

## “Difficult” Colorectal Polyps - Therapeutic Approach

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### Rezumat

#### *Polipii multipli și cancerul colo-rectal*

**Introducere:** Polipectomia endoscopică reprezintă standardul de aur în tratamentul polipilor recto-colonici. Importanța polipectomiei rezidă în primul rând din faptul ca leziunile polipoase prezintă risc crescut de degenerare malignă, nesancționată terapeutic, polipii recto-colonici putând genera un cancer colo-rectal (CCR) - leziune cu un prognostic mult mai sever. Deși de preferat, polipectomia endoscopică a polipilor recto-colonici nu este întotdeauna posibilă existând mulți factori generatori de dificultăți în efectuarea acestei manevre terapeutice.

**Material și metodă:** Studiul efectuat a fost unul de tip retrospectiv, realizat în cadrul Clinicii Chirurgicale I din I.O.B. „Prof. Dr. Alexandru Trestioreanu” pe o perioadă de 3 ani (2008-2011), perioadă în care au fost diagnosticați cu polipi recto-colonici prin colonoscopie un număr de 244 pacienți, dintre aceștia beneficiind de polipectomie endoscopică un număr de 222 de pacienți. Scopul studiului a fost reprezentat de identificarea polipilor „dificili” și stabilirea criteriilor de indicație terapeutică endoscopică vs. chirurgie clasică.

**Rezultate:** Prezența polipilor „dificili” a fost constatată la 37,56% dintre pacienții diagnosticați cu polipi recto-colonici. În peste 88% din cazuri a fost posibilă polipectomia endoscopică iar pentru restul pacienților chirurgia clasică a reprezentat soluția terapeutică pentru care s-a optat.

**Concluzii:** Prezența polipilor „dificili” generează inconveniente în practicarea polipectomiei endoscopice crescând riscul apariției complicațiilor postoperatorii cât și durata intervenției. Dacă criteriile de încadrare a polipilor în categoria polipilor „dificili” sunt relativ bine stabilite, indicația terapeutică endoscopică vs. chirurgicală clasică rămâne la latitudinea operatorului, excepție făcând situațiile în care din motive oncologice se va apela la chirurgia clasică.

**Cuvinte cheie:** polip rectocolonic, cancer colo-rectal, polipectomie

### Abstract

**Introduction:** Endoscopic polypectomy is the gold standard in the treatment of colorectal polyps. The importance of polypectomy rests primarily on the fact that polyp-type lesions present a high risk of malignant degeneration, colorectal polyps being able, if left unattended therapeutically, to generate a colorectal cancer (CRC) – a lesion with a far more negative prognosis. Although preferable, endoscopic polypectomy of colorectal polyps is not always possible, multiple factors generating difficulties in performing this therapeutic measure.

**Material and Method:** We performed a retrospective study in the First Surgical Clinic of the “Prof. Dr. Alexandru Trestioreanu” Bucharest Oncology Institute, spanning a period of 3 years (2008-2011), in which time 224 patients were diagnosed by colonoscopy with colorectal polyps, of whom 222 patients benefited from endoscopic polypectomy. The aim of the study was to identify “difficult” polyps and to identify the criteria for endoscopic surgery versus classic surgery as a therapeutic indication.

**Results:** Presence of “difficult” polyps was observed in 37.56%

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of the patients diagnosed with colorectal polyps. In over 88% of cases endoscopic polypectomy was possible, and for the remaining patients classic surgery was the therapeutic solution opted for.

**Conclusions:** Presence of “difficult” polyps generates inconveniences in performing endoscopic polypectomy, increasing the risk of postoperative complication occurrence, as well as the duration of the operation. If the criteria for characterizing polyps as “difficult” are relatively well-established, the choice between endoscopic and classic surgery as a therapeutic measure is left at the free will of the operating surgeon, with the exception of situations in which classic surgery is resorted to for oncological reasons.

