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CASE REPORT: NON OPERATIVE MANAGEMENT OF A 40-YEAR-OLD WOMAN WITH GRADE IV RENAL TRAUMA AND ACUTE KIDNEY FAILURE POST EXPLORATIONAL LAPAROTOMI IN GRADE IV HEPAR LACERATION

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Background: In cases of abdominal injuries, one of the crucial organs is the kidney. The mechanism of renal trauma is induced by blunt and sharp trauma. Blunt trauma and renal trauma might occur in 63% of car accidents. According to the American Association for the Surgery of Trauma (AAST), management of renal trauma includes of conservative, minimally invasive techniques, and surgery, depending on the symptoms and degree of renal trauma. Priority management of grade IV-V renal trauma cases that are hemodynamically stable and can be managed non-operatively/conservatively. The purpose of this case report is to provide a case of abdominal trauma in a 40-year-old female patient suffering from hemodynamic instability as a result of a car accident. The patient reported stomach and chest pain, but no hematuria or hypotension. The patient suffered from intra-abdominal hemorrhage and required five bags of whole blood transfusions. AAST grade IV renal laceration and grade IV liver laceration were discovered during an abdominal CT scan. Non-operative treatment of renal trauma was used, whereas exploratory perihepatic packing laparotomy was used to treat hepatic lacerations. After an exploratory laparotomy, the patient had hemodynamic instability, which was accompanied by acute kidney failure consequences. Blunt trauma is a common cause of kidney trauma. Non-operative/conservative care of grade IV-V renal trauma with stable hemodynamics is the priority. If there are absolute and relative indications, minimally invasive techniques and surgery can be undertaken.

Keywords: Abdominal trauma; Kidney trauma; Acute kidney failure

INTRODUCTION

The kidney is a crucial organ that is frequently injured in cases of abdominal trauma. Renal trauma occurs in 80-95% of other trauma cases and is rarely identified as trauma to the kidney alone. The mechanism of kidney trauma is caused by 71-95% blunt trauma and the remainder by sharp trauma. Blunt trauma is most commonly caused by motor vehicle accidents (63%), falls from great heights (43%), sports injuries (11%), and other causes. Clinically, kidney trauma is preceded by the presence of hematuria, either gross or microscopic, and/or hypotension, while some cases do not have hematuria. According to the American Association for the Surgery of Trauma (AAST), a contrast abdomen CT scan is required to identify the degree of kidney trauma and can be accompanied by reimaging for evaluation if there is clinical deterioration. Depending on the clinical condition and severity of the renal damage, conservative, minimally invasive techniques and surgery are used to treat it. In this case report, we will look at the case of a 40-year-old lady who had exploratory laparotomy for hepatic lacerations and developed grade IV renal damage and acute kidney failure.

CASE REPORT

Mrs. M, a 40-year-old woman presented to

the emergency room with complaints of stomach pain to the chest accompanied by headaches after being involved in a traffic collision for about 3 hours prior to hospitalization. Fainting (+), nausea (+), vomiting (-), convulsions (-), weakness of limbs (-), nose bleeds (-), active bleeding (-). The patient had no history of hypertension or diabetes, as well as no previous urinary tract or other surgical procedures.

The patient's injury mechanism is that she was allegedly hit by a car from the right side while riding a motorcycle and thrown 10 meters from the vehicle. The patient is still wearing a helmet. Shortly after the occurrence, the patient fainted and was transported to the nearest hospital's emergency room by the witness.

Physical examination revealed the general state of compos mentis, GCS E4 V5 M6. Blood pressure 107/89 mmHg, pulse 111 x/m, temperature 36 C (axilla), respiratory rate 24x/m, oxygen saturation 98%. Examination of airway and c spine controlled: clear, Breathing: spontaneous, Respiratory rate 24x/m, Circulation: active bleeding (-), GCS 15.

