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Research Article

Laparorrhaphy in patients with colorectal cancer. Enrique Cabrera Hospital 2019-2021

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Abstract

Introduction: Until now, no ideal technique has been established that allows performing a laparotomic closure with a guarantee of greatly reducing the incidence of complications. Objective: To compare the results of abdominal wall closure using internal subtotal points (PS) and total points (PT) in patients operated on for colorectal cancer. **Methodological design:** An observational, descriptive, prospective and cross-sectional study was carried out at the General Teaching Hospital "Dr. Enrique Cabrera" between January 2019 and December 2021.
Results: The median age in the PT group was 70 ± 18 years and in the PS 68 ± 18 years. 65% of the PT group and 61.7% of the PS were women. The tumor was located in the sigmoid colon in 35% of the PT cases and in 31.7% of the PS group. Surgery was urgent in 80% of the PT group and elective in 75% of the PS. The incision was medium supra and infraumbilical in 70% of the patients in the PT group and xipho-pubic in 66.7% of those in the PS. There was a median of 3 ± 2 and 1 ± 0 complications for the PT and PS group, respectively. The median hospital stay was 8 ± 6 days in the PT group and 7 ± 2 days in the PS.
Conclusions: The results of the use of internal subtotal stitches in the closure of the abdominal wall were superior with respect to the total stitches.

Keywords: laparorrhaphy; closure with subtotal stitches; closure with total stitches

Introduction

Colorectal cancer (CRC) is a pathological entity that significantly affects humanity and that, to this day, despite technological development, the implementation of new therapeutics and pharmacological advances, leads to high mortality. 1 CRC ranks third in incidence and fourth in mortality worldwide. Being the most frequent neoplasm in Western countries, since it is the second most frequent both in men, behind lung cancer, and in women, after breast cancer. In addition, it is the second most frequent cause of death from cancer. 2 In Cuba, according to the 2018 Health Statistical Yearbook, 3 CRC was the third in mortality in 2017 with 2,485 patients, for a mortality rate of 22.1 x 100,000 inhabitants, with 1,049 patients and a mortality rate of 18.7 x 100,000 inhabitants for the male sex and 1,436 and a mortality rate of 25.4 x 100,000 inhabitants for the female sex. Surgical resection is the most effective method to achieve CRC cure in 50% of cases. Surgery for curative purposes in the event of a recurrence is around 10 to 20%. Access to the abdominal cavity, exposure, and surgery are performed through the abdominal wall incision. Conventional access routes to the abdominal cavity are called laparotomies: incision or surgical opening of the abdominal wall, laparotomy or celiotomy, from the Greek laparo (abdomen) and tome (cut). Despite the important development of the laparoscopic approach in the last 25 years, laparotomy abdominal surgery continues to be widely used, so this type of incision remains unquestionably valid and does not generate any discussion when making the decision to perform it. This type of incision is known to allow quick and safe access to the abdominal cavity with a wide view of it. However, not all are advantages since the damage generated in the structures of the abdominal wall is greater and its inadequate closure can generate a dehiscence, that is, a separation of the edges of the aponeurosis that can present early. or late. The dehiscence of the closure of the median laparotomy arises as a fundamental and frequent problem in these patients.4 Various laparorrhaphy techniques have been described to try to reduce this serious complication, using interrupted suture in different modalities. However, despite being effective in terms of dehiscence prevention, they were unsightly, time-consuming to perform, and consumed a large amount of suture material. When Abel and Hunt, 5 in 1948, adopted the closure of abdominal wounds by taking a large amount of muscle-aponeurotic tissue in continuous suture, a new concept was born, that of mass laparorrhaphy, which revolutionized a very important surgical time. , a rapid, anatomical, functional and aesthetic reconstruction of the abdominal wall. However, up to now no ideal suture technique has been established, nor has it been determined which biomaterials allow laparotomic closure to be performed with a guarantee of greatly reducing the incidence of complications, although there are serious studies 6 and meta-analyses 7 that attempt to establish the optimal suture technique and the most appropriate materials. It is for this reason that we are going to compare the results of abdominal wall closure using internal subtotal points (PS) and total points (PT) in patients operated on for colorectal cancer.

