CASE REPORT

An Autopsy Review of Liver Injuries Resulting From Blunt Trauma: Case Report

Desy Martha Panjaitan[1], Ahmad Yudianto[2], Tutik Purwanti[3]

[1] Resident of Forensic Medicine and Medicolegal Specialist Program, Universitas Airlangga, Surabaya – Indonesia 60132
[2] Departement of Forensic Medicine and Medicolegal, Universitas Airlangga, Surabaya – Indonesia 60132
[3] Bhayangkara Hospital Kediri, Kediri, East Java – Indonesia 64121

ABSTRACT

The liver is the largest abdominal organ and one of that was frequently affected by blunt trauma. A blunt trauma on the upper abdominal can compress and injure the liver. Liver injury is the most common cause of death after abdominal trauma. Rupture of the liver can cause death immediately due to shock and hemorrhage, especially if the portal vein or the inferior vena cava is injured. This is a case of 36 years old woman who died of blunt trauma. On external examination, we found bruises of eyelid, neck, head, chest and upper abdomen. On autopsy, we found liver injuries, abdominal bleeding and subarachnoid hemorrhage. We discuss autopsy findings of a murdered victim with liver injuries resulting from blut trauma.This case represented homicide with the cause of death was liver injuries resulting from blunt trauma caused severe bleeding.

Keywords: Liver, Injury, Blunt, Trauma, Autopsyide

Corresponding Author:
Desy Martha Panjaitan, MD
Email: desymartha40@gmail.com
Tel: (+62) 31-5501011

INTRODUCTION

Blunt trauma is mechanical trauma to a body part, either by impact, injury or physical attack. Two variations of blunt trauma are blunt objects which move to still victims and victims who move to still blunt objects (1). Blunt trauma differs from penetration trauma because of the different injury characteristics on the organs impacted by the blunt compression. Trauma or injury is the 7th cause of death in the world. Abdomen trauma is the third most common injured organ. Blunt abdominal trauma represents 75% of all blunt trauma injuries. It occurs as result of a vehicle accident, fall from height, and assault. The most common solid organ injured in blunt trauma is the liver injury in which thw cases occur in about 5% of all trauma. The mortality of liver injury depends on the degree. The higher the grade of injury, the more fatal it is (2).

Liver injuries that result from assault like homicide can occur because of blunt or penetration trauma. A blunt trauma on upper abdomen can compress abdominal organ like liver and spleen. We can find the cause of death and mechanism of death by doing an autopsy in homicide case. An autopsy is still considered as the gold standard method to investigate cause of death. The laceration is the common type of wound on autopsy. Liver injury case due to blunt trauma. The right lobe is the commonly affected area with grade III injuries. If the portal vein or the inferior vena cava is injured, the wound may cause death immediate due to shock and hemorrhage (3).

CASE REPORT

A 36-year-old woman was found dead with blunt trauma on the head, neck, chest and upper abdomen. We got information from a witness on the crime scene investigation that on Saturday night at about 11:30 p.m., there was a woman who shouted for help and then the residents came to the sound source and saw a woman lying in a ditch in a state of clothes already open up with mouth bleed and unconscious, then the residents took that woman to Jombang Regional Hospital, but unfortunately she was died. On the day after that, the residents reported to the police about murder and rape case. The investigators brought the external and internal examination letter to The Forensic Medicine of Jombang General Hospital.

The following letter from the Criminal Investigation Unit of Jombang Police Resort, East Java, we did the external and internal examination (autopsy) to the victim on Sunday at 08.00 p.m. On external examination we found bruishes on the upper and lower lips, gums, fingertips and nails of both hands and feet. Condition commonly found in asphyxia cases are also shown on the victim palness on the upper eyelid, contusion on the lower eyelid, left cheek, chin, mucous membrane of the upper and lower lip, right upper arm, chest and upper abdomen. Laceration on the mucous membrane of the lower lip. This contusion and laceration due to mechanical blunt trauma.

On autopsy, we found blood absorption in upper head muscles, skull bones, the right and left neck muscles, chest muscles, upper abdomen. There was twenty milliliter subarachnoid hemorrhage. The lung of victim looked pale. There was wrinkle capsule appearance of spleen. The stomach contained rough food. The aceration on anterior and posterior left lobe liver (Figure 1) and (Figure 2) measuring 7 cm x 5 cm and more than 1 cm deep laceration. There was 2000 ml of abdominal cavity bleeding.

Figure 1 : Laceration on anterior left lobe liver.

Figure 2 : Laceration on posterior left lobe liver.

