Journal of Coloproctology

www.jcol.org.br

Original Article

Critical assessment of the surgical treatment of low rectal adenocarcinoma in a reference hospital in Recife☆

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ARTICLE INFO

Article history:
Received 11 January 2019
Accepted 13 February 2019
Available online 14 March 2019

Keywords:
Adenocarcinoma
Rectal cancer
Colorectal surgery
Colostomy
Magnetic resonance imaging

ABSTRACT

Objectives: To evaluate the rates of abdominoperineal resection in patients with low rectal adenocarcinoma at the Hospital Barão de Lucena – SES/PE.
Methodology: This is a study based on the analysis of medical records of patients with low rectal adenocarcinoma submitted to surgical treatment at the Hospital Barão de Lucena Coloproctology Service between 2013 and 2016.
Results: It was observed that 77.5% of patients underwent abdominoperineal resection and 22.5% underwent anal sparing surgery. Most of the patients were male (62.5%), were under 70 years old (72.5%), presented a BMI less than 30 kg/m^2 (87.5%), presented American Society of Anesthesiologists (ASA) score I and III (82.5%), Rullier classification from I to III (95%) and TNM different from T1–T3 (95%). In 92.5% of medical records, there was no record of fecal continence before surgery. The most frequent period between the end of the radiotherapy and the surgery was over 11 weeks (57.5%); the most common distance from the tumor to the anal margin was between 3.1 and 4.0 cm (35% of patients).
Conclusion: There was a high rate of non-sparing anal sphincter surgeries. The only predictive factor for abdominoperineal resection was the presence of tumors classified as Rullier type III and IV.

☆ Study conducted in the Coloproctology Department of the Hospital Barão de Lucena (HBL), managed by the Pernambuco State Health Department (SES/PE).

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https://doi.org/10.1016/j.jcol.2019.02.001

Análise crítica do tratamento cirúrgico do adenocarcinoma de reto inferior em hospital de referência no Recife

Palavras-chave:
Adenocarcinoma
Câncer retal
Cirurgia colorretal
Colostomia
Imagem por ressonância magnética

RESUMO

Objetivos: Avaliar a taxa de ressecção abdominoperineal em portadores de adenocarcinoma de reto inferior no Hospital Barão de Lucena – SES/PE.
Metodologia: Trata-se de um estudo baseado na análise de prontuários de pacientes com adenocarcinoma de reto inferior submetidos a tratamento cirúrgico no serviço de Coloproctologia do Hospital Barão de Lucena entre 2013 e 2016.
Resultados: Observou-se que 77,5% dos pacientes foram submetidos à ressecção abdominoperineal e 22,5% à cirurgia com preservação esfincteriana. A maioria dos pacientes era do sexo masculino (62,5%), tinha menos que 70 anos (72,5%), apresentava IMC menor que 30 kg/m^2 (87,5%), apresentava ASA I e II (82,5%), classificação de Rullier de I a III (95%) e TNM diferente de T1-T3 (95%). Em 92,5% dos prontuários, não havia registro sobre a continência fecal antes da cirurgia. O período mais frequente entre o término da radioterapia e a realização da cirurgia foi superior a 11 semanas (57,5%); a distância, mais comum, do tumor à margem anal estava entre 3,1–4,0 cm (35% dos pacientes).
Conclusão: Houve uma alta taxa de cirurgias não poupadoras de esfíncter anal. O único fator preditivo para a realização da ressecção abdominoperineal foi a presença de tumores classificados como Rulier tipo III e IV.

Introduction

It is estimated that 40,000 new cases of rectal cancer are diagnosed each year in the United States; 8000 deaths/year are attributed to this disease.[1] Data from INCA indicated that approximately 36,360 new cases of colorectal cancer were observed in Brazil in 2018; this condition predominantly affected females, in whom this neoplasm is the second most frequent.[2]

Rectal adenocarcinoma is surgically defined as a tumor located up to 15 cm from the anal margin (AM); it accounts for 30% of colorectal malignancies.[3] Lower rectal tumors are located up to 5–6 cm from the AM[4,5]; they are difficult to stage, have high rates of local recurrence, and in such cases it is more difficult to preserve the sphincter,[6] an indicator of surgical quality.[7]

The introduction of stapling devices, a better understanding of the anal sphincter mechanism and the biology of cancer, a more meticulous surgical technique, and better radiological image quality, especially MRI and ultrasound, have dramatically reduced the rates of abdominoperineal resection (APR) and permanent colostomy.[8] The possibility of local resection of early rectal tumors has also contributed to a decrease in this rate.

