

The Natural History of the Perforated Duodenal Ulcer Treated by Suture Plication

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This retrospective study of 174 patients with proven duodenal ulcer perforation was undertaken to delineate the natural history of those patients primarily managed by suture plication. During this 25-year period, 122 patients (70%) were treated with suture plication and 52 (30%) underwent a definitive procedure. There were 13 deaths in the overall group (7.4%) of which the mortality was 6.5% in the plicated group and 9.6% in the definitive group. Of the 122 patients treated with suture plication, 48% either 1) died of ulcer complications later, 2) required reoperation for ulcer disease, or 3) were under active treatment for ulcer symptoms. The reoperation rate in the entire series was 9% and the reoperation rate 32%. Suture plication is a time-honored, life-saving procedure, however, definitive surgery is a superior form of long-term management of the perforated duodenal ulcer patient.

ACUTE PERFORATION, with its subsequent chemical and bacterial peritonitis, remains a serious complication of peptic ulcer disease. The existing methods of managing the perforated peptic ulcer are suture plication, immediate definitive surgery or continuous nasogastric suction. Although suture plication is a lifesaving procedure, the long-term results of its use warrant close scrutiny and review. Though the appropriate management of an acute perforation is dependent upon a number of factors, it is not clear whether or not this is an isolated event in the natural history of the peptic ulcer patient. This retrospective study was undertaken to 1) delineate the natural history of the acute perforated ulcer patient treated by suture plication and 2) to determine if parameters exist which would be helpful in selecting the appropriate method of management at the time of the acute perforation.

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Materials and Methods

The hospital records of 174 patients with acute duodenal perforation treated surgically at the Creighton University Affiliated Hospitals from 1948 to 1973 were reviewed. A careful analysis of chart and questionnaire data is herein presented. Only free perforations confirmed by surgical intervention were considered for this study and non-surgically treated perforations were excluded.

Of 174 patients studied, 141 (81%) were male and 33 (19%) were female. The mean average age of this patient population was 53 years. One hundred twenty-two (70%) patients were treated with suture plication and 52 (30%) underwent a definitive operation. A "definitive operation" refers to any of standard operations currently being performed to decrease the acid-peptic factor. Suture plication refers to repair of the perforation utilizing interrupted sutures with an omental patch.

Mortality and Morbidity

There were 13 deaths in the overall series with a resulting mortality rate of 7.4% (Table 1). The mortality for the suture plication group was 6.5% compared to 9.6% for those undergoing definitive surgery. Nine deaths (70%) occurred prior to 1965. The mean average age of those who expired was 68.3 years, 15 years higher than the mean average age of the entire group. Seven of the 13 deaths occurred in patients 70 years or older. Two of the 8 deaths in the suture plication group resulted from postoperative bleeding secondary to duodenal ulcer; one

TABLE 1. *Mortality*

Patient/ Age	Year	Operation	Cause of Death
P.J./55	1951	Plication	Peritonitis, shock
P.J./63	1951	Gastrectomy	Exsanguination from bleeding suture line
E.W./77	1952	Plication	Pulmonary sepsis
B.G./43	1957	Plication	Pulmonary sepsis
G.M./73	1957	Gastrectomy	Pseudomembranous enterocolitis
R.G./55	1962	Gastrectomy	Pseudomembranous enterocolitis
S.J./84	1962	Gastrectomy	Peritonitis, shock
M.H./67	1964	Plication	Bleeding posterior ulcer
B.V./62	1964	Gastrectomy	Peritonitis, shock
G.A./74	*1966	Plication	Re-perforation, peritonitis
C.J./83	1968	Plication	Bleeding posterior ulcer
W.L./76	1970	Plication	Pulmonary sepsis
M.G./77	1971	Plication	Peritonitis, shock

* 70% of deaths occurred prior to 1966.

patient reoperated 35 days postoperatively and died from peritonitis, two deaths resulted from peritonitis and three from pulmonary sepsis. The average hospital stay for the plication group was 12 days compared to 14 days for the definitive surgery group. There were 25 complications in the entire series for a complication rate of 14%; 16 of these occurred in the plication group as compared to 9 in the definitive surgery group.

Relationship of the Duration of Symptoms to the Natural History

These patients were classified by two methods: 1) according to the duration of the acute symptoms before surgical intervention, and 2) the presence or absence of chronic ulcer symptoms prior to perforation:

(1) The *acute symptoms* were divided into *Group A* consisting of those patients with acute symptoms of less than 8 hours duration prior to surgical intervention and *Group B* comprising those patients with symptoms greater than 8 hours. Of the 58 patients in *Group A*, 44 had suture plication and 14 underwent definitive surgery. There were 116 patients in *Group B* of which 78 had plication performed and 38 a definitive operation (Table 2).