Methods

An observational, descriptive, prospective and cross-sectional study was carried out in patients operated on for colorectal cancer in the General Surgery service of the General Teaching Hospital "Dr. Enrique Cabrera" in the period between January 1, 2019 and December 31, 2021.

Inclusion criteria

• Patients over 18 years of age.

• Patients with cancer located in the colon and upper rectum.

• They received urgent or elective surgical treatment by conventional route.

• Patients in whom access to the abdominal cavity was made through longitudinal incisions.

Exclusion criteria

• Patients with comorbid conditions such as diabetes mellitus or who received long-standing steroid treatment.

• Patients undergoing chemotherapy treatment.

• Relaparotomized patients.

exit criteria

• Patients who died within 10 days after surgery.

Techniques for obtaining information

The sources of information were the clinical history of each patient undergoing abdominal cancer surgery included in the study. The information collection models were included in a data collection form in which all the general information related to the study was filed:

• Data collection form for the included patients.

The main investigator was responsible for filling out the documentation throughout the entire study, with the highest quality and fidelity of the information. All annexes were filled out by the researcher. All the information was reviewed and classified to be later submitted to the different stages of statistical analysis.

Information processing and analysis techniques

Information processing was performed by the researcher. The clinical histories were stored in the Department file. With the information collected, a database was created in Excel format from Microsoft Office version XP, which was later exported to the SPSS version 22.0 system for analysis.

Statistical analysis

No interim statistical analyzes were performed, only the one corresponding to the end of the study. To summarize the information of the quantitative variables, descriptive statistics such as the mean, median, standard deviation, interquartile range, and minimum and maximum values were used. For all qualitative variables, the absolute frequencies and percentages were calculated.

To study the dependence between the qualitative variables and the technique used, the chi-square test was used (or Fisher's exact test, when more than 20% of the expected frequencies were less than 5). To compare the quantitative variables between the groups, the Mann-Whitney U test was used. Alpha significance level was prefixed equal to 0.05. The results were presented in tables for better understanding.

Discussion and synthesis techniques

The results were presented and we proceeded to compare them with the existing literature: clinical trials or descriptive or other published studies. The findings were discussed based on the stated objectives. Finally, the coincidences and contradictions between the present study and others reviewed were verified and conclusions were reached.

Procedures

All the data were extracted from the medical records of the patients who underwent colorectal oncological surgery in the General Surgery service of the General Teaching Hospital "Dr. Enrique Cabrera" during the period of the investigation.

Ethical considerations

The study was carried out in accordance with the provisions of the Declaration of Helsinki, modification of Fortaleza, Brazil, on research in human beings. To carry out this study, authorization was requested from the General Surgery Service of the General Teaching Hospital "Dr. Enrique Cabrera" to access the medical records and the database of the included patients, with the responsibility and obligation not to disclose the information collected, keeping it strictly confidential. This study was examined by the bioethics committee of both hospitals and its approval depended entirely on them. The oral presentation or publication, in the public or scientific written press, and/or in scientific events or of another type, of the partial or complete results of this research will be carried out after mutual agreement by the main researchers at the time they are received. deem necessary and the confidentiality of the individual data of the participating subjects will be guaranteed.

Results

80 patients were included in the study, in which the distribution according to age showed a homogeneous behavior, being the age group of 60-69 years predominant between both groups with a median of 70 ± 18 years, minimum of 59 and maximum of 88 years. for the cases of the PT group and 68 ± 18 years, minimum of 46 and maximum of 85 years for those of the PS group; followed by the group between 70 and 79 years with 23.8%, but these results were not significant

Age	PT (Total Points) N (%)	PS (Subtotal Points) N (%)	Total N (%)
Less Yhan 60	2 (10)	16 (26,7)	18 (22,5)
60-69	9 (45)	19 (31,7)	28 (35)
70-79	4 (20)	15 (25,0)	19 (23,8)
80 or more	5 (25)	10 (16,7)	15 (18,8)
Median +- IR	70 + - 18	68 +- 18	69 + - 18
Mínimun;Maximun	59 ; 88	46 ; 85	46 ; 88

Table 1. Distribution of patients according to age. General Teaching Hospital Enrique Cabrera". 2019-2021.

