

## Case report

## The valdoni technique for bowel anastomosis. A rare complication

F. Carannante\*, M. Caricato, V. Ripetti

Department of General Surgery, Università Campus Bio-Medico, Via Alvaro del Portillo 21, 00128, Rome, Italy



## ARTICLE INFO

## Keywords:

Colon cancer  
 Right hemicolectomy  
 Ileocolic anastomose  
 Valdoni technique  
 Surgery complications

## ABSTRACT

**Background:** Valdoni technique involves leaving the mucosa layer, between the two anastomosed bowel tract intact, providing for a subsequent breakage of the intestine. It is a technique that allows you to keep the operating field clean.

**Surgical technique and Case Report:** We describe the Valdoni technique. We also report a case of 75 years old man affected by an ascending colon cancer with no metastasis. The patient underwent right hemicolectomy. Making the anastomose, the surgeon did the Valdoni technique, with no intraoperative complications.

The postoperative course was characterized by an abdominal pain with swollen abdomen, no flatus and vomit. A computed tomography (CT) revealed a sub-stenosis of the anastomose. We decided to do an urgent colonoscopy, with a resection of the mucosa layer not totally opened, using a Needle-knife Precut. The post procedure course was uneventful. The patient was discharged three days later.

**Conclusion:** Valdoni technique allows the surgeon to keep the operating field clean. It is a valid alternative when the surgeons have to make a colonic anastomosis, doing open surgery.

## 1. Introduction

Anastomotic leak is the most feared complication after colo-rectal surgery [1], from 3 to 36% [2]. During right hemicolectomy, this type of complication is rare [3]. Another complication is the stenosis of the anastomose [4,5], in particular for anterior rectal resection surgery and in case of Diverticulitis [6] and Radiotherapy [3].

Valdoni technique is a particular surgical procedure, which allows surgeon to keep the operating field clean [8,9]. When the enterotomy is done, the surgeon opens only the adventitia, muscularis and sub-mucosa layers, leaving the mucosa layer intact, providing for a subsequent breakage of the intestine.

Many years ago, when the laparoscopic surgery was only a dream, ones of the important Italian Surgeon, Professor Valdoni, thought up and did a new bowel anastomotic technique. Surgeons, in memory of Professor Valdoni, called this surgical technique by his name: "Anastomosi sec. Valdoni".

In literature we don't find any article which explain or show this technique, but in Italian hospital many surgeons remember this type of anastomosis which their schoolmaster handed down. Now Surgeons are not usually to use the Valdoni technique for anastomose. Surely, this is due to new surgical techniques, such as laparoscopy and robotic surgery with the use of mechanical staplers [7], but the Valdoni technique could be a valid alternative when the surgeon needs to do a bowel

anastomosis doing open surgery. This type of anastomosis could also reduce hospital costs because the surgeon does not need to use mechanical staplers.

We report a particular case of Valdoni technique for right colon cancer, which was complicated by the narrowing of the anastomosis and partial opening of mucosa layer.

This work has been reported in line with the SCARE criteria [12].

## 2. The Valdoni technique

Suitable suture material for small bowel anastomosis, Vicryl (3/0), is used. At first, the two ends of the bowel are brought close together and corner sutures are done (Fig. 1 A). Using the corner sutures, the anastomosis is sewn continuously in a seromuscular fashion (Fig. 1 B).

When enterotomy is done, we open only the adventitia, muscularis and sub-mucosa layers, leaving the mucosa layer intact, so we can avoid the faecal contamination, because the faeces cannot escape and dirty the operating field. (Fig. 1 C–D).

Then, the anastomosis is sewn continuously making the intestinal continuity (Fig. 1 E and F – G).

Only later, when the surgeon finished the anastomoses the mucosa layer could be broken, mechanically with finger pressure or later in the early postoperative days (the layer of the mucosa is the least vascularized layer).

\* Corresponding author. Università Campus Bio-Medico, Via Alvaro del Portillo 21, 00128, Rome, Italy,

E-mail address: [f.carannante@unicampus.it](mailto:f.carannante@unicampus.it) (F. Carannante).

