

Robot-assisted rectopexy is a safe and feasible option for treatment of rectal prolapse

Camilla Haahr, Henrik Loft Jakobsen & Ismail Gögenur

ABSTRACT

INTRODUCTION: Rectal prolapse is seen in up to one in 100 elderly women and results in symptoms such as incontinence, mucus secretion and constipation. The aim of this study was to present short- and long term outcomes after robot-assisted rectopexy in patients with rectal prolapse.

MATERIAL AND METHODS: All patients diagnosed with rectal prolapse at our institution underwent robot-assisted rectopexy. Data regarding the surgical procedure and post-operative morbidity were collected retrospectively. Patients were contacted to register long-term results regarding recurrence, incontinence and satisfaction.

RESULTS: A total of 24 consecutive patients underwent robot-assisted rectopexy from October 2010 to July 2012. Data regarding their long-term outcome was available for 18 patients at follow-up (average ten months). 50% of the patients suffered from faecal incontinence before surgery ($n = 9/18$, 50%). The mean age at surgery was 72 years (28-93 years). The mean duration of surgery was 123 min. (70-245 min.). The median length of stay in hospital was 4.1 days (0-15 days). There was one procedure-related complication (small-bowel obstruction) resulting in reoperation. At the time of follow-up, two patients (11%) had a subjective recurrence of rectal prolapse, and three patients (17%) had faecal incontinence. 89% were satisfied with the operation, and 94% would recommend this operation to other patients with the same condition.

CONCLUSION: Robot-assisted rectopexy is a safe procedure to in patients with rectal prolapse and is associated with acceptable functional outcomes and recurrence rates. There is no evidence in the literature of advantages compared with the corresponding laparoscopic procedure.

FUNDING: not relevant.

TRIAL REGISTRATION: not relevant.

Rectal prolapse is defined as a protrusion of the rectum beyond the anal canal. Rectal prolapse is diagnosed in up to 2.5/100,000 individuals, predominantly among the elderly women in whom the incidence reaches 1:100 [1]. More than 50% of patients with rectal prolapse suffer from faecal incontinence. Other symptoms are constipation, mucous secretion, bleeding, pain and the discomfort associated with having a prolapse [2, 3]. The treatment is primarily surgical. A multicentre randomised controlled trial from 2011 showed that rectopexy is su-

perior to non-operative procedure for the containment of rectal prolapse recurrence at five-year follow-up [4]. The choice of treatment, however, is not standardised, and evidence supporting one procedure over the other is sparse [5].

Laparoscopic rectopexy has gained much interest within the past decades based on improved short-term outcomes (incontinence and recurrence of prolapse) and functional results comparable to those achieved with the corresponding open procedure [6]. Different studies comparing transabdominal rectopexy and laparoscopic procedures show a reduction in length of stay, faster healing and smaller surgical wound with more rapid recovery in patients undergoing laparoscopic procedures [7, 8].

Robot-assisted rectopexy provides a novel option for treatment of patients with rectal prolapse. The procedure has several advantages such as increased dexterity, an improved three-dimensional view and increased angular freedom of movement in the instruments. As a result, the surgeon has improved intracorporal suturing possibilities, which is essential when performing a mesh rectopexy [9, 10].

We aimed to report our experience with robot-assisted posterior rectopexy in patients with rectal prolapse.

MATERIAL AND METHODS

All patients diagnosed with rectal prolapse at our institution underwent posterior robot-assisted rectopexy. Posterior rectopexy was the method of choice previously when this procedure was performed laparoscopically and was therefore continued when robot-assisted rectopexy was initiated.

An experienced colorectal surgeon made the diagnosis of symptomatic full external rectal prolapse. Demographic factors, risk factors (alcohol, tobacco) and comorbidity were recorded. Previous abdominal surgery or previous open rectopexy procedures were not regarded as exclusion criteria.