Source : Clinical History. P = 0,197

According to the distribution by sex, in both groups the female predominated with 13 (65%) cases where total points were applied and 37 (61.7%) where subtotal points were applied, results without significance from the statistical point of view. (Table 2)

Sex	PT (Total Points)	PS (Subtotal Points)	Total
	N (%)	N (%)	N (%)
Female	13 (65)	37 (61,7)	50 (62,5)
Male	7 (35)	23 (38,3)	30 (37,5)

Table 2. Distribution of patients according to sex. General Teaching Hospital "Enrique Cabrera". 2019-2021.

Source : Clinical History. P = 0, 271

White skin color prevailed in the two study groups with 12 (60%) patients belonging to the PT group and 43 (71.7%) to the PS group, which did not show significance when statistically analyzed. (Table 3)

Skin Color	PT (Total Points)	PS (Subtotal Points)	Total
	N (%)	N (%)	N (%)
White	12 (60)	43 (71,7)	55 (68,8)
Black	6 (30)	16 (26,7)	22 (27,5)
Mixed Race	2 (10)	1 (1,7)	3 (3,75)

Table 3: Distribution of patients according to skin color. General Teaching Hospital "Enrique Cabrera". 2019-2021.

Source : Clinical History. P = 0,336

Both in the group where total stitches and subtotal stitches were applied, most of the tumors were located in the sigmoid colon, with 7 (35%) for the patients in the first group and 19 (31.7%) for those in the second group. second group, followed by patients with tumors located in the ascending and descending colon with 21.3% and 18.8% respectively, non-significant results. (Table 4)

Location	PT (Total Points)	ST (Subtotal Points)	Total	P
	N (%)	N (%)	N (%)	
Ascending colon	3 (15)	14 (23,3)	17 (21,3)	0, 832
Transverse colon	2 (10)	5 (8,3)	7 (8,8)	0,914
Descending colon	4 (20)	11 (18,3)	15 (18,8)	0,912
Sigmoid colon	7 (35)	19 (31,7)	26 (32,5)	0, 890
Blind	1 (5)	6 (10)	7 (18,8)	0,871
Appendix	1 (5)	1 (1,7)	2 (2,5)	0,874
High rectum	2 (10)	4 (6,7)	6 (7,5)	0,839

Table 4. Patients according to tumor location. General Teaching Hospital "Enrique Cabrera ". 2019-2021.

Source : Clinical History.

In the group of patients where subtotal stitches were applied, the xipho-pubic incision was made in 40 (66.7%) cases, using PS always for closure in this type of incision; and in the group of patients where total stitches were applied, the supra and infraumbilical median was performed in 14 (70%), statistically significant results in both cases. The PS were used in wider incisions since, following the xipho-pubic incision group, they were presented in the mid-supraumbilical incision group with 28,3 % (Table No. 5).

N		PT	PS	
		N (%)	N (%)	
	Xiphopubic	0 (0)	40 (66,7)	p= 0,000
	Supraumbilical mean	1 (5)	1 (1,7)	P = 1000
Type of Incision	Mean supra and infraumbilical	14 (70)	17 (28,3)	P= 0,000
	Right infraumbilical paramedian	1 (5)	1 (1,7)	P= 1000
	Infraumbilical left paramedian	4 (20)	1 (1,7)	P= 0,517

Table 5. Patients according to type of surgical incision. General Teaching Hospital "Enrique Cabrera". 2019-2021.

Source : Clinical History.