(2) In reviewing the presence or absence of *classic ulcer symptoms* prior to perforation, these patients were divided into three groups: Group I comprised those patients with no history of classic ulcer symptoms prior

to perforation; Group II accounted for those patients with symptoms of less than six months duration and Group III were patients with symptoms which existed more than 6 months prior to perforation. There were 36 patients in Group I (20%), 32 of which had plication and four had definitive surgery. In Group II, of 23 patients, 13 had suture plication and 10 had a definitive operation. Of the remaining 115 patients in Group III, 77 had suture plication and 38 had definitive surgery performed (Table 3).

Other Pertinent Parameters

Shock. Six patients were in clinical shock when initially examined by the physician and of these, three subsequently expired. All patients presenting in clinical shock were in *Group B* (symptoms of more than 8 hours duration).

Pneumoperitoneum. In 43 patients (or 24% of the time), pneumoperitoneum was not radiographically demonstrated. When "free air" was not demonstrable, we were not surprised in retrospect that a delay in diagnosis and operative intervention occurred. Of the 13 deaths encountered, no radiographic evidence of pneumoperitoneum was observed in 6 (46%), and in 5 of these 6 cases, the diagnosis was missed.

Peritoneal Contamination. Peritoneal spillage of duodenal contents was considered "heavy" or significant in 95% of the patients. Though peritoneal contamination did not appear to affect the choice of the surgical procedure or the mortality, these findings would appear to us to be spurious.

Followup of Patients Managed by Suture Plication

During the 25-year period encompassed by this study, 122 patients with duodenal ulcer perforation were treated by suture plication. Of the 122 cases, 20 patients were lost to followup for a followup rate of 82%. An additional 26 patients died of causes unrelated to peptic ulcer disease. Of the 76 remaining patients, 5 expired from complications related to peptic ulcer disease, i.e., 4 from duodenal ulcer hemorrhage and one from re-perforation and peritonitis confirmed by autopsy (Fig. 1).

Thirty-nine patients (32%) required reoperation with a

TABLE 2. *Correlation of Acute Symptoms With Operative Procedure*

Duration of Symptoms	Plication	Vagotomy & Gastrectomy	Deaths
Group A*	44	14	0
Group B†	78	38	13
Total	122	52	13

* Symptoms less than eight hours.

† Symptoms more than eight hours.

TABLE 3. Correlation of Chronic Symptoms With Operative Procedure

Duration of Symptoms	Suture Plication	Vagotomy & Gastrectomy	Deaths
Group I*	32	4	3
Group II†	13	10	1
Group III‡	77	38	9
Total	122	52	13

* None.

† Less than 6 months.

‡ More than 6 months.

mean average interval before reoperation of 4.7 years. Thirty-four had a definitive surgical procedure and 5 had a second suture plication because of re-perforation. In this latter group, two returned for a definitive operation because of intractability. Hence, these 39 patients overall had a total of 41 procedures.

Re-perforation. The re-perforation rate in this group of cases was 9% involving 11 patients. The earliest re-perforation occurred at 6 months and the longest interval before re-perforation was 17 years.

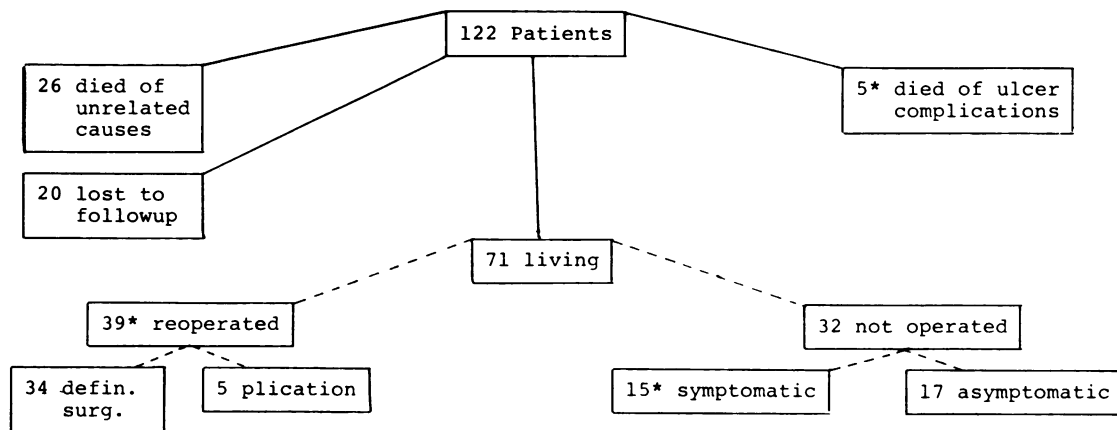
Reoperation. Of those patients who had initially been treated by suture plication, the reoperation rate in this series was 32%. The mean average interval before reoperation was 4.0 years. Thirty-four of the 39 patients in the reoperation group were in Group III (symptoms of more than 6 months duration prior to perforation). Fourteen patients in Group III have not required reoperation but are presently symptomatic and remain on strict medical regimens. Those patients in Group II (symptoms of less than 6 months duration prior to re-perforation), when reviewed, revealed that 3 of 6 required reoperation; two are presently asymptomatic and one requires antacids and dietary management for relief of pain. The longest followup period in this category was 23 years, and the shortest was 4 years. In Group I,

there were 17 living patients. Two required reoperation 6 and 16 years after plication. Fifteen patients are completely free of disease. The longest followup period in this category was 25 years and the shortest was 3 years.