**Key words:** colorectal polyp, colorectal cancer, polypectomy

## Introduction

Endoscopic polypectomy represents the gold standard in the treatment of colorectal polyps. The importance of polypectomy rests on the fact that polyp-type lesions present a high risk of malignant degeneration, if left therapeutically unattended, colorectal polyps being able to generate a colorectal cancer (CRC) - a lesion with a far more negative prognosis and whose treatment implies serious costs (1). Although preferable, endoscopic polypectomy is not always possible, multiple factors generating difficulties in performing this therapeutic manoeuvre. These factors depend on the one hand on the surgeon performing the intervention, as well as on the endoscopic equipment used, and on the other hand there are factors depending on the polyp lesion in itself and on the patient. (2). Thus, an operator with limited experience in performing endoscopic polypectomy could consider difficult a polypectomy which seems a routine intervention to an experienced operator. On the other hand, high quality endoscopic equipment, especially combined with the appropriate accessories (not always available) creates the premises for a therapeutic success. Factors related to the polyp lesion are represented by polyp size, number, site at the level of the colorectum, type of lesion (pedunculated, sessile, villous etc.), histopathological aspect (on endo-biopsies etc.). The Size, Morphology, Site, Access (SMSA) score establishes the degree of difficulty and complexity of a polypectomy depending on the previously mentioned elements characterising the lesion (2). The factors related to the patient and which can generate difficulties in performing endoscopic polypectomy are represented by various associated pathologies that can be contraindications, even relative ones, for performing endoscopic manoeuvres (cardiac, pulmonary afflictions etc.), possibly previous surgical interventions determining postoperative adherence syndrome, different types of colic resections and anastomoses, presence of a colostoma etc. Existence of these factors sometimes makes it impossible to perform endoscopic polypectomy, a classic surgical approach being required for the

therapeutic solution of the problem (3). Conversely, one must consider that insisting to perform endoscopic polypectomy when one or more of these factors mentioned is present can generate undesired complications.

## Material and Method

We conducted a retrospective study on 244 patients diagnosed by colonoscopy with colorectal polyps at the First Surgical Clinic of the “Prof. Dr. Alexandu Trestioreanu” Institute of Oncology in Bucharest, over a period of 3 years (2008-2011). Of these, 222 patients benefitted from endoscopic polypectomy. Patients with inflammatory colorectal diseases as well as those with diffuse colorectal polyposis were excluded from the study. Both patients with a “de novo” diagnosis of colorectal polyps, as well as those with a history of this disease having previously benefitted from polypectomy or those with a history of operated colorectal, patients under follow-up for possible polyp recurrences or development of metachronous lesions were included in the study. Data relating to distribution by gender, age, polyp lesion site, number, size, type, histopathology and, last but not least, treatment method applied, were analysed. Part of the patients in the study benefitted from endoscopic treatment as the sole therapeutic treatment, others benefitted from surgical treatment via a classic approach, and another category of patients with malignant degeneration of the polyps required a classic colic resection apart from the endoscopic polypectomy, in order to respect oncological principles. The degree of difficulty of the endoscopic polypectomies varied according to multiple factors. The criteria for categorising polyps as “difficult” were represented by size, morphology, site and accessibility according to the SMSA score. However, in establishing the indication for classic surgery an important role was attributed to complying with the oncological principles, taking into consideration the histopathological results of endo-biopsy probes. The aim of the study is represented by the identification of factors generating difficulties during endoscopic polypectomy and establishing the criteria for indicating endoscopic therapeutic method versus classic surgical methods.

## Results

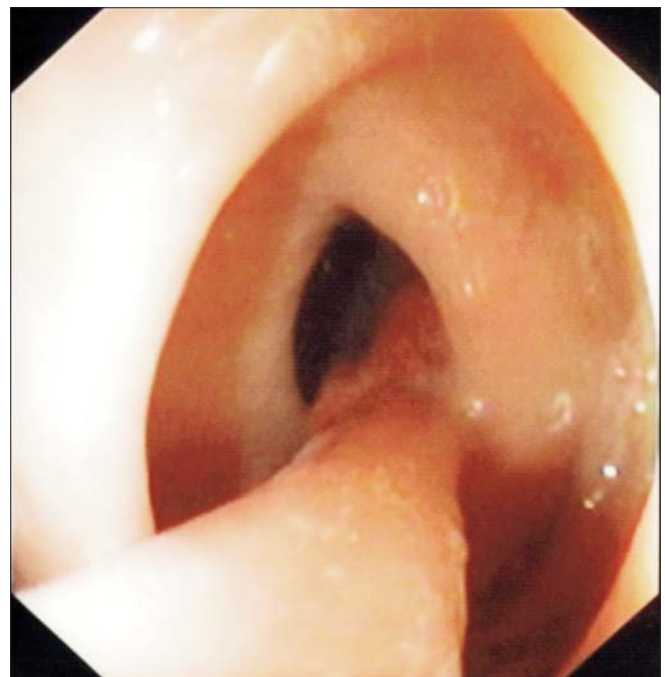
A number of 244 patients diagnosed with colorectal polyps were identified, with a gender distribution confirming the preponderance of men, with a percentage of 58.6% (143 patients) compared to 41.4% (101 patients) in the case of females, results similar to international statistics. The majority of patients presented sessile polyps, with a percentage of 70.9%, and only 29.1% presented pedunculated polyps. The most frequent sites in case of sessile polyps were the descending and sigmoid colon, with a percentage of 62.2% followed by the rectum with 19.8%, transverse colon 11% and ascending colon and caecum 7%. Pedunculated polyps present as most frequent site the descending and sigmoid colon, with a percentage of 68%, the transverse colon being involved in 19%, the rectum is 11% and the ascending colon and caecum only in a percentage of 1.4 % of cases. One can notice that the most

