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Case Report

Abdominal Pain—Beyond Colonic Lipoma Intussusception

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Abstract: Colonic lipomas are relatively rare benign tumors which are composed of mature fat cells and occur most frequently in the large intestine. The occurrence of colonic lipomas in the transverse colon is relatively uncommon. Generally, colonic lipomas are asymptomatic, and many individuals might not experience any noticeable symptoms. Therefore, they are usually discovered incidentally during colonoscopy or as a result of diagnostic imaging prescribed for other reasons. The size and location of the lipoma could influence the clinical presentation. If symptoms occur, they include abdominal pain, changes in bowel habits, or gastrointestinal bleeding. The prognosis for colonic lipomas is generally excellent but it requires an individualized approach based on the specific characteristics of the tumor, the patient's symptoms, and other clinical considerations. We report a case of a colonic intussusception caused by a colonic lipoma in an adult who underwent surgery, with an uneventful recovery.

Keywords: colonic lipoma; intussusception; large lipoma; lipoma of the transverse colon; computer tomography

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1. Introduction

First described in 1757 by Bauer, a lipoma of the colon is a relatively rare, non-epithelial benign tumor arising from deposits of adipose connective tissue [1,2]. With an incidence rate of up to 4.4%, lipomas represent the second most frequent type of benign tumor of the colon, second only to adenomatous polyps [1]. Lipomas appear most frequently in the colon, accounting for 75% of reported cases. The most common site of colonic lipomas is the ascending colon, near de cecum (45%), followed by the sigmoid colon (30.3%), descending colon (15.2%), and transverse colon (9.1%) [1–3]. It was found that most often, lipomas occur in the fifth decade of life, affecting more women than men [4]. Usually, colonic lipomas are asymptomatic or mildly symptomatic. Hence, they are generally detected incidentally through colonoscopy, or radiologically or surgically as a result of procedures intended to diagnose or treat other conditions. However, with increasing size, the tumor may produce clinical manifestations such as abdominal pain, alterations in bowel habits or bloody stools, and even obstruction or intussusception if the tumor size exceeds 4 cm [5–7].

Endoscopic resection and surgery represent the mainstay of treatment for colonic lipomas. Nonetheless, deciding on the optimal method remains controversial. Even if lipomas greater than 2 cm could be resected endoscopically with good remission rates, considering the increased risk of bleeding or perforation, surgical management is recommended, especially when it comes to complications such as intussusception or obstruction [8–10]. Consequently, a consultation with a gastroenterologist and a colorectal surgeon is advisable for a comprehensive evaluation and appropriate management.

Throughout this paper, we present the case of a 39-year-old man who was endoscopically diagnosed with a 6 × 5 cm (6 cm horizontal diameter and 5 cm vertical diameter) atypical submucosal mass in the transverse colon. The computed tomography (CT) scan demonstrated an endoluminal fatty mass in the distal transverse colon, typical of lipomas, and suggested colo-colonic intussusception near the splenic flexure due to the mass. The tumor was too large for endoscopic resection, and it was removed laparoscopically.

2. Case Report

The patient is a 39-year-old male without notable previous personal or familial medical history, a non-smoker, with occasional alcohol consumption, who presented to our clinic complaining of colicky abdominal pain for the preceding three weeks. He denied any nausea, vomiting, weight loss, alternative changes in bowel habit such as diarrhea or constipation, and rectal bleeding.

Physical examination was unremarkable except for an increased sensibility in the upper abdominal quadrant, with no palpable mass in the abdomen. Laboratory tests were normal aside from a mildly elevated C-reactive protein level of 3.49 mg/dL. We first performed an abdominal ultrasonography which revealed hepatic steatosis and thickening of the jejunal loops. Afterwards, the patient underwent an upper endoscopy which pointed out a hiatal hernia and erythematous gastritis. Consequently, we performed a colonoscopy that revealed a giant superficially ulcerated subepithelial mass of approximately 6 × 5 cm in the middle third of the transverse colon, with a wide base. Thus, the suspicion of a lipoma was high according to the macroscopic aspect (Figure 1). However, an ulcerated GIST could not have been excluded; therefore, biopsies were taken. The histopathological examination showed multiple fragments of colonic mucosa with slight acute inflammatory changes and no neoplastic elements. During the colonoscopy, endoloop insertion was attempted, but the tumor was too large to fit through the maximum opening of the endoloop (Figure 2). Afterwards, we sent the patient for an abdominal CT examination with contrast. The CT scan revealed an expansive process of approximately 5 cm, with an adipose structure and bilocular appearance in the distal transverse colon, with evidence of colo-colonic intussusception near the splenic flexure (Figure 3).