The median surgical time for laparotomy closure was significantly lower (11 ± 9 minutes) in the PT group compared to the PS group (18 ± 13 minutes). The closure time was less than 15 minutes in 12 (60%) cases of the PT group and in 19 (31.7%) of the PS, statistically significant results. (Table 6)

N		PT	PS	
Closure Surgical Time (minutes)		N (%)	N (%)	
	Les Than 15	12 (66,0)	19 (31,7)	
	15 or More	8 (40)	41 (68.3)	P= 0,000
	Median +/-IR	11 +/- 9	18 +/- 13	
	Minimum; Maximum	7;18	10;25	P = 0,001

Table 6. Patients according to surgical time of laparotomic closure. General Teaching Hospital "Enrique Cabrera". 2019-2021.

Source : Clinical History.

The median of complications was 3 ± 2, minimum 1 and maximum 5 in the PT group and 1 ± 0, minimum 0 and maximum 3 in the PS group, statistically significant results. The most frequent complications were abscess, granuloma, and necrosis of the edges of the surgical site, which occurred in

26, 21, and 20 patients, respectively. According to the type of complication, despite the fact that the abscess of the surgical wound with 16 (80%) and 10 (16.7%), respectively, and the necrosis of the edges of the wound with 12 (60%) and 9 (13.3%), respectively, were the main complications presented in both groups, statistically significant differences were observed in favor of the group of total points. There was no evisceration, eventration, or incisional hernia in patients with PS closure, although these were not significant differences. (Table 7)

N		PT	PS	
		N (%)	N (%)	
Complications Related to the Closure of the abdominal wall in the Surgical site (SQ)	Cellulitis	2 (10)	7 (11,7)	P= 1000
	Abscesses	16 (80)	10 (16,7)	P=0,000
	Seroma	9 (45)	2 (3,3)	P= 0,012
	Eventration	1 (5)	0 (0)	P=0,250
	Hematoma	0 (0)	1 (1,7)	P= 1000
	Border Necrosis	12 (60)	9 (13,3)	P= 0,000
	Dehiscence	9 (45)	0 (0)	P=0,000
	Evisceration	1 (5)	0 (0)	P= 0,250
	Incisional Hernia	2 (10)	0 (0)	P= 0,060
	Granuloma	3 (15)	17 (28,3)	P=0,215
	Median +/-IR	3 +/- 2	1 +/- 0	P=0,000
	Minimum; Maximum	1;5	0;3	

Table 7: Patients according to complications derived from closure. General Teaching Hospital "Enrique Cabrera". 2019-2021.

Suerce : Clinical History.

Discussion

Colorectal cancer is a clinical entity that presents its own etiopathogenic, physiopathological and anatomoclinical characteristics, which make it independent from other neoplasms. Its incidence has been increasing since the middle of the last century, finding a high prevalence in the elderly due to the increase in life expectancy.8

The incidence of CRC varies according to age, increasing markedly after the age of 50, increasing every decade between 1.5 and 2 times. 92.5% of cases occur over 50 years of age and 78% are registered before 80 years of age, with the average age at the time of diagnosis being between 60 and 79 years, a range within the found in the results observed in this study and in others published in the literature.

