



## MANAGEMENT OF DUODENAL ULCER PERFORATION BY RIGHT MINISUBCOSTAL INCISION

### General Surgery

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### ABSTRACT

**Background:** Duodenal ulcer perforation is one of the most dramatic complication of peptic ulcer and also the most common acute abdominal emergencies faced by surgeon, which in usual circumstances can be easily diagnosed and treated. Surgery is the only modality of treatment for perforated duodenal ulcer by right upper paramedian or midline incision for laparotomy. The present study was a comparison between the traditional right upper paramedian incision and a newer right minisubcostal incision approach.

**Methods:** This prospective study was conducted on fifty patients of duodenal ulcer perforation admitted in surgical units of Krishna Hospital and Medical Research Center, Karad. Our primary aim was to determine advantages and disadvantages of right minisubcostal incision; a new surgical approach over the right paramedian incision approach

**Results:** Of the two approaches, right minisubcostal incision took lesser surgery time (67.4mins), had less post-operative hospital stay (10.24days), showed good wound healing and minimal complications in comparison to right upper paramedian incision approach for perforated duodenal ulcer.

**Conclusion:** We concluded that management of duodenal ulcer perforation by right minisubcostal incision approach is superior and beneficial to patient as it causes lesser trauma and morbidity when compared to right upper paramedian incision approach. However, with this incision, a definitive procedure cannot be done along with closure of duodenal ulcer perforation.

### KEYWORDS

Perforated duodenal ulcer, Laparotomy, Right upper paramedian, Right minisubcostal, Incision, Morbidity, Post-operative Complications.

### INTRODUCTION

“Duodenal ulcer perforation” is one of the most dramatic complication of peptic ulcer and inspite of modern management it is still a life threatening event in life. It is one of the most common acute abdominal emergencies faced by surgeon, which in usual circumstances can be easily diagnosed and treated.

It is interesting to note that due to introduction of new generations of H<sub>2</sub> receptors antagonists and sodium-hydrogen pump inhibitors, the need for elective surgical treatment for peptic ulcer disease has declined. But the rate of emergency operations done for perforated peptic ulcer disease remains unchanged. The frequency of perforation among patients admitted to the hospital with peptic ulcer disease is 22.5%<sup>1</sup> taken overall the prevalence of acute free perforation is generally regarded as 5% to 10% of patients with peptic ulcer disease.<sup>2</sup>

With better understanding of fluid and electrolyte balance, more blood transfusion facilities, better anaesthesia, improved surgical techniques and introduction to higher antibiotics, the mortality has come down remarkably in last few decades.

The treatment of perforated peptic ulcer is operative. Surgery is the only modality of treatment for perforated duodenal ulcer. Right upper paramedian or midline incision for laparotomy is the conventional approach.

We introduced a new surgical approach for the management of duodenal ulcer perforation that is by “right minisubcostal incision”<sup>3</sup> for perforated duodenal ulcer. Patients of duodenal ulcer perforation are being managed with this technique in our institute since last 4 years. The present study is the comparison between the traditional right upper paramedian incision and the new right minisubcostal incision approach.

In this study post-operative complications like intestinal obstruction, wound infection with gaping, burst abdomen, chest complications, stay in the hospital and overall morbidity were studied. Patients were followed to study the late post-operative complications like adhesive intestinal obstruction, incisional hernia, and the type of scar.

### Aims and Objectives

- To determine advantages and disadvantages of right minisubcostal incision; a new surgical approach over the right paramedian incision approach
- To study immediate and late post-operative complications and morbidity of patient by right minisubcostal and right paramedian incision approach.

### MATERIALS AND METHODS

In the present study, fifty patients of duodenal ulcer perforation admitted in surgical units of Krishna Hospital and Medical Research Center, Karad were studied.

Out of these fifty cases, 25 cases were operated by conventional right upper paramedian incision approach and 25 cases were operated by right minisubcostal incision approach. The patient selection was random.

Diagnosis of duodenal ulcer perforation was done by typical history given by the patient, of acid peptic disease, past history, physical examination and its confirmation by X-ray erect abdomen showing evidence of pneumoperitoneum.

The diagnosis of an acute perforation of duodenal ulcer is suggested by the sudden onset of severe epigastric pain followed by a variable degree of shock and often vomiting, without past history of acid peptic disease.<sup>2</sup>

After the diagnosis has been established, pre-operative preparation was done.

1. Patient was kept NBM
2. Continuous Ryle's nasogastric tube aspiration
3. Adequate IV fluids were given to combat dehydration and shock
4. Antibiotics were given.

Operative findings like quantity of peritoneal contamination, nature of contamination whether bilious, purulent or haemorrhagic is noted. The site, size and number of perforations were noted in each case. The nature of perforation as acute, chronic or sealed was noted. The time duration required for the operative procedure by both approaches was noted.

