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ORIGINAL ARTICLE

One decade of rectal prolapse surgery: a national study

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Abstract

Purpose We aimed to investigate the development of common procedures used as treatment for rectal prolapse over a decade and to determine if the choice of primary operation affects the reoperation rate.

Methods This is a retrospective analysis of operative data from a National Data Registry, Landspatientregisteret (LPR), from the period of January 1, 2004 to December 31, 2014. All hospitalized surgical treatments are registered in LPR.

Results Sixteen hundred and twenty-five patients with rectal prolapse underwent 1834 operations. There were 94% women and mean age at surgery was 71.6 ± 18.1 years, with no difference over the 11 years. The types of operations performed differed ($p < 0.0001$), with an increase in overall number of operations and increasing use of laparoscopic procedures. There were 209 reoperations, of which 129 patients were primarily operated with a perineal procedure. The mean age at reoperation was 72.8 ± 17.3 years. The most frequently used reoperation was laparoscopic rectopexy. The overall reoperation rate was 16%: 10% for both open and laparoscopic rectopexy, and for perineal procedures 26% ($p < 0.001$). The overall 30-day mortality was 2.1% and there was no difference in mortality between the procedures ($p = 0.23$).

Conclusions The overall number of rectal prolapse operations was increasing. There was a clear trend towards extended use of laparoscopic rectopexy both as primary procedure and as reoperation. The highest reoperation rates were for the perineal procedures.

Keywords Rectal prolapse · Rectal prolapse surgery · Rectopexy · Laparoscopy

Introduction

The new "Danish National Guidelines for Surgical Treatment of Rectal Prolapse," was released in January 2015. The laparoscopic approach is recommended, outmatching the perineal procedures in most cases. Traditionally, the abdominal approach is favored in younger, healthy individuals, and perineal approach in the elderly frail patients [1–3]. In recent years, the laparoscopic procedures have gained general acceptance in surgical communities, also in the group of elderly patients, only leaving place for the perineal procedures in very few selected cases [4–9]. One considerable criticism of the perineal procedures is that of poor long-term efficiency, especially high recurrence rates [1, 10]. In the literature, there are sparse considerations on which procedure should be the one of choice when operating recurrent rectal prolapse, and even a recent systematic review was reluctant to make any recommendations [11].

As there is very sparse information on large cohort incidence rates of rectopexy, we decided to analyze the distribution of the most usually performed rectal prolapse procedures in a large national material, extracted from an 11-year period in Denmark (DK). We aimed to analyze whether the reoperation rate of rectal prolapse is dependent on the choice of primary procedure, and which reoperation type was most frequently used.

Secondary outcome measures were age at surgery, length of stay (LOS), 30-day mortality and survival.

Methods

Patient data was collected anonymized from Landspatientregisteret (LPR), a nationwide hospital contact-

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based register, registering all public and private hospitals contacts in DK. The population was formed by extracting information on patients with the primary diagnosis of rectal prolapse, using the International Statistical Classification of Diseases, Tenth Revision (ICD-10) code for rectal prolapse, DK623. The Nordic Medico-Statistical Committee (NOMESCO) classification of surgical procedures was used. Patients with the DK623 diagnose, undergoing open rectopexy (KJGC00), laparoscopic rectopexy (KJGC01), perineal rectopexy (Altemeier procedure, KJGC10), Delorme (KJGC30), perineal stapled prolapse resection (PSPR, KJGC33), and stapled transanal resection of the rectum (STARR, KJGA76) formed the population. Data on comorbidity was collected by registering up to ten additional diagnose codes per patient.

All patients who met the criteria in the period of January 1, 2004 to December 31, 2014 were included.

Each patient has a unique 10-digit social security number code that can be tracked, in the Central Person Register (CPR). From the CPR we retrieved information about death or emigration.

The study was approved by the Danish Data Protection Agency (Datatilsynet).

Statistics

Data are presented as mean and standard deviation (±SD) or as median and range. Difference between groups was measured by ANOVA and Pearson's Chi-square test whenever appropriate. Time-dependent data were analyzed with the log rank test. Statistical significance was defined as $p < 0.05$, and all analyses were performed using IBM SPSS 22.