The average age of the patients with colorectal cancer studied by García Sepúlveda 9 was 68.66 ± 11.39 years, with the youngest being 44 years and the oldest 91 years. Of the CRC patients evaluated by Lee et al. 10 7.2% (n=2883) were under 44 years old, 15.2% (n=6031) between 45 and 54 years old, 22.8% (n=9088) between 55 and 64 years old, the 26.9% (n=10720) between 65 and 74 years and 28% (n=11178) 75 years or more, with a mean age of 65.13 ± 13.44 years. The average age at diagnosis of colorectal cancer in the study by Figuereido González et al 11 12 was 69.68 ± 13.72 years, a median of 65.5 years and a minimum of 43 and a maximum of 92 years. The mean age of the 473 patients with CRC included in the series by Liu et al 13 was 67.5 years, with a standard deviation of 11.4 years, a median of 69, and an age range between 25 and 90 years. . According to the results of Davidov 14 the age of the patients with CRC ranged between 39 and 76 years, with a mean of 62.7 years and 48 (64.8%) older than 60 years. With regard to gender, throughout various studies such as those carried out by Sánchez Gudín 15 it is observed that although the difference between both sexes is scarce, men present a greater tendency to present adenomatous polyps and colorectal cancer than women. However, the results of this thesis show a higher incidence of Colon Rectal Cancer in the female sex, which is similar to that reported by some authors such as Campo Sánchez et al 16 who found that more than 50% of the cases were women. According to the results of Ramos et al. 17 in more than half of the cases (51%) the tumor was located in the sigmoid colon, in 16% in the ascending colon, in 10% in the descending colon, in 9% in the transverse colon, 8% in the cecum and 6% in the rectum. In a study conducted by Garcia-Albellan J et al 18 the tumor was located in the sigmoid colon in 40 (45.5%) patients, in the cecum in 22 (25%), in the rectum in 11 (12.5%)), in the ascending colon in 10 (11.4%) and in the transverse colon in 5 (5.7%). Regarding tumor location, Brouwer NPM, Bos ACRK 19 found that the most common location for these was the sigmoid colon in 50%, the cecum in 20%, the ascending colon in 15%, and the transverse colon in 7.5%. , the splenic flexure in 5% and the descending colon in 2.5%. Regarding tumor location, Abu-Helalah et al 20 found that 21% of the patients had the tumor located in the sigma, 15% in ascending colon, 13% in the upper third of the rectum, 11% in the descending colon, 10% in the transverse colon, 8% in the cecum, 7% in the lower third of the rectum, 5% in the third middle of the rectum, 3% in the rectosigma and 2% in the hepatic flexure; by simplifying the location to the colon or rectum, 72.6% of the patients had the tumor located in the colon and 27.4% in the rectum. The CRCs included in the work by Chen ML. et al 21 were located in the sigmoid colon in 462 (31.2%) patients, in the rectum in 419 (28.3%), in the rectosigmoid junction in 156 (10, 5%), in the cecum in 97 (6.5%), in the ascending colon in 93 (6.3%), synchronously in 65 (4.4%), in the hepatic flexure in 52 (3, 5%), in the transverse colon in 49 (3.3%), in the splenic flexure in 44 (3%), in the descending colon in 42 (2.8%) and in the appendix in 3 (0.2 %). Consistent with the results shown here, other investigations where abdominal wall closure techniques are evaluated show a predominance of patients who underwent elective surgery. In this investigation, laparotomy closure with total stitches was significantly lower than closure with subtotal stitches, this is explained by the characteristics of the closure itself. In the reviewed literature, no work was found that compared these two techniques, however, in the studies 22 23 where the time required for wall closure was evaluated, it was significantly less in those patients where the subtotal points were given in mass. Numerous clinical and experimental studies as well as systematic reviews and meta-analyses have been published for more than 2 decades to provide better guidance on the use of abdominal wall closure materials and methods. When comparing the closure of the abdominal wall by subtotal points in mass with subtotal points in planes, Akela and Kumari R. 24 found as complications, wound infection in 3 cases of the first group and in 6 of the second, wound dehiscence in 1, 8% and 7.1%, respectively, incisional hernia in 4.1% of the cases with mass closure and in 7.1% of the cases with layered closure, scar complications (pain or hypertrophy) in 2 and 4 patients in each group and granuloma in 4.1% of the cases of the first group and 7.1% of those of the second. According to Chhabra P. et al 25 closure with subtotal stitches of the abdominal wall caused wound infection in 10 (4.71%) patients, partial dehiscence in 2 (0.94%), wound granuloma in 1 (0 47%) and incisional hernia in 5 (2.35%). In a group of patients with peritonitis studied by Biomen A. et al,26 the closure of the abdominal wall was performed using subtotal stitches, the complications derived from it were wound infection in 61 (35.7%), dehiscence in 41 (23.9%), wound granuloma in 8 (4.7%) and incisional hernia at three months in 5 (2.9%) and at one year in 17 (11.3%). In the opinion of this author and in accordance with other investigations such as those conducted by Gomez Carmone E.27 , Ingt M, Madum S.28 Thorup et al, 29 Nansda D, Hansda L.30 Blande A. et al. 31 the lower occurrence of

complications in the group of patients in which subtotal stitches were used for abdominal wall closure, resulted in a shorter hospital stay in this group of patients. It should be noted that in our study complications such as eventration, evisceration and incisional hernia did not present with significant differences with the use of PS for laparotomy closure against the reviewed literature.