frequent sites regardless of polyp type are the descendent and sigmoid colon, in accordance with the specialized literature. Also worth mentioning is the fact that, perhaps not by chance, these colic segments are the most frequent sites for malignant colonic tumour development. The majority of sessile polyps (76.2%) presented with under 1 cm in size, 14.5% between 1 and 2 cm, and 9.3% over 2cm in size. In case of pedunculated polyps sizes varied from under 1 cm (11.1%), between 1 and 2 cm (48.6%), to over 2 cm (40.3%). If in the case of sessile polyps the majority were sized up to 1 cm, in the case of pedunculated polyps we noticed that the majority had sizes over 1cm and up to 2 cm. The presence of multiple polyps was found in over 40% of cases both in the case of sessile and pedunculated ones, the majority of cases presenting between 2 and 5 polyps. Histopathological exam of biopsy and operative samples showed tubular adenomatous aspect in 52.9% of cases, tubulovillous adenomatous aspect in 12.3% of cases, incipient colorectal cancer in 7.4% of cases, and inflammatory polyp aspect was encountered in 3.3% of cases. Presence of high-grade dysplasia was recorded in 19.7% of cases, and a percentage of 23.36% of cases presented low-grade dysplasia. High-grade dysplasia was encountered most frequently in the case of patients presenting polyps with sizes over 2 cm, as well as of patients with multiple polyps. Endoscopic polypectomy was possible in 197 cases, representing 88.74% of the total number of cases. In a number of 109 patients, representing 62.44% of the cases submitted to endoscopic polypectomy, the polypectomy was considered "simple", while in 74 patients, representing 37.56% of endoscopic polypectomy cases, it was considered "difficult". In 25 patients, representing 11.26% of the cases diagnosed with colorectal polyps, the therapeutic act was represented by classic surgery. The types of surgical interventions performed were colostomy with classic polypectomy in 4 cases, right hemicolectomy in one patient, left hemicolectomy in 4 cases, segmental colectomy in 10 cases and recto-sigmoid resection in 6 cases.

## Discussions

Endoscopy has a well-deserved and incontestable role in the diagnosis and treatment of colorectal polyps. The endoscopic method is rightfully considered the gold standard in the diagnosis of colorectal polyps, presenting the highest specificity and sensitivity of all diagnostic methods (over 95%) and offering in addition to these the advantage of harvesting the biopsy material required for histopathological diagnosis, thus completing the diagnosis picture (1). On the other hand it has earned its reputation of gold standard method in the treatment of colorectal polyps as well, offering the most elegant, minimally-invasive, easy approach, and with very good results, being preferred both by doctors and by patients. There are however situations in which the endoscopic method cannot be performed or in which insisting to perform it could lead to serious and unwanted complications. Thus the identification of these situations and conversion from endoscopic polypectomy to classic surgery respectively proves to be a gesture of professional wisdom, as well as an auspicious one. The elements

of difficulty are represented by polyp size, site at the level of colorectal segments and local positioning within the lesion carrying colic segment, by polyp type and, not less important, by their number. The first element influencing the degree of difficulty of an endoscopic polypectomy is represented by the polyp size. Thus, a polyp of over 2 cm in size is generally considered "difficult" (2). The difficulty consists in the laborious approach of the narrow space during this manoeuvre, thus rendering the task of the surgeon harder and increasing the duration of the intervention. A first gesture is represented by additional insufflation of the digestive lumen in the hope of creating a larger work space. The gesture in itself can sometimes prove useful, but it is restricted by the increase in risk of colic wall perforation on the one hand, and by disturbances in the respiratory dynamics of the patients through important distension of the colic segments and of the intestinal loops in case of incompetent or absent ileocecal valve prior to a previous surgical intervention on the other hand. Worth mentioning is the fact that the size of the polyp is not always a problem in itself, but rather the degree of occupation of the digestive lumen by it is. Thus a relatively large polyp located at the level of a colic segment with a wide lumen will not determine important problems in performing endoscopic manoeuvres, while a polyp of the same size, but developed in a colic segment with a narrower lumen will represent a challenge for the surgeon. We could thus state that a degree of occupation of the digestive lumen of over 50% represents a considerable difficulty factor in performing endoscopic polypectomy. Another aspect to be taken into consideration in the case of pedunculated polyps is represented by the pedicle of the polyp. Problems occur when it has an increased diameter, as well as when its length is also considerable. In case of pedunculated polyps (Fig. 1) with thick pedicle, or semi-



