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Solitary kidney functional damage due to caesarean ureteric injury monitored for 2 years after acute management: A case report

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ABSTRACT

Caesarean section with associated ureteric injuries that damage kidney function is uncommon. Such injury in women with a solitary kidney has far-reaching effects if the diagnosis is delayed. The case report describes the successful acute management with stenting of ureteric damage after caesarean section in a woman with a solitary kidney.

A 29-year-old woman presented with anuria, hypertension (174/101 mmHg) and flank pain 3 days after caesarean section. Physical examination was significant for peri-orbital oedema, left flank tenderness, pallor and delirium. A diagnosis of acute kidney injury was confirmed by elevated blood urea and creatinine levels. An ultrasound scan revealed a solitary hydronephrotic left kidney. She had successful acute management at a resource-deprived facility, with normal renal function at a 2-year follow-up. Proteinuria lasted for about three months after surgery.

Recovery of solitary kidney function with acute kidney injury due to caesarean section ureteric injury may be associated with prolonged proteinuria without evidence of further functional deterioration.

1. Introduction

Solitary kidney damage following an iatrogenic ureteric injury (IUI), although extremely rare, can have far-reaching consequences and be life threatening if diagnosed late [1,2]. Over 70% of ureteric injuries (UIs) are diagnosed late [2]. Lack of clear management guidelines and lack of facilities in low-resource settings are further challenges to successful management. The presence of a solitary kidney is independently associated with an increased risk of chronic kidney disease (CKD) after unilateral nephrectomy or congenital renal agenesis [3]. Thus acute kidney injury following caesarean section (CS) ureteric injury in women with a solitary kidney is a serious complication in obstetric practice. The reported increased incidence of CS ureteric injuries in parts of sub-Saharan Africa and the high cost of treatment after delayed diagnosis [4–6] make reporting these cases important.

2. Case Presentation

A healthy 29-year-old woman, gravida 4, para 3, with 1 previous CS, presented for antenatal care at 13 weeks of gestation at a peripheral health facility. Her booking laboratory test results and obstetric ultrasound scan were reported as normal. The pregnancy progressed uneventfully. A term obstetric ultrasound scan documented an estimated fetal weight (EFW) of 3.6 kg.

The patient went into spontaneous labour, for which she was admitted. Full blood count (FBC), blood urea, electrolytes, and creatinine (BUE & Cr) test indices were normal. The labour lasted over 16 h without significant progress. A caesarean section was therefore performed and a live, normal male child with a birthweight of 4.1 kg was delivered. Lower uterine segment adhesions were noted, and estimated blood loss was 800mls. Post-operatively, she was anuric and remained so for over 48 h despite a 5 L intravenous infusion (3 L crystalloids, 2 L blood) and administration of 260 mg of intravenous frusemide. She

Abbreviations: IUI, Iatrogenic Ureteric Injury; UI, Ureteric Injury; CKD, Chronic Kidney Disease; CS, Caesarean Section; EFW, Estimated Fetal Weight.; FBC, Full Blood Count; BUE & Cr, Blood Urea, Electrolytes & Creatinine; URA, Unilateral Renal Agenesis; VBAC, Vaginal Delivery After Caesarean.

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complained of left flank pain and intermittent breathlessness, necessitating her referral to a tertiary centre.

On admission she was pale, febrile (temperature 38.3 °C), and had peri-orbital and bilateral pitting pedal oedema. The pulse rate was 110 beats/min, blood pressure 170/101 mmHg, and respiratory rate 31 cycles/min. She had coarse bi-basal crepitations, and SPO2–90% on atmospheric air. The CS wound dressing was clean and dry. The uterine size was about 22 weeks and well contracted. The abdomen had signs of peritonism, tender with rebound tenderness. The urine bag contained less than 50mls of straw-coloured urine. Speculum examination revealed no urine leakage per vaginum.

The initial investigations revealed a haemoglobin of 6.7 g/dL, white blood cell count18.2 × 103/ml, platelets 224 × 103/ml, urea 16.1 mmol/L, creatinine 367 umol/L, with negative hepatitis B, C, and retroviral screening tests. An ultrasound scan showed a hydronephrotic left kidney. The right kidney was not visualised (Fig. 1). A diagnosis of obstructive uropathy of a solitary kidney due to CS ureteric injury and intraabdominal sepsis was made.

