



and Other Interventional Techniques

Laparoscopic cholecystectomy: quality of care and benchmarking

Results of a single-institution specialized in laparoscopy compared with those of a nationwide study in Switzerland

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Abstract

Background: Quality control is an important issue in surgery. Therefore, we assessed the outcome of laparoscopic cholecystectomies (LC) performed at our institution specialized in laparoscopic surgery in order to do a benchmarking.

Methods: The perioperative courses of the first 1000 LCs performed in Aarberg hospital were recorded, analyzed, and compared with the results of a recent study including 10, 174 patients published by the Swiss Association of Laparoscopic and Thoracoscopic Surgery (SALTS).

Results: The following quality indicators were compared with the corresponding SALTS rates: primary conversion rate 1.5% (SALTS 8.2%; $p < 0.01$); conversion rate for intraoperative complications 6.5% (63.8%; $p < 0.01$); intraoperative complication rate 22.2% (34.4%; $p < 0.01$); postoperative morbidity rate 8.1% (10.4%; n.s.); in-hospital mortality rate 0.1% (0.2%; n.s.); and reoperation rate 0.8% (1.7%; n.s.).

Conclusions: LC has reached a high quality level in its widespread use, but in a small specialized center even a higher quality level can be achieved. Favorable results seem to depend on structural advantages of a surveyable unit in association with a continuously motivated surgical team.

Key words: Laparoscopic cholecystectomy — Laparoscopy — Quality of care — Benchmarking

The first laparoscopic cholecystectomy (LC) in Switzerland was performed in Aarberg on 1 November 1989. The surgical procedure has since then become the gold standard in treatment of symptomatic and even complicated gallstone disease [20]. With the introduction of

a new technique specific measures for quality management are required. This is particularly true in an environment where quality management is a prerequisite of modern health care concerning cost bearers, service providers, and last but not least the patients themselves. Therefore quality management includes not only the control if a new method provides an improvement over traditional procedures, but also the investigation of whether there are differences between various users of the same method [6, 19].

In surgery this means to clarify whether a specific procedure is justified in the treatment of a surgical disorder and further if it is used in the right hands. Such knowledge is important when a new method is confronted with criticism. It can also act as the starting point for quality improvement [24].

The aim of the present study was to assess the achieved quality level of LC in a single institution specializing in laparoscopic surgery, and to compare this with the quality level of LC in widespread use. The definition of quality level was based on several comparable quality indicators such as mortality, intraoperative complications, perioperative morbidity, and reoperation rate, as they are considered to be some of the most important outcome variables in surgery by surgeons as well as patients [6, 15]. In addition the conversion rate was chosen as a quality parameter, since it leads to a larger proportion of open procedures, which are associated with longer hospital stay, more postoperative pain, later return to normal activities, and worse cosmetics, which again are some of the most important endpoints mainly in the patient's opinion [5, 15].

Materials and methods

During the time period of 1 November 1989 to 11 February 1997, 1000 LC were performed at Aarberg hospital. All these operations were done in a modified "French technique" described by Klaiber et al. [9]

Table 1. ASA scores

	Aarberg	SALTS	SALTS ^a	p-value
ASA I	29%	55%	56%	<0.01
ASA II	53%	35%	34%	<0.01
ASA III	17%	4%	3%	<0.01
ASA IV	1%	1%	1%	1.0

^a Corrected by subtraction of Aarberg cases

Table 2. Indications for laparoscopic cholecystectomy

	Aarberg	SALTS	SALTS ^a	p-value
Symptomatic cholecystolithiasis	85.6%	87.9%	88.0%	0.027
Acute cholecystitis	13.3%	11.9%	11.8%	0.16
Suspected common bile duct stones	4.3%	11.8%	12.2%	<0.01
Biliary pancreatitis	2.1%	6.4%	6.6%	<0.01
Chronic scleroatrophic cholecystitis	0.8%	1.8%	1.9%	0.012
Asymptomatic cholecystolithiasis	1.3%	1.3%	1.3%	1.0
Polyp of the gallbladder	0.7%	0.6%	0.6%	0.7
Others	2.5%	2.6%	2.6%	0.84

^a Corrected by subtraction of Aarberg cases

with only little variation over the study time. Initially a intravenous cholangiography was added to the preoperative investigations, which was replaced by routine intraoperative cholangiography (IOC) after the first 398 procedures.

Both surgeons and surgical trainees acted as operators. The latter were always assisted by one of the five staff surgeons. Patient selection was done during the learning period among the first 100 patients presenting with gallstone disease. Subsequently all patients with uncomplicated as well as complicated gallstone disease have at least been evaluated laparoscopically.

Perioperative data was collected prospectively using the computerized datasheet set up by the SALTS. This program was launched on January 1992 to consecutively record all data of LC patients recruited nationwide from 68 hospitals and 14 surgeons with private practices. Because the comprehensive protocol with more than 300 parameters had been developed and in use at our institution since 1989 it was possible to include all our complete LC data in the study. The data was divided into the following categories: individual patient data, demographic variables and risk factors, preoperative workup, indications for LC, position and operative experience of the surgeon, intraoperative findings and intraoperative complications, histopathological findings, postoperative course and complications, and additional treatment within the first 30 days following operation.

Our results were then compared with the recent data of a nationwide multicenter study including 10, 174 patients from 68 institutions, based on the same datasheets and published by the SALTS [28].

Statistical differences between the compared groups were calculated by chi-square tests after SALTS data correction by subtraction of the Aarberg cases. *P* values <0.01 were considered as statistically significant. The differences of operation times could not be statistically analyzed since the standard deviations of the SALTS data were not known.

Results

Demographic findings

In our study group of 1000 LC the female to male ratio was 2:1 with a mean age of 56 years (range 12–98), a mean weight of 77 kg (39–129), and a mean height of 168 (150–200). The distribution of patients into the ASA risk groups is shown in Table 1. Of the Aarberg patients, 4.4% (SALTS 3.3%; *p* = 0.085) had previously under-

gone an upper abdominal operation and 43% (32.7%; *p* < 0.01) had had a lower abdominal operation.

In general, the demographic findings were identical. However, when comparing the previous abdominal operation rate a tendency, and when comparing the ASA scores even a significant difference toward a higher risk group in the Aarberg collective was found.

Indications for LC

Symptomatic uncomplicated cholecystolithiasis was the main indication for LC accounting for 75% of all cases in Aarberg (Table 2). In 1.3% of cases LC was performed on asymptomatic cholecystolithiasis where the discovery of a large gallstone led to the removal of the gallbladder [12]. A stone-free gallbladder was removed in 1.6% of cases; a chronic cholecystitis accounted for 0.8% of all cases. Histopathological findings revealed gallbladder polyps in 0.7% and gallbladder abnormalities in 0.1% of resected gallbladders. In 19.9% of cases the indication for LC was a complicated cholecystolithiasis accounting for 13.3% of acute cholecystitis, 4.3% of choledocholithiasis, and 2.1% of biliary pancreatitis.

In Aarberg 8.9% (SALTS 6.2%; *p* = 0.002) of LC were performed as an emergency procedure within the first 72 hr after onset of symptoms referring to the findings in the literature [10, 27]. Of the patients, 19.3% (18.4%; *p* = 0.49) underwent LC on the first elective list, which means in the regular operation program after pretreatment of acute symptoms with analgetics and antibiotics. Finally, 71.8% (75.4%; *p* = 0.011) of the patients were operated on from a planned elective list after regular admission.

When comparing those results the profile of indications (Table 2) is identical, but nevertheless there are significantly more emergency operations in the Aarberg collective.

