

# Early postoperative complications of transvaginal access in minimally invasive sigmoid colon procedures

Wczesne powikłania pooperacyjne dostępu przezpochwowego w chirurgii jelita grubego

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## Abstract

**Objectives:** The aim of the study was to evaluate early (the first 30 days) postoperative complications after transvaginal resection of the sigmoid colon.

**Material and Methods:** A total of 23 laparoscopy-assisted transvaginal resections of the sigmoid colon and 1 NOTES transvaginal sigmoid resection were performed in the course of 3 years. Postoperative complications were recorded in a prospective manner.

**Results:** In the group of 24 patients operated on using the transvaginal approach, 6 (25%) complications were recorded, including 3 urinary tract infections, 2 vaginal bleedings, and 1 abdominal trocar site hernia.

**Conclusion:** Early postoperative complication rate after transvaginal resection of the sigmoid colon is relatively low and the clinical complications are not severe.

Key words: **minimally invasive surgical procedures / colonic neoplasms / natural orifice endoscopic surgery / postoperative complications /**

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## Streszczenie

**Cel:** Ocena wczesnych powikłań pooperacyjnych po przezpochowych operacjach wycięcia esicy.

**Materiał i metody:** W ciągu 3 lat przeprowadziliśmy 23 zabiegi wspomaganego laparoskopowo przezpochowego wycięcia esicy i 1 zabieg przezpochowego (NOTES) wycięcia raka esicy. Powikłania pooperacyjne były oceniane w sposób prospektywny.

**Wyniki:** W grupie 24 chorych operowanych z dojścia przezpochowego z powodu schorzeń esicy u 6 chorych (25%) stwierdzono powikłania pooperacyjne w okresie 30 dni od zabiegu. Stwierdzono 3 zakażenia układu moczowego, 2 krwawienia z pochwy i 1 przepuklinę w miejscu wprowadzenia trokara brzuszego.

**Wnioski:** Wczesne powikłania pooperacyjne po przezpochowym wycięciu esicy występują względnie rzadko i nie mają charakteru powikłań ciężkich.

Słowa kluczowe: **techniki minimalnie inwazyjne / nowotwory jelita grubego /  
chirurgia przez naturalne otwory ciała / powikłania chirurgiczne /**

## Introduction

Several minimally invasive techniques of abdominal surgery have been described recently [1]. Techniques using natural body orifices for the access to the peritoneal cavity constitute one of the most promising aspects of surgical research in this field. The transvaginal route is currently the most popular natural orifice transluminal technique, but at the same time it has met with important criticism. The opponents of this approach raise concern over possible complications of the transvaginal access to intestinal resections [2]. In our paper, we present our experience with early postoperative complications after sigmoid colon resections via the transvaginal route.

## Objectives

The aim of the study was to analyze the incidence of early postoperative complications and their possible management techniques in patients undergoing resection of the sigmoid colon using the transvaginal port as part of a minimally invasive approach.

## Material and Methods

After initial experiences on the transvaginal access route for general surgical procedures in an experimental model [3], and after obtaining the approval of the ethics committee of the Consorcio Sanitario Publico del Aljarafe, Hospital San Juan de Dios, Bormujos, Sevilla, Spain, we performed 24 minimally invasive surgical procedures on sigmoid colon using a transvaginal port access. The transvaginal route was either one of the 5 laparoscopy ports used (MANOS technique), or the only access route (pure NOTES technique).

All patients gave their informed written consent. Postoperative complications were recorded in a prospective manner. Complications were classified as 'early postoperative' if they occurred before discharge from the hospital or in the course of the 30 days of the follow-up. All events were classified according to the Dindo-Clavien classification of surgical complications. All complications were analyzed if their occurrence was either likely to be linked to the nature of transvaginal access or inherent to the nature of the procedure itself.

## Results

A total of 23 mini-laparoscopy assisted transvaginal resections of the sigmoid colon and 1 pure transvaginal resection of the sigmoid colon were performed between 2009 and 2011. Indications for sigmoid colon resection included cancer (21 patients operated with the combined technique and 1 patient operated with NOTES), diverticulosis (1 patient), and chronic constipation (1 patient). We recorded 6 (25%) complications in the early postoperative period. The recorded complications were classified according to the Dindo-Clavien [4] system for surgical complications. There were 2 Dindo I complications (vaginal bleeding), 3 Dindo II complications (urinary tract infection) and 1 Dindo III complication (abdominal trocar site dehiscence).

Vaginal bleeding was of minimal amount and could be easily classified as vaginal spotting. In neither case did it require management other than conservative. Hemoglobin levels of both patients were normal during the entire postoperative period.

Urinary tract infections were diagnosed based on urine analysis and treated according to the antibiogram.

Abdominal trocar site dehiscence was operated under spinal anesthesia in a traditional manner. The further postoperative course of that patient was uneventful.

The vaginal bleeding was most likely the result of the transvaginal access route, contrary to the abdominal trocar site complication. It is not clear whether urinary tract infections were the result of using the transvaginal access route.

## Discussion

Several techniques of minimally invasive approaches to colon and rectal surgery have been described in recent decades [1]. Among many experimental techniques, two access routes have received the most attention of general surgeons, namely transumbilical single-access resections and transvaginal resections. Transumbilical single incision colon resections have been shown to be feasible and safe [2, 5]. Regardless, they require advanced laparoscopic skills and technically advanced instruments. Also, in cases of bigger tumors, the umbilical incision can be insufficient and may require a wider incision, thus minimizing the cosmetic effect of the technique and elevating the risk of incisional hernia [2].

