

## LAPAROSCOPIC REPAIR OF PERFORATED ULCER IN WESTERN DENMARK – A RETROSPECTIVE STUDY

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### ABSTRACT

**Objective:** To report the distribution and results of laparoscopic repair of perforated ulcer surgery in surgical departments in a major region in Denmark and compare it with the results from the national database regarding mortality and morbidity.

**Method:** Case charts from all patients who underwent laparoscopic repair of perforated ulcer in Western Denmark in the period 1 January 2003 – 1 July 2007 were collected. Demographical data, surgical details, morbidity, 30-day mortality, and length of stay were recorded. For comparison, data from the National Health Registry (NIP) describing all patients who had an operation due to perforated ulcer in this period was obtained.

**Results:** No more than 51 out of 818 patients undergoing operation for perforated ulcer in the region had a laparoscopic operation. Mortality in the laparoscopic group was 4% compared to 26% reported from the national database (NIP). The laparoscopic group had a higher reperforation rate but length of stay was equal. No formal criteria concerning surgeon or patients selection for laparoscopic surgery were met.

**Conclusion:** Laparoscopic repair of perforated ulcer was done without any selection criteria in few surgical departments in Western Denmark and was associated with a low mortality but a higher risk of reperforation.

Key words: Perforated ulcer; laparoscopy; mortality; morbidity; surgery; selection

### INTRODUCTION

Since the first reports almost 20 years ago (1, 2) the use of laparoscopy in the repair of perforated ulcer has been documented by several centers. Today, the operation is well-established in hospitals with advanced laparoscopic expertise (3–5). The advantage of laparoscopy compared to open surgery is reported to include less postoperative pain, less analgesic use, earlier oral postoperative intake, and shorter recon-

valescence (6–8). However, the laparoscopic approach has so far not been broadly implemented and data concerning the outcome of this modality are mainly from single center studies. Furthermore, it is unknown whether the results from specialized centers can be reproduced in a more broad setting (i.e., nation- or regionwide). To ensure that all patients are accounted for, every patient admitted with a perforated ulcer in Denmark is registered in a national database – the National Indicator Project (NIP), Danish Institute for Quality and Accreditation in Healthcare (9). The morbidity and mortality of these patients is well-described both on a national level and on a single institution level. The NIP-data, however, does not include information as to which type of operation is performed, i.e. open or laparoscopic. In western Denmark (Jutland), approximately half of the Danish population lives, i.e. 2,5 million people. This retrospective study reports the distribution of use and the

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results of laparoscopic repair of perforated ulcer in Jutland.

## METHODS

Case records from all patients undergoing laparoscopic repair of perforated ulcer in the period January 1 2003 – July 1 2007 were obtained from all Departments of Surgery in Jutland. From the journals were extracted demographic data, type of operation (simple suture, omental patch), postoperative morbidity, reoperation if performed, 30 day mortality and length of stay. Each department was asked if formal criteria had been met when selecting surgeons and patients for laparoscopy. Results from the case records were compared with data from patients undergoing repair of perforated ulcer registered in NIP database in the same period, where 818 patients underwent surgery for perforated ulcer. Although the vast majority of patients in the NIP database had an open procedure, the results involve a small risk of bias as 51 out of 818 patients underwent a laparoscopic procedure in the study period.

## RESULTS

Seven out of 18 surgical departments in question performed laparoscopic repair for perforated ulcer. None of these, however, applied formal selection criteria when selecting patients for an open or laparoscopic

procedure. Complete laparoscopic procedure was done in 51 patients with a median age of 66 years (Table 1). In 24% of the cases, simple suturing was performed whereas in the majority of cases suturing was supplied with omental patch (Table 2). Nasogastric decompression was used 3 days postoperatively with oral feeding starting on day 4 and all patients received antibiotics at least three days after the operation (median values), however, substantial inter-institutional differences was observed. The mortality was 4% (2 patients). Thirty-four (67%) patients had no postoperative complications (Table 3). Five patients had a re-perforation making a re-operation necessary, of which one had a reoperation requiring a Billroth I resection, after which she recovered. Eight patients had an abscess in the abdomen and/or pleural cavity requiring drainage postoperatively. The hospital stay was 7 days (median), and nine patients needed postoperative intensive care. From the NIP database, we found that 818 patients underwent operation for perforated ulcer in Jutland of which 16% needed a postoperative intervention, and the 30 day mortality was 25%. Length of stay was 8 days (median). Data from NIP, however, does not discriminate between patients operated with a laparoscopic or open procedure, but only 51 patients presented in this series from 2003–2007 underwent laparoscopic surgery, thus constituting a minor fraction of 51/818 (6%) of all patients operated for perforated ulcer in this period.

