysis. Ureteric stenting has shown to be effective in the prompt recovery of renal function and should be considered alongside other supportive measure, especially when there is evidence of hydronephrosis<sup>6</sup>. There is some role of bilateral nephrostomies for patients with RA associated with hydronephrosis<sup>7</sup>.

One way to reduce the possibility of RA is to use staged removal of stents over a 24-hour period or longer<sup>1</sup>.

Bothwell used staged removal of stents over 24 h (i.e., removal of the right stent immediately post-operatively and the left stent 24 h later) and reported no cases of anuria<sup>8</sup>. Leaving the stent in for longer may reduce complications but might require a longer stay or readmission for stent removal increasing cost and patient's inconvenience<sup>1</sup>. Therefore, the timing of stent removal should be made on a case-by-case basis.

In conclusion, RA should be considered as a differential when dealing with cases of postoperative oliguria/anuria after pelvic surgery with or without ureteric instrumentation. It should be considered once all other causes of ARF are excluded. We propose that the use of ureteric stents should be confined to limited cases only and not to be used routinely due to stent related rare postoperative complications like RA and patient should be informed regarding these risks while discussing surgical complications in preoperative counselling.



*Figure 1: Preoperative MRI Pelvis showing Normal Kidneys and Bladder (A), large posterior wall fibroid uterus measuring 9.3/8.5/8.1 cm (B), Postoperative USG showing normal left and right kidneys(C,D)*

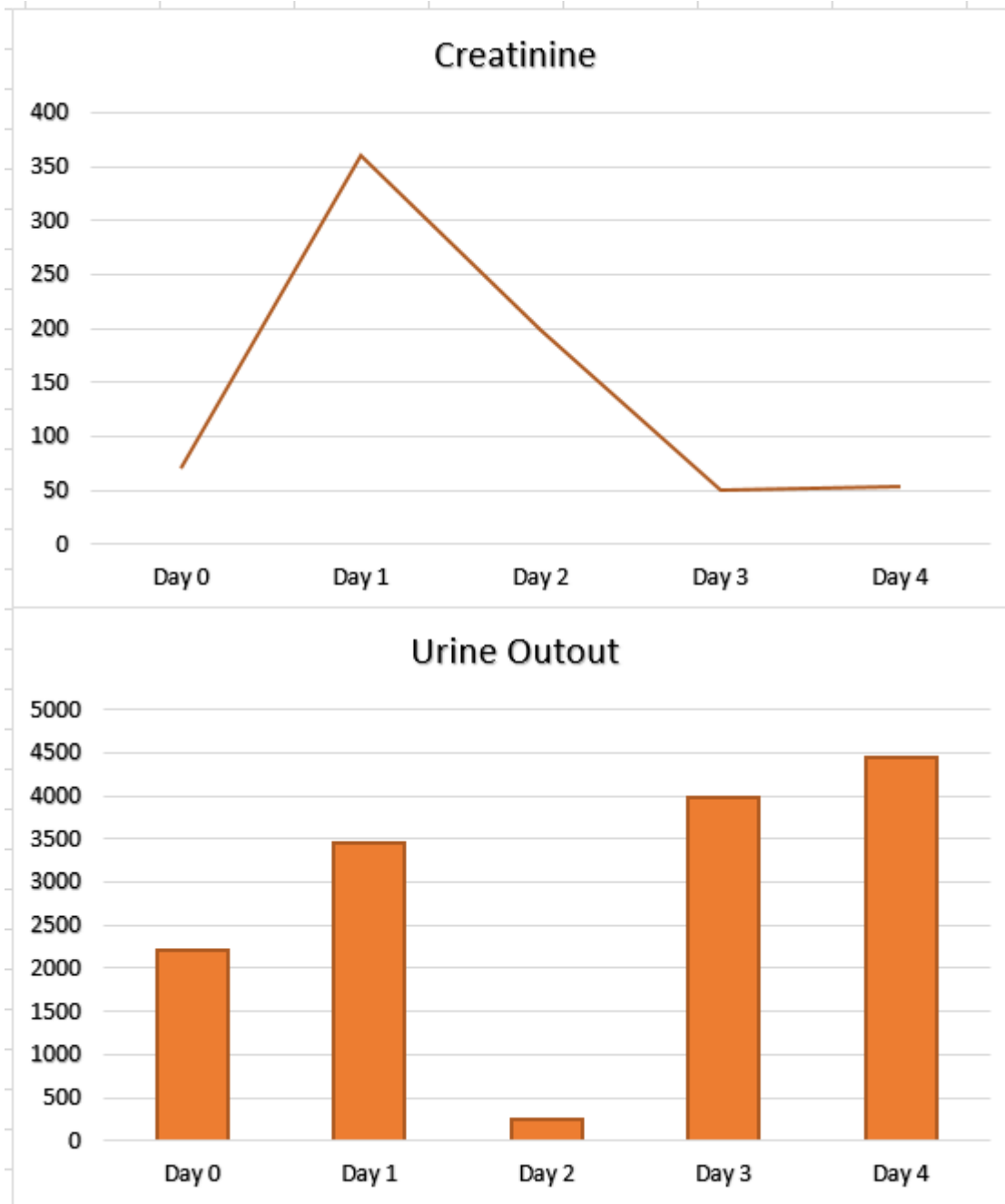


Figure 2: Urine Output and Serum Creatinine during hospitalization

**Declarations of conflicts of interest:**

None declared.

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