Laparoscopic Treatment of Unresectable Colon Polyps with Endoscopic Technique

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Introduction

The removal of adenomatous polyps of the colon is associated with the reduction of incidence and mortality of colorectal cancer [1]. It has been demonstrated that the polypectomy is able to arrest the development of cancer of the colon [2]. Techniques to perform a polypectomy are varied and can be either endoscopic or surgical [3]. Polyps with a diameter >2 cm are present in 0.8-5.2% of patients undergoing colonoscopy [4]. Endoscopic polypectomy in these cases can be extremely difficult from a technical point of view, and burdened with a high risk of colonic perforation or bleeding [5]. Therefore the size of the polyp (when it occupies more than a third of the colonic lumen) and localization (near the ileocecal valve, the splenic flexure or hepatic, in a long and tortuous sigmoid colon) are factors that can lead to surgical treatment [6,7] even if this leads to an increase in morbidity and mortality compared with only endoscopic treatment [8]. Endoscopic treatment with technical “piecemeal mucosal resection” of sessile polyps with a diameter greater than 2 cm, especially localized to the right colon with an adenoma tubulo-villous histological, showed a recurrence rate of 15.3% [9]. The laparoscopic approach, compared to laparotomy, has enabled the development of various techniques aimed at polypectomy with the reduction of days of hospitalization, the incidence of incisional hernias and adherence syndrome [10]. The laparoscopic colonic resection, if polyps are unresectable endoscopically, is increasingly receiving consensus on the treatment of both benign and malignant lesions [11]. The combined treatment, laparoscopic and endoscopic (CELS), may be a viable alternative to colonic resection in the management of colon polyps not removed endoscopically. With this technique, the endoscopist has the ability to perform colonoscopy in the operating room, under strict control of the laparoscopic surgeon who can rectify the colon where necessary or make a colorrafia if case of perforation [12]. This technique requires intra-surgery colonoscopy with the use of CO₂ for the distension of the bowel. The use of CO₂ permits: a rapid excretion via respiration and a lower barrier to laparoscopic vision during the analysis [13].

In some cases they have alternated laparoscopic polypectomy performed by colotomy to the laparoscopic colon resection and concluded that laparoscopic colon resection is a more effective technique, safe and oncologically more correct within the removal of large colon polyps [14].

We have clarified that the topic of laparoscopic polypectomy in the case of colon polyps is not comorbizable endoscopically has been discussed in the literature. The bibliographic references show that the endoscopic polypectomy associated with laparoscopy is routinely performed in centers where it is possible to perform a colonoscopy with CO₂ insufflation. In our center it is not possible therefore the endoscopist marks the endoscopically polyp with methylene blue the day before. Our technique is not a CELS.

In addition, colic resection for large polyps in literature is considered to be an effective, safe and oncologically correct technique [14]. We support this but in our experience we carry colic resection only in polyps with high grade dysplasia.

In this work we analysed the results for patients with endoscopically unresectable polyps and submitted to laparoscopic polypectomy using small colotomy, exhausting through endobag and rafia or laparoscopic colonic resection. We want to highlight what
were the parameters that have led us to choose one rather than the other laparoscopic technique not having the opportunity to perform a intra-surgery colonoscopy using CO2, but by performing marking with blue methylene the day before.

