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Research Article

Primary Closure of the Colon and Rectum in Emergency Surgery. Is it a Paradigm?

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Abstract

Background: The colon and rectum are very characteristic, specific or sui generis organs. Disruption in its integrity or perforation, in any of its anatomical portions, leads to high morbidity and/or mortality. This requires temporary or permanent fecal diversion through a colostomy or a simple primary closure.

Objective: To describe the experience and the results obtained when performing a RC CPS in the Trauma Surgery service in a second-level hospital in the United Mexican States (Mexico).

Patients and Methods: It is a study with a retrospective, longitudinal, comparative, observational and descriptive design. The presentation of the results was carried out through descriptive biostatistical procedures, where the files and files of all the patients who underwent a simple primary closure of the colon and rectum by perforation, in the emergency surgeries. Within the period from May 2018 to May 2022, with a statistical, deductive, critical, logical and impartial analysis.

Results: It was a total of 96 patients, of which 68 patients (71%) were men and 28 women (29%), with an average age of 36 years with a bimodal value of 22 and 41 years. The etiology of perforation de colon and rectum was associated with the following diagnoses and reasons: penetrating abdominal wound by stab in 42 patients representing 42%, 33 individuals due to projectile wound by firearm and that are 34% and in third place 15 more cases due to complicated diverticular disease, attributing 16%.

Conclusion: An emergency surgery never ceases to be a double-edged sword, it is not a paradigm, but it is a behavior that puts the patient's quality and life at risk.

Keywords: *Colon and Rectum; Trauma Surgery; Perforation; Colostomy; Primary Closure*

Introduction

The colon and rectum (CR) are very characteristic, specific or sui generis organs, as they present different peristalsis, diverse morphology, multiple intraluminal pressures, variable arterial or venous irrigation systems and concatenated sequential or progressive functions. Not to mention the exponentially high concentration of the normal pathogenic microbiota, with more than 50% anaerobes [1]. Disruption in its integrity or perforation (P), in any of its anatomical portions, leads to high morbidity and/or mortality. This requires temporary or permanent fecal diversion through a colostomy (C) or a simple primary closure (PSC) [2]. The first colostomy was performed by Praxagoras of Cos (384-322 BC) with a hot iron on the abdomen, 18 centuries later Theophrastus Bombastus von Hohenheim, called Paracelsus (1491-1541) confirms the artificial anus as therapeutic [3,4]. In 1839 Amussat reported 29 colostomy patients; all of them exteriorized in the left lumbar region [5]. The first primary closures of the colon have been documented since 1916, during the First World War, by the English surgeon Wallace [6].

Objective of the Study

To describe the experience and the results obtained when performing a RC CPS in the Trauma Surgery service in a second-level hospital in the United Mexican States (Mexico); in relation to success and associated complications, within the period from May 2018 to May 2022, with a statistical, deductive, critical, logical and impartial analysis.

Methods

It is a study with a retrospective, longitudinal, comparative, observational and descriptive design. The presentation of the results was carried out through descriptive biostatistical procedures, where the files and files of all the patients who underwent a CPS of CR by P, in the emergency surgeries carried out at the General Hospital "Dr. Rubén Leñero" of the Ministry of Health of Mexico City. Country: MEXICO. Second level of care.

Age, sex, comorbidities were taken into account as risk factors for complications, average duration of surgery, type of anesthesia applied, deferral, hemorrhage, causal diagnoses by P of anatomical site of RC, morbidity, mortality, reintervention, readmission after 30 days and finally special observations.

Results

It was a total of 96 patients, of which 68 patients (71%) were men and 28 women (29%), with an average age of 36 years with a bimodal value of 22 and 41 years. The following comorbidities were detected: in the first place, overweight in 35 patients, representing 39%, secondly, arterial hypertension in 8 cases, accounting for 8%, and thirdly, type 2 diabetes mellitus in 2 individuals and type 1 in another represent 3%, other comorbidities detected were 12% (Table 1). The average time of surgery was variable and ranged from 65 minutes to 122 minutes; the type of anesthesia in 94% of the cases was balanced general anesthesia 90 patients, and in the remaining 6% it was regional block. All surgeries were urgent (Figure 1 and 2).

Comorbidities Year	SO	HA	DM	CIR	O
2017	11	-	1	3	7
2018	8	1	-	1	2
2019	9	1	-	-	5
2020	6	4	1	3	9
2021	6	3	1	-	14
Total	40 (39%)	9 (8%)	3 (3%)	7 (7%)	37 (43%)

Table 1: *Associated comorbidities per year in patients with colon and rectal perforation in number/percentage.*

ACOT:
OB: Overweight
HA: Arterial Hypertension
DM: Diabetes Mellitus
IRC: Cirrhosis
OR: Others.