Discussion

Historically, the surgical management of the perforated duodenal ulcer is highlighted by three contributions: 1) In 1887, Mikulicz reported the first suture plication of a perforated ulcer,² 2) Von Haberer, in 1919, initially suggested that this complication of duodenal ulcer disease be treated by definitive surgery,⁵ and 3) the conservative approach of continuous nasogastric suction as suggested by Seeley in 1956.³ The pendulum has swung during different periods in the twentieth century between the first two methods of surgically treating this disease. Subsequent reports on the conservative management by Taylor⁴ and the successful utilization of definitive surgery by Jordan and DeBakey¹ have been noteworthy contributions.

These reports and our observations led us to the conclusion that perforation of a duodenal ulcer is not an isolated event in the natural history of this disease. Indeed, the re-perforation rate of 9% and the overall reoperation rate of 32% following suture plication, is ample evidence that this surgical modality, by design, is an interim lifesaving procedure only. Such a conclusion is further fortified by the fact that only 17 of 122 patients (14%) were asymptomatic in the long-term follow-up. Further, it is noted in this critical review that those patients who either required reoperation because of eventual complications, who were under treatment because of ulcer symptoms or died of ulcer complications total 48%. It is our conclusion, therefore, that suture plication, while an excellent lifesaving procedure, has



*59/122 (48%) patients subsequently reoperated, symptomatic, or died of disease

FIG. 1. Fate of plication group.

limited value to the patient in terms of a definitive cure.

The 15-year span separating the mean average age of the overall patient population in this series (53 years) from the 68.5 years in the expired group introduces an element of caution in the management of the aged patient. These patients have a different pain pattern, enter the hospital at a later point in the course of development of this disease and have a cardiopulmonary system much like other individuals in the same age group.

The duration of the acute symptoms reflects that the longer the interval between the onset of pain and operative intervention, the higher is the association of complications and death. Poor radiographic technique in obtaining abdominal films adds to this delay. The inability to solicit the classic symptoms of acute perforation, accompanied by an absence of previous ulcer symptoms similarly adds to this delay. All too often inexperienced personnel, in obtaining abdominal films, will not leave the patient in the upright position long enough for the free air to gravitate under one or both hemidiaphragms.

Our confirmation that shock, as part of the presenting picture, is a significant clinical factor, is borne out by the fact that 3 of 6 patients admitted in shock expired. Whether or not peritoneal contamination was a dominant factor in selecting between suture plication or a definitive procedure cannot accurately be separated from the surgeon's own basic philosophy about the management of this particular disease.

Conclusions

This retrospective study of 174 patients with perforated duodenal ulcers revealed that 70% were treated with suture plication, and 30% with a definitive operation.

The overall mortality was 7.4%. Seventy per cent of the deaths occurred prior to 1966, and the mean average age of those that expired was 68.3 years, 15 years over the median age of the entire group.

Of 122 patients treated with suture plication, 48% either died of ulcer complications later, required reoperation for ulcer disease, or were under active treatment for ulcer symptoms.

In the group with *acute symptoms* of less than eight hours duration, no deaths occurred. All deaths were in the group with symptoms greater than eight hours duration.

Twenty per cent of the total series experienced no symptoms prior to perforation. In comparing this group with the 80% who had symptoms prior to perforation, the latter group clearly demonstrated higher mortality, reoperation, and continued symptomatology rates.

The re-perforation rate in this series is 9%, varying from 6 months to 17 years. The reoperation rate in this same group was 32%.

The age, existence of prior symptoms, duration of the perforation, extent of peritoneal contamination, the experience and skill of the surgeon, the caliber of the available operating team, and the cardiopulmonary status of the patient are important parameters to be considered in making a decision to employ definitive surgery in the management of the perforated duodenal ulcer.

Although suture plication is a time-honored lifesaving procedure, definitive surgery is a superior form of long-term management of the perforated duodenal ulcer when the above parameters are not violated.

References

1. Jordan, G. L., Jr. and DeBakey, M. E.: The Surgical Management of Acute Gastroduodenal Perforation. *Am. J. Surg.*, 101: 317, 1961.
2. Mikulicz, J.: *V. Dtsch. Ges. Chir.*, 16:337, 1887.
3. Seeley, S. F. and Campbell, D.: Nonoperative Treatment of Perforated Peptic Ulcer: A Further Report. *Surg. Gynecol. Obstet.*, 102:435, 1956.
4. Taylor, H.: The Non-surgical Treatment of Perforated Ulcer (Guest lecture). *Gastroenterology*, 33:353, 1957.
5. Von Haberer, H.: *Wein. Klin. Wschr.*, 32:413, 1919.