Surgery

The robotic system used was the da Vinci surgical system (Intuitive Surgical Inc., Sunnyvale, CA, USA). A posterior Wells' procedure was performed. The patient was

ORIGINAL ARTICLE

Department of Surgery,
Herlev Hospital

Dan Med J
2014;61(5):A4842



TABLE 1

Demographic factors, parameters and outcomes.

Parameter	Outcome
Age, median (range), yrs	72 (28-93)
Female/male, n	23/1
BMI, median, kg/m ²	22.5
Duration of surgery, median (range), min.	124 (70-245)
Previous surgery, n (%)	12 (50)
ASA class, median (range)	II (I-III)

ASA = American Society of Anesthesiologists; BMI = body mass index.

positioned in a French steep Trendelenburg position. The four-armed robotic cart was positioned between the legs of the patient. A 12-mm port was placed in the infra-umbilical position for the camera, and three 8-mm robotic ports were placed for the instruments. Another 12-mm trocar was placed supra-pubically to allow the assistant to retract the bladder and use the stapler to fix the mesh to the promontory [11]. The procedure was performed by two colorectal specialists experienced in robotic colorectal procedures.

Study design

This was a retrospective study of 24 consecutive patients with a prospective evaluation of long-term functional outcomes. All data regarding short-term outcomes were registered from the electronic patient chart. The long-term complications were registered by telephone interviews. The following information was collected: Recurrence (yes/no), subsequent hospitalisation due to surgery (yes/no), incontinence/constipation before operation (yes/no). Incontinence/constipation after the operation (yes/no). Satisfaction with the operation (yes/no). Recommendation of surgery to other patients (yes/no). Data were presented as median (range) or frequencies (%) unless otherwise stated. No ethical approval was needed owing to the design of the study.

Trial registration: not relevant.

RESULTS

Study population and surgery

Between October 2010 and July 2012, 24 consecutive patients with symptomatic rectal prolapse underwent robot-assisted posterior rectopexy. At long-term follow-up, two patients had died. The cause of death was unknown, but the patients did not have any admissions to the hospital up to the follow-up date. These patients were therefore not included in the long-term evaluation. Another three patients were not available for long-term follow-up.

Because of anaesthetic complications in one pa-

tient, an open procedure was performed. This patient was also excluded in our long-term follow-up. A total of 24 patients were evaluated for short-term outcomes, and 18 patients were evaluated for long-term outcomes. All but one patient in our study population were females.

The median age was 72 years (range 28-93 years), and the median American Society of Anesthesiologists (ASA) score was II (II-III) (Table 1). The median body mass index (BMI) was 22.5 (range 16-44.1). 42% (n = 10) were tobacco-smokers. 38% were diagnosed with hypertension, 25% had hypercholesterolemia, and 21% had a cerebrovascular disease. Overall, 12 patients (50%) had a history with earlier abdominal surgery. One patient presented a recurrence following a previous open rectopexy at another institution in 2007. Eight patients (44%) reported that they had faecal incontinence as their major preoperative symptom.

The mean duration of surgery was 124 min. (70-245 min.). There was no need for blood transfusion in any of the procedures. One patient had a serosal tear of the rectum. This was sutured by basic suture technique, and the patient recovered fully.

Short-term and long-term complications

The median length of stay in hospital was 4.1 days (range 0-15 days). Three days after robot-assisted rectopexy, one patient had a small-bowel obstruction. At reoperation, the surgeon found a part of jejunum to be attached to the meche. This was operated without complications, and the patient recovered without complications.

The median follow-up time was ten months (3-24 months). At the time of follow-up, 11% had a subjective recurrence of the rectal prolapse, and 17% had post-operative faecal incontinence. These three patients all had preoperative incontinence.

88% (15/17) of our patients were satisfied with the operation. 94% (16/17) would recommend this operation to other patients with the same disorder. One patient with dementia was unable to answer these questions. This patient was in a nursing home, and data regarding other long-term outcome were collected from the nurse.

DISCUSSION

Robot-assisted posterior rectopexy was a safe procedure with acceptable outcomes on a short and long-term basis in a consecutive group of patients operated for rectal prolapse.

