



## Perforated Peptic Ulcer: Long-term Results after Simple Closure in the Elderly

Lena G.M. Blomgren, M.D.

Department of Surgery, St. Görans Hospital, St. Göransplan 1, S-112 81 Stockholm, Sweden

**Abstract.** The relative incidence of peptic ulcer perforation in the elderly is rising, and the optimal surgical treatment has yet to be defined. To evaluate the long-term result after simple closure a follow-up study was initiated at a Swedish community hospital. During 1983–1992 a total of 151 patients were admitted with perforated peptic ulcer; 92 were elderly (i.e., 70 years or older), 63 of whom were operated with simple closure. Mortality at 30 days was 27% (17/63) and the total in-hospital mortality 30% (19/63). After a mean follow-up of 79 months, 14 of the 44 survivors are still alive. So far only three of the survivors have required additional hospitalization for complications of peptic ulcer disease. Because the rate of serious recurrences is low (14%, 6/44), it is concluded that simple closure is an adequate surgical treatment for peptic ulcer perforation in the elderly.

Optimal surgical management of a perforated peptic ulcer is a matter of debate. Simple closure is the standard operation at many centers as a quick, straightforward procedure but might involve a significant risk of later complications from recurrences [1, 2]. On the other hand, an extended definitive procedure presumably increases the rate of postoperative morbidity and mortality [3]. Because age is a significant risk factor in major surgery and because of their shorter life expectancy it may be assumed that elderly would benefit less from an extended definitive procedure. Conversely, the outcome of a recurrent ulcer might be more deleterious in such patients, suggesting that simple closure should be avoided.

Several characteristics of perforated peptic ulcer disease appear to be changing. One is the increasing rate in the elderly despite the decrease of peptic ulcer disease overall [4–9].

To further elucidate current trends in perforated ulcer disease, a study was performed that included every patient treated at St. Görans Hospital during a recent 10-year period. A major aim was to evaluate the operative risk and the rate of serious relapses in the elderly after simple closure.

### Patients and Methods

The study was initiated in 1992 and comprises all patients with a perforated peptic ulcer diagnosed January 1983 to December 1992 at St. Görans Hospital, Stockholm, Sweden. This community hospital during the study served about 150,000 residents, includ-

ing 16,000 elderly (70 years or older). According to customary rules of admittance it can be assumed that only a few patients from the area were treated elsewhere. In each case the original record was reviewed. Additional information was obtained from a computer registry containing data about all patients treated at any hospital in the Stockholm county. Population statistics including main and contributory causes of death were provided from the National Bureau of Statistics, Stockholm. Statistical analysis was performed using the chi-square test.

### Results

A total of 151 patients with perforated peptic ulcer disease were identified. The age of the patients ranged from 23 to 94 years of age (mean 68 years, median 73 years); there were 70 men and 81 women (0.86:1.00). The location was pyloroduodenal in 119 cases, gastric in 26 cases, and stomal or unspecified in 6 cases. The age-adjusted incidence increased by age (Fig. 1). Of the 151 patients, 92 (61%) were older than 70 years (29 men, 63 women). Altogether 69 of the elderly patients (24 men, 45 women) had pyloroduodenal ulcers, 17 (4 men, 13 women) had gastric ulcers, and 6 (1 man, 5 women) had stomal or unspecified ulcers. The ratio between the gastric and pyloroduodenal locations of the perforation was 0.17:1.00 for elderly men and 0.29:1.00 for elderly women.

In 19 of the elderly patients the lesion was not diagnosed until autopsy. Retrospectively, a few might have been saved by an early correct diagnosis, but about two-thirds were too ill on arrival for any curative treatment.

Eight of the elderly patients were treated conservatively, whereas 65 were treated surgically. In two of the latter an intended primary closure was converted to a gastric resection for technical reasons.