Results

The search included 1625 patients operated between January 1, 2004 and December 31, 2014. The results provided no information about the size of rectal prolapse, details about the type of laparoscopic or open rectopexy or about postoperative morbidity, as this is not registered in the LPR. In follow-up data from two patients, these were excluded due to missing values because of emigration.

Patients

In total, 1625 patients underwent 1834 rectal prolapse procedures: 1734 (94.5%) women and 100 (5.5%) men. The mean age at surgery was 71.6 ± 18.1 years, with no difference between the years in the 11-year period ($p = 0.46$).

Twenty-four patients (1.3% of operations) were under 18 years old and 749 (40.8%) were over 80 years old at the time of surgery.

The registered diagnose codes beside rectal prolapse DK623 were recorded. The most frequent recorded comorbidity was essential hypertension DI109; 72 cases. Cardiopulmonary disease (DI200-DI509 and DJ410-DJ459) was registered in also 72 cases. None of these diagnoses were registered more than once—even in the case of reoperations.

Operations

The operations were performed in 36 hospitals, of which two were in the private sector. The number of operations increased during the 11 years; 138 per 5.405 millions in 2004 to 197 per 5.643 millions in 2014 (rate from 26 to 35 per million). There was a significant difference ($p < 0.0001$) in distribution of operation types performed, shown in Fig. 1, with an increased use of laparoscopic approach, while the use of perineal procedures decreased.

There was a difference in distribution of procedures performed throughout the country (Fig. 2). In the two most populous regions, Copenhagen and Central Jutland, the most frequently performed procedure was laparoscopic rectopexy ($p < 0.001$).

The mean age at open rectopexy was 67.4 ± 19.0 years, at laparoscopic rectopexy 69.1 ± 18.3 years, at Altemeier's procedure 79.8 ± 13.2 years, at Delorme's procedure 76.2 ± 16.7 years, at PSPR 78.9 ± 22.1 years, and at STARR 60.8 ± 18.1 years, ($p < 0.0001$).

Hospital stay

The median length of hospital stay was 6 days (range 1–62) for open rectopexy, 4 days (range 1–64) for laparoscopic rectopexy, 4 days (range 1–40) for Altemeier, 3 days (range