Difficulties faced during exposure of the perforation site, while sucking out peritoneal contaminated fluid, the number of assistants required and adequacy of retraction was noted during both the approaches.

Post-operatively each patient was observed during immediate post-operative period for pain, its severity and analgesics required for that in both the approaches. Every patient was observed till discharge for the wound infection. If it occurs, the type of wound infection whether superficial or deep and the quality of the collected pus was noted. When pus discharge was present, it's sample was sent for culture and sensitivity study. The resulting gape of the wound was measured and noted. All patients were looked for development of early intestinal

obstruction. In case of burst abdomen, whether it was partial thickness or full thickness was noted.

Any pelvic collection or intra-abdominal abscess suspected clinically was screened by USG abdomen pelvis, if present its volume and nature was noted and subsequent treatment required for it was given.

Each patient's mode of recovery in the post-operative period and his total hospital stay in days was noted. Skin sutures were removed on 8<sup>th</sup> post-operative day in both the approaches.

Patients were available for follow up from 3 months to 24 months. During follow up visits of the patients, they were asked about their ulcer symptoms. Each of them was examined for the type of scar, incisional hernia. Incisional hernia if present, the size of the underlying defect was noted. Signs and symptoms of adhesive intestinal obstruction was noted and treated.

The type of the scar whether healed by primary intention or secondary intention and any keloid formation was noted. The results of both the approaches were analysed and evaluated.

## Observations and Results

**Table 1: Age Distribution**

Age (In years)	No.	%
0 – 10	-	
11 – 20	1	23.3%
21 – 30	6	15.5%
31 – 40	8	12.9%
41 – 50	14	15.5%
51 – 60	10	12.9%
61 – 70	11	14.2%
71 – 80	-	5.1%
Total	50	

Patients between 10-80 years of age were included in the study which showed highest incidence in 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> & 6<sup>th</sup> decade.

**Table 2: Sex Distribution**

Sex	No.	%
Male	44	88%
Female	6	12%
Total	50	

44 patients (88%) were males and 6 (12%) were females. Males were 7.33 times more affected than females.

## Time required for the operative procedure

Average time required for the surgery by Rt. paramedian incision was 110.8 (1 hr 50mins), while it was only 67.4 mins (1 hr 7 mins) by right minisubcostal incision.

**Table 3: Incidence of wound infection**

Type of incision	No. of cases	Wound infection	Percentage
Rt. Minisubcostal	25	6	24%
Rt. Paramedian	25	15	60%

In the present study, the rate of wound infection was 60% in patients operated by Rt. paramedian approach while only 24% in patients operated by Rt. minisubcostal incision.

**Table 4: Burst Abdomen**

Type of incision	No. of cases	Burst abdomen	Percentage
Rt. Minisubcostal	25	0	0%
Rt. Paramedian	25	5	25%

5 patients (25%) operated by Rt. paramedian incision had full thickness burst abdomen while it was 0% in patients operated by Rt. minisubcostal incision.

**Table 5: Early and Late adhesive intestinal obstruction**

Type of incision	No. of cases	Early	Late	Percentage
Rt. paramedian	25	1	3	16%
Rt. minisubcostal	25	0	0	0%

16% patients operated by right paramedian incision showed intestinal obstruction (1 patient had early post-operative and 3 patients and late adhesive obstruction). None of the patients operated by right

minisubcostal incision developed intestinal obstruction.

## Hospital stay of the patient (in days)

In the present series, the average hospital stay was 15.36 days in patients operated by right paramedian approach, while it was 10.24 days in those operated by right minisubcostal approach.

**Table 6: Intraabdominal abscess**

Type of incision	No. of cases	Abscess
Rt. paramedian	25	1(subdiaphragmatic)
Rt. minisubcostal	25	1(pelvic)

Out of 25 patients operated by right paramedian incision one had subdiaphragmatic abscess and one patient operated by right minisubcostal incision had pelvic abscess.

**Table 7: Wound healing**

Type of incision	Primary intention	Secondary intention
Rt. paramedian (25)	15	6 (4 died)
Rt. minisubcostal (25)	24	1

6 patients of right paramedian incision and one patient of right minisubcostal incision had their wounds healed by secondary intention which constitute of keloid formation.

**Table 8: Incisional hernia**

Type of incision	No. of cases	Incisional hernia	Percentage
Rt. paramedian	25	4	16%
Rt. minisubcostal	25	0	0

Four patients operated by right paramedian incision developed incisional hernia, while none of the patients developed this complication amongst those with right minisubcostal incision.

## DISCUSSION

Duodenal ulcer perforation is one of the commonest presentation of duodenal ulcer. After reviewing various published data from the literature and comparing it with the data of the present series, certain common facts were observed.