**Materials and Methods**

From February 2013 to April 2016 were enrolled, at the Department of General and Oncologic Surgery Hospital Private Accredited SSN “Villa Dei Fiori” in Acerra (Naples, Italy), 17 patients with endoscopically unresectable colorectal polyps. Of the 17 patients, 15 were treated laparoscopically while two were excluded because subjected to colic resection by laparotomy due to co-morbidities that prevented the general anesthesia so they underwent to peridural anesthesia. Nine (60%) of 15 patients treated by laparoscopy underwent colonic resection while 6 (40%) were treated with laparoscopic polypectomy using minor colotomy. Of the 15 patients included in this work we have analysed: patient’s age, the type and diameter of the polyp, the localization of the polyp, the histology of the biopsy, the surgical technique, duration of surgery, the hospital stay, the complications and histological examination of the surgical specimen. In some patients it was also analysed the endoscopic follow-up to 12 months. All patients were subjected to the polyp marking, with blue methylene [15,16] endoscopically the day before surgery. Six patients (40%) with pedunculated polyps and ≤ 3.5 cm in size, histological examination of biopsy which showed low-grade dysplasia, and distance of the polyp from anal rhyme higher than 15 cm, underwent a simple laparoscopic polypectomy. The patients were adequately informed of the risks and benefits of laparoscopic polypectomy and made aware that this technique is not yet considered the gold standard for this type of pathology. They were also informed about the possibility (~ 15%) that these polyps could be already cancerised [17]. All examined historically and surgically, and that in such cases would be undertaken a colonic resection. It has been also recommended an annual endoscopic follow-up. Out of the 9 patients undergoing colonic resection, 7 had pedunculated polyps and 2 sessile and in all cases the pre-operative histological deposed for high-grade dysplasia. The distance of the polyps from anal rhyme has always been higher than 15 cm. All patients were subjected to antibiotic prophylaxis with intravenous injection, one hour before the operation, of Cefazolin 2 g + Metronidazole 500 mg. Post-surgical antibiotic therapy with intravenous injection of Cefazolin 2 g / day + Metronidazole 500 mg x 3 / day for further 3 days.

**Surgical Technique**

Under general anaesthesia and endotracheal intubation, it has been placed a Foley bladder catheter and nasogastric tube. The laparoscopic procedures were always performed by the same surgeon. The induction of the pneumoperitoneum to 12 mmHg, in 6 patients treated with laparoscopic polypectomy was performed by accessing intra-umbilical of 10-12mm with open laparoscopy technique. It has been used a laparoscopic optics of 5 mm. Two additional 5 mm trocars were positioned according to the location of the polyp. Marking has been identified with blue methylene the day before. It has been proceeded with a small longitudinal incision on tenia coli, at the antimesenteric side, downstream of the polypoid lesion. It has been proceeded with a traction of the polyp in order to make visible the base through incision. Then has been done a section by Echelon Flex™ 45 mm (Endopath Stapler, Ethicon Endo-Surgery, Johnson & Johnson, Cincinnati, Ohio, USA) white and extraction of the polyp through endobag (Figure). The raffia was carried out in the transverse direction with a continuous through V-loc™ 2/0 (Covidien, Dublin, Ireland). In two cases it was carried out omentoplasty. In reference to the 9 patients treated with laparoscopic colon resection we performed: 1 anterior rectum resection, 1 right hemicolecotomy and 7 left hemicolecotomy.

**Results**

The average age of the 15 patients enrolled was 58.5 years (range 35-76 years) with a prevalence of males (M/F = 9:6). Enrolled subjects arrived at our institution on the recommendation by the endoscopist who had defined the polyp as “unresectable endoscopically”. The average diameter of the polyps = 3.04 cm with a range of 2.2-6.2 cm. The polyps were localized: 1 at the intraperitoneal rectum, 8 at sigmoid colon, 5 at descending colon and 1 at caecum. The polyps were defined in 13 cases as pedunculated and in 2 cases as sessile. The histological exam of the biopsies showed: low-grade dysplasia in 6 patients and high-grade dysplasia in 9 patients. The nine patients (7 pedunculated and sessile) 2) with high-grade dysplasia were then undergoing laparoscopic resection while 6 patients (all pedunculated) with low-grade dysplasia were treated with laparoscopic polypectomy. The colonic resection are divided as follows: 1 rectum anterior resection, 1 right hemicolecotomy and 7 patients treated with left colectomy. The simple polypectomy were performed for localized polyps: 4 to sigma and 2 close to the splenic flexure of the colon. The mean surgical time, calculated by the placement of the first trocar to the removal of the last, was 47 ± 15.4 minutes for laparoscopic polypectomy while the colonic resection was 102 ± 27.8 minutes. The average days of hospitalization in patients undergoing polypectomy was 4.1 days (range 3-5 days); in patients undergoing colonic resection, excluding the patient with complication, the average of the days of hospitalization was 7.2 days, with a range between 6-8 days. Only one (11.1%) of the nine patients undergoing colonic resection it has occurred anastomotic fistula colorectal mechanical T-T and was treated by peritoneal cleaning and protective ileostomy. There were no complications in patients treated with laparoscopic polypectomy. The histology of the surgical specimen showed: 5 patients with low-grade dysplasia, 8 patients with high-grade dysplasia, and 2 patients with adenocarcinoma. Among patients treated with laparoscopic colon resection, only one case has been diagnosed
an adenocarcinoma and the patient has been entrusted to the oncologists. One patient among the six treated with laparoscopic polypectomy presented a post surgical histology different than pre-surgical and therefore diagnosed of an adenocarcinoma so he was addressed to a laparoscopic colonic resection. Endoscopy follow-up to 12 months was made only on 8 patients and only one case showed the presence of a small polyp removed endoscopically with histological report of hyperplastic polyp.

