

A Stitch in Time Saves Nine - A Novel Treatment of Duodenal Perforation Closure

Rudraiah HGM¹, Siddharth Vijay Kalke²

ABSTRACT

Introduction: There are many techniques for closure of perforation and there is continuing debate in the literature regarding the preferred surgical procedure for the patient with a perforated peptic ulcer. Our objective is to compare the efficacy and safety of figure of eight suturing technique coupled with pedicled omental graft repair versus conventional omentopexy. In this study we proposed to either prove or reject the null-hypothesis

Material and methods: The proposed study was conducted in Department of Surgery JJM medical college and Bapuji Hospital, Davangere. 50 patients included in the study were divided into two groups after randomization; the groups being patients undergoing figure of eight suturing coupled with pedicled omental graft repair technique for peptic ulcer perforation (SG) and patients undergoing conventional omentopexy technique for peptic ulcer perforation (CG).

Results: Majority of patients in this study were of group 15-30 years and 88% were males. Majority of cases had 2cm perforation (36 cases 72%) and most of the perforations were in first part of duodenum (58%). Complications were seen in 72% of patients, most common being wound infection (40%) and 4 patients in control group had bile leak (8%). Oral feeding was started earlier in the study group as compared to control group. The intra-operative time taken in study group was lesser than control group. The hospital stay was lesser in study group.

Conclusion: In conclusion, the present study is superior than standard omentopexy in terms of intra-operative time taken, bile leak, duration of hospital stay, commencement of oral feed and mortality. It can be used as a safe alternative to standard omentopexy. As with figure of eight suturing technique, lesser tendency to cut through because the pressure at one point is divided into two directions, and the pressure is exerted on four points instead of two points.

Keywords: Figure of 8, Conventional Omentopexy, Peptic Ulcer Perforation, Peritonitis, Duodenal Perforation.

have to risk a major surgery when the general condition is not good. On the other hand it saves the patient of further surgery.

When acute or chronic duodenal ulcer perforates into the peritoneal cavity, three components require treatment viz., the ulcer, the perforation and the resultant peritonitis. The perforation and resultant peritonitis are immediate threats to the life, the ulcer itself is not. The therapeutic priorities thus are treatment of peritonitis and secured closure of perforation, which may be achieved with surgical procedure. In spite of better understanding of disease, effective resuscitation and prompt surgery under modern anaesthesia techniques, there is high morbidity and mortality. Hence, attempt has been made to analyse the various factors, which are affecting the morbidity/mortality of patients with peptic ulcer perforations.

The mortality increases with delay in surgery. The mortality rate when surgery is performed within 6 hours of onset of pain approaches zero; from 6-12 hours the rate is 5-10%, 12-24 hours it is 25% or higher and in the course of 3rd day after, surgeries are seldom successful. Hence it is said that "There is no intra-abdominal catastrophe where a successful outcome is more dependent upon early diagnosis and prompt treatment (surgery)".

With the advent of effective medical therapy the role of surgery in peptic ulcer disease has reduced significantly over the years. However the treatment of perforated ulcer is surgical in majority of the cases.³

There are many techniques for closure of perforation and there is continuing debate in the literature regarding the preferred surgical procedure for the patient with a perforated peptic ulcer.⁴

It is mostly treated by Omentopexy (first described by Cullen Jones in 1929 and later modified by Graham in 1937).⁵ Complications like re-perforation, sepsis and burst abdomen are not uncommon after closure with this technique. This leads to high morbidity and mortality in cases of duodenal perforation closures especially when patient comes late after

INTRODUCTION

Peptic ulcer Perforation occurs in 2-10% of patients with Peptic Ulcer Disease and accounts for more than 70% of death associated with Peptic Ulcer Disease.¹ Perforation peritonitis is the most catastrophic complication of peptic ulcer disease.² The treatment of perforation still continues to be controversial. Just closure of perforation may save life, but chance of recurrence of ulcer is too high and patient may not turn up for a second curative surgery. So, there is a school of thought, which recommends definitive surgery in a perforated peptic ulcer. This may to a certain extent reduce the mortality and morbidity of the patient, because patients

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two or more days of perforation.⁶

Other techniques of peptic ulcer perforation closure are primary closure by interrupted suture, primary closure by interrupted suture covered with pedicle omentoplasty, omental plugging, laparoscopic repair, figure of eight closure^{2,6} etc.

