ABSTRACT

Background: A penetrating injury is due to the mechanical force which is piercing in nature and caused by sharp-pointed objects. Penetrating trauma from the inguinal region to the thoracic region is a case with high morbidity and mortality when not sufficient early surgical assessment and good management. The penetrating injury needs early medical assessment and proper management, and this can be done in type B hospital.

Case Description: Twenty-two years old male came to the emergency department in Jombang Public Hospital District after fell from 4 meters height in a construction project. We found 12 mm metallic foreign body has stabbed from right groin projected to left anterior inguinal region to the thoracic region is a case with high morbidity and mortality when not sufficient early surgical assessment and good management.

INTRODUCTION

A penetrating injury is due to the mechanical force, which is piercing in nature and caused by sharp-pointed objects like knives, daggers, spears, glass fragments, blade, etc. Therefore, penetrating injuries need not always be caused by a metallic object. The tip of a weapon plays a vital role in a penetrating injury as objects with sharper tips penetrate the skin more readily and cause injuries in an individual. These weapons can cause injuries to either the major vessels in the body cavity or those passing through the major viscera of the body. This can be leading to external or internal haemorrhages and also may conclude in the death of the affected.

Here we report a case of death due to penetrating injury at an uncommon site due to an unusual manner of causation. Penetrating trauma from the inguinal region to the thoracic region is a case with high morbidity and mortality when not sufficient early surgical assessment and good management. This case study showed a comprehensive treatment of penetrating trauma which has been done in Jombang Public Hospital District.

CASE REPORT

Twenty-two years old male, came to the emergency department after fell from 4 meters height in the past 4 hours. The patient fell in standing position, impaled by a 150 cm metallic bar. The bar impaled from a right inguinal area closed to the scrotum and penetrated to abdominal wall. The metallic bar was cut using chainsaw then transferred to Jombang Public Hospital District.

The patient was in a stable condition, BP 140/90, pulse 122 bpm, respiratory rate 32 times per minute, temperature 37.2°C, oxygen saturation 97%. Physical examination showed 12 mm round shape metallic bar from right inguinal area to left anterior axillary line over fourth intercostal space (Figure 1). Chest movement was symmetric, without abnormal breathing sound. Bowel movement was good, without muscle rigidity. Anal sphincter tone and prostate were normal from the digital rectal examination. Genital examination showed spontaneous bloody urethral discharge.

Chest X-ray was conducted and no intrathoracic problem was found. FAST sonography was done, and no intra-abdominal fluid was found. KUB photo from anterior and lateral was taken and no free air inside the abdomen was found, the foreign body was found in the anterior abdominal wall. We perform urethrographic to evaluate for the possibility of urethral rupture, and the result was normal.

The patient was observed in the emergency department for 6 hours, and the operation preparation for foreign body extraction has been done. The
patient was in stable condition with stable hemodynamic. We decided to perform a laparotomy exploration and foreign body extraction. The surgery was done by general surgeon and urologist for 2 hours. Midline laparotomy incision was conducted, and the abdominal cavity was showed. No sign of intra-abdominal bleeding and the peritoneal fluid was clear. The solid and hollow abdominal organ was normal, and diaphragm was intact without laceration. The abdominal cavity was closed by simple continuous suture, using absorbable suture. An incision was extended to the left lateral area, created left lateral thoracic-laparotomy incision. The fascia was separated from subcutaneous fat, creating abdominal wall flap, until the bar was seen fully. No vascular damage was seen. An incision was extended to the suprapubic area to evaluate the bladder, and the foreign body was seen over the abdominal fascia.

We perform the foreign body extraction from the trajectory site followed the foreign body axis with simultaneous evaluation for haemorrhage at trajectory tract (Figure 2). Trajectory tract was washed using saline and 10% povidone-iodine. Two vacuum drain was placed below the abdominal flap. The wound was closed layer by layer, and skin was closed by using 2.0 nylon. Postoperative evaluation, the patient was in stable condition, drain was removed after six days, and there is no sign of local inflammation from the surgical site (Figure 3). Abdominal examination was normal. The patient was mobilized after 3 days of surgery, early feeding was started the day after surgery. We gave ceftriaxone and metronidazole injection for 5 days. The patient was discharged after 6 days with urine catheter still attached for 2 weeks.

DISCUSSION

Penetrating trauma is an open type of trauma which simultaneously cause inlet and outlet injury. Penetrating trauma results in sequential tissue damage and can affect subcutaneous tissue, blood vessels, and even some organs. This trauma has not

Figure 1 Patient clinical appearance from the lateral view

Figure 2 The process foreign body extraction

Figure 3 Surgical site view after 6 days
limited to certain organ systems but can cause serious problems in every organ system that is passed by the foreign body. Penetrating trauma has a high mortality and morbidity rate so it requires an early initial medical assessment and appropriate management. Management of penetrating trauma has many varies based on the mechanism and location of the injury, hemodynamic stability, neurological status, associated related injuries, and institutional resources.3,5

Penetrating trauma can be caused by falling from a height, a collision, or a murder attack. Based on the mechanism of injury, penetrating trauma can be classified clinically into three types, wherever, in this case, was type I penetration trauma, because it has an effect of the body on the immovable foreign body. Clinical features of penetrating trauma may indicate solid organ injury, hollow organ injury, vascular injury, with clinical features such as hemodynamic instability or peritonitis where the clinical condition can be differ depending on the injured body part and the shape and size of the foreign body.3,6

Diagnosis of penetrating trauma is based on history and investigation (radiological examination, LWE / Local Wound Exploration, DPL / Diagnostic Peritoneal Lavage, Laparoscopic, and VATS / Video-Assisted Thoracoscopic Surgery). Radiological examination is used include: (1) X-ray photos (Thoracic X-ray photo have a role to determine the complications of pneumothorax and hemothorax. Abdominal X-ray photo have a decisive role in determining the presence of free air which usually shows there is a perforation in the digestive tract), (2) IVP / Intravenous Pyelogram (to determine urinary system injury and predict kidney functional status), (3) CT scan (triple contrast CT scan has a major role in determining the differential diagnosis of pelvic and back penetrating injuries.

