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PERFORATED ULCER OF THE STOMACH AND DUODENUM: CLINICAL, DIAGNOSTIC, AND SURGICAL ASPECTS

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Abstract:A perforation of the gastric or duodenal wall constitutes a life-threatening surgical emergency marked by the disruption of the organ's structural integrity and the subsequent translocation of luminal contents into the peritoneal cavity. This pathological event significantly heightens the risk of diffuse peritonitis, systemic sepsis, and multiorgan dysfunction, thereby necessitating prompt and decisive medical intervention. This article explores the underlying pathophysiological mechanisms, clinical manifestations, diagnostic approaches, and therapeutic strategies associated with perforated peptic ulcers, in addition to examining the epidemiological trends of this condition.

Keywords:gastrointestinal perforation, peptic ulcer pathology, acute peritoneal inflammation, presence of free intraperitoneal air, diagnostic evaluation, operative management.

Introduction: Perforation of a gastric or duodenal ulcer represents a critical surgical emergency arising from peptic ulcer disease, with the potential to precipitate life-threatening complications such as diffuse peritonitis, sepsis, and mortality. This condition is characterized by the full-thickness breach of the gastrointestinal wall, allowing intraluminal contents to escape into the peritoneal cavity, thereby triggering a swift and severe inflammatory and infectious response. In the absence of prompt surgical intervention, the risk of fatality approaches nearly 99%. In certain instances, gastric perforation may develop as a consequence of chronic gastritis. [6] Given its rapidly progressive nature, this pathology necessitates immediate diagnostic evaluation and surgical management, as it unfolds through distinct clinical stages, each marked by characteristic symptoms and a heightened risk of complications. [5]

Pathophysiology of Perforated Ulcer: Perforation of a gastric or duodenal ulcer results in the leakage of the organ's contents into the peritoneal cavity, triggering acute peritoneal inflammation, widespread peritonitis, and subsequent severe systemic intoxication, sepsis, and multiple organ dysfunction. Failure to administer prompt therapeutic intervention significantly increases the risk of mortality, necessitating urgent diagnosis and treatment. [2]

The disease's pathophysiology unfolds in three distinct clinical phases:

1. **Initial Shock Phase (1–6 hours):** A sudden, intense, "piercing" abdominal pain manifests as a consequence of the organ wall rupture. During this phase, the patient may experience nausea, vomiting, and transient loss of consciousness. Additionally, tachycardia and hypotension occur as physiological responses to the acute threat.
2. **Period of False Recovery (6–12 hours):** The patient's condition temporarily stabilizes due to compensatory physiological mechanisms, leading to a reduction in pain and the normalization of vital signs, such as heart rate and blood pressure. However, the inflammatory process continues to propagate within the abdominal cavity, driven by the ongoing spillage of infected material.
3. **Phase of Abdominal Sepsis (12–24 hours):** In this phase, severe peritonitis ensues, characterized by progressive organ failure, heightened intoxication, fever, tachycardia, hypotension, and the deterioration of essential physiological functions. [3]

Clinical Manifestations and Diagnosis:

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The perforation of an ulcer defect leads to a critical patient condition, characterized by marked pallor, cold extremities, profuse perspiration, and rapid, shallow respiration. In the initial stages, the pulse may remain within normal limits or be bradycardic, but as peritonitis ensues, tachycardia and hypotension become evident. Early in the course of the illness, the body temperature may be normal or mildly elevated, but as the inflammatory process intensifies, it may spike to 38°C or higher.
Characteristic signs include constipation and the inability to pass gas, as well as a typical protective posture, with the patient lying on their back or side, knees drawn toward the abdomen. It is noteworthy that the patient's facial expression frequently conveys an expression of alarm and intense distress during this period.
Upon physical examination, distinct signs of perforation can be observed. The abdomen may appear retracted (boat-shaped) or flat, with no observable abdominal movement during respiration. Abdominal wall rigidity is often prominent, sometimes reaching a "board-like" consistency, particularly in the upper abdominal region. In older patients, this muscle rigidity may be less pronounced. Palpation of the abdomen elicits severe tenderness in the epigastrium, accompanied by a positive Blumberg's sign. A critical diagnostic indication is the absence or diminution of hepatic dullness upon percussion, which suggests the presence of free gas within the abdominal cavity. Tympany (Spizarny's sign) may be noted in the epigastric region, while dullness in the lateral abdominal areas points to the accumulation of exudate and gastric contents. [5,6,7]

The following diagnostic techniques are employed to identify a perforated ulcer:

Laboratory Investigations: A complete blood count typically reveals leukocytosis accompanied by a leftward shift of neutrophils, signifying an acute inflammatory response.
Abdominal Radiography: The presence of free gas (pneumoperitoneum) beneath the diaphragm is a hallmark diagnostic indicator of ulcer perforation. This often manifests as a crescent-shaped radiolucency between the right diaphragm dome and the liver.
Pneumogastrograohy: In instances where conventional radiography yields inconclusive results, pneumogastrograohy, involving the infusion of air via a gastric tube, is employed to detect the perforation.
Fibroesophagogastroduodenoscopy (EGD): This endoscopic procedure enables direct visualization of the mucosal defect and the perforated ulcer.
Diagnostic Laparoscopy: This minimally invasive technique is utilized to identify peritoneal inflammation, ascertain the precise location of the perforation, and evaluate potential complications.
Laparocentesis: When results remain ambiguous, abdominal puncture is conducted to aspirate exudative fluid from the peritoneal cavity for further analysis. [1,4]
Surgical Management and Clinical Strategy:
Patients presenting with suspected perforated peptic ulcers necessitate urgent admission to a surgical unit. Emergent operative intervention remains the sole definitive treatment modality, as conservative medical management is both inadequate and contraindicated in such scenarios.
The surgical techniques employed may include:
Primary closure of the ulcerative defect: Typically executed with transverse suturing, augmented by placement of the greater omentum to reinforce and seal the perforation.
Opel–Polikarpov technique: Entails the insertion of a pedicled segment of the greater omentum directly into the perforation, followed by fixation using interrupted sutures to ensure firm adherence between the omental graft and the ulcer margins.

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Gastric resection: Reserved for select cases where primary closure is unfeasible, considering the patient's overall clinical condition and any contraindications to extensive surgical intervention.
Comprehensive peritoneal decontamination is imperative, including aspiration of exudates and gastric contents, followed by adequate drainage. These procedures may be performed via conventional open laparotomy or through minimally invasive laparoscopic approaches, depending on the clinical context and surgical expertise.[3,4]
Epidemiological Characteristics: Peptic ulcer disease, characterized by a propensity for seasonal flare-ups, impacts an estimated 4–6% of the adult population[8,9,10]. Nonetheless, focused clinical screening efforts reveal a markedly higher prevalence, with detection rates reaching 20–25%. The incidence of perforated ulcers is most pronounced among males aged 35 to 50, with men exhibiting a three- to fourfold greater susceptibility compared to women.

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