The figure of 8 technique has been described in the literature especially for very friable oedematous perforation margins. There are many advantages of this technique. The suture can be taken from a relatively longer distance by even a small needle. There is lesser tendency to cut through because the pressure at one point is divided in two directions. The edges do not tend to evert.⁶

However, there has been no study comparing this technique with standard omentopexy technique. In this study, we proposed to study the efficacy and safety of figure of eight suturing technique coupled with pedicled omental graft repair versus conventional omentopexy in peptic ulcer perforation peritonitis.

MATERIAL AND METHODS

The proposed study was conducted in Department of Surgery JJM Medical College, Davangere. 50 patients included in the study were divided into two groups after randomization.

25 Patients underwent figure of eight suturing coupled with pedicled omental graft repair technique for peptic ulcer perforation. 25 patients underwent conventional omentopexy technique for peptic ulcer perforation.

Inclusion Criteria

All patients diagnosed with perforated peptic ulcer who are fit to undergo surgery.

Exclusion Criteria

Pre-operative

1. Patients having severe co-morbidities i.e. shock with systemic inflammatory response syndrome (SIRS) and multiple organ dysfunction syndrome (MODS).
2. Recent myocardial infarction.
3. Malignancy.
4. Traumatic perforations.

Post-operative

1. Patients having multiple perforations.
2. Patients in whom malignant peptic ulcer is suspected.

Parameters compared were

1. Mean operative time.
2. Development of bile leak.
3. Development of septicaemia.
4. Development of pulmonary complications.
5. Development of wound infections.
6. Commencement of oral feed.
7. Hospital stay.

STATISTICAL ANALYSIS

Unpaired t-test was used to compare means between two groups. Difference between two proportions was calculated by Chi-square test. $P < 0.05$ was taken as level of statistical significance. Statistical analysis was performed by using

SPSS computer software v. 16.0.

Technique of Figure Of Eight - Suture was applied a bit away from edges and a figure of 8 was made as follows. Needle was passed into the duodenum at some distance away from the ulcer, suture was taken out through the ulcer and then again it was passed through the ulcer into duodenum and was taken out through all layers of walls of the duodenum on the distal side. Now, these were not tied but the needle was taken to the proximal side of the ulcer and was passed into the duodenum and was taken out through the ulcer and again it was passed into duodenum through the ulcer and was taken out distally through the duodenal wall. A vascularized tongue of omentum is mobilized and brought superiorly to close the defect. Now, the suture was tied to make it a figure of 8. Same group of surgeons and 2-0 vicryl 30mm half circle round body needle was used in this study. (Figure 1,2,3,4)

RESULTS

In our study, the mean age of patients was 41.84 years (range 15 to 75 years) with maximum number (n=17) of patients in age group of 15-30 (34%) and n=14 in the age group of 46-60 years(28%). The present study showed highest incidence (34%) in 2nd and 3rd decade of life. In present study, maximum number of (n=43, 86%) patients were in lower socioeconomic groups. Of the 50 patients, 4(8%) patients were alcoholic, 5(10%) were smokers, 2 (4%) were tobacco chewers, 7(14%) were on NSAIDS, 16 cases

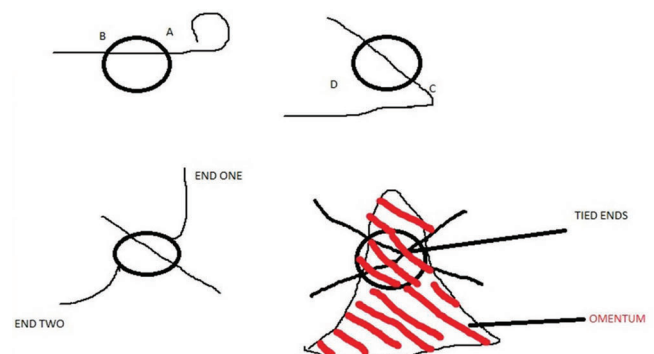


Figure-1: Schematic illustration of figure of 8 stitch with omentopexy. (needle goes from A to B and then C to D. Insert the omentum under the diagonal ends and is finally tied.)

