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Mechanisms of Damage to the Gastric Mucosa in Mixed Injuries

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Abstract: The article provides data on damage to the stomach in mixed injuries. Mixed injuries can lead to rupture of intra-abdominal structures, which causes bleeding and release of stomach, intestinal or bladder contents into the abdominal cavity. This can lead to peritonitis and other serious complications. Bleeding may be slight or heavy, depending on the extent of the damage. More severe injuries may result in shock, acidosis, and coagulopathy. In these cases, surgery is required.

Late complications of abdominal trauma may include hematoma rupture, intra-abdominal abscess, intestinal obstruction or ileus, bile leak and/or biloma, and abdominal compartment syndrome. Complications of treatment may also include abscess, intestinal obstruction, abdominal compartment syndrome, and late incisional hernia. Understanding the mechanisms of damage to the gastric mucosa during mixed injuries is crucial for timely diagnosis and treatment, as well as for the prevention of complications.

Keywords: mixed trauma, stomach, peritonitis, intra-abdominal abscess.

Relevance. The abdominal cavity can be damaged by various types of trauma; the damage may be limited to the abdominal cavity only or be associated with severe multisystem trauma. The nature and severity of abdominal injuries vary depending on the mechanism of injury and the forces involved. Thus, generalizations about mortality and the need for surgery may be misleading.

Damage is often characterized by the type of structure damaged:

Abdominal wall

Dense organ (liver, spleen, pancreas, kidney)

Hollow organ (stomach, small intestine, colon, ureters, bladder)

Vascular network

Some specific injuries resulting from abdominal trauma are discussed elsewhere, including injuries to the liver, spleen, and genitourinary tract.

Causes and mechanisms of abdominal trauma

Abdominal injuries occur through different mechanisms:

Blunt injuries:

- Occurs during impacts, collisions or sudden braking.
- Often affects the spleen, liver and small intestine.

Penetrating injuries:

- Can be either penetrating or non-penetrating into the abdominal cavity.
- Can damage various organs, including any structure in the case of gunshot or stab wounds.
- Penetrating chest injuries occurring below the nipple line can also involve the abdominal cavity.

Classification

To assess the degree of damage, injury rating scales are used, which classify it from 1 (minor) to 5-6 (severe). Mortality rates and the need for surgery increase with the severity of the injury.The scales are designed for the liver, spleen and kidneys.

Associated injuries

- Abdominal injuries may be accompanied by damage to:
- Spine, ribs or pelvis.
- Thoracic aorta (in patients with severe bradycardia)

Blunt or penetrating trauma can result in rupture of intra-abdominal structures. Blunt trauma can also cause only a hematoma of a solid organ or the wall of a hollow organ.

When a rupture occurs, bleeding begins immediately. Bleeding due to minor injury to a solid organ, minimal vascular rupture, or rupture of a hollow organ is usually mild, with minimal physiological consequences. More serious injuries are accompanied by heavy bleeding with the development of shock, acidosis and coagulopathy; surgical intervention is necessary. Bleeding is internal (with the exception of a relatively small number of cases of external bleeding due to penetrating trauma). Internal bleeding can be intraperitoneal or retroperitoneal.

Diagnostic criteria

Complaints and anamnesis:

- abdominal pain of varying localization, intensity and radiation, increased pain when changing body position;
- presence of a wound (stab, gunshot), hematoma, abrasion on the anterior abdominal wall, lumbar region, in the buttocks, in the chest area (below the level of the nipples);
- dizziness, weakness, darkening of the eyes - signs of acute anemia;
- dry tongue, nausea, vomiting, gas and stool retention, difficulty urinating;
- indication of injury (wound by a firearm or bladed weapon, injury by metal, concrete or wooden structures, glass, beating, fall from a height, road accident, etc.);
- circumstances of injury to the patient and accompanying persons;
- time elapsed since injury.

Physical examination (examination, palpation, percussion, auscultation, determination of hemodynamic parameters - heart rate, blood pressure):

1) In case of severe trauma - the presence of physical signs of “instability” in patients with life-threatening injuries, as defined by ATLS [3]:

- blood pressure <90 mm Hg. Art.,
- heart rate >120 beats per minute,
- signs of skin vasoconstriction (cold, clammy sweat, decreased capillary refill),

- change in level of consciousness and/or shortness of breath.2) Presence of physical signs of abdominal injury:
- bloating;
- local or diffuse pain and tension in the anterior abdominal

walls upon palpation;

- disappearance of "liver dullness" (pneumoperitoneum due to rupture of a hollow organ), however, the absence of this sign does not exclude rupture of a hollow organ;
- shortening of percussion sound in the lateral parts of the abdomen (accumulation of free fluid in the abdominal cavity: exudate, intestinal contents, pus, urine, blood);
- weakening or absence of intestinal peristalsis;
- Kullenkampf's symptom (pathognomonic symptom of hemoperitoneum) – pain on palpation of the abdomen and positive symptoms of peritoneal irritation (Shchetkin-Blumberg symptom) in the absence of tension in the anterior abdominal wall,
- symptoms of peritonitis (positive Shchetkin-Blumberg sign - may be absent in the first hour after injury).

3) Presence of external signs of abdominal injury:

- wound (stab, gunshot) on the anterior abdominal wall, lumbar region, in the buttocks, in the chest area (below the level of the nipples);
- the presence of absolute signs of penetrating injury to the abdominal cavity (eventration from the wound of the greater omentum or loops of the small intestine, leakage of blood, intestinal contents, bile, urine from the wound);
- linear ecchymosis (from a seat belt in an accident), abrasions, hematomas on the anterior abdominal wall, lateral areas of the abdomen, lumbar region;

Purpose of the study. To study the mechanisms of damage to the gastric mucosa during mixed injuries, which include both blunt and penetrating impacts.

Mixed injuries result in significant morbidity and mortality, and gastrointestinal injuries are among the most common complications. Understanding the mechanisms of damage to the gastric mucosa during such injuries is critical to the development of effective prevention and treatment strategies.

Result and discussion. The abdomen is susceptible to various types of injuries, the severity of which varies depending on the mechanism of injury. Injuries may be limited to the abdominal cavity only or be associated with severe multisystem trauma.

Injuries are classified by the type of structure injured, including abdominal wall, solid organ (liver, spleen, pancreas, kidney), and hollow organ (stomach, small intestine, colon, ureters, bladder).

Abdominal injuries result from blunt or penetrating mechanisms. Blunt trauma often affects the spleen, liver, and small intestine, while penetrating trauma can damage various organs.

To assess the extent of injury, injury rating scales are used, which classify injury from 1 (minor) to 5-6 (severe). Mortality rates and the need for surgery increase with the severity of the injury.

Abdominal injuries are often accompanied by concomitant injuries to the spine, ribs, pelvis, thoracic aorta, and other areas.

When intra-abdominal structures rupture, bleeding begins, which can be internal or external. Ruptures of hollow organs lead to contents entering the abdominal cavity and the development of peritonitis.

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