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Short Term Review of Highly Selective Vagotomy for Emergency Management of Selective Cases of Perforated Duodenal Ulcer, Evaluation of 30 Cases At a Peripheral Indian Hospital

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ABSTRACT

Perforated duodenal ulcer is a common cause of patient presenting with acute abdominal pain to the emergency ward. In such patients after careful screening, highly selective vagotomy in the same sitting as primary closure of the perforation can provide durable reduction in acid secretion and decrease the further complications of hyperacidity without any additional cost to the patient. The aim of the study was to examine feasibility & efficacy of highly selective vagotomy in emergency management of selective cases of perforated duodenal ulcer.

*Patients & methods:1: Patients of perforation peritonitis with intra -operative diagnosis of duodenal perforation were evaluated.2: Exclusion criteria: Age < 31 years and > 70 years, poor general condition, large duodenal ulcer with (> 2*2 cm), duration of symptom more than 24 hrs, history of prolonged N.S.A.I.D intake & other perforation sites.*

A cohort of 60 patients were selected and randomly divided into test and control. In test group, primary closure of perforation along with live omental patching with highly selective vagotomy was done. In control group, perforated duodenal ulcer was managed by primary closure with live omental patch. Post operatively patients were observed for pain, fullness and abdominal distension. 24 hours Ryle's tube aspirate was measured on day 1 and day 5 post op for quantity (ml) & pH. Patients were reviewed after 6 months and 1 year for complaints if any & presence of acid secreting gastric mucosa with Congo red dye. Symptomatic relief analysis was done by using Visick score. 11

After 1 year, in test group 83.33% patients showed Grade 1 Visick score whereas 26.66% in control. Average range of pH was 5-6 for test group and 2-3 for control (p<.0001).

Conclusions: Highly selective vagotomy done in the same sitting with primary repair of duodenal ulcer in emergency gives durable acid suppression and can prevent prolonged pain and complications of chronic hyperacidity with minimal additional morbidity and without any additional cost.

KEYWORDS: Duodenal perforation, Emergency management, Highly selective vagotomy, 24 hr pH

***Introduction*:**

Perforation peritonitis due to duodenal ulcer is a common presentation of patients coming to the emergency department with acute pain in abdomen. The cause of duodenal perforation is hyperacidity and Helicobacter pylori related duodenitis. Emergency management includes resuscitation and perforation closure. This was attempted by Miculickz in 1884 and successfully done by Dean in 1894(**1**). Currently, this is followed by prolonged or lifelong acid suppressive therapy as well as with H-pylori eradication. However lifelong ant-acid treatment is costly and patient can be re-infected with H-pylori; 13 % per year and overall recurrence up to 43 % in developing countries(**2,3**) . Prolonged antacid therapy is costly and also requires patient compliance which is low in patients in rural areas. Many patients just don't take medication after 2-3 months. Post operatively patients treated for perforated duodenal ulcer and not taking acid suppressant medication have recurrence of symptoms of hyperacidity in 40 % **(4).** Most have chronic epigastric pain, anorexia and heartburn. Some land up in long term complications like gastric-outlet obstruction and very rarely re-perforation . Highly selective vagotomy at the same sitting with primary closure of perforation if done in a stable patient provides durable acid suppression and can remedy this problem(**5,6**).

The aim of the study was to assess 1) feasibility & 2) efficacy ; of highly selective vagotomy in emergency management of selective cases of perforated duodenal ulcer.

***Patients & methods*:**

1: Patients of perforation peritonitis with intra -operative diagnosis of duodenal perforation were evaluated.

2: Exclusion criteria:

i. Age < 31 years and > 70 years
ii. Poor general condition including:
a. Hemodynamic instability (post resuscitation BP< 100 mmHg)
b. Bad cardio-respiratory status
iii. Large duodenal ulcer with doubtful closure & requiring gastro-jejunostomy .i.e size > 2*2 cm .
iv. Duration from first acute symptom more than 24 hrs
v. Patients with history of prolonged N.S.A.I.D intake
vi. Patients with perforated ulcer other than first part of duodenum anteriorly

3: After excluding patients with above given criteria , a cohort of 60 patients were selected . These were randomly divided into 2 groups, Test and control. Patients were divided into age groups at interval of 10 yrs from 31-70 yrs . Number of patients in each age-group were matched. pH of ryles tube aspirate was noted for each patient.