Contrast material is given intravenously, oral, and rectal. The main advantage is being able to evaluate the peritoneum and retroperitoneal area and determine the location of the injured organ. The disadvantages of CT scan are not compatible for diagnosing diaphragmatic injuries and hollow organ injuries, require high cost and contrast material requirements), and (4) USG (This noninvasive diagnostic tool has an adequate degree of accuracy in diagnose intra-abdominal fluid and not expensive. But it has limitations in diagnosing diaphragmatic, pancreatic and intestinal injuries.). In this case, we performed a radiological chest X-ray, FAST ultrasound, supine and lateral abdominal X-ray. Urethographic was done because of the bloody urethral discharge in patients who are suspicious of the trauma of the urethra. CT scans are not considerate as carrying out diagnosis, because the contrast used in oral route will delay the management of this case.

The management of penetrating trauma include supportive (hemostasis, blood transfusion, airway management), and surgical repair of the involved tissue structures and or foreign body extraction. There is a recommendation that the foreign body not to be manipulated first since it can create tamponade effects, and cause massive haemorrhage. But the foreign body can be shortened to facilitate transportation or determine the position of the inlet and outlet. In the study by Osinowo et al (2016), it was found that 38% of patients had to use a combination to do laparotomy with therapeutic causes of laparotomy namely generalized peritonitis, associated evisceration and unstable hemodynamic which were 88.5%, 67.6% and 66.7 % repetitively.6,8

In this case, hemothorax, pneumothorax, generalized peritonitis and hemodynamic instability were not found. The local wound exploration on the wound was not taken into consideration as the result that laparotomy was performed for diagnostic as well as therapeutic management in the act of foreign body extraction. Surgeons need to improvise in performing laparotomy for penetrating trauma patients because the position of the foreign body can give effect to the placement of patients on the operating table. In the study by Gill et al (2018), patients must remain in a semi-lateral position to be intubated before making it in the supine position for laparotomy. Midline Laparotomy is recommended as a standard for evaluating the peritoneal cavity in the presence of visceral injury, haemorrhage or contamination of solid organs or hollow organs. However, it is important to understand those midline incisions are sometimes not a possible choice for patients, so modification can sometimes be needed using non-conventional incisions. After exploration of the intra-abdominal organs is carried out thoroughly and haemorrhage control has been carried out, foreign body extraction can be performed.9

In this case, an urgent exploration laparotomy was performed with a midline incision to evaluate the abdominal cavity. There is a philosophy in carrying out urgent laparotomy, which is to minimize the duration of surgery with a systematic surgical technique and to minimize missed injuries. So the systematic exploration laparotomy is recommended starting from the upper left quadrant continuing to the upper right quadrant and small intestine exploration to the ileocolic region. Then, the large intestine is examined in detail to the rectum and peritoneal reflection. In this case, no abnormalities were found so that the peritoneum and fascia were closed to minimize intra-abdominal contamination,
then the laparotomy incision was extended laterally to form a left lateral thoraco-laparotomy incision to reach the foreign body and the incision was passed to suprapubic for bladder evaluation, and metallic foreign body was found above the fascia. The patient underwent foreign body extraction, haemorrhage control, saline irrigation and vacuum drain placement. The wound was closed layer by layer.5,10,11

In post laparotomy patients there is a greater risk for malnutrition, retraction at the edge of the abdominal fascia, and the risk of complications such as fistulae. Nutritional support must be given early, and the enteral route is preferred to increase protein intake. Data from a multicenter prospective cohort study show that in early enteral nutrition is safe and does not provide side effects in post-laparotomy patients. In addition, the researchers found a decrease in the incidence of pneumonia associated with early enteral nutrition. In addition to early nutrition, the patient's early rehabilitation process is also needed. The process of rehabilitation in trauma patients depends on the nature of the injury and the individuals involved. Early rehabilitation interventions are very important in ensuring a smooth transition process for recovery and restoring the organ function. The principle of conducting rehabilitation is that patients can return to previous patterns of physical activity. In this case we carried out early rehabilitation by initiating the mobilization of patients earlier after there were no signs of sustained bleeding based on the results of the surgical wound drain. In this case, the patient was given therapeutic antibiotics Ceftriaxone and Metronidazole for 5 days, an early feeding started from the first day after surgery and patient began to mobilize on the third day with a length of hospital stay for 6 days.11,12

The urethrographic results showing intact urethra did not exclude mucosal lacerations or hematomas in the urethra, as the result that urine catheter placement was maintained for up to 2 weeks after the procedure.

CONCLUSION

Early surgical assessment and good treatment management should be done in penetrating trauma. Evaluation should be started from the incident and continued to treatment in the hospital. Early resuscitation, supporting the investigation, surgical intervention and non-surgical intervention (nutrition and rehabilitation) are important in the recovery of the patient.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this report.

ETHICAL CONSIDERATION

The patient has been signed the informed consent and agrees for the publication of their data as a case report article.

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AUTHOR CONTRIBUTION

All of authors are equally contributed to the study from initial assessment, operative procedure, until reporting the outcome

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