The standard surgical treatment for lower rectal adenocarcinoma remains controversial. In this study, the Rullier Classification was used as a reference for anatomical definition and as a possible predictor for APR. Where technically feasible, low anterior resection (LAR) with sphincter preservation is preferred to amputation of the rectum for tumors located at least 2 cm proximal to the anal sphincter complex.[9]

The importance of neoadjuvant treatment must be emphasized, since the current guidelines recommend radiotherapy (RT) or neoadjuvant radiochemotherapy (RCHT) for T3/T4 or N+ in cases of low rectal cancer, in a combined conventional modality: a total dose of 45–50 Gy in 28 sessions with 0.4–1.8 Gy/fraction associated with CHT, followed by surgery after 8–12 weeks. When the goal is sphincter preservation, the combined modality of long-course RCHT is recommended.[8,10]

The present study aimed to evaluate the APR rates in patients with low rectal adenocarcinoma at the Hospital Barão de Lucena (HBL), seeking to identify predictive variables related to the preservation or lack of preservation of the anal sphincter in the surgical treatment of these tumors.

Methods

This was a retrospective and observational study of patients diagnosed with low rectal adenocarcinoma who underwent curative surgery at the Coloproctology Department of HBL. Medical records and DICOM images of pelvic/rectal MRIs between 2013 and 2016 were assessed. A literature review was carried out in the following research tools: PubMed, Google Scholar, and MEDLINE.

Patients with a histopathological diagnosis of rectal adenocarcinoma located up to 6 cm from the anal margin were selected. These patients had radiological stages T3 or T4 and/or N+ and underwent neoadjuvant treatment; no signs of metastatic disease were observed.

The clinical variables obtained in medical records were analyzed: age, gender, BMI, ASA classification, and time interval between end of RT and surgery. Furthermore, DICOM

MRI images were reassessed by an experienced radiologist to obtain other important variables such as the TNM pre-neoadjuvant stage, the distance from the tumor to the anal margin, and finally, the classification of Rullier et al.[10] It should be noted that this classification was used during the study, and not at the moment of the indication of the surgeries. It was applied to assess a possible subgroup of patients who could undergo sphincter-sparing surgery, according to their criteria.

This classification suggests considering the following surgical procedures: type I tumors (>1 cm of AM) – LAR with colorectal anastomosis; type II tumors (≤1 cm of AM) – partial intersphincteric resection; type III tumors (intra-anal) – total intersphincteric resection; and type IV (transanal) tumors – APR.[10] Surgeries were performed by laparotomy or videolaparoscopy, at the discretion of the surgeon responsible, following the surgical oncology precepts of colorectal surgery with total mesorectum excision.

Results

Table 1 presents the demographic distribution and clinical and radiological characteristics of the patients. Most patients underwent rectal amputation (77.5%), were male (62.5%), were younger than 70 years (72.5%), had BMI less than 30 kg/m^2 (87.5%), and were classified as ASA I or II (82.5%). The interval between the end of RT and surgery was generally longer than 11 weeks (57.5%). The most often observed distance between tumor and AM was between 3.1 and 4.0 cm (35%). With the radiologist's later assessment, most patients were classified according to the criteria of Rullier et al.[10] as type I, II, or III (95%), and TNM stage between T1–T3 (95%). Fecal incontinence was recorded in three medical charts (7.5%), but this parameter did not appear to have been objectively verified and no score was used to evaluate this condition.

Table 2 presents the type of surgery performed according to the demographic distribution and clinical and radiological characteristics of the patients. Most patients who underwent sphincter-sparing surgery were male (32.0%), were less than 70 years old (27.6%), had BMI ≥ 30 kg/m^2 (40.0%), were classified as ASA I or II (27.3%), and presented type I, II, or III tumors according to the classification of Rullier et al.[10] (23.7%) and a TNM T1–T3 stage (23.7%). A higher prevalence of sphincter-sparing surgery was observed in the group of patients operated on at 11 or more weeks after the end of RT and whose tumor distance from the AM was between 5.1 cm and 6.0 cm. Although a higher prevalence of sphincter-sparing surgeries was observed in the described group, this difference was not statistically significant.