Ethics committee approval for the study was obtained from college ethics committee.

4: After written and informed consent of relatives ; in patients in test group ; primary closure of perforation along with live omental patching with highly selective vagotomy was done. In the area of lesser curvature of the stomach, sparing proximal & distal 5cm, all connections with anterior and posterior vagi were excised and ends ligated . The nerves of Latarjet were spared at gastric antrum. The 'criminal nerve of Grassi" along the posterior aspect near the cardio esophageal junction was identified and excised .

5: In control group perforated duodenal ulcer was managed by primary

closure with live omental patch.
6: Intra-operative time and intra-operative complications if any were noted.
7: Post operatively patients were observed for pain, fullness and abdominal distension.
8: Ryle's tube 24 hour aspirate was measured on day 1 and day 5 post op for quantity (ml) & pH.
9: Complaints if any after starting oral feeding were noted.
10: Patients were reviewed at 6 months and one year for

a. Complaints if any
b. To test for presence of acid secreting gastric mucosa. Congo red dye was sprayed in the stomach lumen via a gastroscope. If dye comes in contact with acid it changes color from red to black and also stains the mucosa. This if extensive indicates presense of acid secretion in the stomach and indirectly , inadequacy of highly selective vagotomy procedure . Any reccurence of ulceration, gastritis or duodenitis were noted.
c. pH of Ryle's tube aspirate at time of gastroscopy was noted .
d. Symptomatic relief was assessed using Visick score.

11: Results were tabulated and conclusion drawn

Figure1: Anterior Vagus



Figure 2: Posterior vagus



Figure 3: Highly selective vagotomy



Figure 4: Excision of nerve of Grassi



Observations:
1: Number of patients:
A: Test group: 30
B: Control group 30
Total patients = 60

2: Table: 1 Age and sex-wise distribution

Age group	Males	Females
30-40	4(6.66%)	0
41-50	6(10%)	4(6.66%)
51-60	12(20%)	10(16.66%)
61-70	14(23.33%)	10(16.66%)

3: Pre-operative average pH of Ryle's tube aspirate for
1: Test group patients = 2-3
2: Control group of patients -2-3
4: Average intra-operative time for
1: Test group: 84 min
2: Control group: 52 min
5: Complications:

Table 2: Complications

Intra-operative complications	Test group	Control group
Bleeding	6(20%)	0
Perforation	0	0
Liver injury	4(13.33%) (Contusion)	1(3.33%) (contusion)
Vagal injury	3(10%) (Thinning in2, avulsion in1)	0
Early post operative complications		
Mortality	0	0
Ventilatory support	3(10%)	1(1.33%)

5: Table 3: Post op Ryle's tube aspirate assessment

		Test group	Control group
Average 24 hr Ryle's tube aspirate in ml	Day 1	750	650
	Day 5	310	280
Average pH of collected 24 hr Ryle's tube aspirate			
	Day 1	6-7	6-7
	Day 5	6-7	5-6

Both groups of patients were given pantoprazole intravenously for first 4 days. Then in test group this was withdrawn on the fifth day.

6: Table 4: Post-operative complaints after Ryle's tube removal

Complaints	Test group	Control group
Vomiting	0	0
Nausea	6 (20 %)	5 (16.66 %)
Upper abdominal fullness	8(26.66 %)	6(20%)
Epigastric pain	3(10 %)	4(13.33%)

Post-operatively all patients in both groups were discharged uneventfully. At time of discharge the control group was prescribed acid suppressant medication for 1 month. Dietary modifications were explained to both groups. Both groups received H-pylori eradication therapy once. Patients were followed at 6 months and one year.