Exposure :

• Thorax:

Look: symmetric, retraction (-), lesion (-)

Feel: tenderness (+), crepitus (-)

• Abdomen:

Look: lesion (-)

Feel: epigastric tenderness (+)

• Cranium:

Look: 0.1x0.1cm vulnus laceratum et regio maxila dextra, edema periorbita dextra

Feel: crepitus (-)

A general examination revealed anemic conjunctiva +/+, no wheezing crackles, normal bowel sounds, epigastric tenderness, and no leg edema. Urological examination of dark yellow urine following placement of the 18Fr foley catheter.

Radiological investigations contrast abdominal CT scan on the fourth day of hospitalization found:

- Hypodense lesion in the right lobe of the liver (uk. AP 9.8 x LL 8.3 x CC 9.9 cm) → laceration (liver injury) grade IV AAST
- Hypodense lesion in the cortex of the right kidney (5.8 cm in size) → grade IV AAST suspected renal laceration
- hypodense lesions are lobulated with regular margins (AP measures 11.8 x LL 7.3 cm x 8.5 cm) in the pelvic cavity appears to be attached to the structure of the large bowel and uterus → suspected ovarian cyst
- Ascites

The laboratory examination revealed the following results :

29th July 2022 12.09		
Hemoglobin	10,9 g/dL	13.0 -17.0 g/dL
Hematocrit	33,5 %	40-54 %
Leukocytes	36.690 /mm3	4.000-11.000 /mm3
Platelets	428.000 /mm3	150.000-450.000/mm3
Erythrocyte	4.19 million/uL	4,4-6,0 million/uL
29 Juli 2022		
Glucose	154 mg/dL	75-200 mg/dL
Urea	22.8 mg/dL	10-50 mg/dL
Creatinine	1.27 mg/dL	0,6-1,4 mg/dL

29th July 2022 20.17		
Haemoglobin	9.0 g/dL	13.0 -17.0 g/dL
Hematocrit	27 %	40-54 %
Leucosit	14.840 /mm3	4.000-11.000 /mm3
Trombosit	238.000 /mm3	150.000-450.000/mm3
Eritrosit	3.45 million/uL	4,4-6,0 million/uL
29th July 2022 20.17		
HbsAg	negative	Negative
HIV	nonreactive	nonreactive

30th July 2022 09.02		
Hemoglobin	7.5 g/dL	13.0 -17.0 g/dL
Hematocrit	22.7 %	40-54 %
Leukocytes	11.320 /mm3	4.000-11.000 /mm3
Platelets	188.000 /mm3	150.000-450.000/mm3
Erythrocyte	2.92 million/uL	4,4-6,0 million/uL

1st August 2022 09.24		
Hemoglobin	8.9 g/dL	13.0 -17.0 g/dL
Hematocrit	27.2 %	40-54 %
Leukocytes	13.960 /mm3	4.000-11.000 /mm3
Platelets	166.000 /mm3	150.000-450.000/mm3
Erythrocyte	3.34 million/uL	4,4-6,0 million/uL
1st August 2022 07.48		
SGOT	342 U/L	< 32 U/L
SGPT	780.1 U/L	< 32 U/L
PPT	18.5 seconds	12-19 seconds
APTT	27.1 seconds	27-42 seconds

2nd Agustus 2022 10.01		
Haemoglobin	12.0 g/dL	13.0 -17.0 g/dL
Hematocrit	27.2 %	40-54 %
Leucosit	13.960 /mm3	4.000-11.000 /mm3
Trombosit	166.000 /mm3	150.000-450.000/mm3
Eritrosit	3.34 million/uL	4,4-6,0 million/uL
3rd August 2022 08.18		
Urea	79.5 mg/dL	10-50 mg/dL
Creatinine	4.63 mg/dL	0,6-1,4 mg/dL

On the second and third days of hospitalization, 5 bags of whole blood transfusions were administered. On the third day of hospitalization, perihepatic packing was performed on grade IV hepatic lacerations, 300cc of peritoneal fluid mixed with blood was discovered, and drainage was performed. Non-operative management is also used in kidney trauma, including clinical monitoring, hemodynamics, laboratory evaluation, and re-imaging. The patient's general condition deteriorated on the second day following exploratory laparotomy, and complications developed. The patient was hospitalized to the Intensive Care Unit (ICU) with hypovolemic shock and was found to have renal

insufficiency, with urine output of <0.3 cc/kgBB/hour for 24 hours and an increase in serum creatinine of 3.6x after 5 days of hospitalization. According to the RIFLE category, this patient had problems from acute kidney failure. The patient was scheduled for hemodialysis, but his condition deteriorated and she passed away.