Preoperative resuscitation included intra-nasal oxygen, intravenous fluids (150mls/h over 3 h), metronidazole, ceftriaxone, and paracetamol. The lung bases were frequently auscultated to detect any worsening bi-basal crepitations. No pre-operative dialysis was instituted though it was available. She was counseled for exploratory laparotomy to which both written and verbal informed consent were obtained.

The procedure was done within 3 h of admission under general anaesthesia with endotracheal intubation. The findings at laparotomy were a dilated left ureter with kinking at the distal third near a traction suture in the parametrium. The left kidney was palpable. The right kidney was absent. There was a right ureteric stump that had an intraluminal mass at the distal part (Fig. 2) and ended blindly with no right ureteric orifice in the bladder (Fig. 3). There was minimal intra-abdominal fluid.

Release of the traction suture, cystostomy, J-J stent placement, and right ureterectomy was done.

Intraoperatively, she had intravenous fluids infused at 375 ml/h over 4 h and a 1 L whole-blood transfusion. Her urine production improved after the ureteric obstruction was relieved.

The immediate post-operative treatment included intravenous fluids, antibiotics, and analgesia. She had another 1 L blood transfusion at 48 h and was continued on oral antibiotics for 5 days. Her blood pressure and temperature normalised. Renal function improved within 2 weeks and she was discharged.

She continued with a scheduled follow-up that included monitoring renal function over 2 years. (Table 1). Renal function remained normal at 2 years of follow up.

3. Discussion

Adults living with undiagnosed solitary kidney are rare. Unilateral renal agenesis (URA), nephrectomy for disease control, and kidney donation are the common reasons why adults have a solitary kidney. With an estimated incidence of about 1 in 2000, renal agenesis is the commonest cause, with males being more affected [7]. The diagnosis of URA using ultrasound scan requires expertise and equipment which may be lacking in low-resource settings.

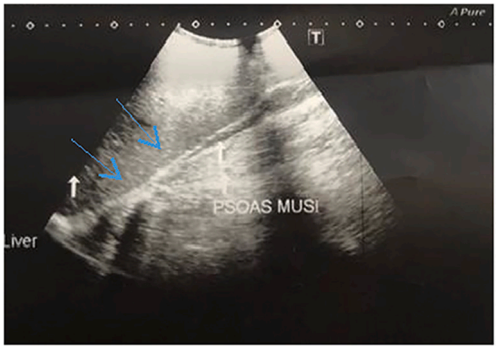

Fig. 1. CDU showing liver, psoas muscle and absent right kidney.

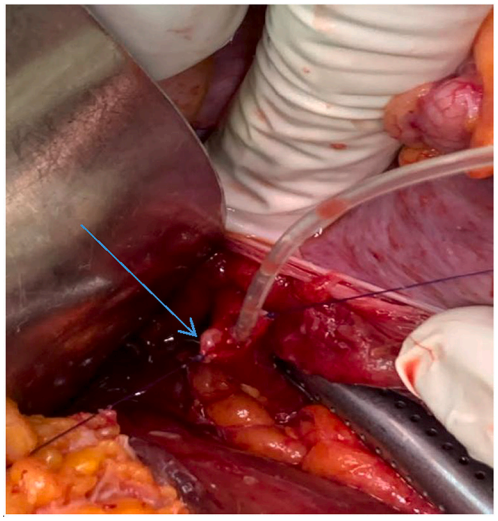

Fig. 2. Distal 3rd right ureterostomy exposing a solid mass (benign by histopathology) and flexible feeding tube insertion to localise ureteric orifice.

