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EVALUATION AND MANAGEMENT OF ACUTE ABDOMINAL PAIN

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Abstract

Background: Acute abdominal pain is a public problem in the outpatient setting and can represent conditions ranging from benign to life-threatening. The patient history, physical examination, laboratory testing, and diagnostic imaging are the major evaluation methods for acute abdominal pain. There was not sufficient good-quality data for the management of acute abdominal pain, where it relies on the knowledge and expertise of the doctors. A web-based search utilizing the advanced characteristics of different databases like PubMed, Google Scholar, Embase, Scopus, and Cochrane electronic databases was carried out. Here we aimed to review the major evaluation methods for acute abdominal pain and its management protocols.

Keywords: Acute, Abdominal, Pain, Evaluation, Management, Review

1. Introduction:

Acute abdominal pain (AAP) is any severe abdomen state demanding fast control. The abdomen distress correlated with further abdomen pathophysiology and thoracic diseases such as severe pneumonia and myocardial infarction can interfere with AAP. AAP is controlled by several practitioners and demands the right diagnosis and management within a particular time limit to prevent mortality [1].

Up to 10% of all presentations to the emergency department (ED) are patients presenting with abdominal pain. The differential diagnosis is very broad and covers multiple specialties [2]. Causes of acute abdominal pain can be classified as urgent or non-urgent. Urgent causes require immediate treatment (within 24 h) to prevent complications, whereas, for non-urgent causes, immediate treatment is not necessary [3]. The most common urgent causes are acute appendicitis, acute diverticulitis, and bowel obstruction. The most common non-urgent causes are nonspecific abdominal pain (NSAP) and gastro-intestinal diseases [4].

Rapid and accurate diagnosis is important to start treatment as soon as possible to ensure the best possible outcome [5]. The standard diagnostic processes for a patient presenting with abdominal pain to ED include; taking a clinical history and performing a physical examination and additional work-up in blood tests, urine, and if considered necessary plain X-rays. The use of additional imaging, especially computed tomography (CT) scanning, for this group of patients has grown through the last decade because of the well-described diagnostic accuracy [5].

Furthermore, there was not enough high-quality evidence for the management of acute abdomen, and the management of acute abdomen depends on instinct and experience of the physicians [1]. However, to date, clinical guidelines for physicians to facilitate the best outcomes in patients with acute abdomen are lacking. Here we aimed to review the major evaluation methods for acute abdominal pain and its management protocols.

2. Materials and Methods:

A web-based search utilizing the advanced characteristics of different databases like PubMed, Google Scholar, Embase, Scopus, and Cochrane electronic databases was carried out. The major MeSH and other keywords like Evaluation of Abdominal Pain, Management of Abdominal Pain, Diagnosis of Abdominal Pain, etc., were used to search the databases. The search included the latest studies published from 2010 to 2020, and the search was limited to studies published in English.

3. Epidemiology of abdominal pain:

Acute abdominal pain is a common presentation. It accounts for 5-25% of all emergency department visits annually. Each year, about 450 females and 180 males per 100,000 are hospitalized for acute abdominal pain. It may

affect the very young, the very old, either sex and all socioeconomic [6]. However, some causes are frequent in the pediatric population (like appendicitis) or are strictly related to gender. It is necessary to estimate specific populations such as the old or oncologic cases [7].

4. Evaluation of Abdominal Pain

Depending on medical history, physical examination, and laboratory parameters, a physician will decide whether additional investigations are necessary. Most studies have analyzed the combination of medical history, physical examination, laboratory parameters, and radiographic scanning, and not the separate elements.

a) History

Detailed histories from the patient, relatives, and pre-hospital and other hospital staff (if necessary) are important for diagnosis. Essential questions to ask when assessing an acute abdomen. As resuscitation and operative treatment are assisted by past medical history, comorbidities, and pre-morbid physical state, it is important not to miss these questions by focusing on abdominal history [8].

Physical examination for evaluation of Abdominal Pain

b) Vital sign

Vital sign irregularities should change the clinician to a severe cause of the abdominal pain. However, the presence of normal vital signs does not exclude a serious diagnosis [9]. While fever certainly points to an infectious cause or complication, it is frequently absent with infectious causes of abdominal pain [9].

c) The abdominal examination

The emergency physician should know the key elements of the abdominal examination while understanding their limitations. In particular, all techniques for the detection of peritonitis will yield both false-negative and false-positive results.