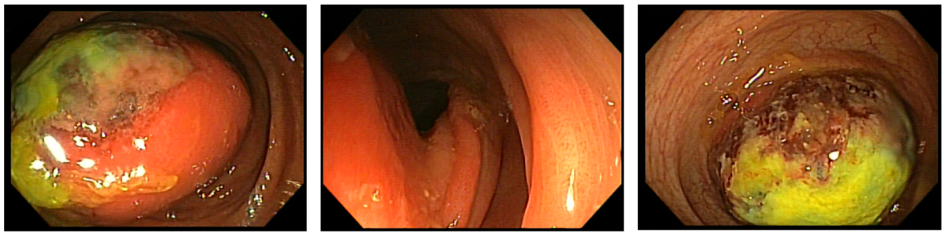

Figure 1. Endoscopic image of the colonic lipoma. (**Left**) Overall aspect and size of the lipoma. (**Center**) The wide base of the lipoma. (**Right**) Different angle of view on the lipoma showing yellow-colored superficially ulcerated subepithelial mass.

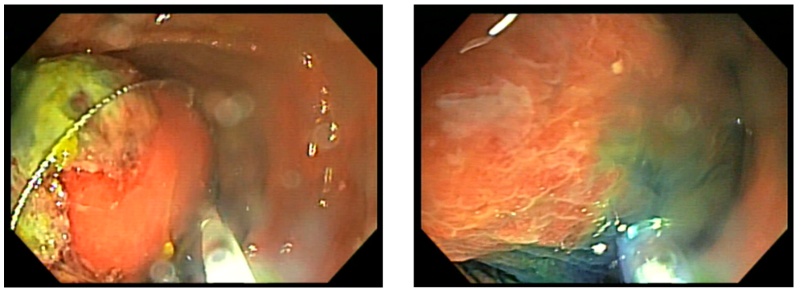

Figure 2. Attempts to insert the endoloop around the lipoma. (**Left**) The maximum opening of the endoloop compared to the size of the lipoma. (**Right**) Injection of the lipoma prior to the attempt of removing it with the endoloop.

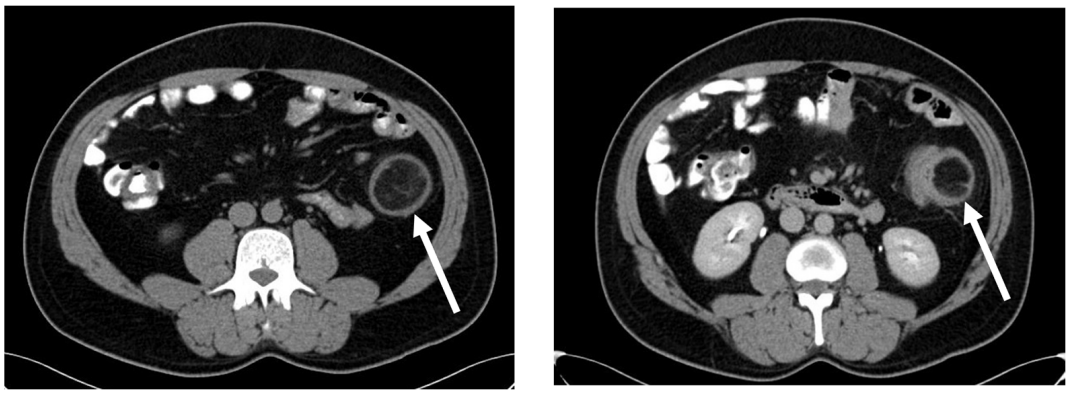

Figure 3. Abdominal CT showing transverse colonic lipoma as a leading point of a colo-colonic intussusception. Two cross-sectional images are shown. The arrows indicate an expansive process of approximately 5 cm with an adipose structure.

