Penetrating stab injury with herniation of stomach through anterior abdominal wall
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Section: Abdominal imaging
Area of Interest: Abdominal wall Stomach (incl. Oesophagus)
Procedure: Diagnostic procedure
Technique: CT
Special Focus: Hernia Case Type: Clinical Cases
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Patient: 40 years, female

Clinical History:

A 40-year-old female presented to the emergency room with a 1 hour old penetrating stab wound. On examination, a soft tissue pinkish mass was noted exteriorly through the stab wound over left anterior abdominal wall. The patient did not have any external bleeding or any signs of hypovolaemia.

Imaging Findings:

CECT Abdomen demonstrates herniation of the stomach outside the abdominal cavity communicating freely with the external environment through the defect in peritoneum and anterior abdominal wall.

Affected herniated stomach segment (body including its anterior and posterior walls) appears compressed and shows mucosal hyperaemia due to congestive changes. No evidence of abnormal dilatation of stomach or non-enhancing areas were noted within it.

Herniation of peritoneal fat is also noted along with the stomach.

Discussion:

Among the abdominal trauma, blunt trauma comprises the major chunk (73.5 %) as compared to penetrating trauma (16.5%) [1]. Penetrating wounds are classified into two categories, 1. Gunshot wound; 2. Stab wound (anterior stab wound and posterior stab wound) [2]. Computed Tomography (CT) plays a pivotal role in evaluating patients with penetrating abdominal trauma who are haemodynamically stable[3]. Other modalities that can be used include diagnostic peritoneal lavage, local wound exploration and laparoscopy [3]. In a haemodynamically unstable patient, FAST (focused assessment with sonography in trauma) is useful to detect abdomino-pelvic free fluid [3].
The organ that is injured depends on the site of stab. CT is used to evaluate the trajectory of the penetrating injury, which is highly important, and to see whether peritoneal breech has occurred [4]. Signs for peritoneal breech on CT includes presence of air, haemorrhage, bullet or bone fragments along the stab wound, presence of intra-abdominal organ injury, vascular injury, or haemoperitoneum [4]. In blunt abdominal trauma, presence of free air foci are suggestive of hollow viscous perforation in most of the cases, but this does not hold true in case of penetrating abdominal trauma where in it may be due to breech of peritoneum [4]. Five types of injures can occur in penetrating trauma, a. Solid organ injury (liver, spleen, pancreas and kidney-laceration, haematomas and active extravasation), b. Hollow organ injury to ureter, urinary bladder, c. Bowel, stomach and mesenteric injury, d. Diaphragmatic injury, e. Vascular injury[4].

The algorithm followed in case of penetrating abdominal trauma is mentioned in Fig. 1[5]:

Following injuries require urgent surgical intervention [4]:
1. Solid organ injury with active extravasation of contrast.
2. Intra-peritoneal urinary bladder rupture
3. Major vascular injury
4. Bowel or mesenteric injuries: Direct signs of bowel injury include bowel wall discontinuity, wound tract extending to the bowel, leakage of oral or rectal contrast, active mesenteric vascular extravasation. Indirect signs include mesenteric haematoma and inter-loop fluid.

Our referral surgeons asked not to use oral / rectal contrast since it would delay the scan time by 30 - 60 minutes. However, with the advent of multislice CT, scan timings have been reduced and now its standard practice to administer oral and rectal contrast for detection of peritoneal and bowel leaks [3].

Stomach is rarely an involved organ in a case of penetrating abdominal trauma. We present a case of a penetrating stab wound leading to a defect in peritoneum with resultant herniation of stomach exterior to anterior abdominal wall.

Differential Diagnosis List: Penetrating injury with herniation of stomach through anterior abdominal wall., Penetrating bowel injury, Blunt abdominal trauma

Final Diagnosis: Penetrating injury with herniation of stomach through anterior abdominal wall.

References:
John D. Gleasan, Gillean Liebermann M.D., (Marc) Radiologic assessment of penetrating abdominal trauma,. eradiology.bidmc.harvard.edu/ Learninglan/gastro/Gleasan
Figure 1

Description: Penetrating abdominal injury algorithm

Figure 2

**Description:** Virtual CT image demonstrating the same thing as mentioned above (yellow arrow).

**Origin:** Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India
**Description:** Figure A (yellow arrows) demonstrates herniation of stomach exterior to anterior abdominal wall through peritoneal and anterior abdominal wall defect. **Origin:** Department of Radiodiagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
**Description:** Figure B (yellow arrows) demonstrates herniation of stomach exterior to anterior abdominal wall through peritoneal and anterior abdominal wall defect. Peritoneal fat is also noted herniating through the defect. **Origin:** Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India
Description: Axial images of CECT Abdomen showing herniating stomach along with Ryle’s tube (yellow arrow). Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India
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