TABLE 1  
*Complications after surgery.*

Jutland	Laparoscopic Jutland	NIP data Denmark	NIP data
Patients (n)	51	818	1714
Age*	68 (22–93)	70 (17–100)	71 (16–100)
Mortality (%)**	4	25 (22–28)	28 (25–30)
Reperforation (%)	10	5	4
Other reoperation (%)***	10	14	14
Length of stay (days)****	7 (2–57)	8 (13–16)	8 (13–15)

\* mean (range)  
\*\* 30 day mortality  
\*\*\* including drainage  
\*\*\*\* median/range

TABLE 2  
*Operative data, all laparoscopic repairs.*

Perforation	51
Duodenum	35
Gastric	16
Suturing alone	12
Suturing with omentoplasty	39
Postoperative nasogastric drainage (days)*	3 (0–10)
Oral feeding start day*	4 (0–13)
Antibiotics (days)*	3 (0–18)

\* median (range)

## DISCUSSION

Laparoscopic repair of perforated ulcer is not a common event in Jutland; less than 50% of the surgical departments undertaking acute abdominal surgery were doing laparoscopic repair of perforated ulcer, and only 51 of 818 patients (6%) were treated with this modality. This is surprising since this series of 51 patients treated with laparoscopic repair for perforated ulcer carries a very low morbidity and mortal-

TABLE 3  
*All complications laparoscopic repairs.*

Mortality	2
Re-perforation (re-operation)	5
Re-re-perforation (re-re-operation)	1
Intra-abdominal abscess	5
Pleural drainage	5
Postoperative bleeding (OP necessary)	1
Wounds dehiscence (OP necessary)	1
Wound infection*	6
Cardiac insufficiency**	7
Respiratory insufficiency***	5
Pneumonia****	3
Renal insufficiency*****	3
No complications	34

\* Any sign of pus around a port site  
\*\* Any need of inotropic medication or clinical signs of pulmonary oedema  
\*\*\* Any need of respiratory support except oxygen  
\*\*\*\* Confirmed on X-ray.  
\*\*\*\*\* Any need of support of diuresis such as loop diuretics

ity, in agreement with randomized studies (10–12). In contrast the NIP data display substantially higher morbidity and mortality rates as previously reported from another Nordic regional multicenter study (13). The NIP database, however, does not discriminate between patients operated with a laparoscopic or an open procedure, but since only 6% of the patients in NIP were operated on laparoscopically, the impact from these patients on the results is very small. It is possible that patient selection could explain the different mortalities found in this series and in the NIP-data. The departments undertaking laparoscopic repair of perforated ulcer had no formal guidelines to select patients for laparoscopy, and the journals do not give consistent information as to preoperative considerations concerning the choice of operative procedure. The only obvious reasons to a priori choose open surgery are large ulcers. Otherwise, it seems feasible to assume that the decision to do a laparoscopic procedure largely depended on the laparoscopic expertise of the surgeon on duty. The low number of laparoscopic operations performed and superior results concerning morbidity and mortality reported could indicate that laparoscopic repairs were performed by a few enthusiastic specialist surgeons capable of advanced laparoscopy, in contrary to open surgery, where surgeons with more limited experience may have been involved, carrying a risk of inferior results. Another explanation could be conversion of high risk patient from a laparoscopic to an open approach. Some authors actually advocate that high risk patients with a subsequent higher mortality risk should be excluded from laparoscopy (6, 7), but this argument not been proved in any trial. It is, however, an obvious limitation of the study that the number of conversions is unknown, since we do not have prospective data. From the literature, the conversion rate is reported to be around 8–27% (5, 8, 14), and apparently not associated with an increase in morbidity or mortality. So far only three randomized controlled trials has been published (10–12). The conclusion was in all cases that laparoscopic repair is a safe operation with low mortality and morbidity, but also associated with less postoperative pain, less use of analgesics, and a shorter hospital. The mortality in our series (4%) thus seems in accordance with data from the randomized trials.

To our knowledge this is the first study reporting the use and results of laparoscopic perforated ulcer repair in a major region. Despite the almost random selection of patients undergoing the operation the results from laparoscopic repair is promising, and it should probably be considered as a possible choice in centers with reasonable laparoscopic expertise, as laparoscopic suturing can easily be performed by junior surgeons adjusted to laparoscopic surgery.

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