Acute subdural hemorrhage accompanied with rupture of the inferior vena cava: a case report

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INTRODUCTION

One of the main causes of mortality and morbidity with physical and mental disabilities is traumatic brain injury (TBI). Apart from that, TBI also causes huge socio-economic burdens around the world. About 60% of TBI cases reported are caused by traffic accidents. Acute subdural hemorrhage (ASDH) is the main clinical finding in TBI cases. Blunt abdominal trauma associated with TBI accounts for 14% of cases. Inferior vena cava (IVC) injury is the most common vessel injured in a blunt (0.6-1%) and penetrating abdominal trauma (0.5-5%). Injury of the IVC can lead to a very high mortality rate.

Case description: Male patient, 15 years old, presented to the emergency department 30 minutes after a traffic accident with decreased consciousness with the Glasgow Coma Scale score of 11. The patient’s chest was clear, abrasions were found on the left hypochondrium. Head CT scan represented acute subdural hemorrhage in the left frontotemporoparietal region accompanied by midline shift more than 0.5cm. Hemicraniectomy decompression was performed. After decompression was done, the patient was unstable, blood pressure down to 70/50 mmHg and weak peripheral pulses with 140 beats per minute. Fluid and blood resuscitation have been performed but not responding. The patient remained hemodynamically unstable with minimal urine output. Physical examination reveals a tense abdomen. Diagnostic peritoneal lavage (DPL) was performed, blood was obtained. Exploration laparotomy was done by a midline incision, and IVC injury was found. The blood was removed, then packing on IVC with gauze, observation, and no blood comes out. The packing was opened, the patient stable, the operation was complete.

Conclusion: Case of severe head injury with acute SDH, then a craniectomy was performed, in the abdomen had a ruptured inferior vena cava, an exploratory laparotomy was done. Currently, the patient has recovered well without deficits.

Keyword: acute subdural hemorrhage, inferior vena cava injury, traumatic brain injury.


CASE DESCRIPTION

A 15-year-old male patient presented to the emergency department 30
CASE REPORT

Figure 1. Head CT scan showing acute subdural hematoma (ASDH) in the left frontotemporoparietal region accompanied with midline shift.

minutes after a traffic accident with decreased consciousness with a GCS score of 11. The patient’s chest was clear, abrasions were found on the left hypochondrium. Head CT scan represented acute subdural hemorrhage in the left frontotemporoparietal region was accompanied by midline shift more than 0.5cm (Figure 1). Hemicraniectomy decompression was performed.

After decompression was done, the patient was unstable, blood pressure down to 70/50 mmHg, and weak peripheral pulses with 140 beats per minute. Fluid and blood resuscitation has been performed but not responding. The patient remained hemodynamically unstable with minimal urine output. Physical examination reveals a tense abdomen. Diagnostic peritoneal lavage (DPL) was performed, blood was obtained.

Exploration laparotomy was done by midline incision. As much as 1.500 cc blood discharge with 500 cc blood clots were found intraoperatively. Then packing was done in 5 places. Identification of bleeding originated from the right retroperitoneal zone 1 and 2, and there was a rupture of the inferior vena cava in the para-renal (PRIVC) segment accompanied by a blood clot on the wall. Temporary tamponade and suturing were performed on the retroperitoneal tear. After 30 minutes, the tampon was opened, the impression that the bleeding was stopped. Furthermore, spleen rupture was seen with active bleeding; the primary suture was performed, the bleeding stopped. After that, the identification of hollow organs was carried out. There was a laceration in the transverse colon at the border of the serosa, and a primary suture was performed. The passage test was good. The solid identification of other organs within normal limits was carried out.

The next identification is the identification of the oral cavity. Pallatum molle rupture is visible, size 5 cm, then repair was performed. The gingival fractures of the upper and lower incisors were shown, fixation and immobilization with thread no. 1. Operation done. He has been transfused 500 ml of packed red cells (PRC) and 1 L of plasma intraoperatively and postoperatively. He remained in the intensive care unit for the first three postoperative days; then, he was shifted to the general ward. Postoperatively, the patient’s chief complaint was the pain at the wound site, which was managed accordingly. There was no significant clinical event from the first day until the last day of his stay at the hospital. He was discharged after ten days of stay in the hospital and remained stable on successive follow-up.