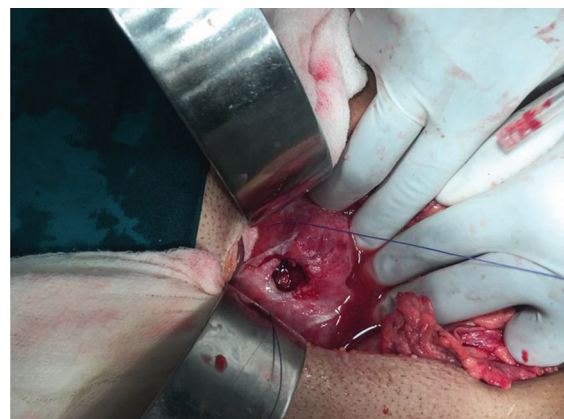


Figure-2: A to B stitch placed.

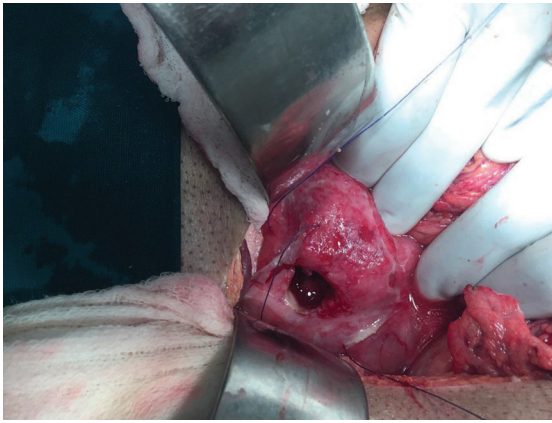


Figure-3: C to D stitch placed.

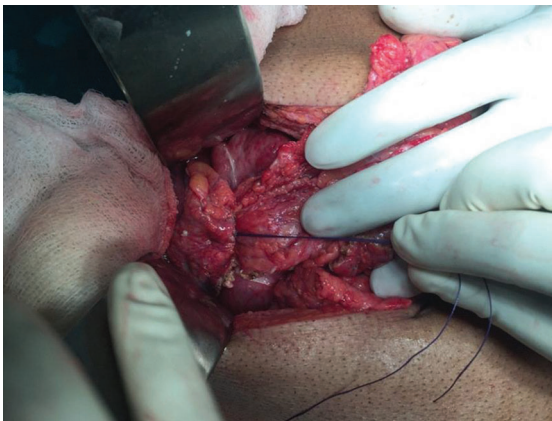


Figure-4: Omentum tied with the figure of 8 stitch.

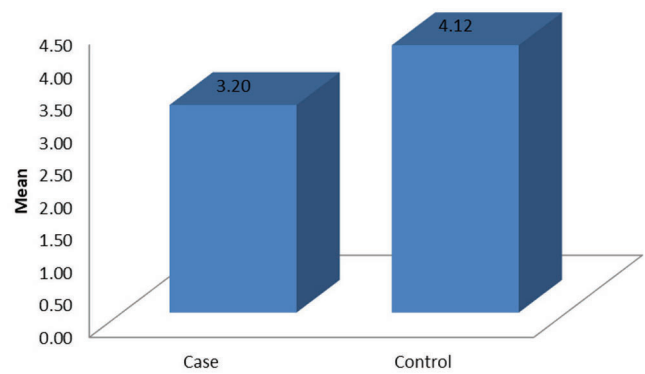


Figure-7: Mean day of oral feed start in each group.

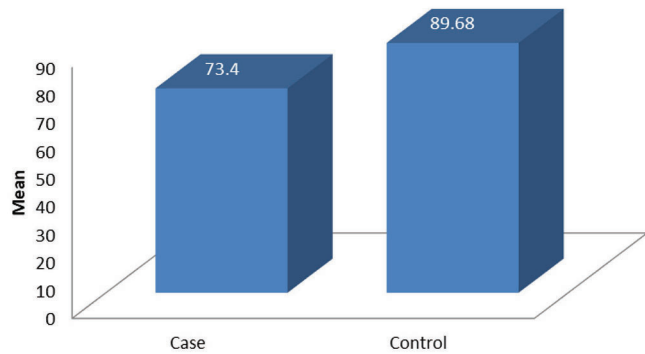


Figure-8: Time taken in each group.

