




Internal Bleeding Management in Patient with Blunt Abdominal Trauma at Rural Hospital: A Case Report of 40-Year-Old Male with Spleen Rupture

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Abstract

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BACKGROUND: Abdominal injury caused by blunt trauma is a common presentation in the emergency room. Especially in developing countries like Indonesia, the number of motor vehicle accident in public roads is still high. Eighty percentages of traumatic injury are blunt injury with the majority of deaths which are caused by hypovolemic shock.

CASE DESCRIPTION: A 43-year-old man arrived at the emergency room after motorcycle accident 2 h before. AMPLE and primary survey was conducted: clear airway, spontaneous breathing, BP 70/palpation mmHg, HR 123 times/min, and altered consciousness, in which showed the patient was undergoing hemorrhagic shock. The patient was hemodynamically stable after being given 1 L of normal saline through two intravenous lines. FAST was conducted and intraperitoneal free fluid was seen in Morison's pouch, left hemithorax, and pouch of Douglass. Chest X-ray showed fracture of ribs 7, 8, and 9 left lateral aspect with minimal hemothorax. After a supporting examination was performed, the patient's BP dropped to 60/40 mmHg, showing the patient was a "transient responder," indicating the patient should undergo laparotomy. The patient was given 500 mL colloid with a systolic target of 80–90 mmHg in accordance to permissive hypotension theory \pm 1500 mL blood was found inside the abdomen during operation, a splenic rupture grade V was the cause. In the 5th day after surgery, the patient was discharged.

CONCLUSION: Since blunt abdominal trauma could cause intraperitoneal bleeding that leads to hemorrhagic shock; therefore, immediate diagnosis is needed. Multiple trauma management at rural hospital should be concordant to ATLS and Schwartz's Principles of Surgery.

Introduction

Abdominal injury caused by blunt trauma is a common presentation in the emergency room with chief cause which is motor vehicle accident [1]. Especially in developing countries like Indonesia, the number of motor vehicle accidents in public roads is still high. Eighty percentages of traumatic injury are a blunt injury with the majority of deaths being caused by hypovolemic shock. Moreover, intraperitoneal bleeds occur in 12% of blunt trauma with liver and spleen being most commonly injured. Therefore, it is essential to identify trauma quickly [2].

Case Description

A 43-year-old man arrived at the emergency room after motorcycle accident 2 h before. Primary survey was conducted: clear airway, spontaneous breathing,

BP 70/palpation mmHg, HR 123 times/min, and altered consciousness with GCS E3V4M6. Two intravenous lines were installed simultaneously with drawing bloods for CBC and blood type. After being given 1L of normal saline, the patient BP became 80/60 mmHg with HR 104 bpm. AMPLE was asked, he confessed that he did not have any allergies, no medication that he take regularly, no past medical history, and his last meal was 5 h before accident. He also confessed that he got crushed by his motorcycle, and at that time, he was in pain especially when breathing.

Physical examination was conducted, the patient looked pale. From lung auscultation, vesicular sound could be heard, but it was decreased around left SIC V–VI. From the patient's abdominal examination, can be seen on Figure 1, it was found that there was lesion from his left chest until his left pelvic on inspection, normal bowel sounds on auscultation, and from palpation abdomen was a little rigid with rebound tenderness.

FAST and chest X-ray were conducted. FAST results came out, intraperitoneal free fluid was seen in Morison's pouch, left hemithorax, and the pouch of Douglass (Figure 2). Chest X-ray showed fracture of ribs 7, 8, and 9 left lateral aspect with minimal hemothorax (Figure 3).

After a supporting examination was performed, the patient's BP dropped to 60/40 mmHg, showed that patient was a "transient responder," indicating, the patient should undergo laparotomy. The patient was given 500 mL colloid with systolic target 80–90 mmHg in accordance to permissive hypotension theory. Colloid was used instead of blood products since it was not available and the blood bank was distanced.

Table 1: Signs and symptoms of hemorrhage by class

Parameter	Class I	Class II (Mild)	Class III (Moderate)	Class IV (Severe)
Approximate Blood Loss	<15%	15 – 30%	31 – 40%	>40%
Heart Rate	Normal	Normal / ↑	↑	↑ / ↑↑
Blood Pressure	Normal	Normal	Normal / ↓	↓
Pulse Pressure	Normal	↓	↓	↓
Respiratory Rate	Normal	Normal	Normal / ↑	↑
Urine Output	Normal	Normal	↓	↓↓
GCS	Normal	Normal	↓	↓
Need for Blood Product	Monitor	Possible	Yes	Massive Transfusion Protocol

Around 1500 mL blood was found inside the patient's abdomen during operation, a splenic rupture grade V was the cause. Due to the intraoperative bleeding and the hemoglobin level was dropped into 9.5 g/dl, the patient was given one pack of PRC (Pack Red Cell) after laparotomy operation. In the 5th day after surgery, the patient discharged with education to restrained his movement.