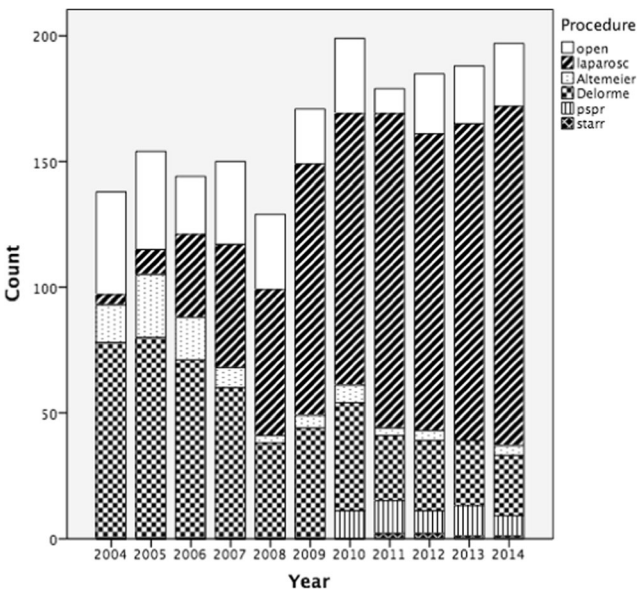

Fig. 1 Number and type of operations per year

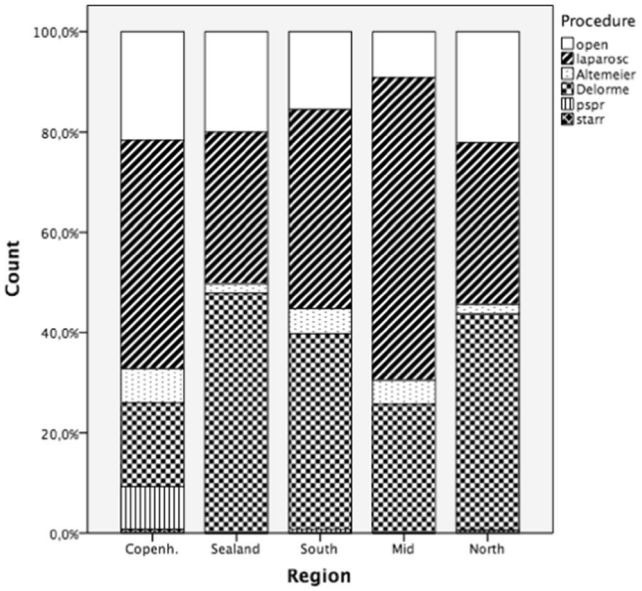

Fig. 2 Operation types within regions

1–35) for Delorme, 3 days (range 1–16) for PSPR, and 2 days (range 1–7) for STARR, which was significantly different ($p = 0.032$).

Reoperation

There were 209 reoperations, 28 of these were re-reoperations. Three men and 178 women had reoperations. Laparoscopic rectopexy was the most frequently used reoperation type. Types of reoperation after the different primary operations, for the entire period, are shown in Table 1, where Delorme, Altemeier, PSPR, and STARR are defined as perineal procedures.

The days to reoperation after the various procedures was significantly ($p = 0.03$) different: 1190 ± 1180 days after open rectopexy, 636 ± 672 days after laparoscopic rectopexy, 804 ± 681 days after Altemeier, 671 ± 719 days after Delorme, 420 ± 346 days after PSPR, and 98 days after STARR (Fig. 3).

There was no significant association between reoperation and registered comorbidity of cardiopulmonary disease or hypertension.

Table 1 Reoperations, including re-reoperations

Primary operation	Reoperation type			Total
	Perineal	Laparoscopic	Open	
Perineal	42	52	35	129
Laparoscopic	13	32	10	55
Open	4	11	10	25
Total	59	95	55	209

Overall mean age at reoperation was 72.8 ± 17.3 years. Mean age at reoperation was 64.6 ± 20.3 years for open rectopexy, 67.1 ± 18.8 years for laparoscopic rectopexy, and 76.8 ± 14.7 years for perineal procedures (Delorme, Altemeier, PSPR, and STARR) ($p < 0.0001$).

To measure reoperation rates with a sufficient follow-up time, we decided to include only patients primarily operated within the first 8 years (2004 to 2011) and for these patients register recurrences over the full 11-year period; showing at least 3 years of follow-up.

There were 1122 patients operated within the period 2004 to 2011, and of these 180 patients were reoperated until 2014; rate 15.8%.

Reoperation rates in this period for the different operations were; open rectopexy 19/187 (10.2%), laparoscopic rectopexy 43/437 (9.8%), Altemeier 25/76 (32.9%), Delorme 88/420 (21%), PSPR 5/20 (25%), and STARR 0/2 (0%)—significantly different ($p < 0.001$). The overall reoperation rate for perineal operations was 26.3%.

Mortality and survival

After the 1834 procedures; 39 patients (2.1%) died within 30 days: 10/300 (3.3%) patients after open rectopexy, 12/866 (1.4%) after laparoscopic rectopexy, 4/91 (4.4%) after Altemeier, 12/518 (2.3%) after Delorme, none after PSPR, and 1/53 (1.8%) after STARR—not significantly different ($p = 0.23$). The overall 30-day mortality for perineal procedures was 2.8%.

Survival after abdominal and laparoscopic procedures was very similar, but markedly better than for the perineal procedures ($p < 0.0001$ for overall difference), when ignoring the small group of STARR procedures (Fig. 4).

Discussion

In a recent 11-year period in DK, there was an overall increase in number of operations for rectal prolapse. There was also a clear tendency towards extended use of laparoscopic procedures, and a simultaneous decrease in the use of perineal procedures. These results indicate that the latest national recommendations in DK already are implemented to a large extent and correlates to the current general consensus in international surgical communities.

Denmark is a small country, and despite of increased use of laparoscopy over the 11-year period, there still is a continued use of perianal procedures, especially in the regions of the country away from the larger cities and hospitals. This could indicate that there is still potential for further expansion of the use of laparoscopic rectopexy.

