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Case Report:

Penetrating Abdominal Injury by a Large Stone.

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Abstract: Penetrating trauma can be commonly caused by sharp objects. We report a case of penetrating injury of abdomen caused by a fairly large sized stone which is used for sharpening the objects or weapons. It pierced through the abdominal wall musculature and caused ileal transection, mesenteric tear and gastric perforation.

Keywords: Penetrating trauma; Stone; Ileal transection; Gastric perforation

Introduction:

The incidence of penetrating injuries differs from centre to centre but majority of them are by gunshots and sharp objects. The severity of the injury varies widely depending on the body parts involved, the characteristics of the penetrating object and the amount of energy transmitted to the tissues. Penetrating injuries with bowel evisceration are also known.[1] We report a case of penetrating injuries with bowel evisceration caused by a hard, broken piece of stone which was used for sharpening the objects or weapons and it was recovered from abdominal cavity. This particular stone was used for sharpening the objects or weapons launched on a machine to rotate. It was rotating at the speed of around approximately 1100 rpm, which suddenly broke down and hit the patient's abdomen just at a distance of 2 feet.

Case Report

A 32-year-old male was brought to our trauma center with the history of injury to the abdomen with small bowel evisceration while working on the machine. At trauma center, he was conscious, pulse was 130/ min and blood pressure 60/40mmHg; respiratory rate 36/min. Examination of abdomen demonstrated evisceration of small bowel in left lumber region through a defect lateral to the left rectus muscle. There was transaction of bowl loop with torn and actively bleeding mesentery. No other injury was clinically apparent. Patient was then shifted to operation theater immediately after initial resuscitation.

Fig 1: The complete transection of ileum at one place with devascularised bowel due to destruction of underlying mesentery.

Fig 2: The stone recovered from the abdominal cavity, 7.5cm in length and 2.5 cm thick weighing 499 gms

Surgical exploration was done immediately under general anaesthesia which revealed a 13 x 7 cm defect in anterior abdominal wall in left lumber region. Proximal ileum was completely transected into two pieces, the underlying mesentery was normal. One and a half feet distal to this transected portion, 10 cm of ileum was gangrenous with complete devascularisation of bowel due to destruction of underlying mesentery with active bleeding from mesenteric vessels (Fig 1). There was also one perforation of 1 x 1 cm size, 15 cm distal to this gangrenous segment (American Association for the surgery of Trauma (AAST): Small bowel injury scale Grade IV).[2] The stomach was also perforated at its greater curvature 15 cm in length. (AAST: Stomach injury scale Grade III).[3] A large stone was recovered from the abdominal cavity lying just above the pelvic brim on right lateral side of common iliac and its bifurcation. The stone was approximately wedge shaped with outer semicircular edge of 13cm and inner 2cm with two side edges of 7.5cm and 6.5cm length and the thickness 2.5 cm and weight 499 Gms (Fig 2). The margins of transected segments were refreshed and end-to-end anastomosis was done. Gangrenous segment was resected and both the ends were anastomed. Ileal and stomach perforations were closed. Abdomen was closed after keeping the drains. Patient recovered well except for wound infection at the site of entry of the stone. Patient was discharged on day 17 post-operative.

Discussion

There have been many reports of penetrating abdominal injury by firearms or high velocity missile. Penetrating injury with bowel evisceration is also known and majority is due to knife stab wounds.[4] There are few reported cases by bicycle handlebar [1], piece of a glass and as a result of blunt abdominal trauma.[4] This kind of penetrating injury by such a large stone as an industrial accident is very rare. No case is reported in literature of such type of injury.

The most widely accepted theory is described by the equation for kinetic energy $E=mv^2/2$.[5] This equation emphasizes velocity. Any increase in velocity or mass results in an exponential increase in wounding potential.[6] Muscle wall destruction might be due to its large weight and velocity, which caused the perforation at its first interface. After entering into the abdominal cavity, by any of its surface, the bowel close to the abdominal wall on its path might have transected or as a result of crushing against the vertebral column.[7] It then entered the mesentery of adjacent loop and created a rent. Gastric perforation along its greater curvature was the result of blow of stone over the abdominal wall causing sudden increase in intraluminal pressure of full stomach.[8] Gastric injuries are estimated to occur in 7 to 20 % of cases of penetrating abdominal trauma.[9]

The patient with a penetrating injury with bowel evisceration requires emergency resuscitation, following standard trauma guidelines to optimize tissue oxygenation and fluid balance; eviscerated bowel should be initially wrapped in cling films or mopps soaked in saline to prevent heat and water loss through evaporation.[1] Post Operative complication includes haemorrhage, wound infection, anastomotic failure, fistula, abscess and adhesive obstruction should be watched for.[10]

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