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Epidemiology and Management of Perforated Peptic Ulcer: A Hospital Experience

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Abstract: ***Introduction: Assessments of true peptic ulcer rates do, however, pose several methodological problems. Preferably prevalence and incidence rates should be based only on cases verified by endoscopy, roentgenograms or surgery. Gastric and duodenal ulcer rates should be reported separately and ulcer incidence calculated exclusively from first time verified lesions. Material & Method: This was a combined retrospective and prospective study of patients operated for peptic ulcer perforations at Gujarat Adani Institute of Medical Science from Janurary 2006 to December 2011. Results & Conclusion: Out of 1200 patients who presented with peptic ulcer disease (PUD) during the study period, 120 patients underwent emergency laparotomy for perforated peptic ulcers. Of these, 10 patients were excluded from the study due to incomplete data and failure to meet the inclusion criteria. Thus, 110 patients were enrolled giving an average of 11 cases annually and represented 10% of cases. Of these, 28 (21.4%) patients were studied retrospectively and the remaining 82 (78.6%) patients were studied prospectively.***

Keywords: Peptic Ulcer, Prevalence, Perforated Ulcer, Management

1. Introduction

Since the mid-twentieth century peptic ulcer mortality in Westernised countries has declined in young and middle aged subjects. Ulcer mortality in senior citizens has, none the less, remained essentially unchanged or even increased.'[1] Similar trends have been seen when other frequency estimates of ulcer occurrence such as hospitalization, operation, and physician visit rates have been reviewed. Assessments of true peptic ulcer rates do, however, pose several methodological problems.Preferably prevalence and incidence rates should be based only on cases verified by endoscopy, roentgenograms or surgery. Gastric and duodenal ulcer rates should be reported separately and ulcer incidence calculated exclusively from first time verified lesions.[1, 2]

The aetiology of peptic ulcer was fiercely debated. It is believed that peptic ulcers develop due to an imbalance between aggressive factors (Helicobacter pylori, NSAIDs, gastric acid) and protective factors (mucin, bicarbonate, prostaglandins), leading to an interruption in the mucosal integrity. Various factors are implicated that play a pivotal role in the pathogenesis of ulcertions like, sedentary life style, alcohol intake, spicy food, drugs and various bacterial infections.[3] Moreover, several endogenous substances have been identified and are reported to be involved in the production of gastrointestinal lesions in animals. The more important ones include some of the bacterial infection, various drugs and chemicals, gastric secretion, lipid metabolites, neuropeptides, inflammatory mediators and reactive free radicals.[4] Oxidative stress has emerged as one of the major pathogenic factors in progression of ulcer that directly impaired the cellular functions and promotes cellular organelles damage in the cells, including mitochondria, lysosomes, and nucleus.

2. Material & Method

2.1 Study Design and Setting

This was a combined retrospective and prospective study of patients operated for peptic ulcer perforations at Gujarat Adani Institute of Medical Science from Janurary 2006 to December 2011.

2.2 Study Subject

The subjects of this study included all patients whowere operated for perforated peptic ulcers at Gujarat Adani Institute of Medical Science during the period under study. Patients with incomplete data were excluded from the study. Patients treated conservatively and those who failed to consent for HIV infection were also excluded from the study. The details of patients who presented from Janurary 2006 to December 2011 were retrieved retrospectively from patient registers kept in the Medical record departments, the surgical wards, and operating theatre. A detailed history and thorough physical examination were followed by investigations like full blood count, blood grouping, serum urea, serum creatinine and random blood sugar. Patients were also screened for HIV infection using rapid test/ELISA test. A determination of CD 4 count was also performed in all HIV positive patients. Radiological investigations like X-ray abdomen erect and chest X-ray were done in all patients on the suspicion of diagnosis of perforated PUD. Other investigations included hematological profile, serum urea and electrolytes and urinalysis.

2.3 Data Collection

Data were collected using a preformed questionnaire. variables included in the questionnaire were; patient's demographic data (age, sex), associated medical premorbid illness, duration of illness, previous history of PUD, NSAID use, alcohol use and cigarette smoking, HIV status, CD 4

count, timing of surgical treatment, site of perforation, size of perforation, type of surgical procedure, postoperative complication, length of hospital stay, mortality. The duration of symptoms was defined as the time span between the initial pain perception due to perforation and the operation.