**Figure 1.** Pedunculated polyp with long pedicle

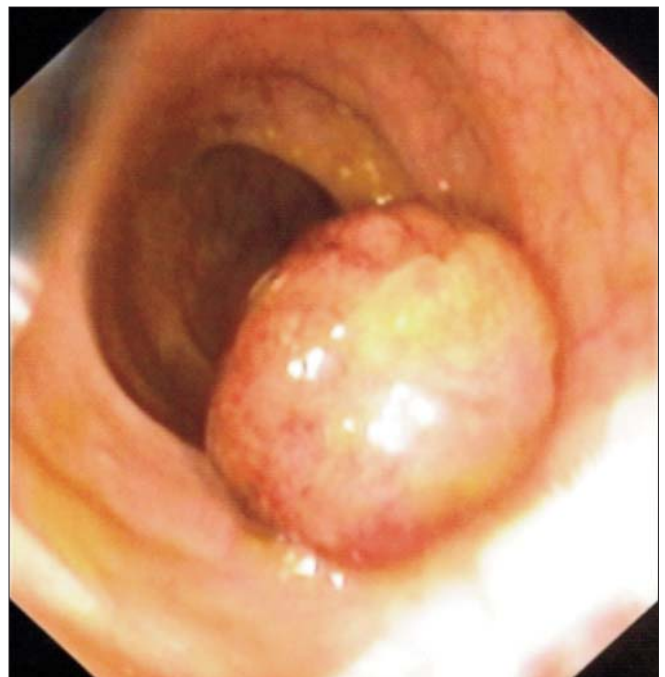


pedunculated ones, the main inconvenience is represented by the haemorrhagic risk at the level of the polypectomy lesion. (Fig. 2) Prevention of this complication is often easy by injecting adrenalin 1/10.000 at the level of the polyp, prior to the polypectomy. In order to obtain optimum haemostasis. If necessary, after performing endoscopic polypectomy additional electro-cauterization will be applied to the polypectomy lesion. Worth noticing is the fact that usually after injecting adrenaline at the level of the pedicle a decrease in the volume of the polyp head of up to 20-25% is obtained, a fact that aids in performing the polypectomy. The first difficult stage in performing endoscopic polypectomy for large size pedunculated polyps is represented by passing the polypectomy loop over the head of the pedicle and fixing it at the level of the pedicle ("lassoing"). Once managing to fix the polyp within the polypectomy loop, before electroresection, the surgeon must make sure that the polyp is not in contact with the walls of the colic segment. Intimate contact between the polyp and the digestive walls during electroresection manoeuvres will determine the electrical energy to be transmitted to the latter, generating lesions as severe as colic perforation, along with all of its serious subsequent consequences. The risk increases when the large dimension of the polyp determines it to occupy over 50% of the digestive lumen. Also, the risk of perforation by this mechanism is increased if the site of the targeted polyp is within a colic segment with a thinner wall, such as the right colon. In terms of sessile polyps (Fig. 3) the difficulty rests both in their laborious lassoing, sometimes requiring their elevation by injecting saline serum at their base, and in the fact that the resection of a large sessile polyp will generate a mucosa lesion at the level of the colic wall appropriate in size. The risk of perforation is not so much determined by the surface extension of the mucosal lesion as by the progression of the thermic effect towards the depth of the colic wall. A protection factor in this case is represented by injecting saline serum at the base of the polyp to elevate it, acting as a "shield" against the thermic energy released during electroresection, thus protecting to some extent the deep layers of the colic wall. From the point of view of localization the risks are high, rendering endoscopic polypectomy difficult in the areas where the colic wall presents a thin wall such as that of the right colon, when the main risk is that of perforation. Of course this does not mean that for polyp lesions located in these colic segments endoscopic polypectomy cannot be performed, but that the surgeon must be aware of these risks and choose an appropriate approach when taking into consideration the benefits and risks. The risk of perforation is considerably higher in case of sessile lesions compared to pedunculated polyps. On the other hand, lesions located in the lower rectum, up to 5 cm from the anal orifice, challenge the surgeon due to reduced possibilities of equipment handling, making endoscopic polypectomy difficult if not impossible. For these situations, especially when there is histopathologically proven malignant degeneration, performing a classic trans-anal polypectomy is much easier and with relatively few inconveniences. There are authors who recommend attempting an endoscopic polypectomy in retroflexion for sessile rectal polyps measuring more than 2 cm (4). Also in

