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Research Article

EFFICACY OF VARIOUS DIAGNOSTIC TESTS IN PERFORATED PEPTIC ULCER

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ABSTRACT

Perforation is one of the common surgical complications of peptic ulcer diseases despite the use of various anti-ulcer agents and eradication therapy¹. Important etiological factors in the perforation of peptic ulcer diseases are infection with H.pylori, followed by chronic NSAIDS intake, chronic alcohol intake, cigarette smoking, smoked foods as in Japan people use smoked fish, spicy foods, irregular diet intake and in type A personalities¹. Anterior ulcers perforate usually and bleeds rarely while posterior ulcers penetrates and bleeds². Peptic ulcer perforation is rare before adolescence, common in 30-40years of age group, and is more common in men than Women³. Abdominal pain, cardinal symptom of perforation is sudden in onset and may wake up the patient from sleep, tearing type, starts in the epigastrium and radiates to tip of the shoulder^{4,5}. Various tests are used in the diagnosis of etiology of peptic ulcer. The sensitivity and specificity of these diagnostic tests is different. In this study we will determine the efficacy of different diagnostic tests considering histopathology as gold standard.

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INTRODUCTION

Methodology

Study procedure

All patients who presented to the emergency ward of Sassoon general hospital with signs and symptoms of perforated peptic ulcer were recruited into the prospective study for a period of two years. Detailed history and clinical examination were noted for each patient. For all patients, baseline investigations such as complete blood count, blood sugar, serum electrolytes, serum creatinine, urea, X- Ray Chest were performed. Other specific investigations such as X- ray abdomen and ultrasonography of the abdomen were done. The past history of the patient was assessed including previous history of peptic ulcer, use of NSAIDS and previous history of surgeries for peptic ulcer and previous treatment for the eradication of H. pylori.

Operative intervention

On admission all the patients diagnosed with perforation were adequately resuscitated with fluids or blood as per the requirement. Investigation to support the diagnosis and for anesthesia were done. Preoperatively antibiotic (iv ceftriaxone, iv amikacin, iv metronidazole) and antacid (iv ranitidine) were given.

All patients following a clinical diagnosis of perforated peptic ulcer and adequate resuscitation underwent an emergency laparotomy. After opening the abdomen all the contaminated peritoneal fluid drained and thorough saline wash given. Site of perforation was identified and two site, edge biopsies were taken from the site of perforation taking care to include mucosa of the perforation site. Perforation sites were closed with silk 2-0 simple suture and omental patch was kept. Two abdominal drains were kept and abdomen closed in layers.



Pink colour : Positive Rapid urease test
No change in colour: Negative Rapid urease test

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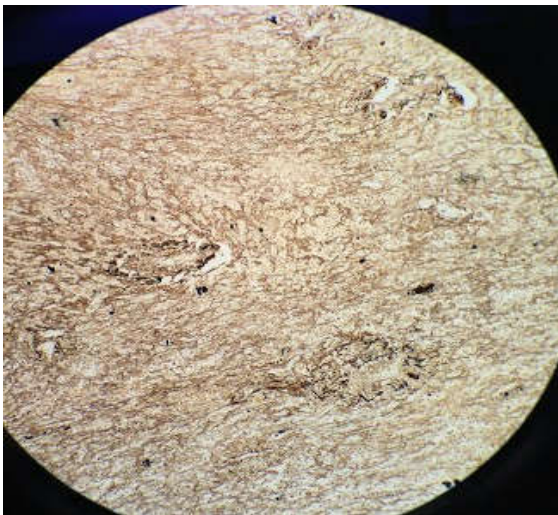
Diagnostic tests

Rapid urease test: One of the two biopsy specimen was put in rapid urease reagent and observed for 24 hrs for colour change and the findings were recorded.

Serum ELISA: Serum of the patient was put on a commercially available H.pylori kit and the results noted.



Histopathology: Other biopsy specimen was collected in normal saline and sent for histopathological evaluation.



Warthin silver starry staining of Histopathology specimen showing spiral shaped Helicobacter pylori bacteria in the gastric mucosa.

DISCUSSION

A study of fifty patients of perforated peptic ulcer was undertaken to determine the efficacy of various diagnostic tests used for detection of Helicobacter pylori in perforated peptic ulcer patients.

Demographic profile of patients

94% of perforated peptic ulcer patients included in the study were males and 6% were females. A similar demographic profile was seen in a study conducted by Ng EK *et al* who found 49 out of 51 patients (96%) to be males [6]. Another study in Nigeria by Nuhu *et al* [7] also included more male patients (80%) as compared to females (20%).