### Age distribution :

The present series shows highest incidence of perforated duodenal ulcer in the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> decade with the youngest patient being 20 years old and the oldest being 70 years old. The 4<sup>th</sup> decade is the one with highest number of cases, which corresponds to Indian series by Vyavahare and Bhatte.<sup>4</sup>

Perforation commonly occurs in 3<sup>rd</sup> to 5<sup>th</sup> decade and is considerable in lower age group. The study by Mackay showed mean age of men rose from 43.9 in 1924-1943 to 54.9 years in 1964-1973 and in females from 40.9 to 48.1 years during the same years.<sup>5,6</sup>

### Sex:

In the present series 44 (88%) patients were males and 6 (12%) were females. So males were 7.33 times more affected than females.

Review of the western literature also shows a male preponderance. However increasing incidence in females is seen in Scotland<sup>7</sup> due to smoking habits and holding important position at work.<sup>1,7</sup> Similar female preponderance is also seen in studies done by Elashoff and Grossman.<sup>6</sup> However, as smoking habits are not common in Indian females the incidence in females is low.

### Post-operative complications:

#### Wound infection:

In the present series, 15 patients (60%) operated by right upper paramedian incision had wound infection compared to 6 patients (24%) operated by right minisubcostal incision approach.

Out of 15 infected wounds of right paramedian incision, 9 were deep wound infections and 6 were superficial. All 6 infected wounds of right minisubcostal incision were superficial or deep and healed by daily dressing within 4 to 7 days.

#### Burst abdomen:

Out of 25 patients who were operated by right paramedian incision, 5 patients developed full thickness burst of the abdomen between 6<sup>th</sup> to 10<sup>th</sup> post-operative day. Through the wound bowel loops were visible and leaking peritoneal fluid was evident.

Out of these 5 cases of burst abdomen one wound which was a small size healed by daily dressing with normal saline and secondary suturing was done. Rest of the 4 cases were managed by resuturing under general anaesthesia. Thus 4 patients (16%) who were operated by right paramedian incision had to undergo one more surgery with prolonged hospital stay. None of the patients operated by right minisubcostal incision approach developed full thickness burst abdomen.

#### Early post-operative intestinal obstruction:

Out of 25 patients who were operated by right paramedian incision, one patient developed small bowel obstruction on 6<sup>th</sup> postoperative day and was explored under general anaesthesia. Multiple small bowel interloop adhesions were present and bowel loops were stuck to the previous laparotomy scar. Adhesiolysis was done and patient improved gradually.

None of the patients operated by right minisubcostal incision developed this early postoperative adhesion with subsequent intestinal obstruction.

#### Late (adhesive) intestinal obstruction:

Three patients developed adhesive intestinal obstruction during their follow up period from 6 months to 18 months. All were operated by right paramedian incision. All three patients were operated under general anaesthesia and adhesiolysis was done.

Not a single patient operated by right minisubcostal incision developed this type of adhesive intestinal obstruction.

#### Intra-abdominal abscess:

One patient operated by right paramedian incision had a right sided subdiaphragmatic abscess on 6<sup>th</sup> post-operative day. USG guided aspiration of the abscess was done.

One of the patients operated by right minisubcostal incision approach had pelvic abscess. On ultrasonography examination he had a localized abscess measuring 150cm<sup>3</sup>. USG guided per rectal aspiration was done.

#### Wound healing:

All patients operated by both the approaches were followed for 1 to 2 years. Out of 25 patients who were operated by right upper paramedian incision approach 19 patients had the wounds healed by primary intention which were acceptable but 6 patients (28.5%) developed wound healing by secondary intention with formation of hypertrophied scars, one of them was keloid formation (4%) proves that scar of right minisubcostal incision is more acceptable and cosmetic as compared to right paramedian incision.

#### Incisional hernia:

At the end of 2 years of follow up period, 4 patients operated by right upper paramedian incision were found to be having incisional hernia, but not a single patient operated by right minisubcostal incision developed incisional hernia.

#### Time required for the surgery:

The average time required for the laparotomy was 110.8(1 hr 50.8 mins) by right upper paramedian incision where as it was only 67.4 minutes (1 hr 7.4 mins) for the right minisubcostal incision approach.

#### Hospital stay of the patients:

Mean hospital stay of the patients operated by right upper paramedian incision was 15.36 days compared to 10.24 days in patients operated by right minisubcostal incision. Thus hospital stay of patients operated by right minisubcostal approach is definitely less due to quick operative procedure with low infection rate of the wounds and minimal complications.

#### CONCLUSIONS

- Right minisubcostal incision approach for duodenal ulcer perforation uses a smaller incision and is muscle splitting. Through this incision fair degree of location of perforation site is obtained and it is technically easy to close the perforation by direct visualization.
- However definitive procedure cannot be done along with closure of duodenal ulcer perforation and if the perforation is in ileum or any other part of the bowel, this incision will not provide adequate

visualization.

- Management of duodenal ulcer perforation by right minisubcostal incision approach is superior and beneficial to patient as it causes lesser trauma and morbidity when compared to right upper paramedian incision approach.

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