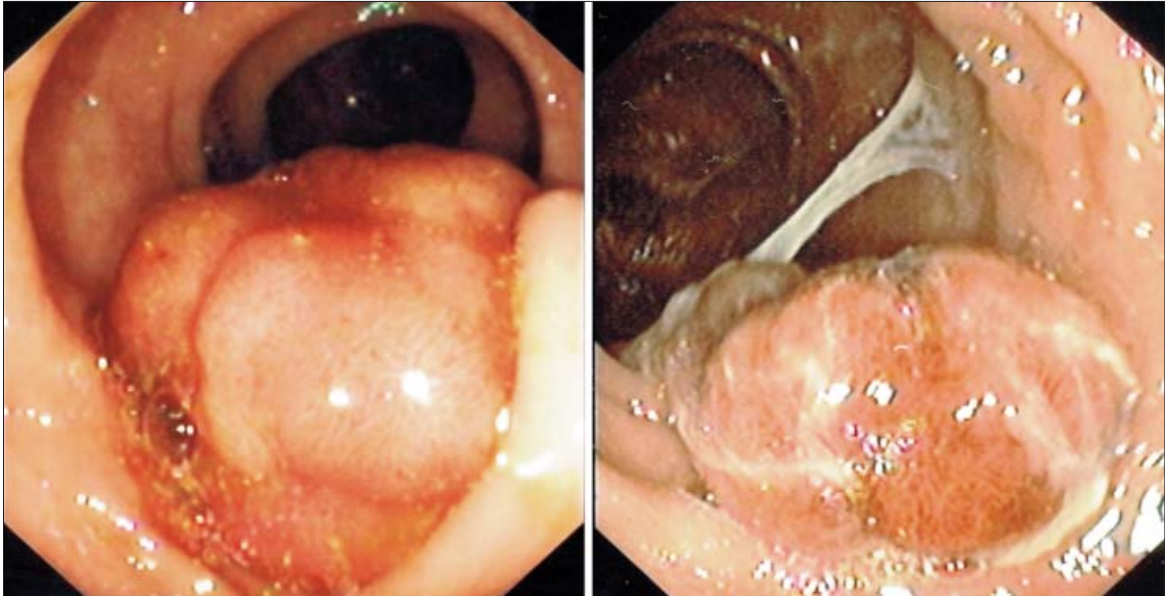


*Figure 2. Post-polypectomy aspect*

terms of polyp site we must mention the situation in which, regardless of the colic segment, the polyp is located behind a fold of the mucosa, making it difficult to approach. An often frustrating situation given that, although the polyp is "in front of the surgeon," repeated manoeuvres for approaching the lesion fail miserably. One must also bear in mind that, in the event that polyp lassoing and its subsequent resection are