Table 3 shows the distribution of non-sphincter-sparing surgery according to the demographic and clinical–radiological characteristics of patients classified as type I, II, or III according to Rullier et al.[10] who underwent APR. Most patients were male (55.2%), younger than 70 years (65.5%), had a BMI ≤ 30 kg/m^2 (89.7%), had no fecal incontinence (89.7%), had an ASA score of less than III (79.3%), were classified as Rullier III (52.6%), presented TNM other than T4 (100%), and were operated at 11 or more weeks post-RT (55.2%). The most prevalent distance of the tumor from the AM in the evaluated group was 3.1 cm to 4.0 cm (41.4%).

Table 1 – Distribution of the personal and clinical profile of the patients evaluated.

Assessed factor	*n*	%	*p*-value[a]
Gender			0.114
Male	25	62.5	
Female	15	37.5	
Age			0.004
Less than 70 years	29	72.5	
70 or more years	11	27.5	
Minimum–maximum	39–88		
Mean ± standard deviation	61.4 ± 12.6		
BMI			<0.001
Less than 30	35	87.5	
30 or more	5	12.5	
Minimum–maximum	15.9–32.9		
Mean ± standard deviation	25.0 ± 3.8		
Incontinence			<0.001
No	37	92.5	
Yes	3	7.5	
ASA			<0.001
Lower than III	33	82.5	
III or more	7	17.5	
Rullier			<0.001
Other than IV	38	95.0	
Level IV	2	5.0	
TNM			<0.001
Other than T4	38	95.0	
Level T4	2	5.0	
Time after RT			0.343
Less than 11 weeks	17	42.5	
11 or more weeks	23	57.5	
Minimum–maximum	0.0–100.0		
Mean ± standard deviation	15.1 ± 18.4		
Distance from AM			0.018
0.0–1.0 cm	2	5.0	
1.1–2.0 cm	3	7.5	
2.1–3.0 cm	7	17.5	
3.1–4.0 cm	14	35.0	
4.1–5.0 cm	8	20.0	
5.1–6.0 cm	6	15.0	
Minimum–maximum	0.0–6.0		
Mean ± standard deviation	3.6 ± 1.5		
Sparing surgery			0.001
Yes	9	22.5	
No	31	77.5	

[a] *p*-value of the chi-squared test for comparison of proportion ($p < 0.05$ indicates the proportions found in the levels of the factor evaluated differ).

Discussion

The surgical treatment of low rectal cancer is a controversial topic in the literature. The rate of sphincter preservation is considered to be an indicator of surgical quality in the treatment of rectal cancer; this rate varies worldwide. Currently, APR rates range around 20%–25% for patients with tumors of the lower third of the rectum in large centers. In a review, Crane et al.[11] suggested that the predictive factors for sphincter-sparing surgery were: greater tumor distance

Table 2 – Distribution of sparing surgery according to patient profile.

Assessed factor	Sparing surgery		p-value[a]
	Yes	No	
Gender			0.117
Male	8 (32%)	17 (68%)	
Female	1 (6.7%)	14 (93.3%)	
Age			0.399
Less than 70 years	8 (27.6%)	21 (72.4%)	
70 or more years	1 (9.1%)	10 (90.9%)	
BMI			0.311
Less than 30	7 (20%)	28 (80%)	
30 or more	2 (40%)	3 (60%)	
Incontinence			1.000
No	9 (24.3%)	28 (75.7%)	
Yes	0 (0%)	3 (100%)	
ASA			0.175
Lower than III	9 (27.3%)	24 (72.7%)	
III or more	0 (0.0%)	2 (100%)	
Rullier			1.000
Other than IV	9 (23.7%)	29 (76.3%)	
Level IV	0 (0.0%)	2 (100%)	
TNM			1.000
Other than T4	9 (23.7%)	29 (76.3%)	
Level T4	0 (0.0%)	2 (100%)	
Time after RT			0.707
Less than 11 weeks	3 (17.6%)	14 (82.4%)	
11 or more weeks	6 (26.1%)	17 (73.9%)	
Distance from AM			0.163
0.0–1.0 cm	0 (0.0%)	2 (100%)	
1.1–2.0 cm	0 (0.0%)	3 (100%)	
2.1–3.0 cm	1 (14.3%)	6 (85.7%)	
3.1–4.0 cm	2 (14.3%)	12 (85.7%)	
4.1–5.0 cm	2 (25%)	6 (75%)	
5.1–6.0 cm	4 (66.7%)	2 (33.3%)	

[a] *p*-value of Fisher's exact test ($p < 0.05$ indicates that the factor evaluated influences the type of surgery performed).