We aimed to examine any link between the choice of primary operation, and the rate of reoperation. We do not have

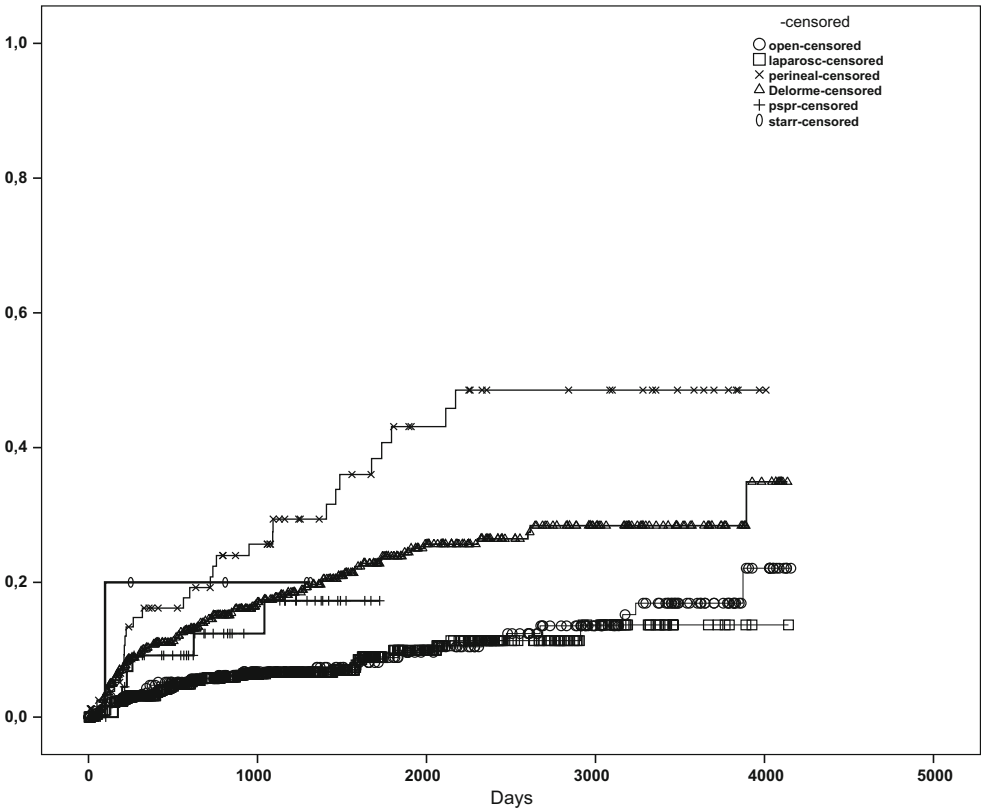

Fig. 3 Reoperation over time

information of all recurrences, as only operation in the same patient more than once indicated need for another surgical repair. Our study reports reoperation rates and not recurrence rates. Some of the operations, especially from the early study