Considering that the tumor was not eligible for endoscopic resection and because it was complicated with colo-colonic intussusception, we further sent the patient to surgeon. During the laparoscopic surgical intervention, an unexpected Meckel's diverticulum was detected. A macroscopic assessment of the resected specimen identified a 15 cm long colon segment, with a central polypoid, a nodular mass of 5.4 × 5.4 cm, yellow in color, which was located submucosally. The covering mucosa was partially ulcerated, without tumoral resection margins. In addition, a diverticulum was identified with a length of 4.5 cm and a diameter of up to 2.7 cm, without tumor elements. The histopathological examination of the resected specimen revealed that the mass was composed of mature fat cells, focal erosion, and ulceration of the overlying colonic mucosa, without any element of malignancy (Figure 4). In addition, the specimen contained a Meckel's diverticulum consisting of an intestinal-type wall with mild inflammatory changes in the mucosa, areas of fibrosis, and vascular congestion in the rest of the wall. The surgical procedures included transverse colon segmental colectomy with end-to-end colo-colonic anastomosis as well as diverticulectomy. The postoperative course was uneventful, the patient being afebrile, with progressive resumption of food tolerance and intestinal transit, and with reduction in drainage.

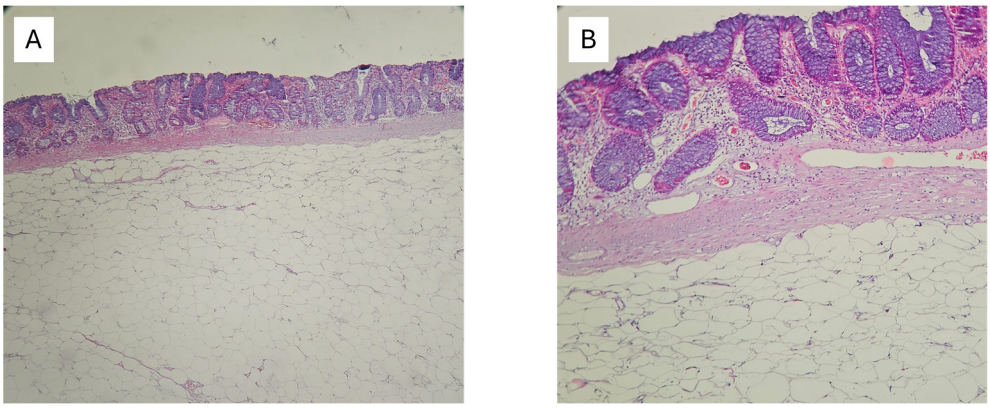

Figure 4. Histological images of the lipoma (hematoxylin and eosin stain): (**A**) 40×; (**B**) 100×.

3. Discussion

Colonic lipomas are rare benign non-epithelial neoplasms derived from mature adipocytes of unknown etiology. With a reported incidence ranging from 0.2% to 4.4%, in almost 90% of cases, lipomas of the colon are located in submucosa, with only a few presenting in the subserosal layer [3]. Most commonly, they arise in the large intestine, particularly in the right hemicolon cecum and ascending colon (more than 70% of cases),

with a slightly higher predisposition in women and a peak incidence in the fifth decade of life [3,7,10]. Typically, colonic lipomas appear as well-delineated, ovoid, soft, yellowish sessile, or pedunculated masses, which could vary in size from several millimeters to thirty centimeters [3,11]. However, ulcerations or erythema can be sometimes seen on the overlying mucosa, which may lead to the suspicion of malignancy [9]. Considering the submucosal location of colonic lipomas, literature reports highlight three critical endoscopic signs which could advocate the diagnosis: "the tenting effect—grasping the overlying mucosa with biopsy forceps presents a tent-like appearance, "the cushion sign"—probing the polyp with closed biopsy forceps will often yield a pillow-like indentation, and the "naked fat sign"—biopsies might result in an extrusion of yellowish fat [4,12–14]. Endoscopic ultrasound (EUS) could provide more specific information about the extension of the lesion into the deeper layer of the submucosa and also could help differentiate a lipoma from other submucosal lesions such as a leiomyoma or a schwannoma [5].

