



A Study of Duodenal Ulcer Perforation With Special Reference to Serum and Peritoneal Fluid Amylase

KEYWORDS

Duodenal ulcer, Peritoneal fluid, Amylase, Perforation

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ABSTRACT

The fact that a certain number of patients with perforated gastroduodenal ulcer have significantly elevated serum and peritoneal fluid amylase is widely known. The determination of amylase content in serum or peritoneal fluid may often prove useful adjustment to clinical evaluation. There is a tendency for larger perforation to have high serum and peritoneal fluid amylase. Preoperative shock is more frequent in patients with higher serum amylase

INTRODUCTION:

Medical statistics indicate about 10% of male population of the world between 20-40 years of age suffer from peptic ulcer. In Andhra Pradesh duodenal ulcer is most common.

Perforation of duodenal ulcer which is fairly frequent complications and common cause of death in the past, but now in this state it is not so common cause of death as before. Perforated duodenal ulcer forms 11.7% of all emergency operations done in Govt. General Hospital, Kurnool. This study is done because duodenal ulcer perforation is one of the common emergencies in this region.

According to literature the earliest case of acute perforation of peptic ulcer was recorded in 1670.

The perforation of an ulcer of stomach or duodenum may be acute, sub acute or chronic. In acute type there is sudden rupture of the base of the ulcer and contents escape into general peritoneal cavity. In sub-acute type the rupture is exceedingly minute, when it occurs often adhesions have adhesions have been formed around the base of ulcer or when the rent is quickly closed by a plug of omentum and the general peritoneal cavity is not contaminated. The chronic form, adhesions have been formed by the stomach but the organ into which ulcer penetrated.

Site of perforation

Anterior wall – 92%

Posterior wall – 2%

About pyloro-duodenal junction – 6%

First part of duodenum (anterior wall) including the pyloric region 79.

Size of perforation

Gastric ulcers are usually not more than 1cm in diameter. Duodenal ulcers are seldom over 0.5cm in size, Stran & Spencer (1980) suggest 'The larger the perforation'. 5-10% of perforations may recur.

From the time of perforation, the clinical symptoms and signs progress.

The progress is divided into three phases.

Primary stage or the peritoneal irritation.

Second stage or stage of peritoneal reaction.

Tertiary stage or stage of bacterial peritonitis.

Individual symptoms and signs

Pain

Shoulder tip pain

Nausea and vomiting

Haemorrhage

Abdominal rigidity and tenderness

Obliteration of liver dullness

Shifting dullness

Auscultation of the abdomen

Temperature

Pulse

Blood pressure

Investigations

Haemoglobin percentage

Peritoneal fluid for culture of bacteria

X-ray examination

Serum and peritoneal fluid amylase in perforated peptic ulcer :

In normal healthy person the serum amylase levels remain within normal range of 80-160 somogyi units based on the amount of glucose liberated from the serum during incubation with water serum.

These levels vary only slightly as they are influenced by prandial and post-prandial states. Although abnormal rise in blood amylase is accepted clinically as usually indicative of acute pancreatitis, it is well know that such range can occur, in gastro duodenal perforation.

Hence serum amylase is no more the diagnostic criteria of acute pancreatitis.

Following are the conditions where elevation of serum amylase occurred.

	Acute pancreatic
Primary pancreatic :	Chronic pancreatic (acute exacerbation) Pseudocyst of pancreas, Penetrating peptic ulcer.

Conditions which probably produce their effect at the ampullary level	Carcinoma ampulla of vater Carcinoma head of the pancreas Common duct exploration Acute duct stones Common duct stones Post sphinterotomy drug Drug induced (morphine) Small bowel obstruction (simple mechanism)
Abnormal renal insufficiency	Chronic renal excretion of enzymes Acute reversible renal failure shock
Diseases which produce a gastric intestinal leak or exudates	Perorated peptic ulcer Mesenteric vascular occlusion Small bowel obstruction (strangulated, strangulated, gangrenous)

Mechanism of elevation of serum amylase in the perforated peptic ulcer :

The raise of serum amylase in peptic ulcer is probably a result of increased liberation of pancreatic secretion into free peritoneal cavity with resultant lymphatic pick up. Thus a larger amount of fluid and hence a more generalised fluid a pill should be important factor in increasing serum absorptions.

Eight patients with elevated serum amylase and peptic ulcer perforation noted direct relationship between the size of perforation and degree of spillage adn serum amylase.

He observed it:

- There is increased mortality in patients where there is high serum amylase.
- Rise in serum and peritoneal fluid amylase most of the times are directly related to the amount of abdominal fluid spill.
- Longer the duration of perforation the more rise in serum amylase.
- There is a tendency for larger perforation to have high serum and peritoneal fluid amylase.
- Preoperative shock is more frequent in patients with higher serum amylase.

The determination of amylase content in serum or peritoneal fluid may often prove useful adjustment to clinical evaluation.

MATERIAL AND METHODS :

A retrospective review was made of all the patients admitted with diagnosis of perforated duodenal ulcer and treated at Kurnool Medical College/GGH, Kurnool from March 2011 to June 2013.

25 cases were personally studied. Blood was taken at the time of admission and peritoneal fluid was taken at the time of Laparotomy. Samples were analysed for amylase estimation by modified Somgyi method adopted by King and Wootton.