DISCUSSION

Because of its high mortality and morbidity, ASDH has become a critical entity representing about 30% of brain injuries. Until the 1990s, the mortality rate of ASDH was reported to be around 60%, and it decreased to be around 20-40% in the last decade. The functional recovery rate ranges between 19-45% in traumatic ASDH. Mechanisms that can cause ASDH are cortical surface vessel damage, bleeding from underlying parenchyma injury, and tearing of bridging veins from cortex to dural venous sinuses. In order to decrease intracranial pressure, hematoma evacuation and decompressive craniectomy were performed. Many prognostic factors may influence patients’ outcomes, such as the patient’s age, associated brain injuries, time lag between the onset of injury and the medical-surgical care, and the level of consciousness of the patient on admission.

Blunt abdominal trauma associated with TBI contributes to 14% of cases. Injury of the IVC can lead to a very high mortality rate. A rapid and uncontrollable hemorrhage can be produced by the shear forces on the blood vessels induced by deceleration. Anatomically, the IVC is divided into segments, which are supra-renal (SRIVC), infra-renal (IRIVC), para-renal (PRIVC), supra-hepatic (SHIVC), and retro-hepatic (RHIVC). The most frequently injured segment is IRIVC (39%), and SHIVC is the least likely segment to be injured. Several factors reported that may be predictive to patient’s mortality are patient’s hemodynamic status on arrival, level of the IVC where the injury occurred, amount of associated injuries, blood that have been loss since the injury occurred, and blood transfusion requirements. Because the patient is shifted early to the hospital and the intraabdominal bleed of hematoma tamponade effect can be controlled, he can survive. The other reason he can survive is that the segment involved is the PRIVC.

Control of hemorrhage is the main intervention needed in IVC injuries because active bleeding may affect the disease prognosis badly. In our case, a tamponade effect on IVC is produced by retroperitoneal hematomas, stopping further bleeding and increasing the survival probability. One study showed that patients with retroperitoneal tamponade have a 91% survival rate compared to patients without tamponade with a 93% mortality rate. Multiple cases have reported that retroperitoneum exploration may start profuse bleeding due to the patient’s hematoma tamponade effect removal. The uncontrollable bleeding after the tamponade effect released is reported to be the cause of death of 40% of the patients, as shown in a study done by Huerta et al. Hence, exploration or no exploration remains debatable. A study done by Okyere et al. concluded that a conservative approach might be chosen instead of exploration in the presence of a contained hematoma that can cause tamponade. IVC repairment can be accomplished by using different techniques that have been published, including primary repair by direct suturing, i.e., venorrhaphy, ligation, atriocaval shunting, venacaval transposition, and others.
In our patient, surgical intervention like grafting or shunting of the IVC was impossible due to inadequate facilities, lack of required equipment, and also lack of specialized vascular surgeons. Direct repair of IVC was preferred instead of ligation. It is because the para-renal part of IVC was accessible, and the lumen diameter looked wide enough. This proved to be a better choice in concordance with other studies that preferred direct repair instead of ligation. Our patient also had visceral injuries that need surgical intervention.

CONCLUSION
Case of severe head injury with acute SDH, then a craniectomy was performed, in the abdomen had a ruptured inferior vena cava, an exploratory laparotomy was done. Currently, the patient has recovered well without deficits.

FUNDING
None.

CONFLICT OF INTEREST
All authors stated no conflict of interest regarding this report.

AUTHOR CONTRIBUTION
All authors contributed to the concept, design, definition of intellectual content, literature research, clinical studies, data analysis, manuscript preparation, review, and also served as guarantor of this study. Marsal Risfandi and Celia also contributed to the statistical analysis and manuscript editing.

ETHICAL STATEMENT
All authors declare that they have obtained written informed consent to publish the details relating to the patient in this case report.

REFERENCES