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Sigmoid Colon Cancer in an Irreducible Scrotal Hernia Case: A Combined Surgical Laparoscopic and Inguinal Approach and Review of the Literature

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Abstract

Inguinal hernia and colorectal cancer, considered individually, are very common pathologies; their simultaneous manifestation in the same patient, on the other hand, is a rare condition and even more the presentation in the form of a complication (bleeding, intestinal obstruction, etc.). We report an 86-year-old man case of incarcerated sigmoid colon carcinoma diagnosed in the emergency department preoperatively and treated with elective laparoscopic surgery, combined with an inguinal approach. Literature review (last 30 years) was applied to analyzed variability and open questions in the management of this particular pathologic combination.

Keywords

Inguinal Hernia; Sigmoid Carcinoma; Colon Carcinoma; Incarceration

Introduction

Inguinal hernia is a common pathology; about 30% of men receive this diagnosis in their lifetime. Approximately 20 million inguinal hernia repair surgeries are performed each year worldwide; this pathology manifests with an irreducible inguinal mass, in 5-15% of cases. Urgent surgery is required in these cases [1].

Colorectal cancer accounts for approximately 10% of cancer-related mortality in western countries and its incidence is still growing especially in developing countries. It is the second most common cancer in women and third most common in men. Its 'rise' can be attributed to the increasingly aging population, dietary habits and an increase in risk factors such as smoking, low physical exercise and obesity [2].

Primary colon carcinoma within an inguinal hernia sac is very rare and most reported cases were found at emergency open surgery for an incarcerated hernia; the estimated incidence is 0.5% in the excised sac [3,4].

We report a case of incarcerated sigmoid colon carcinoma diagnosed preoperatively and treated with elective laparoscopic surgery, combined with a inguinal approach.

Case Report

A 86-year-old man, with no relevant medical history (except for a radical prostatectomy performed 18 years before), was admitted to the emergency department with a 7-day history of abdominal pain, dis-canalization and weakness, weight loss (5 kg in the last 10 months) was present too. Physical examination revealed only a large, not tender, not reducible mass in the left groin. The patient had a left irreducible inguinal hernia for long time, but on this occasion no pain nor other associated symptoms were represented. Blood testing revealed a leukocyte count of $14.0 \times 10^9/L$ and a hemoglobin value of 12.2 g/L. TC scan showed a left giant inguinoscrotal hernia containing large bowel, with asymmetric wall thickening and luminal alterations, suggesting a neoplasm within the inguinal hernia. Colonoscopy revealed a stenotic tumor in the sigmoid colon (Fig. 1-3).

The patient underwent elective surgery. A laparoscopic approach was chosen, a common choice in our operating unit when faced with a case of colonic neoplasia without clear evidence of extra-organ invasion.

A Laparoscopic left hemicolectomy was performed. In lithotomy position, under general anesthesia, an 11-mm trocar was inserted below the umbilicus (for a 30-degree camera). 11-mm trocars were inserted at the right upper abdomen and the right lower abdomen. The operator and a camera assistant were on the right side of the patient, the first assistant was positioned on the left side.

Onofrio L | Volume 3; Issue 1 (2022) | JSRP-3(1)-032 | Case Report

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Significant stages of surgery include colo-epiploic detachment, which started from the middle of the transverse colon up to the splenic flexure, recognition of the Treitz and the inferior mesenteric vein, the plane of detachment between the Gerota and the lamina of Toldt was identified: at this point that the two bands are joined and more easily recognizable in their dissection. Following the mesenteric cord (proceed in a medium-lateral direction, from top to bottom), until the inferior mesenteric artery is clearly identified, freed from the peri-arterial lymphatic tissue and sectioned between clips. This section allows to proceed with the preparation of the Gerota up to the left parietocolic wall laterally and up to the sacral concavity at the bottom.

After having mobilized all the Gerota laterally and downwards, the upper edge of the mesenteric vein is returned. The lower edge of the pancreas is identified and the mesocolon is detached from the upper edge of the pancreas until it enters the retrocavity of the epiplons. Once the mesocolon has been freed from the pancreas, the section of the mesenteric vein is moved between clips and the mobilization of the colon from the left parietocolic shower up to below the promontory of the sacrum. At this point left descending and sigmoid colon had been separated and free from the retroperitoneum; traction was applied to reduce the distal sigmoid colon into the abdominal cavity (from the inguinal hernia sac). After unsuccessful attempts, a left standard inguinal incision was made (Fig. 4). Using this approach the sigmoid colon (dolico-sigma) was completely identified and carcinoma recognized in the hernia sac. The sigmoid colon dissection from the hernia sac was performed, finally the sac of the inguinal hernia was incised and opened, at the internal inguinal ring (external oblique hernia). Now the sigmoid colon could easily be pulled downward, crossing the inguinal ring unhindered. Resection was performed (by a mechanical powered stapler) and the proximal sigmoid colon were end-to-side anastomosed by a circular stapler. Colon was finally reduced in the abdomen; inguinal hernia was repaired with synthetic mesh according to the Lichtenstein technique.