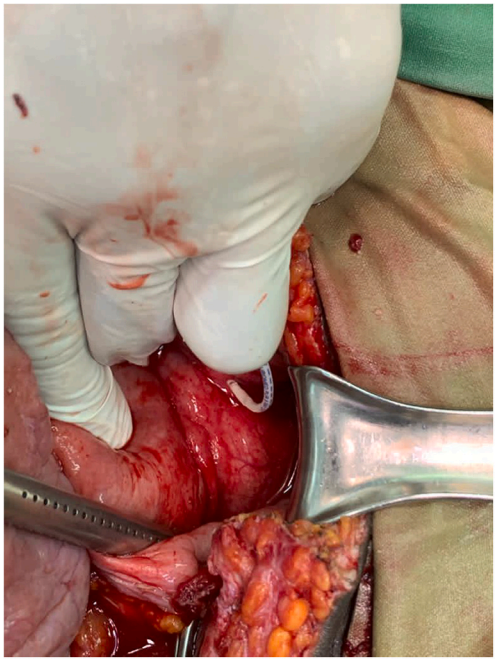

Fig. 3. Cystostomy with left double pig-tail stenting of left ureter after release of suture and absent right ureteric orifice at the bladder trigone.

Vaginal delivery after caesarean section (VBAC) frequently fails when the birthweight is >3.5 kg [8]. The EFW, which was 3.6 kg, was, therefore, an indication for a planned CS. The decision that led to attempted VBAC was probably drawn from practices in isolated centres where ultrasound EFW >3.5 kg is accepted for trial of labour after caesarean section [9,10]. As the actual birthweight was 4.1 kg we suggest that specialist ultrasound training should be encouraged in low-resource settings to improve obstetric care.

During caesarean delivery, urine output of 0.5 ml/kg/h or greater is expected following a crystalloid infusion rate of 250mls/h for patients

Table 1
Presentation and follow-up parameters.

Parameter	Presentation	Discharge	3 months	6 months	12 months	18 months	24 months
Blood pressure(mmHg)	170/101	132/84	138/88	112/78	126/82	118/80	125/86
Urea(mmol/L)	16.1	7.2	5.4	6.1	5.8	4.3	4.8
Creatinine/umols/L	367	144	98	111.2	117.6	108	94.2
Proteinuria	N/A	++	+	nil	nil	nil	nil
Leucocytosis	N/A	nil	nil	++	nil	nil	+

References value: urea [2.1–7.1], creatinine[45.0–115.0].

with stable vital signs peri-operatively. The infusion of 3 L of crystalloid and 2 L of blood, which failed to produce urine despite 260 mg frusemide administration, at the primary facility was a departure from the standard management. Such clinical progression was sufficient to trigger early recognition and referral of a possible ureteric injury. Anuria and left flank pains were consistent with iatrogenic ureteric ligation and were further suggestive of unilateral involvement [2].

Most caesarean ureteric injuries occur at the distal third segment due to haemostatic suture placement in an extended uterine incision to control bleeding within the broad ligament [11–13]. Previous caesarean section scar and adhesions made dissection difficult in this case [2]. Recovery was characterised by transient proteinuria during the follow-up period (Table 1). We initially believed this proteinuria was an early sign of a possible progression of renal impairment since the pregnancy period urinalysis was normal. It resolved within three months, however. Even though renal function was normal after 2 years, there are still concerns about development of CKD in the future.

4. Conclusion

Anuria with unilateral flank pain after CS should alert health care practitioners to the possibility of ureteric injury. Recovery of solitary kidney function due acute CS ureteric injury may be associated with prolonged proteinuria without evidence of further functional deterioration.

Contributors

Mahamudu Ayamba Ali contributed to patient management and data collection, and drafted and edited the manuscript.

Mawuenyo Attawa Oyortey contributed to patient management and data collection, and edited the manuscript.

Raymond Saa-Eru Maalman contributed to the literature review and drafted the manuscript.

Yaw Otchere Donkor contributed to the literature review and drafted the manuscript.

Kekeli Kodjo Adanu contributed to patient management and data collection, and edited the manuscript.

Mathew Yamoah Kyei helped shape the concept, and contributed to manuscript review.

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Patient consent

The patient consented to the publication of the report and any accompanying images. Ethical approval from the research and ethics committee of the Ho Teaching Hospital with reference HTHREC (15) FC-2022 was granted.

Provenance and peer review

This article was not commissioned and was peer reviewed.

Declaration of Competing Interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

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