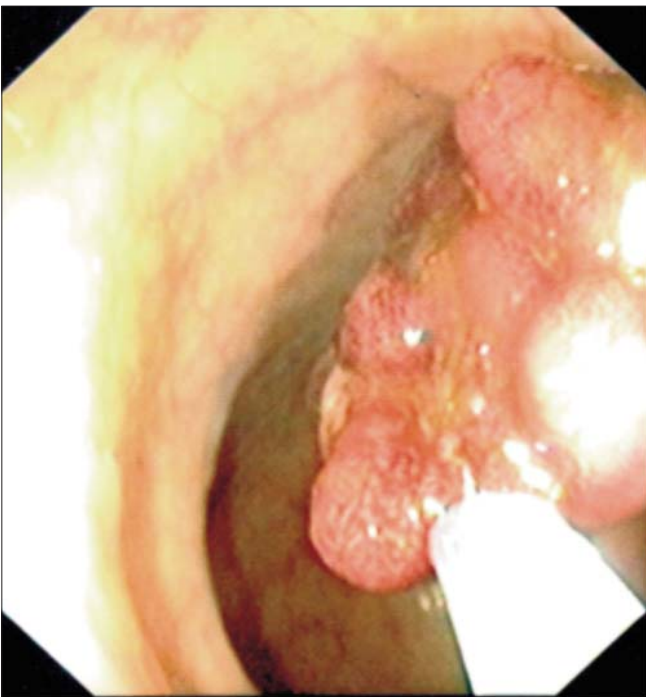


*Figure 3. Sessile polyp with large implantation base*



**Figure 4.** Villous polyp

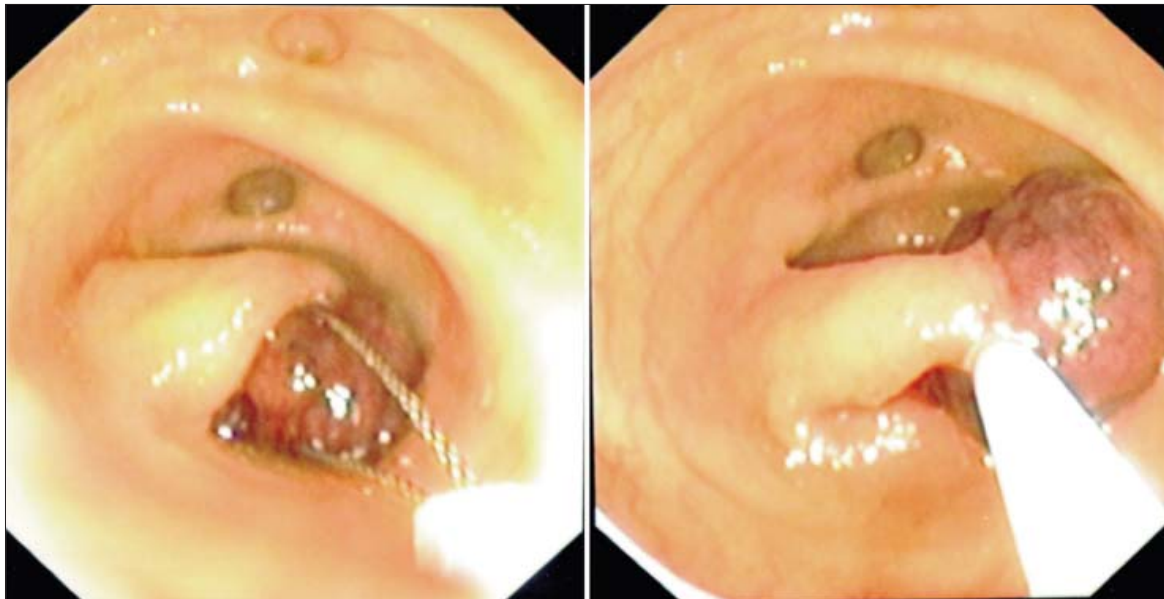
achieved, most often the resection plane will remain “hidden” behind the fold of the mucosa, being almost impossible to approach if further haemostasis manoeuvres are required. In terms of the type of polyp, sessile polyps and particularly villous (Fig. 4) ones can represent a challenge for the surgeon. Large sessile or villous lesions often cannot be resected “in one piece”, a piece-meal type resection being sometimes necessary (5). (Fig. 5) This type of polypectomy involves repeated, fragmented resection, often incomplete and leaving a large



**Figure 5.** Piece-meal type polypectomy

remnant mucosal lesion. Aside from the increased risk of perforation in these situations there is also the risk of remnant lesional tissue in place, which will lead to recurrence of polyps or malignant degeneration, and even an unfortunate progression towards a CRC. In these situations performing an endoscopic mucosal resection (EMR) may be appropriate, opinion supported by other authors as well (6,7). To prevent incomplete resection after EMR, there are authors who recommend in case of large sessile lesions the association of an “avulsion” technique that is performed using a hot biopsy forceps associated with electrocauterization of the tissue remaining after EMR (8). A situation worth mentioning is that in which the patient diagnosed with colorectal polyps also presents colonic diverticula. (Fig. 6) In these situations colonic diverticula are a risk factor in itself for performing the colonoscopy, given that their extremely thin wall may favour the occurrence of colon perforation. So insufflation into the colonic lumen must be done with moderation and caution, thus determining difficult conditions for the surgeon by creating a work space sometimes insufficient for performing endoscopic polypectomy. On the other hand, the development of a polyp in the vicinity of a diverticular orifice will considerably increase the risk of colon perforation during endoscopic polypectomy manoeuvres. Although not directly related to “difficult” polyps, we consider that we should also mention some aspects related to the patient and his medical history that can determine difficulties in performing endoscopic polypectomy. By this we are referring not only to the possible associated pathologies (cardiac, pulmonary afflictions), which may be contraindications in performing an endoscopy, but especially to the surgical history of the patient. Thus in patients who previously underwent certain colon resections some particular aspects can be found, which could raise problems sometimes not easy to overcome. In patients with right hemicolectomy, in whom the ileocecal