Table 3 – Distribution of the personal and clinical profile of the patients evaluated.

Assessed factor	*n*	%	p-value[a]
Gender			0.577
Male	16	55.2	
Female	13	44.8	
Age			0.095
Less than 70 years	19	65.5	
70 or more years	10	34.5	
BMI			<0.001
Less than 30	26	89.7	
30 or more	3	10.3	
Incontinence			<0.001
No	26	89.7	
Yes	3	10.3	
ASA			0.002
Lower than III	23	79.3	
III or more	6	20.7	
Rullier			0.030
I	7	18.4	
II	11	28.9	
III	20	52.6	
TNM			
Other than T4	29	100.0	
Post-RT time			0.577
Less than 11 weeks	13	44.8	
11 or more weeks	16	55.2	
Distance from AM			0.033
1.1–2.0 cm	3	10.3	
2.1–3.0 cm	6	20.7	
3.1–4.0 cm	12	41.4	
4.15.0 cm	6	20.7	
5.1–6.0 cm	2	6.9	

[a] *p*-value of the chi-squared test for comparison of proportion ($p < 0.05$ indicates the proportions found in the levels of the factor evaluated differ).

to the AM, T3 stage, absence of obstruction, absence of circumferential involvement of the tumor in the rectal lumen, tumor mobility, patients operated in the last year of the survey, and complete clinical response. In that same study, gender and age were not predictive of sphincter preservation, which was also observed in the present series. In the present study, the percentage of surgeries where sphincter preservation was not possible was 77.5% (Fig. 1), which is much higher than that observed in other published studies.[8,10,12,13] Regarding staging, in the present study sphincter preservation was not possible in any of the tumors classified as T4, whereas for the other stages, the rate of sphincter-sparing surgery was approximately 23%; nonetheless, the difference between the two groups was not statistically significant.

The original work in which Rullier's classification for low rectal tumors was proposed retrospectively evaluated 404 patients with lower rectal tumors (up to 6 cm from the AM).[10] The mean age was 65 years, similar to that of the present study (61 years). The BMI of the patients in the present study was also similar to that found in that study (25 kg/m^2). In the present

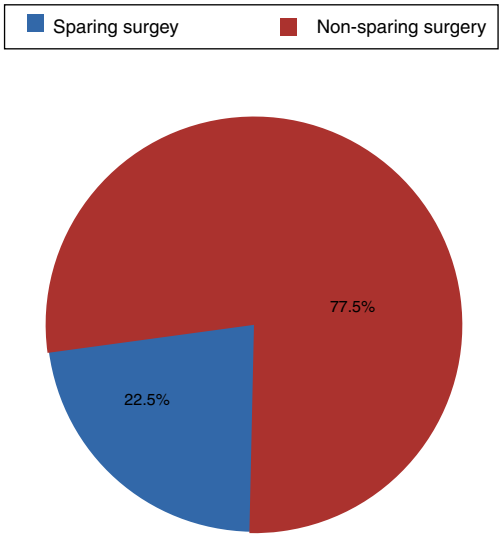

Fig. 1 – Distribution of the type of surgery performed.

sample, only two (5%) patients had T4 tumors, while 65 (16%) of the patients in Rullier's study had T4 tumors. In turn, the rate of APR was lower in Rullier's study (21%), despite the higher number of more advanced tumors when compared with the present series, where a much higher rate of mutilating surgery (77.5%) was observed for a smaller amount of T4 tumors.

Surprisingly, in the present survey 29 patients (76.3%) had tumors classified as type I, II, or III according to Rullier and, therefore, could have been initially submitted to sphincter-sparing surgery, which was not the case (these patients were submitted to rectal amputation). Analyzing the sample, it was observed that most of these tumors were classified as Rullier type III (intra-anal tumor, with internal anal sphincter invasion), a statistically significant finding when compared with the other groups. This finding could justify the fact that sphincter-sparing surgery was not performed as an indication of the service, probably due to fear of an inadequate radial margin or the possibility of poor sphincter function.

