



Penetrating trauma to the kidney and Meckel's Diverticulum in a patient with unilateral renal agenesis

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ABSTRACT

INTRODUCTION: Emergency laparotomy for abdominal gunshot wounds is frequently performed in South Africa and remains associated with significant morbidity and mortality. The occurrence of congenital anomalies during surgery is an unexpected finding and presents a major challenge.

PRESENTATION OF CASE: The successful management of a haemodynamically unstable 26-year-old man with unilateral renal agenesis, concomitant right renal and hepatic injuries, and a transected Meckel's Diverticulum following an abdominal gunshot wound is presented.

DISCUSSION: Intraoperative decision-making is difficult when congenital visceral anomalies form part of the injury complex in trauma. Basic principles of damage control surgery that include initial exploration, secondary resuscitation and definite operation must be adhered to. Repair of complex injuries are delayed until the definitive laparotomy. The presence of one congenital anomaly should alert the surgeon to the possibility of further anomalies.

CONCLUSION: Although congenital visceral anomalies are spectacular findings at laparotomy, they should not distract the trauma surgeon. Adhering to damage control surgery principles and careful inspection of the peritoneal cavity for further abnormalities remain the mainstay of successful management.

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1. Background

South Africa has one of the most violent societies in the world. The estimated national homicide rate is 30.9 per 100 000 population, 4.5 times the global average. The South African Mortality Surveillance System registered 33 484 injury-related deaths in 2007, with more than a third resulting from acts of violence [1]. This burden of violence has placed strain on a healthcare system that is already facing budgetary and workforce-related challenges.

The Groote Schuur Hospital (GSH) Trauma Centre is a large academic referral centre and sees an average of 10 000 patients annually. Penetrating injuries account for 26% of all the Trauma Centre visits; 1933 patients with stab wounds and 442 gunshot cases will comprise this cohort [2].

Emergency laparotomy for abdominal gunshots forms a significant part of the trauma surgeon's operative log of at our institution. A recent study showed that over a 5½ period, 834 laparotomies were performed for abdominal gunshots at the GSH Trauma Centre

[3]. Whilst solid organ and hollow viscous injuries are frequently seen, findings of congenital visceral anomalies at laparotomy are rare and can complicate surgical therapy.

2. Presentation of case

A 26-year-old man presented to the trauma centre following a gunshot wound to the abdomen. There was hemodynamic instability, signs of peritonism and macroscopic haematuria. A single shot Lodox® Intravenous Pyelogram (IVP) showed no contrast uptake in the left kidney (Fig. 1). Emergency laparotomy revealed Grade III liver and right renal injuries with active bleeding from both solid organs; a hole in a Meckel's Diverticulum was also noted (Fig. 2A and B). Careful intraoperative inspection of the abdomen and pelvis confirmed an absent left kidney (Fig. 3). The liver was packed and Gerota's fascia of the right kidney opened; a venous bleeder within the fascia was identified and ligated. The Meckel's Diverticulum was resected and the small bowel segment primarily anastomosed. The liver packs were left in situ and the patient ventilated with temporary abdominal closure in the Intensive Care Unit for 48 h. Subsequent removal of the liver packs was uneventful and on abdominal closure, the right kidney and liver were drained via a closed suction drainage system. The patient was discharged

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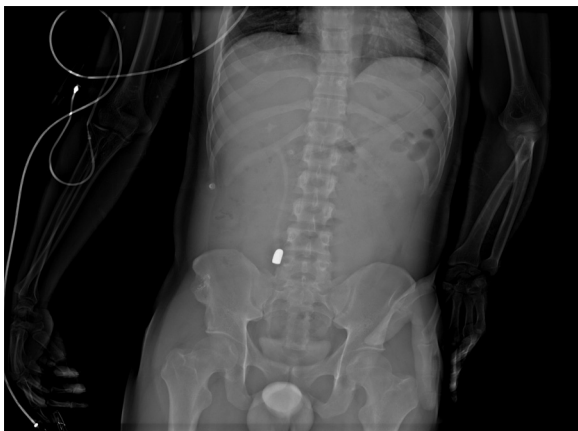


Fig. 1. Single shot Intravenous Pyelogram on Lodox® demonstrating absence of left kidney.

uneventfully five days post admission. Clinical examination and renal function were unremarkable at a 30-day follow up.

3. Discussion

Findings of congenital anomalies during the emergency laparotomy are extremely rare, and present diagnostic and therapeutic challenges. Extensive pre-operative investigations such as computed tomography of the abdomen are limited by haemodynamic instability. Damage control resuscitation and careful inspection of the peritoneal cavity for further congenital abnormalities therefore remains the mainstay of treatment.

This reported case illustrates that a certain degree of surgical planning is feasible even in the in extremis injured patient with a most unusual combination of congenital abnormalities. The value of a single shot IVP to demonstrate an uninjured contralateral kidney in the haemodynamically unstable patient with macroscopic haematuria cannot be stressed enough. Renal preservation strategies should be adopted in the patient with a solitary kidney [4].