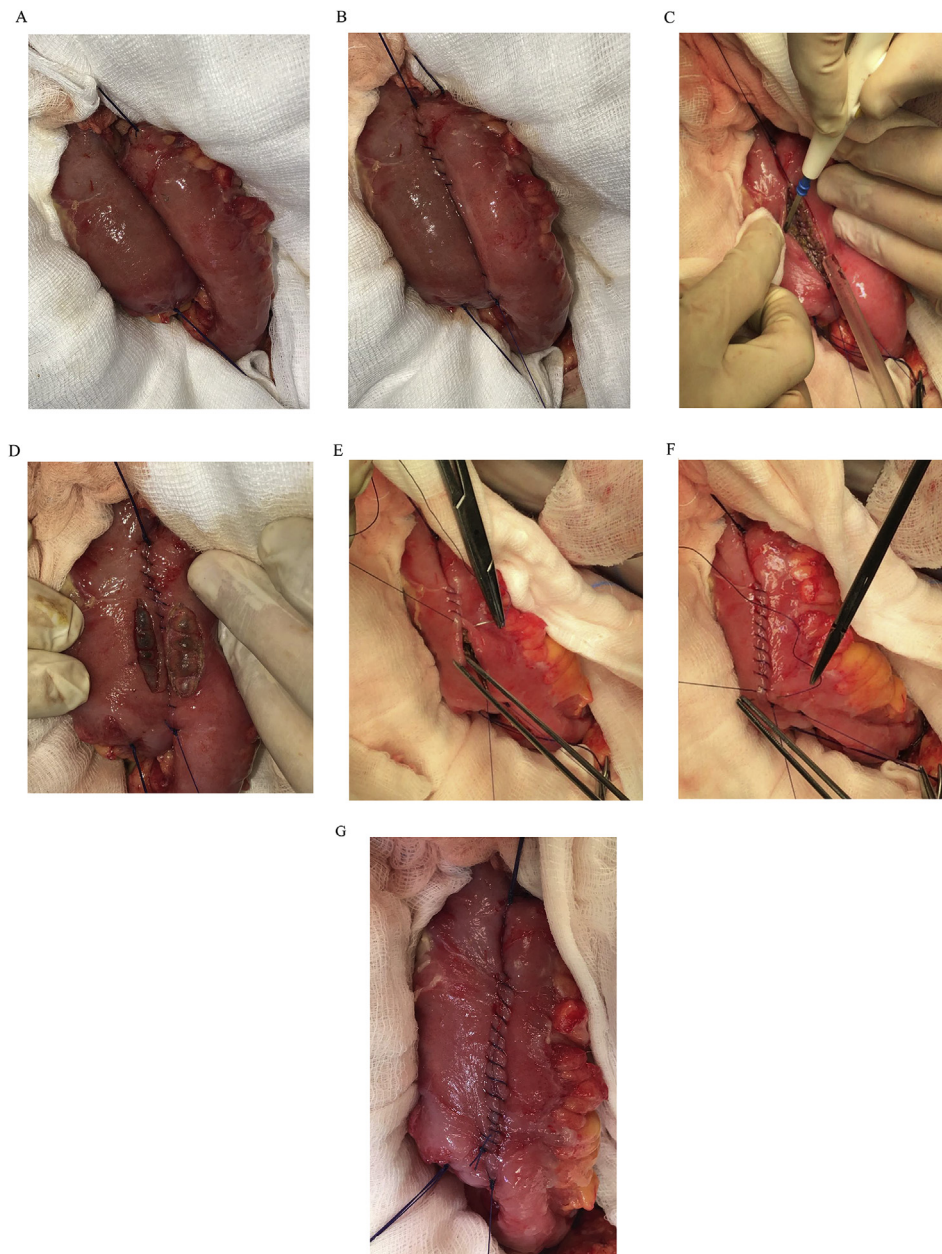


Fig. 1.

### 3. Case report

A 75 years man was referred to our hospital for anaemia (Hb 11.6 g/dL), slimming and lack of appetite. He was a construction worker, not a smoker, from southern Italy. The patient had undergone a laparotomic appendectomy and laparotomic cholecystectomy, respectively 50 and 30 years ago. No other previous abdominal surgery was noted.

Total colonoscopy and computed tomography (CT) revealed ascending colon cancer with no distant metastasis. Tumour markers test results were within the normal range, with CEA of 3.35 ng/mL and CA19-9 of 11.6 U/mL.

We decided to do a laparoscopic right hemicolectomy. Unfortunately, due the previous surgeries a lot of adhesences were found, so we decided to convert to open right hemicolectomy. When we have to make the anastomose, the surgeon did a particular surgical technique, called Valdoni technique. Prof. Valter Ripetti performed the procedure. No intraoperative complications occurred.

Pathological examination showed that the tumour was a low

differentiated adenocarcinoma (G3) of the ascending colon, which reached the subserosal layer, with no lymph node metastasis (0/67). The pathological staging was T3N0M0 (TNM classification).

The postoperative course was characterized by a delayed canalization. At the fifth post-operative day, the patient showed an abdominal pain with swollen abdomen, with no flatus and vomit.

A computed tomography (CT) revealed a sub-stenosis of the anastomose, with distension upstream of the intestinal loops (Figs. 2A–1B). No vascular problems were found; Superior and inferior mesenteric artery and vein were enabling the blood to flow properly.