Altogether 63 patients above 70 years of age (27 men, 36 women), mean age 79 years (range 70–94 years), were treated with simple closure of a perforated peptic ulcer, which in three cases was supplemented with a pyloroplasty. The pyloroplasty was performed because the surgeon considered the pylorus too narrow after the simple closure. The location of the ulcer was pyloroduodenal in 53 patients (84%), gastric in 9 (14%), and stomal in 1 (2%) case. The postoperative mortality rate (30 days) was 27% (17/63). It tended to increase with age, 19% (6/31) at 70 to 79 years, and 34% (11/32) at 80 years or older; but statistical

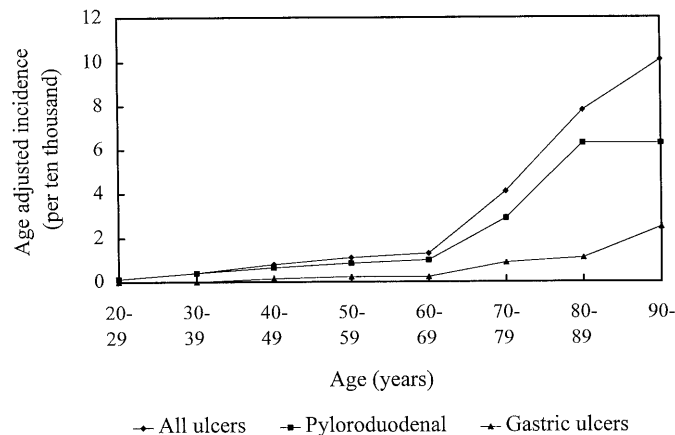


Fig. 1. Age-adjusted incidence of perforated peptic ulcer in a district of Stockholm, Sweden, 1983–1992.

significance was not achieved ( $p = 0.18$ ). The operative mortality in patients with gastric ulcers was 44% (4/9) and in those with pyloroduodenal ulcers 25% (13/53) ( $p = 0.22$ ). The mortality rate in the former group is high and might indicate a suboptimal surgical procedure, but only one of the deaths was related to complications from the operated region, and the small number of gastric ulcers makes statistics inconclusive.

Information about the time lag from arrival at the hospital to laparotomy was available in 48 cases and varied between 2 and 33 hours (mean 8 hours). Patients operated within 6 hours had a 30-day mortality of 8% (2/26) and those operated later 50% (11/22); this difference is statistically significant ( $\chi^2 = 10.56$ ,  $df = 1$ ,  $p = 0.0012$ ). Another two patients died 42 and 58 days postoperatively owing to complications directly related to the perforated ulcer.

Forty-four of the elderly patients (70%) recovered after simple closure of the perforated ulcer. They were arbitrarily prescribed  $H_2$ -antagonists or omeprazole usually for a short time. At the completion of this study (January 1996) 30 of them are dead, 3 because of a new episode of peptic ulcer disease 18, 22, and 26 months after the primary operation, respectively. One of the latter died from a bleeding ulcer and two from a new perforation. The other 27 patients died after 1 to 84 months for reasons apparently not related to the peptic ulcer disease (i.e., cardiovascular events 15 cases, malignancy 7 cases, pneumonia 2 cases, dementia 2 cases, and pancreatitis 1 case).

Fourteen patients are still alive for a mean follow-up of 79 months (range 40–145 months). Three of them have required a new hospitalization for complications of peptic ulcer disease. One needed a surgical intervention because of outlet obstruction, and one was treated conservatively because of bleeding. One patient has had several recurrences but refuses any kind of drug therapy or further surgical therapy. The mean age of the 14 patients still alive is 86 years (range 74–96 years). The rate of serious relapses in terms of death or hospitalization in the elderly treated by simple closure was 14% (6/44).

## Discussion

During the last 50 years there has been a radical change in the epidemiology of peptic ulcer disease. The rate of perforated

peptic ulcers has tended to decrease [4, 6, 8, 9]. Concomitantly, a gradual relative increase in elderly persons sustaining a perforation has been observed [4, 6, 8, 9]. In fact, an absolute increase has been reported in elderly women [4, 9]. During the 1950s men exceeded women in a ratio of 50:1 regarding the rate of perforated peptic ulcer [10]. Since then this ratio has steadily decreased [4, 9]. The present study shows that more women than men sustain a perforated peptic ulcer (0.86:1.00). There is no obvious explanation for this change. Variations in smoking habits and the use of nonsteroidal antiinflammatory drugs have been suggested, but conclusive evidence is lacking [4].