The basic principles of damage control surgery that include initial exploration, secondary resuscitation and definite operation

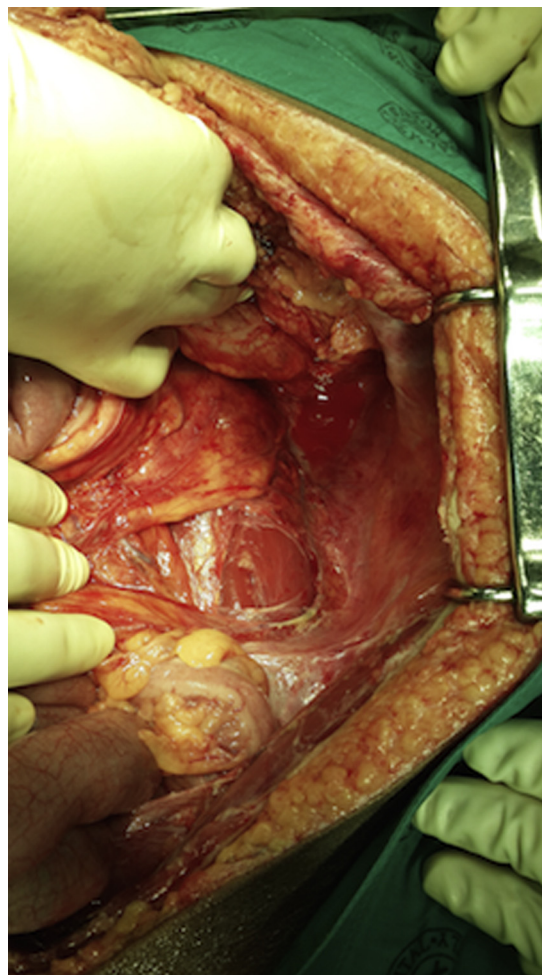


Fig. 3. Left renal agenesis with absent kidney in left renal fossa.

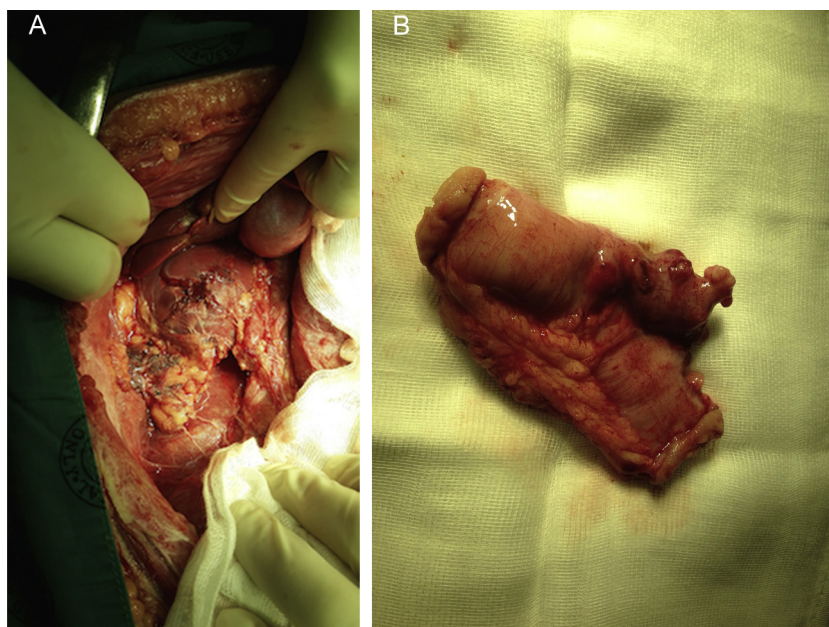


Fig. 2. (A) Grade III right renal injury. (B) Resected small bowel segment with a hole in the Meckel's Diverticulum.

have also been adhered to. Simple injuries were addressed via rapid ligation and simple repair, while liver packing rather than complex hepatic homeostatic manoeuvres was used for the liver injury.

Finally, careful inspection of the peritoneal cavity completes the management of these patients. A suspected congenital abnormality detected during any pre-operative investigation should be confirmed intraoperatively and further abnormalities should always be sought for.

4. Conclusion

Congenital anomalies are unexpected findings in the setting of penetrating abdominal trauma. Haemodynamic status and the injury complex direct surgical planning and decision-making.

Conflict of interest

No conflict of interest to be declared.

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Author contribution

S.S., R.S., P.N.: writing of the manuscript.
S.S.: intraoperative pictures and design of study.

S.E., A.N., D.K.: proof reading and preparation of figures.
S.S., P.N.: study design and proofreading.

Consent

Not required; the patient's assessment, investigations and management were all part of standard clinical procedures at the Trauma Centre of Groote Schuur Hospital, Cape Town, South Africa. All data is completely anonymous.

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