We decided to do an urgent colonoscopy, which showed a normal colonic mucosa. When the Endoscopist arrived at the end of the Colon, we found a narrowing of the anastomosis, with a partial opening of the mucosa layer (Fig. 3 A–3 B - 3C). At this point, we decided to do a resection of the mucosa layer with a Needle-knife Precut, normally used for ERCP (Endoscopic retrograde cholangiopancreatography) creating a large connection between ileus and colon (Fig. 4). We decided to use a Needle-knife Precut and not a Argon Plasma Coagulation (APC)



Fig. 2. CT scans of the abdomen and pelvis, demonstrating the anastomotic stenosis.

instrument due to high risk of a colon perforation or explosion [10,11]. No complication occurred and the postprocedure course was uneventful. The patient was discharged after three days.

One month after, the CT scan showed no surgical complication and no distance metastasis.

#### 4. Conclusion

Valdoni technique is a particular surgical procedure, which allows the surgeon to keep the operating field clean, doing open surgery. The partial opening of the mucosa layer is a complication not shown in the literature and, therefore, to be considered more than rare, but still to be taken in consideration. However, their resolution could be easy to solve.

To date, few surgeons use this technique, but it is a valid alternative when the surgeon have to make a colonic anastomosis, doing laparoscopic surgery. Also, the reduction of health costs should be taken into consideration.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2019.06.006>.

#### Ethical approval

This is a case report. It's exempt from ethical approval.

#### Sources of funding

The Authors disclose no sources of funding for research.