The ratio between the gastric and pyloroduodenal locations of the perforation has decreased in elderly women according to previous studies [4, 5, 8], but comparison is difficult as definition of ulcer sites varies among studies [9]. In the present study the ratio is 0.17:1.00 for elderly men and 0.29:1.00 for elderly women.

The gradual increase in average age of patients with perforated peptic ulcer has been confirmed repeatedly [4–9]. About 61% of the patients in this study were older than 70 years, and the median age was 73 years. The shift toward the elderly may be partly explained demographically. Yet in view of recent reports [8, 9] and because of the marked difference in age distribution it can be assumed that this change also reflects a true relative increase of perforated peptic ulcer in the elderly.

The mortality rate among the elderly undergoing surgery for perforated peptic ulcer is high: 12% to 47% [3, 11–13]. The present study, in agreement with previous ones, reveals the importance of early surgical intervention to improve survival rates [3, 12, 14, 15]. Operation at 7 hours or more after admission was associated with a sixfold increase in mortality.

Surgical treatment of perforated peptic ulcer is the preferred procedure at most centers, although the strategy varies [1–3, 16, 17]. A crucial point is whether simple closure is sufficient or if the emergent operation should include a definitive procedure. The major argument against simple closure is the possible risk of future serious complications of relapse. According to the present study the rate of complications necessitating rehospitalization after simple closure is remarkably low among the elderly. Although additional relapses might occur in the cohort studied, few patients are still at risk. It should be further emphasized that none of the patients having a relapse had been on efficient acid-reducing medication. It might be assumed that such regimen, with the possible addition of antibiotics against *Helicobacter pylori*, should reduce the relapse rate to a negligible one [7, 17–19]. Consequently, elderly persons sustaining a perforated peptic ulcer generally should have only simple closure without unnecessary delay. It has been suggested that the endoscopic approach for simple closure minimizes surgical trauma and improves the immediate surgical result [7, 20, 21]. Hence the demonstrated long-term efficacy of simple closure is of additional importance.

## Résumé

L'incidence relative de perforation d'ulcère chez le sujet âgé est en hausse. Le traitement chirurgical optimum reste à définir. Les résultats à long terme après suture simple ont été évalués dans un hôpital général suédois. Entre 1983 et 1992, 151 patients ont été admis pour perforation d'ulcère. Quarante-vingt-douze d'entre eux avaient 70 ans ou plus. Soixante-trois ont eu une suture simple. La mortalité à 30 jours était de 27% (17/63) et la mortalité globale

hospitalière de 30% (19/63). Après un suivi moyen de 79 mois, 14 des 44 survivants sont encore en vie. A ce jour, seuls trois des survivants ont nécessité une rehospitalisation pour complications de leur maladie. Compte tenu du taux de récurrence faible, de 14% (6/44), on conclue que la suture simple est suffisante chez le sujet âgé ayant une perforation d'ulcère.

### Resumen

La incidencia relativa de perforación de la úlcera péptica en las personas de edad avanzada es creciente, y aún está por definir la modalidad óptima de tratamiento quirúrgico. Con el propósito de evaluar los resultados a largo plazo luego del cierre simple de la perforación, se inició un estudio de seguimiento en un hospital comunitario de Suecia. En el período 1983-1992, se hospitalizaron 151 pacientes con úlcera péptica perforada. Noventa y dos de ellos fueron ancianos, o sea de 70 años o más. Sesenta y tres pacientes ancianos fueron operados mediante cierre simple, con una mortalidad a 30 días de 27% (17/63) y una mortalidad total intrahospitalaria de 30% (19/63). Luego de un seguimiento promedio de 79 meses, 14 de los 44 sobrevivientes se encontraban todavía vivos. Hasta el momento sólo 3 de los sobrevivientes han requerido hospitalización adicional por complicaciones de la enfermedad ulceropéptica. Puesto que la tasa de recurrencias graves es baja, 14% (6/44), nuestra conclusión es que el cierre simple es una modalidad adecuada de tratamiento quirúrgico de la perforación de la úlcera péptica en los ancianos.