Discussion

Trauma is the most common cause of death for all individuals between the ages of 1 and 44 years and



Figure 1: Lesion at the left lateral abdominal region from (a) AP and (b) lateral positions

is the third most common cause of death regardless of age. In 2014, there were almost 200,000 injury-related deaths, but 37.2 million injured patients treated in emergency departments (EDs) [3]. ATLS provides a structured approach to the trauma patient with standard algorithms of care that emphasizes the "golden hour" concept so the doctor can prioritize which interventions that needed to get done first to prevent death and disability.

The patient's vital functions must be assessed quickly and efficiently. Management consists of a rapid primary survey with simultaneous resuscitation of vital functions, a more detailed secondary survey, and the initiation of definitive care. The mechanism of injury, injury forces, location of injury, and hemodynamic status of the patient determine the priority and best method of abdominal assessment. The assessment of circulation during the primary survey includes early evaluation for possible intra-abdominal and/or pelvic hemorrhage in patients who have sustained blunt trauma. In hypotensive patients, the goal is to rapidly identify an abdominal or pelvic injury and determine whether it is the cause of hypotension. Significant blood loss can be present in the abdominal cavity without a dramatic change in the external appearance or dimensions of the abdomen and without obvious signs of peritoneal irritation [4].

Primary survey in this patient showed that the patient was in hemorrhagic shock class III–IV according to ATLS as seen on Table 1 with BP 70/palpation mmHg, HR 123 bpm, and GCS E3V4M6.

The patient was hemodynamically stable with BP 80/60 mmHg and HR 104 bpm after being given initial fluid therapy which was 1 l of normal saline. The goal of resuscitation is to restore organ perfusion and tissue oxygenation, which is accomplished with administering crystalloid solution and blood products to replace lost intravascular volume.

The need to identify trauma quickly is high moreover when the patient is unstable. The optimal test should be rapid, accurate, and non-invasive. The FAST examination evaluates three potential spaces within the peritoneal cavity which evaluates free fluid in Morison's pouch or the hepatorenal space, left upper quadrant in subphrenic area and in the

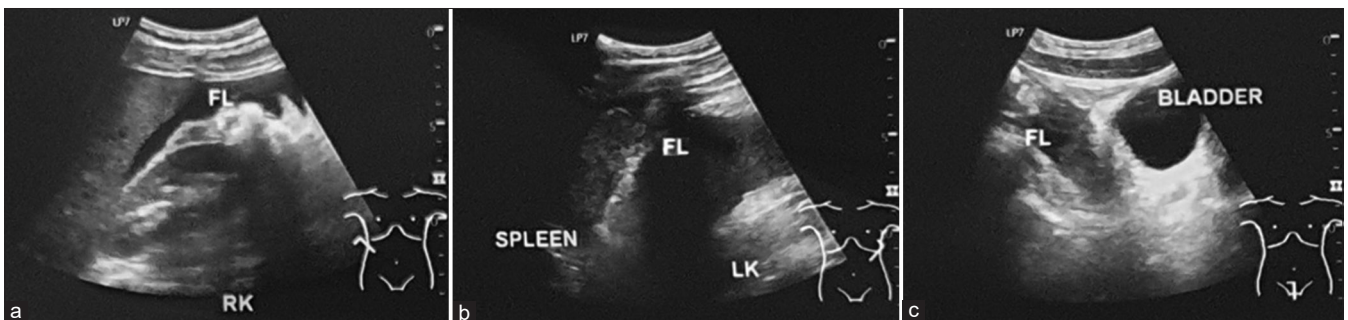


Figure 2: FAST results, fluids seen in (a) Morison's pouch, (b) left hemithorax, and (c) the pouch of Douglas

rectovesical pouch in males, and the rectouterine (Pouch of Douglas) and vesicouterine pouches in females [2]. In this patient, free fluid was found in all area which proved that the patient had intra-abdominal bleeding.



Figure 3: Chest X-ray results, fracture of ribs 7, 8, and 9, left lateral aspect with minimal hemothorax

Chest X-rays can show potentially life-threatening injuries that require treatment or further investigation. Chest X-ray from this patient showed that there was fracture 7, 8, and 9 left lateral aspect with minimal hemothorax. Since the inability to breath was not prominent and the hemothorax shown from X-ray was just minimal, thoracotomy was not conducted in this patient. One of the reasons is bleeding which is usually self-limited and does not require operative intervention [4].