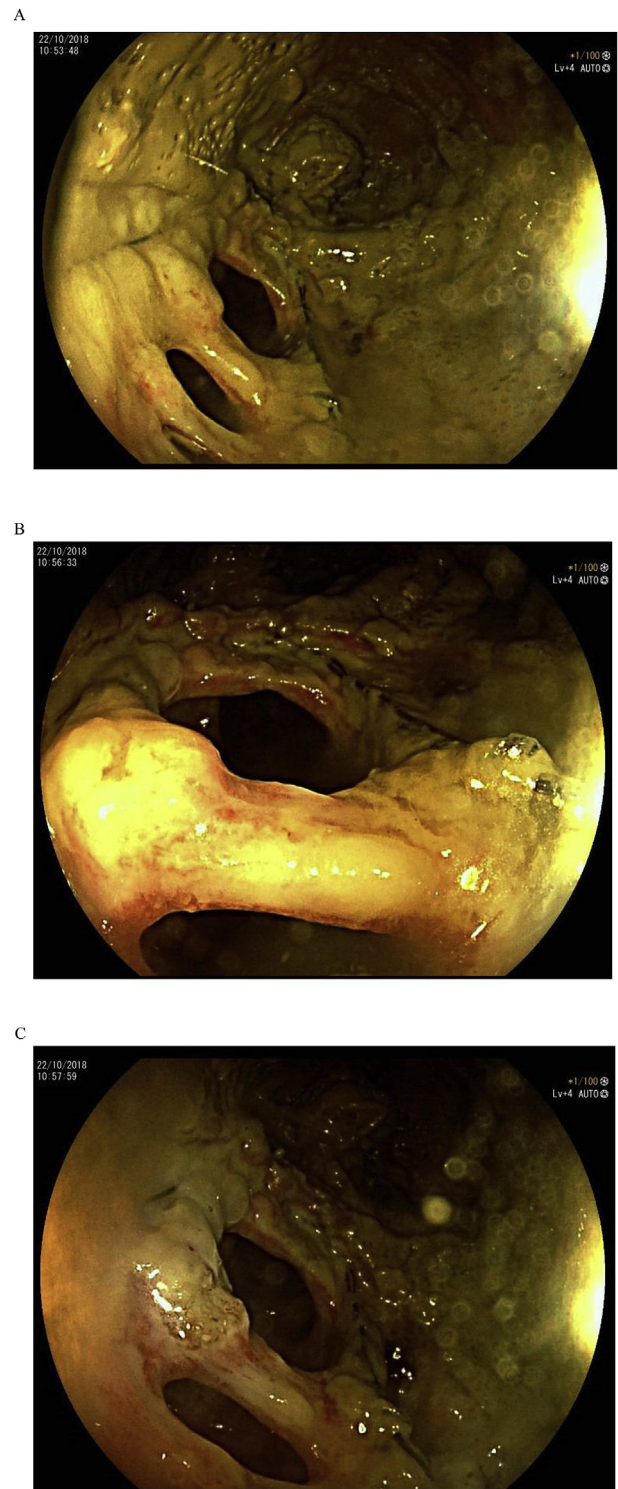


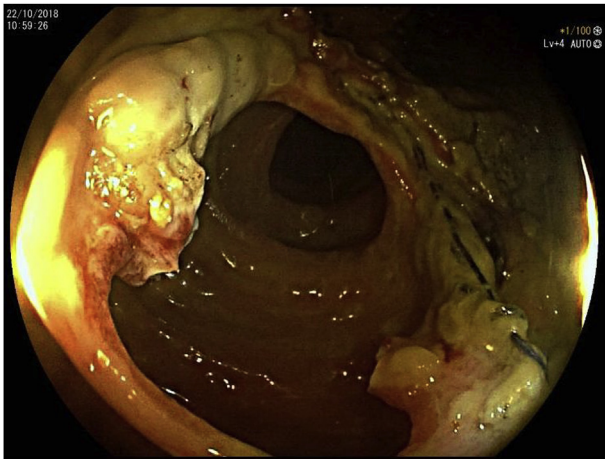
Fig. 3. (A) Colonoscopy image, demonstrating the partial rupture of the mucosa layer. (B) Colonoscopy image, demonstrating the partial rupture of the mucosa layer. (C) Colonoscopy image, demonstrating the partial rupture of the mucosa layer.

#### Author contribution

F. Carannante: study design, data collections, data analysis, and writing.

M. Caricato: data collections.

V. Ripetti: reviewer.



**Fig. 4.** Colonscopy image, demonstrating the mucosa layer, after the endoscopy resection.

#### Conflicts of interest

The authors disclose no conflicts.

#### Trial registry number

This study is not a first in man study and the registration in a publicly accessible database is not required.

#### Guarantor

Prof. Valter Ripetti.

#### Informed consent

The patient gives informed consent for publication.

#### “Compliance with ethical standards”

Authors disclose no conflicts of interest.

Research not involve Human Participants and/or Animals.

Informed consent was required and obtained.

#### References

- [1] B. Gessler, O. Eriksson, Angenete E - diagnosis, treatment, and consequences of anastomotic leakage in colorectal surgery, *Int. J. Colorectal Dis.* 32 (4) (2017) 549–556.
- [2] C. Platell, N. Barwood, G. Dorfmann, G. Makin, The incidence of anastomotic leaks in patients undergoing colorectal surgery, *Colorectal Dis.* 9 (1) (2007 Jan) 71–79.
- [3] Q.I. Qin, T. Ma, Y. Deng, J. Zheng, Z. Zhou, H. Wang, L. Wang, Wang J. - impact of preoperative Radiotherapy on anastomotic leakage and stenosis after rectal cancer resection: post hoc analysis of a randomized controlled trial, *Dis. Colon Rectum* 59 (10) (2016 Oct) 934–942.
- [4] G.C. Bannura, M.A. Cumsille, A.E. Barrera, J.P. Contreras, C.L. Melo, D.C. Soto, - Predictive factors of stenosis after stapled colorectal anastomosis: prospective analysis of 179 consecutive patients, *World J. Surg.* 28 (2004) 921–925.
- [5] M.A. Luchtefeld, J.W. Milsom, A. Senagore, J.A. Surrall, W.P. Mazier, - Colorectal anastomotic stenosis: results of a survey of the ASCRS membership, *Dis. Colon Rectum* 32 (1989) 733–736.
- [6] K. Francis, R. De Peyer, J.L. Frossard, - Colorectal anastomotic stenosis after elective laparoscopic sigmoidectomy for diverticular disease: a prospective evaluation of 68 patients, *Dis. Colon Rectum* 51 (2008) 1345–1349.
- [7] Neutzling CB1, S.A. Lustosa, I.M. Proenca, E.M. da Silva, D. Matos, - Stapled versus handsewn methods for colorectal anastomosis surgery, *Cochrane Database Syst. Rev.* (2012 Feb 15) 2.
- [8] P. Valdoni, *Cancer of the rectum*, *Minerva Med.* 59 (88) (1968) 4722–4724.
- [9] Felice Virno, Vittorio Fornasari - *Chirurgia Addominale: Tecniche operatorie/Pietro Valdoni*, (1968).
- [10] C.H. Chuang, T.C. Chou, C.Y. Chen, - Minute perforation after argon plasma coagulation for management of small colonic polyps, *Endoscopy* (2009).
- [11] H. Manner, N. Plum, O. Pech, C. Ell, M.D. Enderle, - Colon explosion during argon plasma coagulation, *Gastrointest. Endosc.* 67 (7) (2008 Jun) 1123–1127.
- [12] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill For the SCARE Group, The SCARE 2018 statement: updating consensus surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 60 (2018) 132–136.