### Acknowledgment

This study was supported by grants from the Stockholm County Council.

### References

- Christiansen, J., Andersen, O.B., Bonnesen, T., Baekgaard, N.: Perforated duodenal ulcer managed by simple closure versus closure and proximal gastric vagotomy. *Br. J. Surg.* 74:286, 1987
- Tanhiphat, C., Tanprayoon, T., Na Thalang, A.: Surgical treatment of perforated duodenal ulcer: a prospective trial between simple closure and definitive surgery. *Br. J. Surg.* 72:370, 1985
- Irvin, T.T.: Mortality and perforated peptic ulcer: a case for risk stratification in elderly patients. *Br. J. Surg.* 76:215, 1989
- Walt, R., Katschinski, B., Logan, R., Ashley, J., Langman, M.: Rising

- frequency of ulcer perforation in elderly people in the United Kingdom. *Lancet* 3:489, 1986
- Kulber, D.A., Hartunian, S., Schiller, D., Morgenstern, L.: The current spectrum of peptic ulcer disease in the older age groups. *Am. Surg.* 56:737, 1990
- Gilinsky, N.H.: Peptic ulcer disease in the elderly. *Gastroenterol. Clin. North Am.* 19:255, 1990
- Cocks, J.R.: Perforated peptic ulcer—the changing scene. *Dig. Dis.* 10:10, 1992
- Agrez, M.V., Henry, D.A., Senthiselvan, S., Duggan, J.M.: Changing trends in perforated peptic ulcer during the past 45 years. *Aust. N.Z. J. Surg.* 62:729, 1992
- Svanes, C., Salvesen, H., Stangeland, L., Svanes, K., Søreide, O.: Perforated peptic ulcer over 56 years: time trends in patients and disease characteristics. *Gut* 34:1666, 1993
- Kirsner, J.B.: Peptic ulcer. In Cecil-Loeb Textbook of Medicine, P.B. Beeson, W. McDermott, editors. Philadelphia, Saunders, 1963, pp. 911-913
- Ball, A.B.S., Thomas, P.A., Evans, S.J.: Operative mortality after perforated peptic ulcer. *Br. J. Surg.* 76:521, 1989
- Werbin, N., Kashtan, H., Wasserman, I., Wiznitzer, T.: Perforated duodenal ulcer in the elderly patient. *Can. J. Surg.* 33:143, 1990
- O'Riordain, D.S., O'Dwyer, P.J., O'Higgins, N.J.: Perforated duodenal ulcer in elderly patients. *J. R. Coll. Surg. Edinb.* 35:93, 1990
- Boey, J., Wong, J.: Perforated duodenal ulcers. *World J. Surg.* 11:319, 1987
- Svanes, C., Lie, R.T., Svanes, K., Lie, S.A., Søreide, O.: Adverse effects of delayed treatment for perforated peptic ulcer. *Ann. Surg.* 220:168, 1994
- Feliciano, D.V., Bitondo, C.G., Burch, J.M., Mattox, K.L., Jordan, G.L., DeBakey, M.E.: Emergency management of perforated peptic ulcers in the elderly patient. *Am. J. Surg.* 148:764, 1984
- Bornman, P.C., Theodorou, N.A., Jeffery, P.C., Marks, I.N., Essel, H.P., Wright, J.P., Terblanche, J.: Simple closure of perforated duodenal ulcer: a prospective evaluation of a conservative management policy. *Br. J. Surg.* 77:73, 1990
- Hentschel, E., Brandstätter, G., Dragosics, B., Hirschl, A.M., Nemeč, H., Schutze, K., Taufer, M., Wurzer, H.: Effect of ranitidine and amoxicillin plus metronidazol on the eradication of *Helicobacter pylori* and the recurrence of duodenal ulcer. *N. Engl. J. Med.* 328:308, 1993
- Simpson, C.J., Lamont, G., Macdonald, I., Smith, I.S.: Effect of cimetidine on prognosis after simple closure of perforated duodenal ulcer. *Br. J. Surg.* 74:104, 1987
- Matsuda, M., Nishiyama, M., Hanai, T., Saeki, S., Watanabe, T.: Laparoscopic omental patch repair for perforated peptic ulcer. *Ann. Surg.* 221:236, 1995
- Lau, W.Y., Leung, K.L., Zhu, X.L., Lam, Y.H., Chung, S.C.S., Li, A.K.C.: Laparoscopic repair of perforated peptic ulcer. *Br. J. Surg.* 82:814, 1995