Inspection, auscultation, and percussion : Inspection is important for the detection of surgical scars, skin changes, including signs of herpes zoster, liver disease (caput medusa), and hemorrhage (Grey Turner's sign of flank ecchymoses with a retroperitoneal source, Cullen's sign of a bluish umbilicus with intraperitoneal bleeding) [10].

- **Palpation**

The ED abdominal exam is directed essentially to the localization of kindness, the recognition of peritonitis, and the identification of specific expansions like the abdominal aorta [11]. Various strategies have been advocated to improve the palpation phase of the examination, including the progression from non-painful areas to the location of pain [11]. It may be useful to palpate the abdomen of anxious or less cooperative children with the stethoscope to define areas of tenderness [11].

- **Tests for peritoneal irritation**

Determining the presence or absence of peritonitis is a primary objective of the abdominal examination; unfortunately, the methods for detecting it are often inaccurate [11]. Traditional rebound testing is performed by gentle depression of the abdominal wall for approximately 15–30 seconds with a sudden release. The patient is asked whether the pain was greater with downward pressure or release [11]. Despite limitations, the test was one of the most useful in a meta-analysis of articles investigating the diagnosis of appendicitis in children [11].

- **The rectal examination**

The diagnostic benefit of a rectal examination in evaluating acute abdominal pain is limited; however, it may be of use in detecting intestinal ischemia, late intussusception, or colon cancer. The routine performance of a rectal examination in suspected appendicitis is not supported by the available literature [12].

IV. Special abdominal examination techniques

Several examination techniques may be useful to the emergency physician in helping to establish a diagnosis, including; Carnett's sign (Abdominal wall tenderness can be caused by trauma), Cough test, Closed eyes sign, Murphy's sign, The psoas sign, The obturator sign, and The Rovsing sign. Some of these tests have not been well studied, but documentation of their presence or absence on the chart will indicate consideration of a specific disease process such as appendicitis [13].

V. Other examination elements

- **Endoscopy:** in cases of rectal bleeding or volvulus, rigid sigmoidoscopy can be utilized. This may sometimes identify the source of bleeding (e.g., a malignancy) or indicate if it is proximal to the rectum. In volvulus, a flatus tube may be passed under direct vision to untwist the bowel and relieve the obstruction [14].

- **Water-soluble gastrointestinal contrast**: Studies can be useful in diagnosing mechanical large bowel and pseudo-obstruction. However, CT is used more frequently and can provide additional information about the pathology involved [15].

- **Laparoscopy/laparotomy:** Laparoscopy is useful in patients whose exact diagnosis is unclear despite appropriate non-invasive investigation, especially if appendicitis, cholecystitis, perforated peptic ulcer, or pelvic inflammatory diseases are suspected [16]. Early laparoscopy can provide a higher diagnostic accuracy and allow treatment in patients with acute abdominal pain of uncertain etiology [16].

d) Laboratory for evaluation of Abdominal Pain

Laboratory work in patients with abdominal pain can diagnose, indicate the disease's severity, or direct attention toward coexisting medical problems. Most abdomen

laboratories examine overall physiology; for example, the complete blood count (CBC) [17]. Some examinations are as special as the lipase and urinalysis. Also, relatively specific tests, such as aspartate transaminase (AST) and alanine aminotransferase (ALT), may be abnormal in many different conditions [17]. The advantage of a provided test is usually estimated by its strength to manage in or out a presented disease. It is clear that laboratory examinations that give a stronger systemic impression of a case's physiology, for example, a CBC or electrolytes, will be perceived as less "useful" than laboratory tests that more directly measure injury to a diseased organ, for example, troponins in myocardial ischemia or lipase in pancreatitis [17]. However, laboratory tests that indicate systemic illness are clinically significant for patients with abdominal pain [17].

e) Radiographic examination

- **Conventional Chest and abdomen Radiography**

Conventional radiography is the primary imaging scan performed in the diagnostic work-up of patients who present with AAP to the emergency department [18]. This scan is broadly obtainable, can be easily performed in admitted patients, and excludes major illnesses such as bowel obstruction and perforated viscus. The efficiency rates for conventional radiography in the diagnostic work-up of cases with AAP are not acceptable. Some study researchers have reported an accuracy of 53% [19]. In one study, treatment management changes after reviewing the radiographs were reported for only 4% of patients [20].