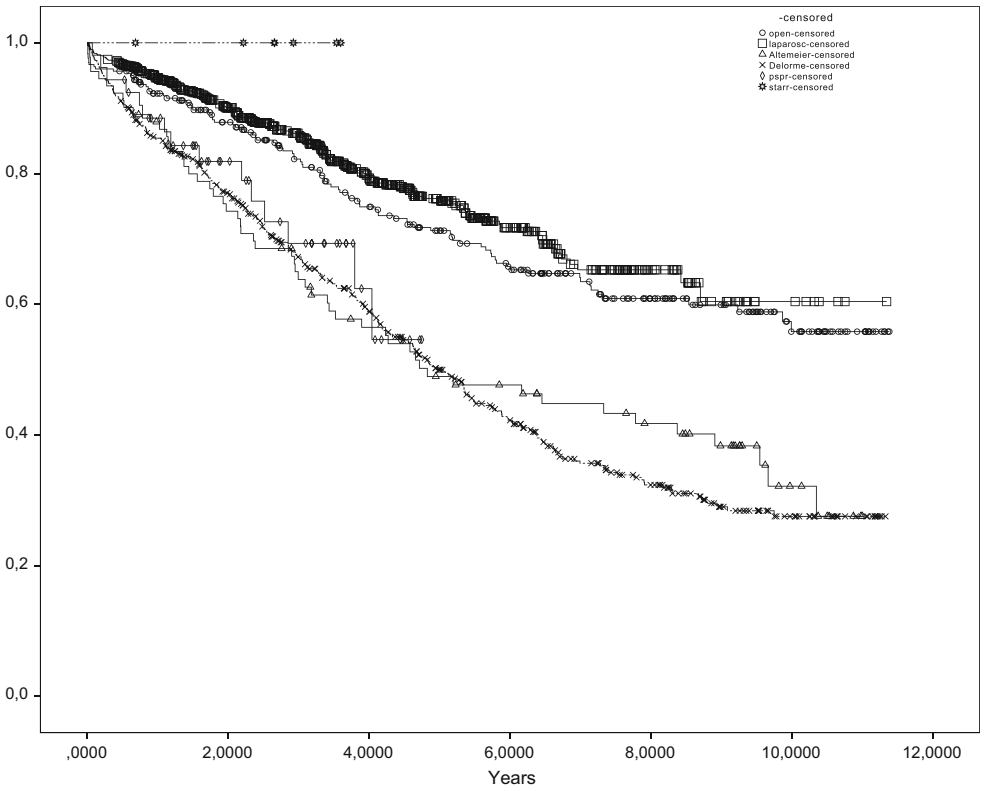

Fig. 4 Survival by procedure

period, may be reoperations from the preceding period, but on the other hand, patients from the late study period may be reoperated after the study period. The reoperation rates for laparoscopic and open rectopexy found in our study is consistent with a recent meta-analysis, claiming the laparoscopic and open procedure to be equal with regard of recurrence [12]. Some studies report a lower recurrence rate after laparoscopic rectopexy, but these study series also represent smaller and selected cohorts and have shorter follow-up time [13–15]. The high reoperation rates we found after perineal procedures are similar to previously reported results [1] and are consistent with the general concern regarding these procedures.

Despite the lack of evidence-based guidelines on the treatment of recurrent rectal prolapse, laparoscopic rectopexy was the most frequently used reoperation, regardless of the primary operation. A part of these patients may have previously been evaluated to be unfit for abdominal surgery, and then afterwards undergo an abdominal operation. It could be beneficial for this group to have undergone a laparoscopic procedure primarily, in which case reoperation rate may be lower. Approximately 50% of the patients in our study, primarily operated with Altemeier's procedure, underwent a reoperation within 6 years, compared to only 10% of the patients operated with a laparoscopic procedure. Furthermore, the LOS is no longer than for Altemeier's procedure.

The reoperation rate for Altemeier procedure is markedly higher than for Delorme procedure. This could be explained by the fact that Delorme procedure usually is offered to the frailest of patients, and therefore these patients may not be offered a reoperation in case of recurrence.

Hospital mortality in rectal prolapse surgery is low [16]. In our study, the choice of procedure did not affect the 30-day mortality. In the literature, there are sparse reports on the mortality concerning rectal prolapse surgery. In two recent studies of laparoscopic rectopexy, although not reporting national data, the 30-day mortality was 1.2% in one small series with 81 patients [8] and 60-day mortality was 1.1% in another study of 190 patients [17], which compare to the 1.4% for the laparoscopic rectopexy found in our study. Another study of national data shows a markedly lower overall mortality of 0.5; 0.13,% for abdominal procedures and 0.9% for perineal procedures, but in this study only 25% of the patients were octogenarians [16]. In our study 41% were octogenarians.

Unfortunately, we are unable to make conclusions from the results according to comorbidity. The registration depends on the dismissing surgeon's thoroughness and our sparse results must represent an underestimated rate in 1834 operations with given patient age.

The strength of this study is the large patient material, with no selection including all generally performed types of rectal prolapse operations. Another strength is the long follow-up time, as it is known that most recurrences occur in the first 2–3 years [18]. Only two patients were lost to follow-up in the survival statistics, due to the high reliability of the CPR-registry.

A limitation in our study is the missing data on postoperative morbidity and the recurrences that do not require operative treatment. Because it is not possible to retrieve recurrence rates from the database, our study discusses reoperation rates, which is less accurate, but a close estimate of number of recurrences.

Conclusions

There was an overall increase in rectal prolapse operations and the use of laparoscopic rectopexy was increasing as the overall use of perineal procedures was decreasing. The perineal procedures had the highest reoperation rates and the most frequently used reoperation type was laparoscopic rectopexy.

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