Use of intraoperative colonoscopy during laparoscopic surgery for colorectal cancer: Review and update

Muhammad Shahbaz, MD a; Liu Naiqing, MD b; Gustavo Marcucci, MD c; Muhammad Ijaz, MD d; Linhai, MD b; Fernando Serra, MD c; C. Federico Davrieux, MD c e and Jun Niu, MD a*

a Department of General Surgery, Qilu Hospital affiliated to Shandong University, Jinan, China; b Department of Gastrointestinal Surgery, Linyi Central Hospital, Shandong, China; c DAICIM Foundation, Buenos Aires, Argentina; d School of Pharmaceutical Sciences, Shandong University, No. 44 Wenhuaxi Road, Jinan 250012, China and e Sanatorio de la Mujer, Rosario, Argentina.

Abstract

Background: Colorectal cancer is one of the most frequent diseases worldwide. Surgical resection of the tumor is its definitive treatment. The laparoscopic approach is an excellent option but requires an adequate delimitation and endoscopic marking of the tumor. At times it is not possible to locate the exact site of the labeling and a laparoscopic colectomy must be combined with the intraoperative endoscopy. The aim of this study is to review the current usefulness of intraoperative colonoscopy during laparoscopic colorectal surgery as a treatment for colon and rectal cancer.

Materials and Methods: A literature review on the usefulness of intraoperative endoscopy during laparoscopic colectomy in the treatment of colorectal cancer in different search engines, using Boolean operators, was performed without time limit.

Results: A total of 15 articles were analyzed, 11 were excluded, n= 3 were included (clinical studies).

Conclusion: The use of intraoperative colonoscopy during laparoscopic colectomy for the treatment of colorectal cancer is useful, safe and widely disseminated.

Keywords colorectal cancer; colonoscopy; laparoscopic colectomy; intraoperative endoscopy; minimally invasive surgery

*Corresponding author: Prof. Jun Niu
Department of General Surgery, Qilu Hospital, Shandong University, 107 Wenhua W Rd, Lixia Qu, Jinan Shi, Shandong Sheng, China. Zip Code: 250012.
Tel: +86-53182169203 Fax: +86-53182169243
Email: sdusurg@163.com

INTRODUCTION

Colorectal cancer is one of the most frequent diseases worldwide [1]. It ranks third in incidence, and second in death associated with cancer [2]. Its definitive treatment is the surgical resection of the tumor. It is currently accepted that a laparoscopic approach is an excellent option. It proved to have comparable results with open surgery [3]. In order to perform a correct resection with safe limits, an adequate delimitation of the tumor extension is required. To this end, endoscopic marking with ink (tattoo) is used [4]. Although several articles have proven their usefulness, sometimes it is not possible to locate the exact location of the marking. In obese patients, the surgeon may encounter difficulties because of the fat and the large epiploic appendages that surround the colon and rectum. On the other hand, the endoscopist sees limited action in patients with intestinal obstruction and poor colonic preparation [5]. This is how the surgical result is compromised from the oncological point of view. For this reason, it is sometimes convenient to combine a laparoscopic colectomy with intraoperative endoscopy to determine the exact location and extent of the tumor. With the advent of minimally invasive procedures, some cutting-edge centers worldwide have applied this method in a routine and selective manner [6].

In this article, we present a review and update of the combined use of intraoperative colonoscopy in the laparoscopic colorectal resection.

Objectives

To determine the characteristics of intraoperative colonoscopy during laparoscopic colorectal surgery as a treatment for colon and rectal cancer.

MATERIAL AND METHODS

A literature review on the usefulness of intraoperative endoscopy during laparoscopic colectomy in the treatment of colorectal cancer is presented. A literature search was performed using the search engines "MEDLINE", "EMBASE", and "Scielo". Search terms were "laparoscopic colorectal", "intraoperative endoscopy", and "laparoscopic colorectal [AND]

