Importance of Conversion for Results Obtained with Laparoscopic Colorectal Surgery

Frank Marusch, M.D., Ingo Gastinger, M.D., Claus Schneider, M.D., Hubert Scheidbach, M.D., Jochen Konradt, M.D., Hans-Peter Bruch, M.D., Lothar Köhler, M.D., Eckhard Bärlehner, M.D., Ferdinand Köckerling, M.D., and the Laparoscopic Colorectal Surgery Study Group (LCSSG)

From the Department of Surgery, Carl Thiem Hospital, Cottbus, Germany

PURPOSE: The need for a conversion is a problem inherent in laparoscopic surgery. The present study points up the significance of conversion for the results obtained with laparoscopic colorectal surgery and identifies the risk factors that establish the need for conversion. METHOD: The study took the form of a multicentric, prospective, observational study within the Laparoscopic Colorectal Surgery Study Group. A total of 33 institutions in Germany, Austria, and Switzerland participated. The study period was 3.5 years. Cases were documented with the aid of a standardized questionnaire. RESULTS: Within the framework of the Laparoscopic Colorectal Surgery Study Group, a total of 1,658 patients were recruited to a multicenter study over a period of three and one-half years (from August 1, 1995 to February 1, 1999). The observed conversion rate was 5.2 percent (n = 86). The patients requiring a conversion were significantly heavier (body mass index, 26.5 vs. 24.9) than those undergoing pure laparoscopy. Resections of the rectum were associated with a higher risk for conversion (20.9 vs. 13 percent). Intraoperative complications occurred significantly more frequently in the conversion group (27.9 vs. 3.8 percent). The duration of the operation was significantly increased after conversion in a considerable proportion of the procedures performed. Postoperative morbidity (47.7 vs. 26.1 percent), mortality (3.5 vs. 1.5 percent), recovery time, and postoperative hospital stay were all negatively influenced by conversion, in part significantly. Institutions with experience of more than 100 laparoscopic colorectal procedures proved to have a significantly lower conversion rate than those with experience of fewer than 100 such interventions (4.3 vs. 6.9 percent). CONCLUSION: Although, of itself, conversion is not considered to be a complication of laparoscopic surgery, it is true that the postoperative course after conversion is associated with appreciably poorer results in terms of morbidity, mortality, convalescence, blood transfusion requirement, and postoperative hospital stay. The importance of experience in laparoscopic surgery can be demonstrated on the basis of the conversion rates. Careful patient selection oriented to the experience of the surgeon is required if we are to keep the conversion, morbidity, and mortality rates of laparoscopic colorectal procedures as low as possible. [Key words: Multicenter study; Laparoscopic colorectal surgery; Conversion; Learning curve; Experience]

Supported by Ethicon Endosurgery, Norderstedt, Germany, and Takeda Pharma, Aachen, Germany.

Address reprint requests to Dr. Marusch: Department of Surgery, Carl Thiem Hospital, Teaching Hospital of Humboldt University, Thiemstr. 111, D-03048 Cottbus, Germany.

Laparoscopic colorectal surgery is technically demanding and can be performed with low morbidity and mortality rates only by a surgeon with above-average experience in laparoscopic surgery working in concert with a well-trained team.1

The need for conversion is a problem that is inherent in laparoscopic surgery. If, during any laparoscopic intervention, intraoperative problems (e.g., the size of the tumor or adhesions) that make unequivocal diagnostic clarification of the medical situation impossible, or intraoperative complications (e.g., hemorrhage or perforation of the bowel) are encountered and prove unamenable to laparoscopic resolution, the option to convert is always available. In this connection it is important to emphasize that conversion itself is not a complication, but merely reflects the exercise of the responsibility felt by the surgeon for the patient in his care.2 In addition to such patient-related risk factors as obesity, previous surgery, and large tumor size, the experience of the surgeon is of paramount importance for determining the conversion rate. In comparable patient populations and surgical indications, therefore, this factor is a quality indicator in laparoscopic surgery. The conversion rate in laparoscopic colorectal surgery as reported in the literature varies between 2 and 77 percent.3,4 The aim of the present investigation was to identify the risk factors leading to the conversion of a laparoscopic colorectal intervention and the conditions under which such surgery is possible with minimal conver-
sion rates, and thus enable the establishment of suitable indications (Table 1).

PATIENTS AND METHODS

The investigation took the form of a multicenter, prospective, observational study performed within the Laparoscopic Colorectal Surgery Study Group. The results of selected questions from this study have been published elsewhere.10,50-52 No selection of the institutions participating in the study was performed. All those taking part had extensive experience in the use of laparoscopic surgery. The study was begun on August 1, 1995. By the end of this investigation (February 1, 1999) a total of 53 institutions in Germany, Austria, and Switzerland were participating in this study.

All of the hospitals involved in this study are public institutions of varying size (7 university hospitals, 20 academic teaching hospitals, and 6 other hospitals). No record was made of the individual surgeons involved in each of the hospitals.

Between August 1995 and February 1999, 1,658 consecutive patients undergoing a laparoscopic or laparoscopic-assisted colorectal procedure were recruited to the study. Purely laparoscopic interventions are procedures with no additional incision (rectopexy, n = 20; construction of a stoma, n = 80). Laparoscopic-assisted operations are all other interventions, that is, laparoscopic procedures with additional incision for external anastomosis, introduction of the stapler anvil into the proximal bowel segment, or for recovery of the surgical specimen in the case of extirpation of the rectum (n = 1,472). Conversion is defined as the breaking off of the laparoscopic procedure, removal of the trocars, and continuation of the operation via a standard laparotomy.

Documentation of the cases was done with the aid of a standardized questionnaire, and there was no control group. The nature of the investigation, designed as an observational study, made the need for approval by an ethics committee unnecessary. All the data were recorded in the Access (Microsoft Corp, Redmon, WA) data bank and checked for completeness. The data were evaluated with the aid of the SPSS® 8.0 (SPSS Inc., Chicago, IL) program. For numerical data (operating times and postoperative hospital stay) the test for independent random samples with two-tailed significance testing was used; for testing the significance of events, the chi-squared test was used, and significance was checked with the two-tailed Fisher's exact probability test.

RESULTS

During the course of this multicenter study that was performed between August 1, 1995, and February 1, 1999, a total of 1,658 operations were prospectively recorded and evaluated. The operations were performed at 33 different institutions. Each of the institutions had performed an average of 50.2 (range, 1-447) operations. The gender distribution of the patients was 43.5 percent (n = 721) males and 56.5 percent (n = 937) females. The average age of the patients was 62.6 (median, 63.5; range, 38-94) years.

Within this three-and-one-half-year observation period, a total of 86 conversions (5.2 percent) were needed. The gender ratio was 1:1 (43 males and 43 females) and did not differ significantly (P = 0.221) from that of the overall study. The age distribution of patients undergoing conversion (mean, 64.7; median, 66; range, 28-94 years) and those not needing conversion (n = 1,572; mean, 62.5; median, 63.4; range, 27-94 years) showed no significant differences (P = 0.187). In contrast, the patients undergoing conversion were significantly heavier (body mass index, 26.5) than those in whom the procedure was purely laparoscopic (body mass index, 24.9; P < 0.05). The reasons for conversion are shown in Table 2.

The two groups did not differ significantly in terms of indications for surgery. Although the conversion group had a higher percentage of curative rectal resections (14 percent, n = 12) in comparison with the