**Discussion**

The laparoscopic approach in patients with unresectable colorectal polyps endoscopically is much more beneficial of the laparotomy approach because: reduces post-operative pain, also reduces hospitalization days, lowers the risk of wound infection and reduces the incidence of incisional hernia and adherence syndrome [18]. Various laparoscopic techniques are currently in use for the removal of colon polyps unresectable endoscopically. In the study conducted by Hanloser D [19], the combined endoscopy and laparoscopy approach for the removal of large polyps of the colon, has shown a success equal to 82-91% of cases. The laparoscopic colon resection is only needed in 9-12% of cases with a conversion rate to laparotomy of 15%. The sample of patients being tested is small and represents our initial experience. We are continuing on this process but up to now only the sample of patients undergoing colic resection has increased but not that of laparoscopic polypectomy. In our study, out of a total of 17 cases suffering from colon polyps unresectable endoscopically, we have a high percentage of cases, 88.2% (15 patients), treated laparoscopically but also a higher percentage (60%) of patients treated with laparoscopic colonic resection. This depends on two main factors: the patients 60% had high-grade dysplasia on endoscopic biopsy and the inability to perform an intra-surgical colonoscopy with colonic distension using CO2 gas. In conclusion our institute at that 60% of the cases we have therefore decided to apply the correct oncological technique of colon resection [17]. In the same study of Hanloser D [19] the percentage of cancerised polyps was of 6-13% of cases underwent associated laparoscopic-endoscopic technique. In our study we have a single cancerized polyp (16.6%) among the six patients treated with laparoscopic polypectomy and only one case (11.1%) among the nine patients treated with laparoscopic colonic resection. In our series we have therefore an average rate of 13.8% of cancerised polyps: in agreement with other research studies [17,19]. The anastomotic leakage after colonic resection, as shown in the study of Chambers WM, et al. [20], occurs in a 3.4-6% of cases and is most common with a percentage between 2.9-15.3%, in cases of rectal anastomosis.

The complications in our study reflect this fact. The colorectal anastomosis leakage (11.1%) after anterior resection of the rectum by laparoscopy has affected only one out of the nine patients undergoing colic laparoscopic resection. In our experience we have performed laparoscopic polypectomy using small colotomies, polypectomy with stapler and raffia in 40% of cases and showed that is a safe technique in patients with:

- pedunculated polyps,
- diameter <3.5 cm,
- low-grade dysplasia on biopsy
- localization > 15 cm from anal rhyme

According to Dulkas D, et al. [16] research laparoscopic polypectomy using small colostomy was performed in 28.6% of patients (42 patients in eight years) with unresectable polyps endoscopically and who had pedunculated polyps. In the 71.4% of cases it was carried out a colonic resection instead. Before treating the patient to a laparoscopic polypectomy it is right to inform him about the need of a colonic resection where the histological examination of the surgical specimen, in contrast to that of the biopsy, highlighted an adenocarcinoma (16.6% of cases in our experience). Laparoscopic polypectomy mitigates the risks related to an initial colonic resection because doesn’t have post-surgical complications although our case series is still low. This laparoscopic procedure still involves an annual endoscopic follow-up. The laparoscopic colon resection, however, remains the first-choice therapy in patients with bulky polyps, pedunculated or sessile, with high-grade dysplasia on biopsy and located more than 15 cm from anal rhyme or in massive extra peritoneal rectum polyps (Table).

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**Disclosure/Conflict Of Interests**

All authors have no conflicts of interest or financial ties to disclose.

**References**


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