On the other hand, transvaginal access offers other advantages, but at a price of different kind of complications. Apart from the obvious fact that the technique is available only in females, the pure transvaginal NOTES access is also highly technically demanding and requires advanced instruments [6]. However, used in combination with classical laparoscopy, it can be easily performed with standard laparoscopy instruments, offering a nice extraction route even for larger tumors, and with standard laparoscopy skills being sufficient [7, 8].

However, transvaginal access to sigmoid or colon pathology has also some fierce opponents, citing a possibility of local complications related to transvaginal placement of a working port as the main problem of this technique [2]. In the present paper we addressed the issue of early postoperative complications resulting from the transvaginal access route to colon surgery.

The idea of the transvaginal approach to peritoneal cavity is not a new concept. First transvaginal interventions (ectopic pregnancy management) were performed in 1896 by Howard Atwood Kelly of Baltimore, USA [9]. In 1901, in Petersburg, Russia, Dimitri Oskarewicz Edler Von Ott described a technique of "ventroscopy", i.e., access to the peritoneal cavity through colpotomy [10].

In the current series we report our experiences with early complications occurring in 21 patients operated for sigmoid colon cancer and 2 patients operated for non-malignant sigmoid disease, using the transvaginal route as one of many laparoscopic ports. We also included 1 patient operated by pure transvaginal NOTES for sigmoid cancer in the analysis. The latter operation, probably being the first such case described in the world literature, was had been reported by us previously in a separate paper [6]. The recorded rate of complications classified as Dindo I to Dindo III was 25%. This number seems exceedingly high when compared with the results of the biggest review on the topic to date in which Diano et al., reported combined results of 130 patients in which transvaginal specimen extraction route was used. In this review, the authors established the rate of the complications at 3.7% and 2% for the left and right colon operations, respectively [11]. However, in the paper by Diana et al., only major complications (i.e. requiring surgical, endoscopic or radiological interventions; Dindo III) were included. In our series the percentage of Dindo III complications was 4.2%, which is similar to the results of the aforementioned work.

Early postoperative complications resulting from the transvaginal access route include vaginal bleeding, vaginal discharge, and infection of the posterior vaginal fornix opening. Intestinal evisceration, vaginal cancer cells implants and dyspareunia can be considered as late complications, but can also present relatively early during the postoperative period.

Vaginal bleeding is the most common complication of the transvaginal access route to the peritoneal cavity. In a large series of transvaginal oocyte retrievals, the reported frequency of this complication ranged from 2% [12] to as high as 18% [13]. In our study, this complication occurred in 8% of the patients and was managed conservatively without any sequelae. The possibility of intraperitoneal infection or vaginal infection in transvaginal access varies in the literature reports. In a series reporting oocyte retrieval, the infectious complication rate can be lower than 1/1000 [12]. Intuitively, this rate is expected to be higher after longer lasting procedures that include opening of the lower gastro-

intestinal tract. Surprisingly, current data fail to support this statement. In a large multicenter study of transvaginal approach to different organs (362 patients; 66% cholecystectomy; 16% gastrointestinal resection), only 1 case of infectious complication (general peritonitis after cholecystectomy) was reported [14]. In a study by Ghezzi et al., the authors reported the results of 33 rectosigmoid transvaginal resection for endometriosis and found only 1 case (3%) of complications that could be attributed to infectious factors [15].

The incidence of postoperative urinary tract infection was on the other hand surprisingly high in our patients. The 13% of patients developing urinary symptoms coincide with data from other series on transvaginal access. In the multicenter trial reported by Zorron et al., there were 2 cases (0.5%) of urinary tract infections (UTI) overall, but the frequency of UTI in the subpopulation of rectosigmoid resections in the same study amounted to 8% [14]. The mechanism of high incidence of UTI in rectosigmoid resections using transvaginal access route is unclear and needs further studies, with proximity of transvaginal working port to the urinary catheter as one of the possible explanations.

Intestinal evisceration through the posterior vaginal fornix opening is one of the possible complications of transvaginal access. Although it has been described in the literature in patients undergoing gynecologic procedures [16], we did not note that complication in our study. Neither has it been described in any of the series of non-gynecologic transvaginal procedures. However, it has to be underlined that transvaginal route of access in general surgery is still in its embryonic phase and there are still no long follow-up data on these patients.

The lack of long follow-up data is also the reason why it is still too early to claim transvaginal procedures for intra-abdominal malignancies as oncologically safe. Some opponents of the technique mention that it creates a possibility for vaginal cancer cell implants during specimen extraction. In order to address this issue, we used a protective plastic bag for specimen extraction in all our patients, despite evidence that the manoeuvre does not offer complete protection from cancer cells implants [17].

The technique of transvaginal access for general surgical operations seems to offer several advantages for general surgeons. Several reservations regarding this technique are not evidence-based. On the other hand, more long term data are required to state that transvaginal access for colon resections is as safe as transvaginal hysterectomy.

## Conclusions

Transvaginal access for sigmoid colon resections has an acceptable rate of early non-severe postoperative clinical complications.

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#### Authors' Contribution

1. Andrzej L. Komorowski – concept, analysis and interpretation of data, article draft, corresponding author, critical revision.
2. Francisco Alba Mesa – concept, assumptions, article draft, critical revision.
3. Antonio Amaya Cortijo – study design, assumptions, acquisition of data.
4. Jose Manuel Romero Fernandez – study design, assumptions, acquisition of data.
5. Miguel Angel Sanchez Hurtado – concept, analysis and interpretation of data, article draft, critical revision.
6. Francisco Miguel Sanchez Margallo – analysis and interpretation of data, article draft, critical revision.

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