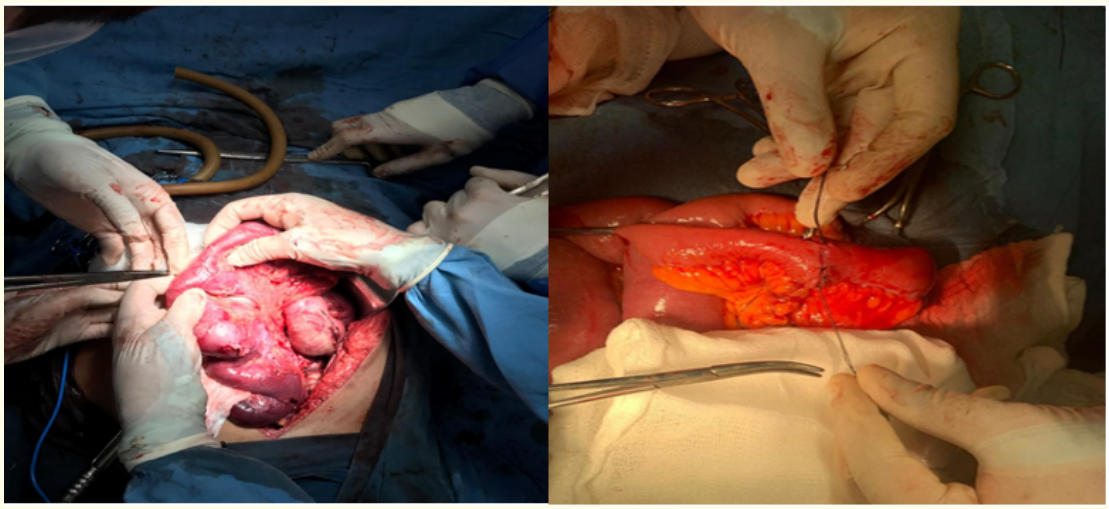

Figure 1 and 2

The hemorrhage found or hemoperitoneum in the cavity at the time of surgery was an average of 350 ml and, due to the surgical procedure, an average of 250 ml was added, giving a total of 600 ml on average, with a range of 150 ml to 820 ml. The etiology of P de CR was associated with the following diagnoses and reasons: penetrating abdominal wound by stab in 42 patients representing 42%, 33 individuals due to projectile wound by firearm and that are 34% and in third place 15 more cases due to complicated diverticular disease, attributing 16%. The most frequently affected anatomical sites in the patients (Figure 3) are the left colon in 61 (64%), the right colon in 40 cases, 40 (41%), the transverse colon in 13 (13%) and the rectum in 5 (5%). increases the number of anatomical portions since in some cases there were 2 to 3 Ps at the same time (Table 2).

Figure 3

Diagnosis Year	HPIC	HPAF	EDC	TCA	DV	CP	CE
2018	6/3CI/3CD/1T	6/2CD/3CI/1T	4/ CI	1/ T	1 /CD	-	-
2019	7/1R/4CI/2CD	5/1T/3CI/1CD	-	-	-	-	-
2020	5/1R/4CI	4/4CD	2 /CI	-	-	-	-
2021	13/8CI/3T/2CD	8/5CI/2T/1CD	5 /CI	1 /CI	-	1 /T	1 /R
2022	11/3R/7CI/1T	10/2R/2T/4CD/2CI	4 /CI	1 /CD	-	-	-
Total:	42/43%	33 /34%	15 /16%	3 /3%	1/ 1%	1 /1%	1 /1%

Table 2: *Diagnoses per year of colon and rectal perforation in patients by number and percentage.*

ACOT:
PIH: Penetrating Sharp Instrument Wound
HPAF: Gun Projectile Wound
DCS: Complicated Diverticular Disease
TCA: Closed Abdomen Trauma
DV: True Fun
PC: Previous Surgery
EC: Foreign Body
DC: Right Colon
IC: Left Colon
T: Transverse Colon
A: Straight.

Morbidity was low, only 4% where 3 surgical wound infections were documented (Figure 4 and 5) with an adequate response to standard management, and one nosocomial pneumonia without response to medical treatment. Mortality was 4%, finding one patient due to pneumonia previously detailed, two patients mortality was due to wounds of origin (multiple blunt trauma) and one due to a firearm projectile wound, with injury to large vessels such as the aorta and cava. There was no reintervention and no readmission within 30 days after discharge. He was followed up in the specialty consultation for three months without reporting any complications.