7: Table 5 : Assessment at 6th month follow-up

Complaints		Test group	Control group
1.Nausea & vomiting		0	7(23.34%)
2.Epigastric pain & heart- burn		2 (6.66%)	11 (36.66%)
3.Upper abdominal fullness		2(6.66%)	4(13.34%)
4.Symptoms of adhesion colic		1(3.33 %)	1(3.33%)
Visick score	Grade 1	20 (66.66%)	9 (30 %)
	Grade 2	7(23.34%)	9(30 %)
	Grade 3	2(6.66%)	8(26.66)
	Grade 4	1(3.34%)	4(13.34%)
Avg range of pH of Ryle's tube aspirate after 24 hr fasting		6-7	2-3
Mucosal colour change from red to black from Congo red dye sprayed via gastroscope		3(10%)	12(40%)
Gastritis		0	0
Duodenitis		0	0
Duodenal ulcer		0	0
Gastric ulcer		0	0
Duodenal stricture		0	0

8: Table 6: Assessment at 1 yr follow-up

Complaints		Test group	Control group
1.Nausea & vomiting		1(3.33%)	3(10%)
2.Epigastric pain & heart-burn		3(10%)	12(40%)
3. Upper abd. fullness		5 (16.67%)	4 (13.34%)
4.Symptoms of adhesion colic		1(3.33%)	1(3.33%)
Visick score	Grade 1	25 (83.33%)	8 (26.66%)
	Grade 2	3(10%)	9(30%)
	Grade 3	1(3.34%)	8(26.66%)
	Grade 4	1(3.34%)	5(16.66%)
Avg range of pH of Ryle's tube aspirate after 24 hr fasting		5-6	2-3
Mucosal colour change from red to black from Congo red dye sprayed via gastroscope		4 (13.34%)	20
Gastritis		0	0
Duodenitis		0	0
Duodenal ulcer		0	0
Gastric ulcer		0	0
Duodenal stricture		0	0

Statistical analysis of above results at 6 months and 1 year:

Test used to compare test and control group results: Chi square test with 2*2 tables

1: Recurrence of epigastric pain & heartburn

2: Presence of acid secretion detected by Congo red dye test showed a difference with probability values using chi square test ; <0.0001. This is statistically significant.

Evaluation of above findings suggests that in patients operated with only primary closure of perforation, the acid secretion by the gastric mucosa gradually retains its acid secreting capacity with passage of time. This later on leads to frequent pain, chronic gastritis and gastric outlet obstruction. Patients need long term acid suppressing agents. Most rural patients are non-affording for the relatively high cost of acid suppressant drugs and are also non compliant for prolonged medication.

Highly selective vagotomy gives durable acid suppression and can prevent prolonged pain and complications of chronic hyperacidity with no additional cost. The operation if performed in properly selected patients has very less additional morbidity and complication rate. With practice it can be performed quickly and thus in single sitting provides management of both duodenal perforation as well as the hyper-acidity, the causative factor. There are no significant long-term complications.

Discussion:

Thus in our study we found that highly selective vagotomy could be done in same sitting as primary management of perforated duodenal ulcer. We compared our observations with other studies done on the same subject.

Table 7:

Authors	Dura- tion of evalu- ation	Recurre- nce of peptic ulcer / gastritis after simple closure	Recurrence of peptic ulcer / gastritis after simple closure with H.S.V
Li Sy and Liang ZJ (7)	3	N.A	12.6% ulceration, 13.7 % gastritis
Li sy & An P (8)	11	N.A	5.5% ulceration
Tsugaa Koyana-gi (9)	5	63.5% gastritis	38.5% gastritis
Boey J et.al (10)	3	36.6% ulceration	10.6% ulceration

Highly selective vagotomy can be combined with primary closure of perforated duodenal ulcer with minimal additional morbidity and very rare mortality. Chernokov et al reported minor post operative complications in 8.3 % cases and late complications in 3.6% cases (**11).** Congo red dye was used as a pH indicator which changed colour at pH above 3 to red and below that to blue – black . (**12,13**) .Visick scale was used to grade symptomatic relief with grade 1: full relief , grade 2 : improvement, grade 3: no relief & grade 4 : deterioration(**14).**

Conclusion:

Highly selective vagotomy gives durable acid suppression and can prevent prolonged pain and complications of chronic hyperacidity. The operation if performed along with primary repair of duodenal ulcer in the same sitting in properly selected patients has very less additional morbidity and complication rate. There are no extra cost and significant long-term complications.

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