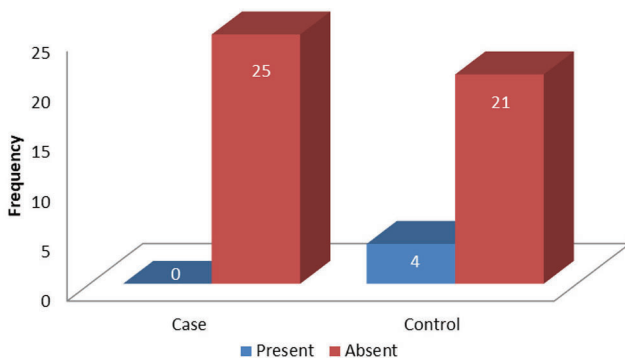


Figure-5: 4 cases of bile leak in conventional omentopexy group.

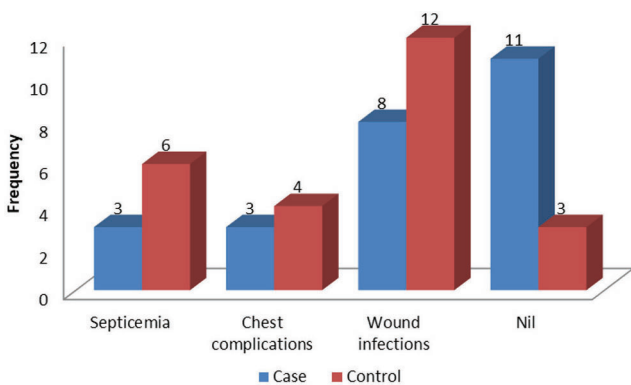


Figure-6: Distribution of complications in both groups.

(32%) were smokers and alcoholics, 12 cases (24%) were smokers, alcoholics and tobacco chewers, 4 cases (8%) were

having history of chronic gastritis. Overall 33 cases (66%) were smokers. In total of 50 patients, 12(24%) patients were presented to hospital on first day of their onset of symptoms, Another 21(42%) patients were presented to hospital on second day, 8 patients (16%) presented on third day of onset of symptoms 9 patients (18%) presented on day 4. 17(34%) cases presented late that is on day 3 and day 4. The delay before surgical treatment is a strong determinant for increased complication rates and hospital costs.¹⁴ Of 50 patients, all presented with diffuse pain abdomen. 26 cases (52%) out of 50 had distension of abdomen. 34 cases (68%) out of 50 had bilious vomiting. 39 cases (78%) had guarding out of 50. 26 cases (52%) had rigidity out of 50. Guarding was present in 49(81.66%) patients, Rigidity was present in 45 (73.33%) patients. In total of 50 patients the mean pulse rate in study group was 96.40 and mean pulse rate in control group was 101.28. Mean urine output was 0.92ml/kg/hr in study group with std deviation of 0.640 and 1.28ml/kg/hr in control group with std deviation of 0.737ml/kg/hr. 93.20% was mean saturation in study group with std deviation of 3.476 and 93.88% in control group with std deviation 4.086. 11(22%) patients presented to our emergency department with low blood pressure (<90/60mmhg). 29 cases (58%) out of 50 had D1 perforation which is the most common site of perforation in our study and other studies in the literature.⁵ 10% out of 50 cases had 1 cm perforation 7 cases (14%) had 1.5cm perforation, 36 cases (72%) had 2cm perforation, 2 cases (4%) cases had 3cm perforation. The most common size of perforation found was 2cm, i.e. 36 cases (72%). In this present study, the post-operative complications noted were bile leak, septicaemia, wound infection and lung complications. Of

these, wound infection (20%) was most common followed by septicemia (18%) and lung complications (14%).