DISCUSSION :

Duodenal perforation is one of the commonest surgical

emergencies. A clinical study is undertaken to evaluate the relative frequency of occurrence, age, sex, incidence and the relation of serum and peritoneal fluid amylase to the morbidity and mortality.

Total number of emergency operation done	2092
Appendicitis	1084(52.06%)
Intestinal obstruction (including hernia obstructed)	381(18.20%)
Duodenal ulcer perforations	224(11.71%)
Gastric perforations	9(0.44%)
Ileal perforations	75(3.6%)
Others	289(13.885)

The sex ratio is as follows in Govt. General Hospital, Kurnool.

Total number of cases	224
Female cases	10
Male : Female	234:10 = 23.4:1
Avery Jones and Pollack	Present series
6:1	23.4:1

Age

It is predominant during 20-50 years of age. Peak incidence is between 31-40 years.

Table

Age incidence from 01-04-2011 to 31-05-2013 at Govt. General Hospital, Kurnool.

	No. of cases	Percentage
Below 20 years	18	8
21 to 30 years	63	25
31 to 40 years	69	28
41 to 50 years	59	24
51 to 60 years	30	13
More than 60 years	5	2

Table

Total number of operations : 244

Season	Period	No.of cases	Percentage
Summer	March – June	59	24
Rainy	July-October	104	43
Winter	Nov-Feb	81	33

Blood grouping

Increased incidence in 'O' group.

Ian Aid (1954), Wright (1955) found increased incidence in 'O' group.

In the present series of 25 cases:

Blood group	No. of cases
O +ve	12
A +ve	5
B +ve	5
AB +ve	1
AB -ve	1

Amylase

The fact that a certain number of patients with perforated gastroduodenal ulcer have significantly elevated serum and peritoneal fluid amylase is widely known.

Normal range of serum amylase is 80 to 160 somogyi units. Elevation upto 200 somogyi units is taken as normal by some authors.

Normal peritoneal fluid does not contain amylase. In duodenal ulcer perforation because of leak of the pancreatic juice the amylase level is elevated.

Serum amylase value in perforated duodenal ulcer mortality and morbidity.

Total number of cases : 25

Table

Range	No.of cases	Complications	Deaths
Less than 200	12	2	-
200-300	9	2	-
300-400	3	2	-
400-600	-	-	-
More than 600	1	-	-

12 normal serum amylase complications 2 (16.66)

13 elevated serum amylase complications 4 (30.74%)

Deaths 1 (7.7)

The present series compared to Roger's series is as follows

Table

	Rogers series	Present series
Duodenal ulcer perforations	806	25
Elevated serum amylase.	321	13
Deaths	34	1

It is observed from above table that the numbers of cases with morbidity are increasing in the amylase level more than 1000 somogyi units. The deaths has occurred in whom the peritoneal fluid amylase is 3200 somogyi units.

The series compared to Amerson's series in as follows ;

	Amerson's series 1958	Present series 2004
	No.of cases	No.of cases
Duodenal ulcer perforation	24	25
Peritoneal fluid amylase more Than 200 somogyi units	15 (62.5%)	24 (96%)
Mortality	Not studied	1

Relation of the abdominal fluid spill and elevated serum amylase.

Table

Total No.of cases : 25

Fluid spill	Cases	Normal Amylase	Elevated amylase Less than 200s.u.
Small (250 ml)	4	4	-
Moderate (250-500 ml)	7	6	1
Large (500-1000 ml)	7	4	3
Massive more than 1000ml	7	0	7

Duration of perforation of serum amylase

Table

Duration	No. of cases	Non elevated	Elevated
0-8 hours	1	1	-
8-16 hours	7	4	3
16-24 hours	5	3	2
24-48 hours	3	-	3
More than 48 hours	9	3 (33%)	6 (66%)

Size of perforation

The bigger the size of the perforation and more abdominal fluid spill and elevated of peritoneal and serum amylase.

Relation of the shock to the serum amylase

Table

No. of cases : 25

Shock	No.of cases	Normal amylase	Elevated
Shock absent	19	11 (57.89%)	8 (42%)
Shock present	6	1 (16.66%)	5 (83.33%)

CONCLUSIONS

Duodenal ulcer perforation is one of the commonest surgical emergencies.

Commonest in males.

Patients come to the hospital in late stages as most of them are villagers and belong to low income group.

The incidence is more tin blood group 'O' patients.

Most cases were diagnosed by clinical examination and plain x-ray of abdomen.

Though abnormal rise of serum amylase is indicative of acute pancreatitis, such range can occur in duodenal ulcer perforation.

The rise of serum and peritoneal fluid amylase in duodenal ulcer perforation is directly proportional to size of perforation. Duration of perforation, amount of spillage and presence of shock.

The increased levels of amylase are well correlated with morbidity and mortality.

In early cases, where peritoneal contamination and serum amylase is less, closure of perforation, and definitive surgery can be attempted. But majority of the patients come to this hospital in late stage, so that only closure of perforation is best procedure.

A conclusion is drawn that pre operative serum amylase estimation helps both as regards to prognostic value as well as therapeutic value i.e. the type of surgery, either simple closure or closure of perforation with definitive surgery in cases of duodenal ulcer perforation.

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