2.4 Statistical Analysis

The statistical analysis was performed using statistical package for social sciences (SPSS) version 15.0 for Windows (SPSS, Chicago IL, U.S.A).The mean ± standard deviation (SD), median and ranges were calculated for continuous variables whereas proportions and frequency tables were used to summarize categorical variables. Continuous variables were categorized. Chi-square (c2) test were used to test for the significance of association between the independent (predictor) and dependent (outcome) variables in the categorical variables. The level of significance was considered as $P < 0.05$. Multivariate logistic regression analysis was used to determine predictor variables that predict the outcome.

3. Results

Out of 1200 patients who presented with peptic ulcer disease (PUD) during the study period, 120 patients underwent emergency laparotomy for perforated peptic ulcers. Of these, 10 patients were excluded from the study due to incomplete data and failure to meet the inclusion criteria. Thus, 110 patients were enrolled giving an average of 11 cases annually and represented 10% of cases. Of these, 28 (21.4%) patients were studied retrospectively and the remaining 82 (78.6%) patients were studied prospectively.

3.1 Surgical Treatment

The majority of patients, 70 (83.3%) had Graham's omental patch of the perforations with either a pedicledomental patch or a free graft of omentum. Those with sealed perforations had peritoneal lavage with warm saline and mass closure of the abdomen. One patient had truncalvagotomy and Roux-en-Y gastro-jejunostomy in addition to simple closure. One patient who had a large ulcer, which penetrated to the pancreas and caused pyloric obstruction, underwent subtotal gastrectomy.

3.2 Outcome of Treatment

Post-operative complications were recorded in 30(31%) patients. Of these, surgical site infection (51.0%) was the most common post-operative complications. The mean age of patients who developed complications was 52.4 ± 16.4 years, whereas the mean age of patients without complications was 32.6 ± 10.2 years. This age difference was statistically significant ($P = 0.011$).

4. Discussion

In this original research, a total of 110 patients were enrolled over a 6 year period giving an average of 11 cases annually. This figure is similar to what was reported by Schein et al. in South Africa reported a low incidence of perforated PUD. These differences reflect differences in the rate of risk factors for perforated peptic ulcer disease from one country to another. The figures in our study may actually be an underestimate and the magnitude of the problem may not be apparent because of high number of patients excluded from this study.

In agreement with other studies, the diagnosis of perforated PUD in this study was made from history and identification of free air under the diaphragm in plain abdominal and chest radiographs, and the diagnosis was confirmed at laparotomy. The value of the radiological investigation has been compared with other writers and with current radiological techniques; 80-90% of cases are correctly diagnosed[5]. In case of perforated PUD ulcer, free intraperitoneal gas is less likely to be seen if the time interval between the perforation and radiological examination in short.[6] Recently, Computerized tomography (CT) scans with oral contrast are now considered the reliable method of detecting small pneumoperitonium before surgery and the gold standard for the diagnosis of a perforation.[6] Abdominal ultrasonography has also been found to be superior to plan radiographs in the diagnosis of free intra-peritoneal air. None of these imaging studies were used in the diagnosis of free intra-peritoneal air in our study. We relied on plain radiographs of the abdominal/chest to establish the diagnosis of free intraperitoneal air which was demonstrated in 65.8% of cases. We could not establish, in our study, the reason for the low detection rate of free air under the diaphragm.

In our study, duodenal ulcer perforation was the most common type of perforation with a duodenal to gastric ulcer ratio of 12.7:1. This is comparable to a study in Kenya which reported a duodenal to gastric ulcer ratio of 11.5:1.[6] A high duodenal to gastric ulcer ratio of 25:1 was reported in Sudan. A study in Ghana reported high incidence of gastric ulcer perforations than duodenal ulcer perforation. Low duodenal to gastric ulcer ratios of 3:1 to 4:1 have been reported from the western world. Gastric ulcer is considered a rare disease in Africa being 6-30 times less common than duodenal ulcers. There was no obvious explanation to account for these duodenal to gastric ulcer ratio differences.

5. Conclusion

Perforation of peptic ulcer remains a frequent clinical problem in our environment predominantly affecting young males not known to suffer from PUD. Simple closure with omental patch followed by Helicobacter pylori eradication was effective with excellent results in majority of cases despite patients' late presentation in our center.

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