**Figure 6.** Pedunculated polyp located in the vicinity of colonic diverticula

valve does not exist anymore, gas insufflation will produce marked distention upstream of the small bowel intestinal loops, together with an unsatisfactory colonic distension at the level of the segment where the polypectomy is attempted, resulting in an unsatisfactory or insufficient “work space”, rendering difficult even the ectomization of a polyp that would not normally raise problems. Instilling additional gas could be the solution to the situation, but it significantly increases the risk of changes in respiratory dynamics and even of the occurrence of intestinal reflux upstream, with increased risk of bronchial aspiration. On the other hand postoperative adherence syndrome can fix mobile segments of the colon in abnormal positions, creating angulations at this level, and generating difficulties for the surgeon in convenient handling of the endoscope. Another mention is related to the presence of colostomies, performing trans-stoma endoscopy presenting specific impediments, of which difficult contention of the gas insufflated in the colon, with slow creation of the work space is most noticeable.

The therapeutic indication is established depending on several factors. Thus endoscopic polypectomy is usually indicated when the targeted lesions are benign, histologically proven, and when there are foci of malignancy at the level of the polyp but they do not invade the submucosa, with well-differentiated histopathological aspect, and complete polypectomy can be performed. In situations where there is malignant invasion in the submucosa (9), the histopathological type presents low degree of differentiation or the tissue resection margins show remnant tissue, classic surgical treatment is indicated, with observance of oncological principles, given the risk of cancer metastasis and local neoplastic evolution after endoscopic polypectomy (10,11). Classic surgical treatment is indicated when endoscopic polypectomy cannot comply with oncological principles, as well as when endoscopic

polypectomy is not technically feasible or involves risks that outweigh the expected benefits. There are studies that recommend performing polypectomy by laparoscopically assisted colonoscopy (LACP) for polyps that cannot be resected endoscopically, with similar results to laparoscopic hemicolectomies (12). Endoscopic polypectomy in our study could be performed in most patients, over 88% of cases benefitting from this minimally invasive method, thus confirming that the endoscopic method is the gold standard in the treatment of colorectal polyps. The relatively high proportion of endoscopic polypectomies considered difficult is worth highlighting, of over 37% of all polypectomies performed. This high percentage was due primarily to the increased sizes of the polyps, but the other factors generating difficulties mentioned above were also involved. Polyp size over 2 cm represented an insurmountable obstacle for performing endoscopic polypectomy in only 4 cases. In these cases, endoscopic treatment failure indicated classic surgical treatment, the type of surgery opted for being minimum colotomy followed by classic polypectomy. For all other cases with polyps sized over 2 cm endoscopic polypectomy, although difficult, could be successfully performed. So we can say that the increased size of polyps is not an absolute contraindication for attempting endoscopic polypectomy. Classic surgical treatment was indicated in 25 patients, representing only 11.26% of cases. Therefore, aside from the interventions mentioned above, 1 right hemicolectomy in a patient with multiple polyps presenting confirmed malignancy (poorly differentiated carcinoma) at the level of the ascending colon, 4 left hemicolectomies in patients with multiple polyps at the level of the left colon and confirmed malignancy in one or more polyps, 6 recto-sigmoid resections for large polyps and histologically confirmed malignancy were also performed. Besides these interventions we also performed 10 segmental colectomies in patients presenting multiple polyps of the colic

segment, and with confirmed malignancy of one or more polyps in 4 cases respectively, in patients with large polyps and malignant histology in 3 cases, as well as in 4 patients with highly dysplastic polyps in whom endoscopic polypectomy succeeded, but the resection piece histopathology exam confirmed presence of dysplastic tissue in the resection trace. One can note that in most of the cases for which classic surgery was indicated the decisive argument was malignancy confirmed by histopathology exam and the need to comply with oncological principles. Also noteworthy is the fact that high-grade dysplasia and confirmed malignancy occur mainly in polyps larger than 2 cm in size, a fact observed by other authors as well (13), these types of polyps being considered as difficult candidates for endoscopic polypectomy. In these situations we can say that both polyp size and malignant aspect at histopathological examination may each indicate classic surgical treatment. Thus in the case of a large polyp, but with proven malignancy, attempting endoscopic polypectomy may leave malignant tissue in place, fact which in itself is considered an argument for classic colic resection. We believe that for these polyps the appropriate and prudent indication is classic surgery complying with oncological principles. As for other aspects identified as factors generating difficulties in performing endoscopic polypectomy, we consider their value relative in determining the indication for classic surgery, as they can be most often overcome by a surgeon experienced in endoscopy. Postoperative follow-up regardless of the chosen therapeutic method is mandatory and must comply with well-established monitoring protocols, respecting the specific peculiarities depending on the benign or malignant aspect of the lesions treated. Raising awareness in patients in this regard is a responsibility of the physician who must acknowledge his duty and the influence he has over the patient.