## Invited Commentary

John R. Cocks, M.D.

Department of General Surgery, Box Hill Hospital, Melbourne, Australia

This paper particularly highlights the ever-increasing age of patients presenting with perforated ulcer and accentuates the high mortality rate in the elderly. The authors confirm the higher mortality in patients whose surgery is delayed. In fact, in 21% the ulcer was not diagnosed until autopsy. They stress the mortality

difference between delays in hospitalization to surgery, although most authors emphasize delays in presentation to hospital in the elderly, with higher rates of preoperative shock, as being the main factor influencing survival [1]. It is not made clear in this paper whether the in-hospital delays were predominantly diagnostic or if adequate resuscitation was given during that delayed time.

The philosophy of the management of perforated ulcer remains twofold: (1) to minimize the time the patient is exposed to peritonitis; and (2) to minimize long-term complications. There remains a diversity of opinion as to how these aims should be achieved.

There are protagonists for early definitive vagal denervation or gastric resection techniques who have demonstrated no differ-

ences in mortality between these more extensive procedures and simple oversew, although in this elderly group of relatively unfit patients many would choose the lesser procedure. On the other hand, our group has demonstrated that 68% of ulcers presenting within 18 to 24 hours of perforation seal spontaneously with an adequate short time of "deliberative" resuscitation [2]. We do agree with others that the elderly do not appear to seal spontaneously as well as young patients [3], but even in this age group our 13% mortality compares well with 29% with immediate oversew.

Although it has been previously noted that up to 39% of all oversewn patients need definitive surgery within 6 years [1], these authors are to be congratulated on being able to follow all their patients and determine that only 14% of this selected age group series have suffered a recurrent ulcer over a mean time of 79 months. Although recurrent ulceration produced demise in 50% of those patients, it is pointed out that there was no long-term antiulcer protocol in the studied group. It is also noted that 68% of this series had died by the time of review, most apparently from unrelated causes, suggesting that definitive surgery does not have much justification in the elderly.

Although a case has not been made for simple oversew as the procedure of choice, it is suggested that such a procedure in most cases does produce satisfactory results. Debate continues on the place of laparoscopic surgery for perforated ulcer, but it is suggested in this paper that these more minimally invasive tech-

niques, together with adequate long-term postoperative antiulcer agents and, where appropriate, an anti-*Helicobacter* protocol, may provide the lowest mortality and long-term complication rates in the elderly. I thoroughly concurs with this attitude.

Perforated gastric ulcers remain somewhat of an enigma. The mortality in this series was 44%, but it is also high in other series [4]. Perhaps local gastric ulcer resection, where appropriate, followed by antiulcer and anti-*Helicobacter* therapy where indicated in patients in whom simple oversew procedures appear to be failing may provide the way forward.

Many of these elderly patients are taking the ulcerogenic nonsteroidal antiinflammatory group of drugs. Hence particular preventive and therapeutic strategies continue to be developed for such ulcers.

### References

1. Boey, J., Wong, J.: Perforated duodenal ulcers. *World J. Surg.* 11:319, 1987
2. Cocks, J.R.: Perforated peptic ulcer—the changing scene. *Dig. Dis.* 10:10, 1992
3. Crofts, T.J., Park, K.G., Steel, R.J., et al.: A randomised trial of non-operative treatment for perforated peptic ulcer. *N. Engl. J. Med.* 320:970, 1989
4. McGee, G., Sawyers, J.L.: Perforated gastric ulcers. *Arch. Surg.* 122:555, 1987