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Type of study</th>
<th>Patients (n)</th>
<th>Pathology</th>
<th>Synchronous polyps</th>
<th>Synchronous cancer</th>
<th>Add Operative Time</th>
<th>Complications rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Szmierczman et al.</td>
<td>2018</td>
<td>Clinical study</td>
<td>168</td>
<td>Cancer</td>
<td>24 %</td>
<td>-</td>
<td>+ 19'</td>
<td>n/d</td>
</tr>
<tr>
<td>Kim et al.</td>
<td>2007</td>
<td>Clinical study</td>
<td>51</td>
<td>Cancer</td>
<td>37 %</td>
<td>24 %</td>
<td>+ 10.5'</td>
<td>11 %</td>
</tr>
<tr>
<td>Brullet et al.</td>
<td>1992</td>
<td>Clinical study</td>
<td>67</td>
<td>Cancer</td>
<td>36 %</td>
<td>9 %</td>
<td>+ 15'</td>
<td>3 %</td>
</tr>
<tr>
<td>Marcuccii-Serra</td>
<td>2019</td>
<td>Clinical study</td>
<td>15</td>
<td>Cancer</td>
<td>6 %</td>
<td>0 %</td>
<td>+ 9'</td>
<td>6 %</td>
</tr>
<tr>
<td>Naiqing</td>
<td>2019</td>
<td>Clinical study</td>
<td>59</td>
<td>Cancer</td>
<td>19 %</td>
<td>10 %</td>
<td>+ 15'</td>
<td>2 %</td>
</tr>
</tbody>
</table>

Table 1. Review of articles that address the combination of laparoscopic surgery and intraoperative colonoscopy for the treatment of malignant colorectal pathology.


is intra-operative endoscopy". Boolean operators were used to optimizing the survey. Articles were analyzed without time limit. The selection criteria were as follow: inclusion criteria were 1) laparoscopic colectomy combined intraoperative endoscopy, and 2) colorectal cancer cases; exclusion criteria were 1) the use of intraoperative endoscopy to check anastomosis or another purpose.

RESULTS

A total of 15 articles were analyzed, of which 11 were excluded (4 were applied to the development of new technologies, 3 related to...
studies in benign colonic pathology, and 2 to studies related to polypectomies). The articles included n= 3 corresponded to clinical studies.

Laparoscopic oncological surgery applied to colorectal pathology, in particular, is widely studied and accepted globally. It is carried out in the main surgical centers fulfilling high standards.

Several studies could establish that endoscopy to locate colorectal tumors in the same operative act is feasible and very useful.

DISCUSSION

Because colon and rectal cancer are one of the most frequent diseases [1] and because its surgical resection is the treatment of choice, colorectal surgery is one of the procedures most commonly performed by the Department of Surgery. In order to obtain oncological success, it is necessary to know the staging of the disease and the delimitation of the tumor extension. To this end, different diagnostic methods are used, such as computed tomography, magnetic resonance imaging, and endoscopy [5]. In addition, the open surgical approach allows the use of manual palpation to know the extent of tumors during the operative act. This is not possible in laparoscopic surgery [7]. Endoscopic evaluation together with marking with tattoo is a good option [8], but it is not always accurate [9]. During the last time, new technologies have been sought in this field, such as the application of intraoperative ultrasound for the detection of colorectal tumors [10, 11], the use of magnets [12], or the use of indocyanine green intraoperatively [13, 14].

Laparoscopic resection has become a standard procedure in this type of pathology [15]. According to Lacy et al. their results are comparable with open surgery [16]. The evolution of surgery and the advent of minimally invasive procedures allowed laparoscopy to be combined with intraoperative endoscopy in the same operative act [17]. It enables the localization of colorectal tumors, their extension, and the presence of inadvertent synchronous lesions during the preoperative diagnosis, as shown by Brullet et al [18]. In addition, other authors such as Lanthaler et al. they have added functions when checking their use in the control of colorectal anastomoses [19]. Many centers apply the combination of these two methods routinely [20]. The data obtained from the literature support this practice [21].

In this article, we can see the usefulness of intraoperative endoscopy in laparoscopic surgery in colorectal cancer.

CONCLUSION

The use of intraoperative colonoscopy during the laparoscopic approach for the treatment of colorectal cancer is a useful and safe practice, widely spread around the world.

Conflict of Interest: All authors declare to have no conflict of interest.

Funding: None

Ethics approval and consent to participate: Informed consent was obtained from all individual participants included in the study. This study was approved by the Ethics Committee of hospitals.

REFERENCES


19. Lanthaler M, Biebl M, Mittermair R, et al. Intraoperative colonoscopy for anastomosis assessment in laparoscopically assisted left-sided...