Concerning the clinical presentation of colonic lipomas, either the patient is asymptomatic (especially lipomas with a smaller size than 2 cm) or he/she presents with vague and non-specific symptoms like abdominal pain, alterations in bowel habits, or bloody stools [3,4,11]. Thus, colonic lipomas may have the potential to mimic malignancy and lead to misdiagnosis. In a review based on the international literature from 1757, when Bauer reported one of the first known symptomatic colonic lipomas (SCLs), in 2014, Sapalidis et al. found 115 articles describing 210 cases of SCLs [11], but they limited their report from 2000 to 2014 and finally reviewed 7 cases. The study pointed out that clinical manifestations are related to the size of the tumor (mean size of 5.09 cm; range from 0.35 to 10 cm), and lipomas larger than 2 cm are more likely to be symptomatic, with most of the patients presenting with abdominal pain described as diffuse, intermittent, crampy, or acute [11]. Imaging techniques, including colonoscopy and computed tomography, contribute to the preoperative diagnosis of lipomas, but the histopathological examination remains the mainstay for establishing a conclusive diagnosis. Giant colonic lipomas are defined as lipomas larger than 5 cm in diameter and they are the most common cause for intussusception, which is a frequent pathology among children [9,15]. In adults, colonic intussusception can be induced by primary carcinoma in up to 75% of cases. Moreover, due to chronic pressure effects provoked by intussusception and traction, large lipomas might develop superficial ulcerations or necrosis on the mucosa, making them more difficult to be differentiated from a malignant lesion during colonoscopy [3,13].

The management of colonic lipomas is still under debate, without consensus available. Considering that in the past, endoscopic resection was associated with a higher risk of perforation and bleeding, the surgical approach was more frequently used especially for large lesions [4]. However, multiple case reports have recently provided an expansion of the criteria based on size for endoscopic resection, with complication rates higher than success rates [12]. For instance, one systematic review compared the efficacy and safety (based on endoscopic resolution rates, clinical remission rates, and adverse events) of lipoma unroofing with respect to dissection-based techniques, endoscopic mucosal resection (EMR), or loop-assisted resection. Bronswijk et al. revealed similar clinical remission rates in patients with large colonic lipomas with several differences regarding the adverse events: amongst patients who underwent EMR and loop-assisted techniques, adverse events were identified in 12.9% and 13.8% of the cases, respectively, compared to none in the unroofing and dissection-based resection group [12]. Yet, the endoscopic approach is still limited to tumors arising from submucosa, whereas the risk of perforation increases significantly when the deeper layers of the submucosa are involved. Surgery remains the mainstay of treatment, particularly for large colonic lipomas with increased potential for complications or if malignancy could not be completely excluded [11,13,16].

We presented in this paper the case of a patient with a giant colonic lipoma with unspecific symptoms (abdominal pain) and atypical features such as young age, male gender, transverse colon (as the least common site), and endoscopic appearance (large mass with ulcerated and necrotic mucosa on gross examination, raising the suspicion of ulcerated

GIST), suggesting that colonic lipomas may well mimic a malignant tumor and could be hard to differentiate (Figure 1). Another particularity of the case was the development of intussusception due to its large size. During the colonoscopy, the first intention was endoscopic resection, hence endoloop insertion was attempted. The size of the tumor was too large to fit into the maximum opening of the endoloop (Figure 2) [17]. Thus, a surgical approach was decided, and the patient underwent laparoscopic segmental colectomy. An unexpected Meckel's diverticulum was discovered during the surgery.

Gould et al. reported only seven cases of transverse colonic lipomas published in the literature [4]. Moreover, studies have reported a significant increase in the incidence of intussusception if the size of the lipoma is larger than 4 cm, raising up to 80%, and even 100% if the size exceeds 6–7 cm [18]. Crocetti et al. reviewed 88 articles including 184 patients diagnosed with a large colonic lipoma, in which 127 patients were selected for inclusion in the subgroup analysis [16]. Of these patients, 27 (21%) were asymptomatic, whereas 100 patients (79%) were symptomatic. Symptoms at presentation consisted of abdominal pain in 51 cases (51%), rectal bleeding in 46 cases (46%), alterations in bowel habits in 29 cases (29%), colo-colonic intussusception in 25 cases (25%), weight loss in 5 cases (5%), and volvulus of the sigmoid colon in 1 case (1%). In addition, studies have pointed out that complications of intussusception due to colonic lipomas are very rare in adults, accounting for 1–5% of the cases [19].

After the evaluation of published works with the use of PubMed and the Central Journal of Medicine issued between 2000 and 2020, only six case reports of laparoscopic surgery for transverse colonic lipoma were found [18].