The maximum number of patients included in the study were in the age group of 30-39 years (24%) followed by 50-59 years of age (22%). The lowest number of patients belonged to the age group of >70 years (2%). The mean age of patients was 43.46 years which was similar to the studies done by Hussain *et al* in which the mean age was 44.6 years [8] and Ng EK *et al* where the mean age of the patients was found to be 47.6 years [7].

Symptomatology in Peptic Ulcer Perforations

Pain (100%) and vomiting (64%) were the most significant and consistent symptoms. 52% of patients included in the study complained of fever and 14% of dyspepsia. None of the patients had any past history of ulcer management or intake of H.pylori eradication therapy.

Tenderness (100%), distension (90%), guarding(88%) were the most consistent signs in patients of perforated peptic ulceration and rigidity was seen in 74% cases while 52% patients were in shock . This is similar to another study conducted in Malaysia by Said in 1982 where tenderness and guarding was noted in 84% patients, rigidity in 48% [9].

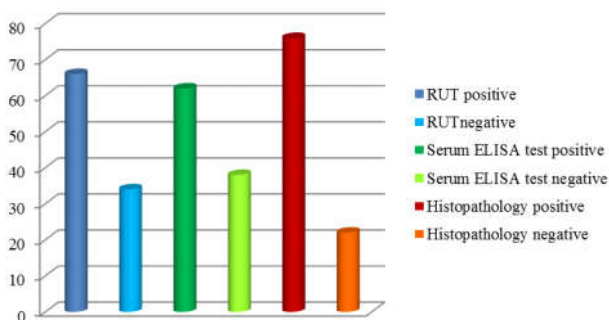
Among a total of 50 patients, 40% of the patients presented within the first 24 hours of onset of symptoms and 14(28%) presented ≥ 72 hours after initial illness. Nuhu *et al* reported that 26(47.3%) patients presented within 24 hours of perforation, while 9 (16.4%) presented more than 72 hours afterwards [7]. Similarly, Goudar *et al* from India in 2010 reported that 72 out of 180 patients (40%) included in their study presented within the first 24 hours of development of symptoms [10].

Surgical Intervention and Intra-Op Findings

All patients included in the study presented with acute peptic ulcer perforation and underwent exploratory laparotomy. Primary closure with omental patch was performed in all 50 patients. The same protocol for management of a perforated peptic ulcer has been described in by Said in 1982 [9], Sharma *et al* [11] in 2006, Nuhu *et al* in 2009 [7] and Goudar *et al* in 2010 [10].

Total number of duodenal perforations were 25(50%), prepyloric 7(14%) pyloric 16 (32%) and body of stomach 2(4%). Hussain *et al* conducted a study with similar findings of perforated duodenal ulcer in 50 (67%) patients while 25(33%) patients had perforated gastric ulcer [8]. Another study by Goudar *et al* in 2010 also showed a predominance of duodenal ulcers (90.5%) and only 9.5% patients presented with gastric

Series 1



ulcers^[10]. However, Said in 1982 from Malaysia^[9] reported more cases of gastric perforations (87%) as compared to duodenal ulcer perforations (13%).

Detection of Helicobacter Pylori In Biopsy Specimen

The presence of Helicobacter pylori in the biopsy samples taken from the site of the peptic perforations was done using three different methods- Rapid Urease detection, Serum ELISA and Histopathology.

Mechanism of these tests

Histopathology: The organism can be detected on biopsy specimen using Hematoxylin eosin stain, Giemsa stain and Warthin silver starry stain. Warthin silver starry staining is considered as gold standard³⁷.

Rapid Urease Test: It utilizes the ability of the H.pylori in biopsy specimen to produce urease which when comes in contact with solution containing urea leads to change in colour of the solution to pink.

Serum ELISA Test: Commercially available Serologic kits are used to test for the presence of immunoglobulin G antibodies directed against H.pylori.

CONCLUSION

Perforated peptic ulcers are a common cause of morbidity and mortality in the young population. *Helicobacter pylori* is implicated in a majority of these ulcers in the presence or absence of co-morbidities and other risk factors like NSAID use, alcohol consumption and smoking. Delay in seeking treatment from initial appearance of symptoms, size of perforation and degree of peritoneal contamination plays a big role in the outcome post operatively.

Rapid urease test (RUT) is a rapid, inexpensive, easy and accurate test (as compared to serum ELISA) which can be performed immediately after collection of the sample to detect the presence of *Helicobacter pylori*.

Serum ELISA is cheap, easily available test to detect the presence of H.pylori but its sensitivity, specificity is less as compared to rapid urease test.

This was a pilot study consisting of fifty patients to determine the association of *H.pylori* with perforated peptic ulceration. Studies carried out on a larger group of such patients will more conclusively prove this association and may help pave the way for recommending the use of anti-*H.pylori* eradication therapy for every patient of peptic ulcer perforation.

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