The patient’s response to initial fluid resuscitation is the key to determining subsequent therapy. After doing supporting examination, the patient BP became deteriorate and the HR increased, indices as the initial fluids are slowed to maintenance levels which shown either an ongoing blood loss or inadequate resuscitation, this condition called transient response. Most of these patients initially have lost an

estimated 15% to 40% of their blood volume (classes II and III hemorrhage) and the need for blood is moderate to high [4].

Since blood was not ready as of that moment, the patient was given 500 mL colloid with systolic target 80–90 mmHg in accordance to permissive hypotension theory [5]. Permissive hypotension is the act of maintaining a blood pressure lower than physiologic levels in a patient that has suffered from hemorrhagic blood loss to maintain adequate vasoconstriction, organ perfusion, and prevent an undesired coagulopathy during initial fluid resuscitation. Research favors resuscitation to maintain systolic pressures of 80 mmHg to 90 mmHg or a MAP of 40 mmHg to 60 mmHg [6], [7].

From Figure 4, with the patient’s unstable hemodynamic state and positive FAST examination, laparotomy should be done as soon as possible. The only thing that needs to be determined in the emergency department is if an exploratory laparotomy is necessary, not which one intra-abdominal organ is harmed. Abdominal stiffness, which one of the symptoms of abdominal compartment syndrome, and hemodynamic impairment in patient with traumatic injury are signs that should elicit immediate surgical exploration [3], [8]. [9].

Around 1500 mL blood was found inside the patient’s abdomen during operation, a splenic rupture grade V was the cause. Due to the intraoperative, bleeding and the hemoglobin level was dropped into 9.5 g/dl, the patient was given one pack of red blood cell [10], [11].

In the 5th day after surgery, the patient discharged with education to restrained his movement.

Conclusion

Since blunt abdominal trauma could cause intraperitoneal bleeding that leads to hemorrhagic

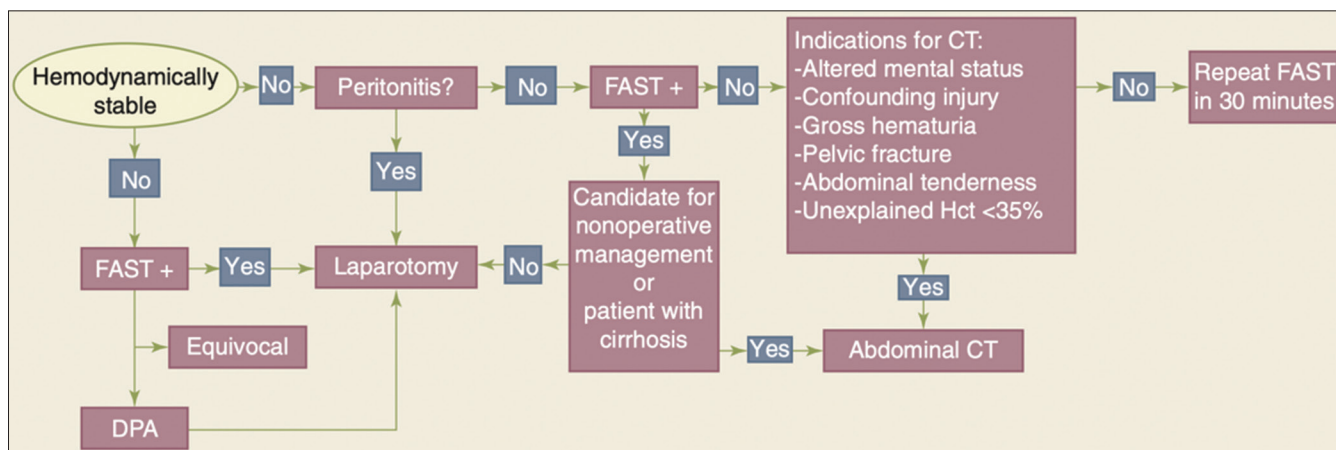


Figure 4: Algorithm for the initial evaluation of a patient with suspected blunt abdominal trauma. Figure from Brunicardi F, Andersen DK, Billiar TR, Dunn DL, Kao LS, Hunter JG, et al., editors. Schwartz’s Principles of Surgery. 11th ed. New York City: McGraw Hill; 2019

shock; therefore, immediate diagnosis and therapy are needed [1]. ATLS provides a structured approach to the trauma patient with standard algorithms, so the doctor can prioritize which interventions that needed to get done first to prevent death and disability. Multiple trauma management at rural hospital should be concordant to ATLS and Schwartz's Principles of Surgery.

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