Bile leak: 4 out of 50 cases had bile leak (8%). All 4 cases were in control group. No case in study group had bile leak. (Figure 5)

Septicaemia: 9 cases (18%) out of 50 developed developed septicaemia, of which 3 cases (12%) were in study group and 6 cases (24%) were in control group.(Figure 6)

Wound infection: 20 cases (40%) out of 50 had wound complications, of which 8 cases (32%) were in study group and 12 cases (48%) were in control group (Figure 6)

Lung complication: 7 cases (14%) out of 50 had some chest related complication, of which 3 cases (12%) were in study group and 4 cases (16%) were in control group. (Figure 6)

Commencement of oral feed: Mean post-operative day of commencement of oral feed in study was 3.66 days with a standard deviation of 0.895. Oral commencement was earlier in study group i.e on 3rd and 4th day (80% and 20% respectively), while in control group was late. (Figure 7)

Time taken- the mean time taken in study group was 73.40 minutes with a std deviation of 2.483 minutes and the mean time taken in control group was 89.68 minutes with a std deviation of 3.473 minutes. The difference was statistically significant (p value- 0.000) (independent t test). (Figure 8)

Hospital stay- the mean hospital stay in study group was 9.60 days with a std deviation of 2.309 days and in control group was 13.44 days with a (std deviation of 2.002 days). The hospital stay varied upon the duration of perforation, initial condition of the patients, associated illness and development of post-operative complications. In this study, duration of hospital stay was less than most of the studies.^{11,16}

Mortality: Both intra-operative mortality and post-operative mortality within 30 days in both group was zero.

DISCUSSION

The present study is superior to conventional omentopexy in terms of bile leak, time taken, duration of hospital stay, commencement of oral feed. It can be used as a safe alternative to standard omentopexy.⁶

As with figure of eight suturing technique, lesser tendency to cut through because the pressure at one point is divided into two directions, and the pressure is exerted on four points instead of two points. So, the procedure can be recommended as a safer alternative to standard omentopexy for perforated peptic ulcer especially when the patient presents late to the hospital, where the edges of the ulcer and walls of the duodenum are very friable.¹¹

There is shift of age towards elderly in other part of world.⁸ It may be due to difference in lifestyle, such as smoking, alcohol, psychological stress etc.⁹ Male: Female ratio in this present study was 7:1 which similar to other studies is where the male to female ratio is between 9:1 to 7.5:1.^{2,11,12,13}

Langman in 1974 noted that since 1959, both gastric and duodenal ulcers have become more frequent in lower socio-economic groups in the UK and USA⁷ and study by Svanes

C¹⁰ showed most of ulcer perforation in subject <75 years of age can be attributed to smoking

A study by Gujar N¹⁵ showed localised pain was seen in 100% patients, generalized abdominal pain was present in 89.78% patients, distension of abdomen in 72.04%, dehydration in 58.60% and fever in 43.01%.

Testini and co-workers in their study showed 9(6%) patients were in shock at the time of admission and mortality among them was 55.6%.¹⁶

In Khan JS et al¹⁷ study, post-operative complications were recorded in 54 (38%) patients. The most common complications were: chest infection in 35(24%) patient, followed by wound infection in 14(9%) patients, burst abdomen in 3 (2%) patients and fistula in 2(1.5%) patients. In Kocer B etal¹⁸ study, post-operative complications were seen in 65(24.2%) patients. Pneumonia and wound infection were the commonest complications seen in 40(37.04%) and 20(18.52%) cases respectively; followed by sepsis in 9(8.34%) patients, leakage in 6(5.55%) patients, intra-abdominal abscess in 2(1.86%) cases and bleeding in 1(0.92%)patient.

The study by Madhumita M et al showed that mean day of commencement oral feed in patients treated by omental plugging was 4.8 days and mean day of commencement of oral feed in patients treated by omentopexy was 3.46 days.

We compared the efficacy and safety of figure of eight suturing technique coupled with pedicled omental graft repair and the Figure of Eight suturing technique may be safer and reliable for the Peptic ulcer perforation especially for very friable oedematous perforation margin. In this study we prove the null-hypothesis.¹²

It is to remember that the present study was conducted in small sample size with pre-operative exclusion of patients having severe co-morbidities i.e. shock with systemic inflammatory response syndrome(SIRS) and multiple organ dysfunction syndrome(MODS) and had a short period follow up, and so the conclusion of this study must be considered with caution. This conclusion needs to be further evaluated by prospective randomized control trials including large sample size.^{13,14}

CONCLUSION

In conclusion, the present study is superior than standard omentopexy in terms of intra-operative time taken, bile leak, duration of hospital stay, commencement of oral feed and mortality. It can be done in a very short amount of time with a very small incision and is also possible laparoscopically. This method is the future of the closure of duodenal perforation with lesser morbidity and mortality.

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