In 2002, Munz et al conducted a prospective study on six patients who underwent robot-assisted rectopexy. Long-term outcomes after six months left no clinical evidence of recurrence in five of the patients.

One had post-operative faecal soiling, but the patient's condition was much improved compared with before surgery [12]. These results are similar to the results of our study.

Our study population was unselected and no patients was excluded for robotic surgery. We did exclude one patient at long-term follow-up due to conversion to an open operation. We had long-term follow-up data on 82% of patients. One limitation of this study is the relatively small number of patients. But, to the best of our knowledge, this is the biggest descriptive study to date that investigates robot-assisted rectopexy. The recurrence rate was found to be 11%, which was exclusively determined through interviews, and the observation was therefore made by the patients themselves. One of these patients had the recurrence diagnosed by a surgeon. If the remaining patients had been examined by a surgeon, the recurrence rate might be different and this is a limitation of the study. The median follow-up time of only ten months is a limitation of the study, and later recurrences may present. We found no correlation between earlier abdominal surgery and recurrence. Two of the patients had previously undergone operation for rectal prolapse of whom one had a previous rectopexy procedure performed in 2000. The other patient underwent surgery in the 1980s, and it has not been possible to find information about the operation. Both procedures were without complications and the recovery was complete.

In a case-control study with 82 patients evaluating recurrence and functional outcomes after laparoscopic, open and robot-assisted rectopexy, a recurrence rate of 26% after laparoscopic rectopexy was found. The length of stay was 3.5 days, and the mean operation time 199 ± 31 min. [13]. This study population was four times larger than our population and therefore more representative. Despite this, we believe that our results are comparable with respect to recurrence rate, length of stay and especially with respect to procedure time. The case-control study concluded that laparoscopic rectopexy and robot-assisted rectopexy were adequate procedures.

In 2012, Faucheron et al performed a prospective evaluation of 175 consecutive patients who underwent a laparoscopic rectopexy. They found no post-operative mortality and a 3% recurrence rate [14]. However, a recent prospective study from 2012 made by Cunin et al involving 85 patients showed that faecal incontinence remained in at least half of the patients after laparoscopic rectopexy at a three-year follow-up [15]. Thus, the reported recurrence rates in the literature are heterogeneous. In our study, we recorded an apparent reduction of patients suffering from faecal incontinence from 44% before to 17% after surgery.

There was only one procedure-related complication

with a small bowel obstruction due to fixation of a small bowel loop to the mesh. The fixation was not to a suture but to the mesh. We did not peritonealise the mesh in any case. We have no reason to believe that this fixation could have been avoided if the procedure had been done laparoscopically or as an open operation.

The retrospective interview with the patients obviously adds uncertainty to the results as some patients had difficulties remembering their symptoms prior to the operation. All data ought to be collected prospectively. We have not used a validated prospective assessment tool to score incontinence (e.g. the Cleveland Clinic Score System) [16]. Therefore, we do not know if the post-operative incontinence has improved compared with preoperatively. However, the aim of the treatment of rectal prolapse is to prevent incontinence, constipation and discomfort among patients and, importantly, to reduce their risk of recurrence. Thus, the patients' own satisfaction and subjective experience are key indicators of a successful treatment. In our small patient cohort, approximately 90% of patients were satisfied and would recommend the surgery for other patients.

Because of the variable results in laparoscopic rectopexy, it is difficult to compare the effectiveness and success of robot-assisted rectopexy. The major advantages of robot-assisted surgery that combines the advantages of the laparoscopic technique with the advantages of open surgery combined with our results make this an area that deserves further exploration [17]. 3D-vision, no hand tremor, better ergonomics for the surgeons and a minimally invasive procedure make it an attractive option. However, the costs of robotic surgery is substantially higher than those of the corresponding open or laparoscopic procedure, and there is no evi-

The da Vinci robot with the surgeon console from where all instruments are controlled.



dence to support that the use of robot-assisted surgery is superior to open or laparoscopic procedures.

Therefore, these procedures should primarily be performed as part of prospective controlled trials.

