ORIGINAL ARTICLE

Analysis of risk factors cotnributing to releak in duodenal ulcer perforation: experience of surgical closure by Graham's patch

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Abstract:
Introduction: Free perforation of peptic ulcer into the general peritoneal cavity is a catastrophic event. Although laparoscopic approach has been successfully used for its management, primary closure of the perforation using an omental patch (Grahm's patch) is the immediate alterative.
Objective: This study was planned to analyse risk factors, which could predict releak following Grahm's patch closure.
Patients and Methods: This study was carried out for five years from April 2003 to March 2008, at department of surgery Muhammad Medical College Mirpurkhas. All patients undergoing surgery for perforated duodenal ulcer were included in the study. 53 patients underwent Grahm's Patch Closure. 6 patients developed releakage post operatively. Therefore two groups were made. Patients with releak were kept in case group (n=6) and the patients with no leak (n=47) were included in control group.
In this study all patients were assessed for age, pulse rate, systolic blood pressure, hemoglobin & serum Protein / albumin, total leukocyte count (TLC) on arrival, delay in arrival since sign and symptom (probable) of perforation and size of perforation on operation were also documented.
Results: Age greater than 50 years (p=0.05), pulse greater than 110/min (p=0.22), systolic blood pressure less then 90mmHg (p=0.021), hemoglobin less than 10gm% (p=0.25), serum albumin less than 2.5gm% (p=0.018), delay in arrival for more then 36 hour (p=0.00017), and size of proportion greater then 5mm in it maximum dimension were identified as risk factor for releak .
Conclusion: Delay in arrival was the single most significant factor influencing mortality rate after omental patch closure of perforated duodenal ulcer.

Key words: Duodenal ulcer of perforation – Grahm's patch – risk factor – releak.

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Background:
Perforated peptic ulcer is negligible in hospital emergency admission in UK and their current data is mostly based on findings observed over two decades ago[1].

But in our region, it is still a load in emergency centres. It is believed that Helicobacter pylori (H.pylori), has played an important role in the causation of peptic ulcer. However, its role in duodenal ulcer perforation has not been investigated extensively and the results are conflicting[2].

Aside from genetic factors (increased prevalence of duodenal ulcer in patients with blood group O), individuals with hyper pepsinogenaemia, dietary factors, drug ingestion (NSAID) and smoking are important. The latter is associated with an increased incidence of both gastric and duodenal ulceration and a higher relapse rate following successful healing by medication or surgical therapy[3].

Free perforation of peptic ulcer in the general peritoneal cavity is a catastrophic event. In the

past, primary closure for perforated peptic ulcer was not effective due to lack of proper control over acid production[4].

Since the advent of Proton Pump blocker, whole spectrum of peptic ulcer surgery has changed. The discovery of Helicobacter pylori, its association to peptic ulcer and the effective medication, triple therapy with Proton Pump Inhibitors for acid control for peptic ulcer disease, definitive surgery is less frequently used[3]. Even today primary closure of the perforation on an omental patch (Grahm's patch) is the immediate alternative[5]. Perforated duodenal ulcers is one of the common surgical emergencies, and releak after duodenal ulcer perforation closure, is an important cause of mortality[1].

This study was conducted to assess risk factors which may lead to releak.

Patients and method:

This study was carried out between April 2003 to March 2008 in department of surgery Muhammad Medical College for five years. Patients with perforated duodenal ulcer in whome Grahm's patch repair was done, were included in the study. Patients expired before or after primary surgery were excluded from the study. Total 53 cases were selected for the study and all under went primary closure of perforation over an omental patch (Grahm's Patch). Post operatively all patients were kept on injectable proton pump inhibitor (PPI), along with third generation cephalosporin and metronidazole[7]. Out of all (n=53), 6 patient developed releakage post operatively.

Therefore two group were made and patients with releak were kept in case group (n=6) and the patients with out leakage were considered as a control group. (n=47)

Factors considered for comparison among the two groups were age, pulse rate on arrival, systolic blood pressure, hemoglobin, serum total protein, total leukocyte count at presentation, delay in arrival from probable appearance of sign and symptoms of perforation of duodenal ulcer and the size of perforation.

Results:

A significant correlation with morbidity (releakage) was observed with positive considered factors in perforated duodenal ulcer cases who underwent Graham's patch surgery. As all cases were male, therefore sex discrimination remained irrelevant. But age greater than 50 years (P-0.05) showed bad outcome, as control group had mean age 42.32 years whereas case group had mean age 52.33 years.

Pulse rate on arrival also showed its importance. As the cases group had mean pulse rate>110/min whereas control group had>110/min. But its correlation with releak was not established (P-0.022) as multiple number of patients recovered uneventfully without complications despite there pulse rate 110/minutes or more on arrival.