- **Ultrasound Examination**

US is broadly obtainable and is accessible in the ED. The US is a real-time dynamic scan that can show the presence or deficiency of peristalsis and describe blood movement. Besides, it is probable to associate US findings with the goal of maximal kindness. Broad availability in the ED, low costs, and deficiency of radiation exposure are advantages of the US compared with CT. When radiologists perform the US in patients, relevant additional information can be obtained during the examination. Although values for the US's accuracy in patients with acute abdominal pain are not available, in one study [21], the US reportedly provided useful information for 56% of patients with acute abdominal pain. Another study [22] either yielded unique diagnostic information or confirmed one of the differential diagnoses in 65% of patients.

- **Computerized Tomography (CT) Examination**

The CT procedure practiced to monitor AAP cases commonly includes scanning the complete abdomen after intravenous management of an iodinated contrast medium. However, abdominal CT can be performed without contrast medium [18], the intravenous administration of contrast material facilitates good accuracy with a positive predictive value of 95% reported for the diagnosis of appendicitis [23] and a high level of diagnostic confidence, especially in rendering diagnoses in thin patients, in whom fat interfaces may be almost absent. Although rectal or oral contrast substance may be effective in distinguishing fluid-filled bowel loops from abscesses in some patients, the use of oral contrast material can considerably enhance the time these patients spend in the ED [24]. The deficiency of enteral contrast medium does not appear to hamper the accurate reading of CT scans acquired in cases with AAP in postoperative cases. Exposure to ionizing radiation is a limitation of CT [25].

- **Magnetic Resonance (MR) Imaging**

MR scanning is not yet broadly applied in the diagnostic work-up of cases that present with AAP to the ED. The main advantage of MR scanning is the deficiency of exposure to ionizing radiation. The large intrinsic contrast resolution rendered with MR scanning is another advantage, as an intravenous contrast medium may not be needed [18]. The resolution of great intrinsic contrast has the potential to be especially valuable for the evaluation and diagnosis of pelvic disorder in female cases, but this has not been confirmed. In the past, MR scanning needed long examination times. With recently introduced high-speed procedures, MR scanning protocols for AAP cases include testing times shorter than 15 minutes [18]. The deficiency of around-the-clock availability of MR scanning is still a logistic difficulty at various hospitals [18].

MR scanning is more specific than CT for diagnosing acute cholecystitis and identifying popular bile duct stones [26]. The body of scientific research on MR scanning in cases with AAP is relatively limited. Consequently, the availability of and expertise with this scanning are limited, and the cost-effectiveness has not been investigated. Additional study should be directed toward better defining the role of MR scanning in the setting of AAP, particularly as associated with US and CT. Modern data shows that MR scanning previously could be used for a wider range of indications [27]. MR scamming has contraindications, including claustrophobia, which may prevent MR imaging from being performed [27].

5. Management of abdominal pain

Patients with acute abdomen commonly present with dehydration and appetite loss, fluid intake reduction due to nausea, increased water excretion due to vomiting and diarrhea and increased insensible perspiration due to the fever. Historically, an advantage of transfusions was reported in cases of perforative or abscess formation-related appendicitis, even if not complicated with septic shock [28]. When the intra-abdomen disease is suspected, even if circulatory dynamics are stable, the urgent blood transfer is prescribed by the intra-abdominal infection guidelines (SIS and IDSA guidelines) [29]. In cases of hemorrhagic shock or septic shock caused by intra-abdominal infection, the stabilization of circulatory dynamics with rapid transfusion (blood transfusion as required) is the top priority [30].

Broad-spectrum antibiotics treating gram-negative enteric organisms should be delivered in a timely fashion when infection, peritoneal spoilage, or sepsis are differential [31]. Sick cases should be controlled with ongoing vital sign resuscitation. Adequate pain relief with opioids is a standard of care. The use of anti-emetics is likewise important [31]. If a surgical emergency is suspected based on the presentation or physical findings, a expert must be consulted in an emergent fashion. The surgeon must be contacted before potentially time-consuming testing is performed [31].

6. Conclusion

In summary, the causes of acute abdominal pain can be classified as urgent or non-urgent. Rapid and accurate diagnosis is important to start treatment as soon as possible to ensure the best possible outcome. Most studies have analyzed the combination of medical history, physical examination, laboratory parameters, and radiographic scanning. Sufficient pain relief with opioids is a standard of care. The use of anti-emetics is likewise essential. If the condition is even probably surgical, early consultation with a surgeon is mandatory as well.

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