Figure 4 and 5

Discussion

RC perforations (Ps) are pathological entities that present critically fatal complications and high morbidity at a great cost [7]. The causes or etiologies of Ps of CR are multiple and varied, since they occur from a simple evacuating enema [8] to a complicated diverticular disease. Some etiological diagnoses are listed that are sometimes even interrelated between them, or are consequences of other nosological entities such as [9]: internal hernia, volvulus, foreign body, inflammatory bowel disease, colon or rectal cancer, foreign body, toxic colon, toxic colon; various colitis or proctitis such as ischemic, pseudomembranous, post-radiation, neutropenic, infectious, etc. In addition, we must not fail to mention closed, open, stab wounds, firearm projectiles, deceleration, among others. For this reason, its diagnostic etiological complexity [10-12].

The Ps of CR in terms of their incidence, although specifically unknown, it is estimated that they have increased by up to 50% of the so-called emergency surgery, where the colon and rectum are the main protagonists [13]. The clinical picture is nonspecific, with intermittent to continuous crampy abdominal pain of medium intensity to disabling, with attack on the general condition and signs of systemic inflammatory response until declaring an overwhelming acute abdomen [14]. However, there are analogies or factors to consider depending on each scenario in each patient specifically, such as: the degree of infection or contamination of the abdominal cavity, cause or etiology of P, comprehensive clinical condition or hemodynamic status or degree of systemic inflammatory response, patient age, nutritional status, blood group, hospital infrastructure, among others. The laboratory and cabinet extension studies do not definitively determine the surgical therapeutic decision, however, having them are fundamental tools that contribute to the conduct and prognosis of the patient in question of elucidating, which together with the expertise and experience of the surgeon; A correct and adequate emergency surgical intervention will be carried out, for the best benefit of the patient [15,16].

The most frequent anatomical site affected in the colon and rectum has not been estimated, however in this study it is the predominance of the left colon, due to common and pre-existing pathology, such as CR cancer and complicated diverticular disease; due to the sum of anatomical and physiological characteristics or factors that condition its lability (in the sigmoid colon the intestinal lumen is smaller in diameter and therefore greater physical pressure, the anterior anatomical position and its greater mobility, the deceleration of propulsive peristalsis by the barrier reservoir of the rectum, the longer contact time of the mucosa with fecal matter, the recto-sigmoid junction with the superior rectal valve, angulation and greater rectal physical pressure) where the incidence is higher in terms of cancer presentation, which is in the sigmoid colon and straight; and by similar factors diverticular disease [9,11,17].

On the other hand, invasive studies of the RC endoscopic, manometric, colon by enema, proctogram, defecography, etc. always present a latent risk of P; although, the advantage that should be considered is that they undergo bowel preparation or prior systematized mechanical cleansing, and these cases are not included in this research for this reason [2,8,18].

It is worth mentioning that all the Ps variants of RC, which, due to their very diversity, make therapeutic standardization complicated, and to date, more than 40 years later, there is no reliable medical-scientific-statistical evidence of a CPS to do it [19] or not to do it, of a P of CR, this is not something new [19]. Therefore, the following criteria should be considered at the time of surgery:

1. Degree of septic and/or hemodynamic shock.
2. Degree of infection or local fecal contamination.
3. Etiology or reason for the perforation.
4. Injury to other organs.

5. Number and location of perforations.
6. Rectal injury according to specific third.
7. Nutritional status.
8. Comorbidities.
9. Damage control surgery.
10. Others.

The conduct to follow can be from a damage control surgery or now called abbreviated laparotomy, since in trauma they are strategies for the management of seriously injured or ill patients [20] is based on the doctrine of Oliver Goldsmith in the year 1761, "for he who fights and flees will live to fight another day, but he who is slain in battle will never rise to fight again" [21,22]. The options to be taken into account are, in the first order, an endoscopic closure with a clip, since it is safe and efficient for the fistula.

Colorectal with a success rate of 70%, being a potential alternative to the surgical approach [23,24] or a CPS only, or resection of the affected segment with primary anastomosis without mechanical and antibiotic preparation;; or a CPS with a protective stoma (ileostomy, colostomy); or resection of the affected segment with distal closure and diverting stoma or failing that, a Hartmann procedure when the injured segment is exclusively the sigmoid colon, rectosigmoid junction or rectum [25,26].

Conclusion

Colon and rectal perforations have a mortality rate well above that of any intestinal organ, their risks increase exponentially due to transcendental surgical decisions; performing a colostomy versus a primary colorectal closure.

The decision to perform primary closure in emergency surgery will depend on the specific scenario of each patient, the skill and experience of the surgeon, as well as the infrastructure resources available.

The colostomy continues to be a salvage resource that in certain cases will require its indication, however a second procedure is latent with an increased risk of morbidity and even mortality.

An emergency surgery never ceases to be a double-edged sword, it is not a paradigm, but it is a behavior that puts the patient's quality and life at risk.

Conflict of Interests

The authors declare that they have no conflict of interest.

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