Systolic blood pressure was also noted in every case on arrival and in control group it ranged

Table 1: *Parameters on arrival (Total Case N=53)*

		Case Group (N=6)		Control Group (N=47)		
S.No.		**Range**	**Mean**	**Range**	**Mean**	**P-Value**
1.	Age in year	45-68	53.33	22-61	42.32	0.05
2.	Pulse rate (minutes)	100-138	119	90-116	106	0.22
3.	Systolic Bp (mmHg)	60-100	80	90.128	102	0.021
4.	Hemoglobin (gm/ dl)	8.2-11.5	9.77	9.08-12.30	10.06	0.025
5.	Total leucoyte albumin (gm/dl)	6200-8500	5400	6500-11800	7800	0.004
6.	Serum protein albumin (gm/dl)	1.98-3.00gm	2.24	2.8-42	3.35	0.018
7.	Delay in arrival (hours)	36-70	62	8-30	16	0.0017
8.	Size of dudenal perforation (mm)	6.00-13.00	8.01	3.0-8.0	4.5	0.0010

from (90mmHg to 128mmHg) with mean of 102mmHg, whereas in control group it remained on lower side with range 60-100mmHg (mean of 80mmHg) (p=0.021). Hemoglobin in this series was not significantly different in the two group, as the control group had a mean hemoglobin 10.06gm/dl (range of 9.8 to 12.03gm/dl), whereas in case group it ranged from 8.2 to 11.5gm/dl with mean 9.77gm/dl (p=0.025).

As far as total leucocytes count was concerned it was almost raised in all cases of control group on arrival. But it was on lower side in case group (mean 2400/cumm) (p=0.004).

Serum albumin less then 2.5gm/dl (p=0.018) was an important factor as out of all (n=6) case group, only one patients had serum albumin >3.00gm/dl. Remaining had less then 2.5gm/dl. Delay in arrival remained a constant feature, as no patient arrived in <6 hours time. Morbidity as well as mortality were significantly raised with late arrival (P-0.00017). Size of the perforation >5mm (range 5.5mm – 12.5mm) (P-0.0010) was observed in all case group and less in control group (3.0mm – 6.0mm) mean 3.5mm.

Discussion:

Perforated duodenal ulcer is one of the common surgical emergencies[6]. Releak after duodenal ulcer perforation closure is an important cause of mortality[7]. This study was planned to analyse risk factors, if any, which could predict releak following duodenal ulcer perforation closure. Average age above 50 years in our study remained a bad prognostic indicator. A similar study[7], showed age greater then 60 years as cofactor for releak after simple closure of perforation.

In an other study in Ethiopia[8], peptic ulcer perforation was reported in comparatively early age group (mean age 32.6 years). Kumar S et al[3] found age group 39.4±15.5 with duodenal ulcer perforation. Datis AC et al[5] found average age 55 years in their study for perforation in duodenal ulcer.

Male dominancy is obvious in the development and perforation of peptic / duodenal ulcer. This ratio in an study.[9] was (21.33:1). In our study all cases were male. Tachycardia (Pulse rate >110/minutes), systolic blood pressure <90mmHg) and low hemoglobin at arrival also proved as co morbid factor for releakage and worse outcome. Data collected from other studies[5,7] also show low while blood cell count (as it shows depressed immunity status of the patient), as an important predictor for releakage if present on arrival.

Generalized biliary peritonitis is a serious intra abdominal emergency following duodenal ulcer perforation, and rapidly evolve bacterial peritonitis, aggravates toxicity and leads the patients into septicemia[10].

Delay in arrival in our series remained a significant factor for mortality and morbidity as it was 76 hours (range 62-96 hours) delay on average in case group before reaching a tertiary care hospital and 16 hours (range 8 to 36hr) in control group. This delay is not observed in most studies but conversion of chemical i.e biliary peritonitis into bacterial peritonitis as cause of bad outcome is well recognized[10].

Size of the perforation greater then 5mm was identified as the single independent risk factor for releak prediction, and is consistent with regional[7] and international.[11] studies. Increased perforation size is directly related to delay in arrival. That could be because of delay in diagnosis. In a study presence of gas in the fissure for ligamentum terse is recognized as an early sign of perforation in duodenal ulcer[12]. In an another study they have recommended a "Fish eye sign" as evidence for perforated duodenal ulcer on sonology[13].

Delay in arrival at secondary or tertiary care hospital is the basic problem of third world and quite significant number of patients came with septicamia. According to a study in Bangladesh, they have managed perforated case of duodenal ulcer with septicemia by percutaneuous abdominal drainage[14] . On the other hand in Europe and USA early arrival of such cases, to tertiary care centres is changing the trend in emergency surgery, and case of perforated duodenal ulcer

are being dealt with laparoscopic closure[1,7,15]. But simple closure of perforated duodenal ulcer on Omenal Patch (Grahm's patch) in combination with postoperative proton pump inhibitor is accepted treatment[5,16] and the immediate acid reduction surgery in the contaminated environment is probably unnecessary.

Conclusion:

Delay in arrival of the patients to tertiary care hospital is the most significant factor in our region. Low level of serum albumin, depressed immunity and bigger size of perforation are reasonable parameters for the prediction of releak after omental patch (Grahm's Patch) closure of duodenal ulcer perforation. Delay in diagnosis is also a contributing factor, which could be improved by good sonological expertise.

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