The distance from the lower margin of the tumor to the AM is a parameter to be evaluated for sphincter preservation. In a Chinese study,[14] through a multivariate analysis, it was observed that the distance of the tumor from the AM was closely related to sphincter preservation, with statistical significance in the sample studied. In turn, in the present study, which included 40 patients with tumors located up to 6 cm from the AM (distance assessed by MRI) and whose mean distance to the tumor was 3.6 cm, no statistical significance was observed between tumor distance and sphincter-sparing surgery.

The researched literature did not present studies that evaluated the sphincter function objectively as criteria for the indication of sphincter complex-sparing surgeries. In the present series, anal continence was not objectively assessed; the records only presented the subjective assessment of each patient regarding the presence or absence of symptoms of anal incontinence in the preoperative period. Moreover, this data was not collected from all patients before surgery.

Regarding the time between the end of the neoadjuvant treatment and the surgery, patients were divided into two groups: <11 weeks and ≥11 weeks, based on the French study published in 2016[15] which, despite not evaluating the rate of sphincter preservation, suggested several indirect indicators in favor of a more technically challenging rectal resection after an 11-week interval. The reported pelvic fibrosis and the difficulty in pelvic dissection leading to the conversion were findings mainly described in the group of patients operated at 11 weeks. It was observed that a little over half of the present population was operated with a longer interval after RCHT, a fact that could be associated with the delay in performing the surgery due to the long waiting list of the patients in this service. In the present study,17 patients (42.5%) were operated before 11 weeks and 23 patients (57.5%) were operated after 11 weeks; however, the difference between the groups was not statistically significant, and the time elapsed after RCHT was not determinant of sphincter-sparing surgery in this population.

The present study did not assess any pelvic parameters, such as those used in the study by Gu et al.,[16] regarding the smaller distance from the pubis to the coccyx, distance from the ischial tuberosities, or sacral extension. BMI data was collected and patients were divided into two groups: BMI <30 kg/m^2 and ≥30 kg/m^2. The mean BMI of the study population was approximately 25 kg/m^2 (normal weight or overweight) with a maximum BMI of 32.9 kg/m^2 (obesity grade I). Although most patients (87.5%) presented a BMI < 30 kg/m^2 (statistically significant), which would theoretically facilitate and favor sphincter-sparing surgery, this parameter was not determinant of the preservation of the anal sphincter in the present patients.

Sun et al.[14] assessed 330 patients with low rectal tumors and concluded that anal sphincter-sparing surgery was strongly associated with gender. When analyzing the present sample, although the majority of the patients were male (62.5%), no statistical difference was observed regarding gender as a predictor of anal sphincter preservation.

Age is another factor to be evaluated as a determinant of sphincter preservation in patients with low rectal tumors. In the present analysis, the mean age of the patients was 61.4 years, and most patients were younger than 70 years; however, unlike the study by Sun et al.,[14] no correlation was observed between sphincter-sparing surgery and the age of the patient.

Believing that the physical state of the individual could influence the proposed or performed surgery, the authors decided to adopt more objective criteria and correlate the preoperative ASA score with sphincter-sparing surgery. Most patients in the present population were classified as ASA I or II, *i.e.*, they had controlled comorbidities, and these data were statistically significant. Nonetheless, the pre-operative assessment of the ASA score was not determinant of anal sphincter preservation in the population studied.

Conclusion

A high rate of non-sphincter-sparing surgeries was observed in patients with lower rectal adenocarcinoma. The clinical parameters assessed (age, gender, BMI, ASA, preoperative fecal incontinence, and time from neoadjuvant treatment to surgery) did not prove useful as predictors for the type of surgery performed. The only predictive factor for APR was the classification of low rectal tumors according to Rullier's classification, specifically in types III and IV. Prospective studies with a larger population are required to establish the predictive factors for sphincter preservation in patients with low rectal adenocarcinoma.

Ethical considerations

This article was submitted to the Ethics and Research Committee (CEP) for studies involving humans, linked to the Federal University of Pernambuco, and was approved under Certificate of Presentation for Ethical Appreciation (CAAE) No. 63090616.0000.5208. In compliance with the Resolution 466/12 of the National Health Council (CNS), the four basic principles of bioethics were respected: autonomy, non-maleficence, beneficence, and justice. The secrecy and privacy of the information obtained during the research was also guaranteed.

Conflicts of interest

The authors declare no conflicts of interest.

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