Grade	Description of injury
Grade I	Hematoma: Subcapsular, <10% surface area Laceration: Capsular tear, <1 cm parenchymal depth
Grade II	Hematoma: Subcapsular, 10%-50% surface area Hematoma: Intraparenchymal <10 cm diameter Laceration: Capsular tear 1-3 cm parenchymal depth, <10 cm length
Grade III	Hematoma: Subcapsular, >50% surface area of ruptured subcapsular or parenchymal hematoma Hematoma: Intraparenchymal >10 cm or expanding Laceration: Capsular tear >3 cm parenchymal depth
Grade IV	Laceration: Parenchymal disruption involving 25%-75% hepatic lobe or involves 1-3 couinaud segments
Grade V	Laceration: Parenchymal disruption involving >75% of hepatic lobe or involves >3 couinaud segments (within one lobe) Vascular: Juxtahepatic venous injuries (retrohepatic vena cava/central major hepatic veins)
Grade VI	Vascular: Hepatic avulsion

N.b. Advance one grade for multiple injuries up to Grade III

Figure 3 : Laceration on anterior left lobe liver.

We found postmortem stainning (livor mortis) that disappeared and cadaveric rigidity (rigor mortis) that resisted. It was important to predict the time of death. However, because the bodies were stored in the freezer, estimating time death was difficult. The cold temperature prolonged the stiffness of the corpse and the decomposition process. We could estimate the time of death by knowing the stomach contained rough food. It meant that the victim died before 2-3 hours before being found. It was 08.30 – 09.30 pm. We conduct other additional examinations to prove the existence of intercourse (rape case), like vaginal swab examination and vagina rinse (vagina irrigation). The result was no sperma cell found in the vagina.

DISCUSSION

Blunt abdominal trauma can caused by kicking, stamping and heavy punching (1). The factors that influence the severity of blunt trauma to the abdominal cavity are the size of the blunt object, strength, injured organ and the condition when the collision occurs. Severe intra abdominal injury may be present without any mark on the skin. It can occur if blunt impact is applied large surface relatively or if clothing protects the skin (4). The liver is the largest organ in the right upper quadrant of the abdominal cavity. Because of its anatomic location, large size and solidity, the liver is often exposed to trauma, both blunt trauma or penetrating trauma. The right lobe is five times more likely to be injured than the left lobe (1). Rupture of the liver is a common laceration following serious abdominal trauma. Injuries caused by blunt trauma depend on the force and the anatomic structures

surround the liver (3). If blunt trauma occurs directly in front of the liver it will cause the liver to shift posteriorly, causing a laceration at the junction of the lobes. It can also cause a contrecoup laceration because collision with the vertebral column (1). The liver can show one or more linier cracks, most often on the convex upper surface, which possibly the severity of superficial subscapular tears to complete transaction of the organ. The surface laceration may extend deeply into the liver and may even appear on the opposite surface. There can be internal tears that do not communicate with the surface (4).

If the liver injury affects the parenchyma it can also cause injury to the portal vein hepatica, artery hepatica and vena cava inferior (1). Massive bleeding in the abdominal cavity can result from ruptured solid viscous or mesentery bleeding (4). In this case, the victim experienced severe bleeding and had lost about 2000 ml because of liver injury and portal vein injury. The estimated blood loss for this victim was 40% times body weight, 40% x 50 kg = 2000 ml, which can be categorized as class III Hemorrhage: 31% to 40% blood volume Loss. In some case, this causes a drop in systolic blood pressure consistently. This condition could immediate death.

The American Association for The Surgery of Trauma Hepatic Injury Scale classified injuries have been shown in (Figure 3) (5). In this case, liver injuries were grade III which the capsule laceration tears more than 3 cm parenchymal depth, contained active bleed and vascular injury (portal vein injury).

CONCLUSION

In this case, the victim has been declared dying of unnatural death, presumably murder. The cause of death was stab wounds on the neck that cut large blood vessels and penetrated the larynx, trachea, and cervical vertebrae 3. The obstruction in the airway prevented the entry of air into the respiratory organs and the mechanism was aggravated by bleeding.

ACKNOWLEDGEMENT

Praise the presence of God Almighty for all His grace and gifts. I would like to thank all parties for the assistance provided so that this case report can be completed, especially to Dr. dr. H. Ahmad Yudianto, Sp.F (K), SH, MKes as the Head of Study Program for Specialist Doctor Education Program (PPDS) I Forensic Medicine and Medicolegal Studies Universitas Airlangga-RSUD Dr. Soetomo Surabaya, who has patiently provided constructive guidance, criticism and advice.

REFERENCES

1. Garudadhri G, Raghavendra R, Devadass P. Fatal Stab at Unusual Site: A Case Report. J Indian Acad Forensic Med. 2013;35(3).
2. Kaushik VK, Sheikh M. Which is the Cause of Death? - A Case Report. Ntl J Community Med. 2017;
3. Saukko P, Knight B, Knight's. Forensic Pathology Fourth Edition. CRC Press Taylor&Francis Group: LLC;
4. Kumar V, Abbas A, Aster J, Robbin. Basic Pathology Tenth Edition. Canada: Elsevier; 2018.
5. Soesilo R. Kitab Undang-undang Hukum Pidana. Bogor: Politeia; 1995.