In conclusion, robot-assisted rectopexy is a safe and feasible option for the treatment of rectal prolapse. The recurrence rate is acceptable and functional outcomes are comparable to those of the corresponding laparoscopic technique. There is no evidence in the literature to support the use of robot-assisted instead of laparoscopic rectopexy and future controlled trials are warranted to investigate this.

CORRESPONDENCE: *Camilla Haahr*, Kirurgisk Afdeling, Herlev Hospital, Herlev Ringvej 75, 2730 Herlev, Denmark. E-mail: camillaahaahr84@gmail.com

ACCEPTED: 6 March 2014

CONFLICTS OF INTEREST: Disclosure forms provided by the authors are available with the full text of this article at www.danmedj.dk.

LITERATURE

1. Matzel KE, Heuer S, Zhang W. Rektumprolaps. *Der Chirurg* 2008;79:444-51.
2. D'Hoore A, Cadoni R, Penninckx F. Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. *Br J Surg* 2004;91:1500-5.
3. Parks AG. Royal Society of Medicine, Section of Proctology; meeting 27 November 1974. President's address. Anorectal incontinence. *Proc R Soc Med* 1975;68:681-90.
4. Karas JR, Uranues S, Altomare DF et al. No rectopexy versus rectopexy following rectal mobilization for full-thickness rectal prolapse: a randomized controlled trial. *Dis Colon Rectum* 2011;54:29-34.
5. Marderstein EL, Delaney CP. Surgical management of rectal prolapse. *Nat Clin Pract Gastroenterol Hepatol* 2007;4:552-61.
6. Kariv Y, Delaney CP, Casillas S et al. Long-term outcome after laparoscopic and open surgery for rectal prolapse. *Surg Endoscopy* 2005;20:35-42.
7. Purkayastha S, Tekkis P, Athanasiou T et al. A comparison of open vs. laparoscopic abdominal rectopexy for full-thickness rectal prolapse: a meta-analysis. *Dis Colon Rectum* 2005;48:1930-40.
8. D'Hoore A, Cadoni R, Penninckx F. Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. *Br J Surg* 2004;91:1500-5.
9. Luca F, Cenciarelli S, Valvo M et al. Full robotic left colon and rectal cancer resection: technique and early outcome. *Ann Surg Oncol* 2009;16:1274-8.
10. Munz Y, Moorthy K, Kudchadkar R et al. Robotic assisted rectopexy. *Am J Surg* 2004;187:88-92.
11. Hoog DEMN, Heemskerk J, Nieman FHM et al. Recurrence and functional results after open versus conventional laparoscopic versus robot-assisted laparoscopic rectopexy for rectal prolapse: a case-control study. *Int J Colorect Dis* 2009;24:1201-6.
12. Munz Y, Moorthy K, Kudchadkar R et al. Robotic assisted rectopexy. *Am J Surg* 2004;187:88-92.
13. Hoog DEMN, Heemskerk J, Niemann FHM et al. Recurrence and functional results after open versus conventional laparoscopic versus robot-assisted laparoscopic rectopexy for rectal prolapse: a case-control Study. *Int J Colorect Dis* 2009;24:1201-6.
14. Faucheron JL, Voirin D, Riboud R et al. Laparoscopic anterior rectopexy to the promontory for full-thickness rectal prolapse in 175 consecutive patients. *Dis Colon Rect* 2012;55:660-5.
15. Cunin D, Siproudhis L, Desfourneaux V et al. Incontinence in full-thickness rectal prolapse: low level of improvement after laparoscopic rectopexy. *Colorect Dis* 2013;15:470-6.
16. Jorge JM, Wexner SD. Etiology and management of fecal incontinence. *Dis Col Rect* 1993;36:77-97.
17. Hoog DEMN, Heemskerk J, Niemann FHM et al. Recurrence and functional results after open versus conventional laparoscopic versus robot-assisted laparoscopic rectopexy for rectal prolapse: a case-control study. *International J Colorect Dis* 2009;24:1201-6.