The patient recovered without complication and left the hospital on postoperative day 9. Pathological examination of the tumor revealed a well-differentiated adenocarcinoma, with sub-mucosal invasion through the muscularis mucosa. Nine, no-pathological, lymph nodes were discovered.

Figure 1: TC scan: Hernia.

Figure 2: TC scan: tumor in the sigmoid colon.

Onofrio L | Volume 3; Issue 1 (2022) | JSRP-3(1)-032 | Case Report

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Figure 3: Colonoscopy: neoplastic stenosis.

Figure 4: Surgery: laparoscopic + inguinal approach.

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Discussion

Inguinal hernia and colorectal cancer are, singularly, very frequent pathologies, on the other hand, their presentation, in the form of a complication, in the same patient and at the same time is rare, about 40 cases are present in literature [6]. This disease was more common among elderly population and frequently involved the sigmoid colon, the causes are due to the relevant frequency of colorectal cancer in the population and to high frequency of sigmoid colon in the hernia sac, for its anatomy. The inguinal hernia was predominant in the left side and generally sigmoidectomy with colostomy is the most frequent surgical option, frequently without using artificial materials for inguinal hernia repair [5,6].

Chronic inflammation of the herniated bowel and circulatory distress were considered as possible causes of correlation between inguinal hernia and colon cancer in the past; but no significant association was found so direct correlation between these two pathologies is considered implausible [8,9,10].

In Most cases of inguinal hernia the history and physical examination are usually sufficient to make the diagnosis. Although imaging is rarely necessary, ultrasonography or TC/MR scan can help diagnose a hernia in specific cases, such as athlete without a palpable impulse or bulge on physical examination, or in complicated cases (as in our particular case), in which a physical examination have a limited part in detecting etiology, extent and environment. Moreover imaging is necessary when differential diagnosis/complications need to be focalized for a correct surgical approach.

Even if the first presentation of the patient was in the emergency department, the lack of a condition of surgical emergence has permitted the surgical approach to be postponed, allowing for an accurate pre-operative study including radiological and endoscopic investigations. A colonoscopy completed the pre-op staging; a virtual TC colonoscopy was necessary due to the neoplastic stenosis which did not allow exploration of the entire colon by standard colonoscopy, in order to exclude other synchronous colon cancer, possibly upstream of the stenotic tract.

This condition (lack of surgical emergence) gave the chance of a convinced laparoscopic approach too. Laparoscopy allowed a precise diagnostic classification as well as a correct surgical treatment, not linked to a laparotomy and with the possibility of being remodelled if necessary.

As regards oncological valuation, it should be considered that often these are incidental diagnoses that are presented directly to the operating table and therefore preclude a preliminary oncological assessment and even if such an evaluation were sometimes feasible in the pre-operative evaluation, the advanced age of presentation and co-morbidities would make a neoadjuvant chemotherapy approach contraindicated in most cases [11,12].

Even if faced with a rare pathological combination, a comparison with the data in the literature is always appropriate. As mentioned, since 1938 to date, less than 50 cases have been described (including our current case), of which it is useful to consider above all the type of surgical approach and the methods of treatment of the hernial defect. Made the necessary premise that the surgical approach used must be considered also and above all in the light of the different clinical conditions (Fig. 5) and epoch of presentation [4,6,13].

Considering the treatment and the evolution of surgical procedures over the years, literature cases recorded in the last 30 years have been taken into consideration (22 cases; Table 1)[14-17] . Looking at these data, Hartmann's procedure is the most common (54%), the most used surgical approach in complicated cases, only Ruiz-Tovar and Diao opted for direct anastomosis, even in the presence of a perforation, without however reporting relevant post-operative complications [18,26]. The Laparoscopic approach was performed in 23% of (most recent) cases, no relevant complications were presented. Chern performed colectomy and hernioplasty in a unique laparoscopic approach [6]. The open approach was performed in 23 % of cases. The analysis of these data also confirms there is no evidence to support a certain approach in elective surgery: the choice of the abdominal (open or laparoscopic) versus inguinal approach will depend on the patient's anatomy, the surgical findings and the surgeon's experience [25,28].

Figure 5: Patient's clinical presentation.

On the other hand, the evidence that emerged from recent meta-analyzes about the benefits of laparoscopic hemicolectomy (vs open right hemicolectomy in non-emergent cases in reduction of:

- Post-operative pain
- Blood loss
- Time to first flatus
- Length of hospital stay

Associated with similar results from an oncological point of view:

- Number of lymph nodes removed
- Size of resection
- Recurrence's rate

It marries our conviction about the validity of the laparoscopic approach and its use when possible and whether it represents an approach routinely used [29,30].

Finally, the surgical approach to inguinal hernia should be considered. In this ambit the main question is whether to use a mesh repairs technique in the restore of the hernial defect. The answer coming from this series examination is non-mesh repairs in most cases (73%); mesh repairs approach (six cases) have been performed in low risk sepsis cases. In the case reported by Ruiz-Tovar, there was perforation without contamination; he performed a mesh repair approach, no complications were reported [18]. Obviously, the main problem here is the risk of mesh infection, 11 surgeons have chosen to perform open hernioplasty without mesh; 2 surgeons opted for intra-abdominal defect closures with the same modality [18].