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract, resulting from incomplete obliteration of the vitelline duct, with a reported prevalence between 0.3% and 2.9% in the general population, although a systematic review revealed a prevalence of 1.2% among 31,499 autopsies in seven studies [20–22]. A classic description of Meckel's diverticulum is given by the "rule of two" which states that Meckel's diverticulum occurs in approximately 2% of the population with a male-to-female ratio of 2:1, is located within two feet of the ileocecal valve (approximately sixty-one centimeters), and can be two inches in length (approximately five centimeters), although in practice, the size of Meckel's diverticulum varies. Approximately 2–4% of patients develop a complication over the course of their lives, often before the age of two [20,23]. Usually, Meckel's diverticulum is clinically silent, with only 4 to 6% of patients presenting with gastrointestinal bleeding or acute abdominal symptoms related to bowel obstruction, Meckel's diverticulitis, or perforation [24,25]. An accurate diagnosis of Meckel's diverticulum can prove to be challenging and requires a high index of suspicion, whereas the clinical manifestations are non-specific. Thus, the diagnosis is generally based on imaging studies or surgical exploration. Nevertheless, even if symptomatic Meckel's diverticulum could be present at all ages, it is predominantly seen in children. Retrospective studies comprising patients of all ages proved that the prevalence of symptomatic Meckel's diverticulum decreases with age, with more than half of patients being younger than 10 years [21,24–27]. The literature has described several risk factors responsible for developing symptomatic disease, including male sex, age < 50 years, diverticulum length > 2 cm, or those consisting of heterotopic mucosa. The proportion of symptomatic Meckel's diverticulum increases to 25%, 42%, and 70% when two, three, or four of these factors are met, respectively [21,24,28]. Also, these criteria are associated with the development of future complications [24]. One controversy focuses on the management of incidentally discovered Meckel's diverticulum. In a systematic review of 244 retrospective studies, Zani et al. showed that resection of incidentally discovered Meckel's led to significantly higher postoperative complication rate than leaving it in situ [22]. On the other hand, one retrospective study of 76 patients proved that there were no significant differences between symptomatic and asymptomatic patients when it comes to age, gender, APACHE score, postoperative complications, and hospital stay [29]. Furthermore, the authors concluded that resection of incidentally discovered Meckel's diverticulum is not associated with increased operative morbidity and mortal-

ity [29]. Hence, there are different perspectives and the retrospective studies do not agree with each other on this matter, whereas most authors establish their recommendations on their own experience. Consequently, Robijn et al. suggested that the decision regarding the optimal approach should be based on the presence of the four risk factors for the development of symptomatic and complicated Meckel's diverticulum, and the resection should be performed if any of those four criteria are fulfilled [30]. Furthermore, if resection is performed, it is recommended to perform diverticulectomy for long diverticula and wedge or segmental resection for short diverticula [31–33].

Similarly large lipomas have been reported before [4,8,15,16,18], out of which a specific case describes the successful resection using an endoloop [17]. The uniqueness of the case reported here comes from the incidental finding of a Meckel's diverticulum during the surgical removal of a comparatively large lipoma as the leading point of a colo-colonic intussusception.

In summary, our patient is a 39-year-old male with Meckel's diverticulum of 4.5 cm length and a diameter of up to 2.7 cm, discovered incidentally during a laparoscopic segmental colectomy. The only clinical manifestation was colicky abdominal pain. Given the fact that our case presented at least three of the risk factors mentioned above, the decision to perform diverticulectomy was made. The patient had a stable postoperative course without any complications.

4. Conclusions

In conclusion, we cannot specifically assess the etiology of our patient's abdominal pain, as both Meckel's diverticulum and colonic lipoma may be incriminated. Colonic lipomas as well as Meckel's diverticulum are uncommon conditions with non-specific symptomatology that could be easily misdiagnosed. Clinical awareness and a conclusive preoperative diagnosis are of great importance and a real challenge, histopathological examination being the mainstay. When it comes to therapeutic approach, the optimal strategy depends on a proper preoperative diagnosis, the size of the lesion, as well as the presence of complications. Surgery was the optimal choice in our case both for the colonic lipoma and Meckel's diverticulum. However, concerning colonic lipomas, endoscopic resection remains an effective and a safe option for large tumors depending mainly on the endoscopist's skills and the use of appropriate hemostatic devices.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient to publish this paper.

Data Availability Statement: Clinical, laboratory, and radiological reports concerning the case described in this manuscript are available on request from the corresponding author.

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