Conclusions

The results of the use of the internal subtotal sutures in the closure of the abdominal wall were superior with respect to the synthesis of the wall with the total sutures. In the study population, women between 60-69 years with white skin color predominated. The most frequent location of the tumor was in the sigmoid colon, for which most patients underwent elective surgery. There were fewer complications in patients where closure was performed with subtotal stitches, the most frequent being abscess and granuloma of surgical wound,

Conflicts of Interests: The authors have no conflicts of interest to declare.

Reference

1. Kolligs FT. (2016). Diagnostics and epidemiology of colorectal cancer. Visc Med; (32):158-64.
2. Ferlay J, Shin H, Bray F, Forman D, Mathers C, ParkinD. (2014). Estimates of worldwide burden of cancer in 2014. GLOBOCAN 2014. International Journal of Cancer; 127(12):2893-2917.
3. Ferlay J, Soerjomataram I, Dikshit R, Eser S, MathersC, Rebelo M, et al. (2015). Cancer incidence and mortalityworldwide: sources, methods and major patterns inGLOBOCAN. Int J Cancer;136(5):359386.
4. Ministerio de Salud Pública. MINSAP. Anuario Estadístico de Salud. Dirección de Registros Médicos y Estadísticas de Salud. La Habana. Cuba.
5. 5.Townsend CM, Beauchamp D, Everst EM, Mattox K. (2017). Tratado de cirugía. Sabiston.Fundamentos biológicos de la práctica quirúrgica moderna. 20a. ed. Madrid: Editorial GEA.
6. 6.Patiño JF. (2015). Lecciones de Cirugía. 4a. ed. Editorial Médica Panamericana.Buenos Aires, Bogotá.
7. Cano Valderrama O, Sanchez Santos R,Vicenso V , Paniagua M , Moncada E. (2023). Has the Covid-19 pandemic changed the clinical picture and tumour stage at the time of presentation of patients with colorectal cancer? A retrospective cohort studies. Rev Cir Esp.; 101 (2): 90-96.
8. Fischer JP, Basta MN, Mirzabeigi MN, et al. A risk model and cost analysis of incisional hernia after elective abdominal surgery based on 12,373 cases. the
9. (2016). case for targeted prophylactic intervention. Ann Surg.; 263(5):1010-7.
10. García Sepúlveda ME. (2018). Cáncer colorrectal estadio IV por metástasis hepáticas sincrónicas irresacables. Estudio de morbimortalidad y supervivencia trasresección del tumor primario. Tesis doctoral. Universidad Complutense de Madrid. Madrid, España.
11. Lee YH, Kung PT, Wang YH, Kuo WY, Kao SL, Tsai WC. (2019). Effect of length of timefrom diagnosis to treatment on colorectal cancersurvival: A population-based study. PLoS ONE; 14(1):0210465.
12. Figuereido González O, Gómez Viana L, Zepeda Blanco C, Casas García ML, Domínguez Hervella F. (2017). Analgesiaepidural vs. analgesia en la herida quirúrgica para el controldel dolor agudo postoperatorio en cirugía de colonabierta. Rev Soc Esp Dolor; 24(5):234-240.
13. Asociación Española de Gastroenterología, (2018). Sociedad Española de Medicina deFamilia y Comunitaria y Centro Cochrane Iberoamericano. Prevención delcáncer colorrectal. Guía de Práctica Clínica.
14. Liu F, Li C, Jia H, et al. Is there a prognostic value of tumorlocation among Chinese patients with colorectal cancer? Onco-target 2017; 8:38682-92.
15. Davidov D. (2017). Prognostic factors for survival in patients with metastatic colorectal cancer treated with first-linechemotherapy. J IMAB; 23(2):1532-1535.