Based on the anamnesis, physical examination, supporting examinations, and post-exploratory laparotomy, the working diagnosis in this case was hypovolemic shock after exploratory laparotomy e.c grade IV liver laceration accompanied by grade IV kidney trauma e.c blunt abdominal trauma + acute kidney failure.

DISCUSSIONS

The kidney is a relatively safe retroperitoneal organ, however it is one of the geniuireteral organs most commonly injured in trauma. In 80-95% of cases, renal trauma occurs together with other injuries, but it can also occur as an isolated injury. Kidney trauma can be caused by both blunt and sharp trauma. The majority are the result of blunt trauma. Blunt trauma is most commonly caused by motor vehicle accidents (63%), falls from great heights (43%), sports injuries (11%), and other causes.¹

AAST is used to classify renal trauma on a scale of 1 to 5 (the mildest 1; the most severe 5). The AAST classification predicts morbidity in kidney trauma caused by blunt or sharp trauma. Furthermore, the classification defines the requirement for surgical treatment (from 0% to 93%) as well as the risk of nephrectomy (0-86%). According to the AAST classification, the number of cases is distributed as follows: 22-28% for grade I, 28-30% for grade II, 20-26% for grade III, 15-19% for grade IV, and 6-7% for grade V.¹

The treatment of kidney trauma is classified as conservative / non-operative, minimally invasive techniques, or surgery. Bed rest, vital sign monitoring, and kidney function monitoring are the non-operative treatment options for grade IV renal trauma patients.¹ In the study by van der Wilden et al, 74% of 206 patients with grade IV or V kidney injuries were followed up on with surgery (25 patients had angioembolization). Non-operative management has failed in 12 of 154 patients.² In a study conducted by Sunichiro et al. in Japan, the greater the AAST grade of renal damage, the higher the mortality rate. It is also influenced by various factors such as age > 65 years, falls from great heights, pedestrian accidents, unstable situations when arriving at the emergency room, and trauma to other regions such as the brain, gastrointestinal system, pelvis/lower extremities, liver, and spleen.

Whereas, Lanchon et al described 306 patients with renal trauma, 124 with grade IV and 27 with grade V, who had nonoperative treatment, with success in 110 patients (89%) with grade IV and 14 patients (52%) with grade V renal trauma.⁴

Classification of renal trauma according to AAST

Grade	Injury type	Description
I	Contusion	Microscopic/visible hematuria, normal kidney function
	Hematoma	Subcapsular and non-spreading injury, without parenchymal lacerations
II	Hematoma	Perirenal hematoma does not spread and is present in the retroperitoneum
	Laceration	Renal cortical laceration depth < 1.0 cm without urinary extravasation
III	Laceration	Renal cortical laceration depth > 1.0 cm without collection system rupture or urinary extravasation
IV	Laceration	Parenchymal lacerations extending to the renal cortex, medulla, and collection system
	Vascular	Renal vein or artery damage with bleeding that does not extend
V	Laceration	Kidney crushed / crushed
	Vascular	Renal hilum avulsion leading to loss of renal vascularity

According to the most recent scientific evidence, hemodynamic instability, unresponsive cases after intensive resuscitation, and grade V lacerations are absolute determinants for exploratory surgery.¹

CONCLUSION

According to the literature, nonoperative treatment was successful in the majority of grade IV renal trauma patients. Renal trauma, along with grade IV hepatic injury (hepatic laceration) and acute kidney failure, as well as hemodynamic instability, worsened the patient's condition, and patient outcomes can swiftly deteriorate if resuscitation is not aggressive.

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