In Our opinion using a mesh repairs technique is feasible and at a low risk of septic complications in evidence of any abdominal contamination; while us consider TAPP approach to be impracticable for the risk of infection. Dissected peritoneum, in TAPP procedure, is the only wall between mesh and bowel, definitely too thin a barrier to counter the infectious risk.

The original strategy was the one used by Kouraklis who applied a two-stage procedure: in the first time he had created a loop colostomy; in the second operation, delayed 6 weeks, he performed a mesh repair during colostomy closure operation [16].

Author-Year	Age	Site	Complications	Colon Cancer Treatment	Hernia Treatment
Hale (1991) [14]	85	Sigmoid	Incarceration	Hartmann's	Intra-abdominal internal ring Closure
Tan (2003) [15]	62	Sigmoid	Incarceration	High anterior resection + left orchidectomy	intra-abdominal internal ring closure
Kouraklis (2003) [16]	79	Sigmoid	Perforation	Hartmann's + loop colostomy	Left open hernioplasty
Cervinka (2003) [17]	69	Sigmoid	Incarceration	Sigmoidectomy + anastomosis + defunctioning transverse colostomy	herniorrhaphy (Bassini)
Sakorafas (2008) [31]	85	Sigmoid	Perforation	Hartmann's	herniorrhaphy (Bassini)
Slater (2008) [4]	66	Sigmoid	Incarceration	Hartmann's + left orchidectomy	internal ring closure
Slater (2008) [4]	73	Sigmoid	Perforation	Hartmann's + left orchidectomy internal ring closure	internal ring closure
Ruiz-Tovar (2009) [18]	67	Sigmoid	Perforation without contamination	Sigmoidectomy and anastomosis	hernioplasty (Lichtenstein)
Ko (2010) [19]	84	Sigmoid	Perforation	Hartmann's	Herniorrhaphy
Mai (2010) [20]	83	Sigmoid	Strangulation	Hartmann's	Herniorrhaphy
Pernazza (2011) [21]	70	Caecum	Incarceration	Laparoscopic right hemicolectomy	Herniorrhaphy
Carr (2012) [22]	65	Sigmoid	Incarceration	Laparoscopic high anterior resection	open biosynthetic hernioplasty
Meniconi (2013) [23]	78	Caecum	Incarceration	Open right hemicolectomy	Herniorrhaphy
Tan (2013) [24]	63	Sigmoid	Perforation	Hartmann's	Herniorrhaphy
Kanemura (2014) [32]	67	Sigmoid	Incarceration	Laparoscopic sigmoidectomy	Herniorrhaphy

J Gnaś(2014) [33]	61	Sigmoid	Incarceration	Hartmann's	Herniorrhaphy
Kulasegaran (2016) [25]	66	Sigmoid	Perforation + necrotising infection	Hartmann's + debridement	Hernioplasty (staged skin graft)
Diao (2016) [26]	48	Transverse colon	Perforation	Transverse colectomy + orchidectomy + partial scrolectomy	Herniorrhaphy
Sharma (2017) [27]	84	Caecum	None	Open right hemicolectomy	Herniorrhaphy
Chern (2018) [6]	83	Ascending colon	Incarceration	Laparoscopic right hemicolectomy	Laparoscopic hernioplasty
Baldi (2019) [28]	88	Sigmoid	Incarceration	Open left hemicolectomy+ orchidectomy	Herniorrhaphy
Onofrio (2020) [Current report]	87	Sigmoid	Incarceration	Laparoscopic left hemicolectomy + open left herniorrhaphy	hernioplasty (Lichtenstein)

Table 1: Bowel cancer within inguinal hernia 1990-2020.

Conclusion

The rarity of this pathological association (inguinal hernia - colon cancer) cannot be separated from a correct diagnostic setting, even in emergency conditions, even and above all in the face of common pathologies such as inguinal hernia, search for possible symptoms relative to an equally frequent pathology such as colorectal cancer. A correct diagnosis generally translates into a correct surgical approach and a significant limitation of possible complications.

Finally, considering the average age and poor general conditions of patients, it should always be prudence (rather than recklessness) to guide surgical choices, for the awareness that a septic complication would be much more deleterious than a two-stage operation.

Conflict of Interest

It is stated that there are no conflicts of interest.

Onofrio L | Volume 3; Issue 1 (2022) | JSRP-3(1)-032 | Case Report

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Authors' Contributions

- Luciano Onofrio: conceived the original idea, wrote the manuscript.
- Danilo Cafaro: developed the theoretical formalism.
- Lorenzo Ascione, Maria Diana Fidanza: performed the analytic calculations and performed the numerical simulations.
- Francesco Iarrobino, Gianfausto Iarrobino: contributed to the final version of the manuscript.

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Onofrio L | Volume 3; Issue 1 (2022) | JSRP-3(1)-032 | Case Report

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