16. Sánchez Gudín J. (2019). Seguridad y calidad de vida en pacientes con cáncer colorrectal no metastásico: 5-fluorouracilo frente acapecitabina. Tesis doctoral. Universidad Complutense de Madrid. Masrid, España.
17. Campo Sánchez SM, CamargoTrillos J, CalleRamírez JA, Gómez Wolff LR, SánchezPatiño LA, García García HI. (2019). Supervivencia de cáncer colorrectal en un centrooncológico de Colombia. Estudio de cohorte histórica. Revista de Gastroenterología de México;84(2):174-184.
18. Ramos RF, Carvalho Santos dos-Reis L, Esteves Borgeth Teixeira B, Maroso Andrade I, Sulzbach JS, Ary Leal R. (2017). Colon cancer surgery in patients operated on an emergency basis. Rev Col Bras Cir; 44(5):465-70.
19. Garcia-Abellan J.et al. (2019). Risk of cancer in HIV infected patients in Spain ,2003-2015.The CORIS cohort study.Enferm Infecc Microbiol Clin (Eng/ed).; 37(8): 502-508.
20. Brouwer NPM, Bos ACRK, Lemmens VEEP, Tanis PJ, Hugen N, Nagtegaal ID, et al. (2018). An overview of 25 years of incidence, treatment and outcome of colorectal cancer patients. Int J Cancer; 143:2758–2766.
21. Abu-Helalah MA, Alshraideh HA, Da'na M, Al-Hanaqtah M, Abuseif A, Arqoob K, et al. (2016). Delay in presentation, diagnosis and treatment for colorectal cancer patients in Jordan. J Gastrointest Cancer; 47(1):36-46.
22. Chen ML, Ruberti JW, Nguyen TD. (2018). Increased stiffness of collagen fibrils following cyclic tensile loading. J Mech Behav Biomed Mater; 82:345-54.
23. García Pastor P. (2018). Cierre de laparotomía media. En: Cirugía de la paredabdominal. Morales Conde S, Barreiro Morandeira F, Hernández Granados P, Feliu Palà X, eds. Capítulo 3. 3ra edición. Ediciones Arán. España.
24. Fortelny RH. (2018). Abdominal wall closure in electivemidline laparotomy: Thecurrent recommendations. Front Surg; 5:34.
25. Akela A, Kumari R. (2018). Comparative study between mass closure (single layer) vs layer wise closure of midline incisions. International Journal of Current Research; 10(7):71279-71280.
26. Chhabra P, Maheswari M, Kumar D. (2020). A comparison between mass closure and layered closure in laparotomy wounds. International Journal of Medical and Health Research; 6(2):8-11.
27. Bloemen A, De Kleijn RJCMF, Van Steensel S, Aarts F, Schreinemacher MHF, Bouvy ND. (2019). Laparotomy closure techniques: Do surgeons follow the latest guidelines?Results of a questionnaire. International Journal of Surgery; 71:110-6.
28. Gomez Carmone Z, et al (2021). Diverticulitis Aguda e incidencia de Cancer Colorrectal.Rev Cir Andal .;32 (4) : 503-506
29. Ingt M, Magadum S. (2019). A study of comparison between monolayer and layered closure ofabdominal laparotomy wound. Int J Healthcare Biomed Res; 7(02):46-51.
30. 29.Thorup T, Tolstrup MB, Gögenur I. Reduced rate of incisional hernia afterstandardized fascial closure in emergency laparotomy, Hernia 2019; 23(2):341-346.
31. 30.Hansda D, Hansda L. (2018). Evaluation of abdominal closure technique in emergency laparotomies at a tertiary care hospital in Jharkhand. IOSR-JDMS; 17(7):55-58.
32. Bande A, Saxena D, Nichkaode PB, Akhtar M. (2018). A comparative study of single layer closure versus conventional layered closure of laparotomy wounds. Int Surg J; 5(4):1459-1463.