## Conclusions

1. Colorectal adenomatous polyps are precursor lesions for colorectal cancer.
2. Polypectomy is an important prevention factor for colorectal cancer.
3. Endoscopic polypectomy is the gold standard in the treatment of colorectal polyps.
4. Endoscopic polypectomy is not always technically possible, there being a number of factors generating difficulties in performing it.
5. The key elements defining a polyp as difficult are size, site and morphology.
6. Polyp size over 2cm is the main factor that increases the difficulty of endoscopic polypectomy.
7. Endoscopic polypectomy for difficult polyps increases the risk of postoperative complication occurrence and the duration of surgery.
8. Classic surgery remains the chosen solution in selected cases when the endoscopic method is not feasible or does not comply with the oncological principles.
9. For polyps over 2cm and presenting histopathologically

confirmed malignancy classic surgical treatment is indicated ab initio.

10. Postoperative monitoring is required and must be respected.

## Conflicts of Interest

None declared.

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## References

1. Trifan A. : Manual de endoscopie, Editura Junimea, 2003, vol 2, p 80-100, p 16-17.
2. Shareef Thloor, Orestis Tsagkournis, Peter Basford, Pradeep Bhandari: Managing difficult polyps: techniques and pitfalls, *Ann Gastroenterol*, 2013; 26(2): 114-121.
3. Voloyiannis T, Snyder MJ, Bailey RR, Pidala M: Management of the difficult polyp referred for resection: resect or rescope ?, *Dis Colon Rectum*, 2008 Mar, 51(3): 292-5, Epub Jan 18.
4. Douglas K. Rex, Mouen Khashab: Colonoscopic polypectomy in retroflexion, *Gastrointestinal Endoscopy*, 2005 september 1.
5. Shai Friedland: Optimizing resection of difficult colon polyps, *Gastrointestinal Endoscopy*, <http://dx.doi.org/10.1016/j.gie.2005.08.037>.
6. Anna M. Buchner, Carlos Guarner-Argente: Outcomes of EMR of defiant colorectal lesions directed to an endoscopy referral center, *Gastrointestinal Endoscopy*, 2012, vol. 76, no.2, p255-264.
7. G Longcroft-Wheaton, R Mead, M Duku, P Bhandari: Endoscopic mucosal resection of colonic polyps: a large prospective single centre series, *Gut* 2011; 60: A14-A15 doi:10.1136/gut.2011.239301.27.
8. Sherif Andrawes, Gregory Haber: Avulsion: a novel technique to achieve complete resection of difficult colon polyps, *Gastrointestinal Endoscopy*, [http:// dx.doi.org / 10.1016/j.gie.2014.04.013](http://dx.doi.org/10.1016/j.gie.2014.04.013).
9. Ghelase F, Mogos D.St., Margaritescu D., Iordache S., Ghelase M.St., Ramboiu S., Mogos G., Bica M., Saftoiu A., Georgescu I.: Relatia polip adenomatos-cancer colorectal precoce. Implicatii diagnostice si terapeutice, *Chirurgia*, 2009, Nr.2, 104: 159-165.
10. Muto T.: Early colorectal cancer – concepts and clinical implications: Introduction, *World J. Surg.*, 2000, 24:1015.
11. Jass R.J.: Histopathology of early colorectal cancer, *World J. Surg.*, 2000, 24:1016.
12. Jonathan Buscaglia, Cris E. Lascarides, Satish Nagula, Juan Carlos Bucobo, Paula Denoya, Ramona Rajapakse, Robert J. Richards, Muath Bishawi, Roberto Bergamaschi: Laparoscopic-Assisted Colonoscopy with polypectomy (Lacp) Versus Laparoscopic Hemicolectomy for Endoscopically Unresectable Right-Sided Colon Polyps: Results of a Randomized Controlled Trial, *Digestive Disease Week*, May 3-6, 2014.
13. Setlacec D., Oproiu Al., Popescu I.: Polipii si polipozele recto-colonice, Editura Medicala, 1988.