Original Article

Results of surgical treatment of colorectal cancer in nonagenarian patients

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ABSTRACT

Purpose: The objective of the present study was to compare the results of surgical treatment of nonagenarian patients having colorectal cancer with patients younger than 90 years.

Methods: A total of 622 patients who underwent curative surgery were included in the present study. The database of the surgical service, in the period from 2007 to 2013, was used to obtain the sample. This is a descriptive, retrospective study that compared the profiles of 17 nonagenarian patients (Group I) with 605 patients younger than 90 years (Group II). The groups were compared regarding surgical complications, length of hospital stay, type of surgery performed and ASA classification.

Results: The mean age between the groups was 92.2 years and 61.2 years. The mean length of hospital stay in Groups I and II was 17.3 days and 8.75 days, respectively. The surgery performed most frequently was the right colectomy, in both groups. The most common postoperative complication was sepsis (11.8%) among the nonagenarians, and paralytic ileus (4.5%) among those younger than 90 years. Laparoscopic surgery was performed on 5 out of a total of 17 patients evaluated in Group I. Among the three mortalities registered in this latter group, two were classified as ASA III and only one as ASA I.

Conclusion: The results indicate that colorectal surgery may be performed in this group, with acceptable morbidity and mortality rates, in patients with low preoperative risk (ASA I/II).

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Resultados do tratamento cirúrgico do câncer colorectal em pacientes nonagenários

RESUMO

Resultado: O objetivo do presente estudo foi comparar os resultados do tratamento cirúrgico de pacientes nonagenários portadores de câncer colorectal versus pacientes com menos de 90 anos.

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Métodos: O estudo envolveu 622 pacientes que foram submetidos à cirurgia curativa. Para obtenção da amostra, utilizamos o banco de dados do serviço de cirurgia, abrangendo o período de 2007-2013. Este é um estudo retrospectivo descritivo que comparou os perfis de 17 pacientes nonagenários (Grupo I) versus 605 pacientes com menos de 90 anos (Grupo II). Os grupos foram comparados para complicações cirúrgicas, duração da permanência no hospital, tipo de cirurgia realizada e classificação ASA.

Resultados: A média de idade para os Grupos I e II foi, respectivamente, 92,2 e 61,2 anos. A duração média de permanência no hospital nos Grupos I e II foi, respectivamente, 17,3 dias e 8,75 dias. A cirurgia mais frequentemente realizada foi colectomia direita, nos dois grupos. A complicações pós-operatória mais comum foi sepse (11,8%) entre os nonagenários, e ileo paralítico (4,5%) entre os pacientes com menos de 90 anos. Cirurgia laparoscópica foi realizada em 5 pacientes, em um total de 17 pacientes avaliados no Grupo I. Considerando as três mortalidades registradas nesse último grupo, duas foram classificadas como ASA III e apenas uma como ASA I.

Conclusão: Os resultados obtidos indicam que, nesse grupo, a cirurgia colorretal é opção válida, com percentuais aceitáveis de morbidade e mortalidade, em pacientes com baixo risco pré-operatório (ASA I/II).

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**Introduction**

Colorectal cancer (CRC) is more prevalent in people aged 65 or more and its incidence increases with age. Considering the increase in life expectancy of the population, according to data provided by the World Health Organization, the diagnosis of CRC in the elderly has increased concomitantly. A lower physiological reserve to address homeostasis imbalances, whether in cardiovascular, metabolic or respiratory areas, associated with a much greater coexistence of comorbidities, makes this age group more subject to complications. Thus, the benefit of surgery and anesthesia must be carefully evaluated, as well as the prognosis and survival rates. Cancer in this elderly population is an ethical dilemma for surgeons and oncologists regarding the decision about the aggressiveness of the treatment, balancing the benefit of surgery and the increase of associated risks, in an age group with short expectancy of survival.¹

There are few available studies on the postoperative results of surgical treatment of colorectal cancer in patients over 90 years or more, both of the laparoscopic and the conventional procedures.²

In general, the randomized trials, in the medical literature, have shown that laparoscopic colorectal resection for cancer had survival and recurrence rates similar to those shown in open resection surgery, but with a reduction in hospital stay, postoperative pain and morbidity.³

The objective of the present study was to compare the results of surgical treatment in nonagenarian patients with colorectal cancer, with patients of less than 90 years. The little evidence available in the literature on the subject, associated with the fact that there is a predominance of articles with small samples, confirms the relevance of this study.

**Materials and methods**

This is a retrospective and descriptive study, with 622 patients with colorectal cancer, undergoing curative surgery in the period from 2007 to 2013. The service database was used to obtain the sample which compared the profile of 17 nonagenarian patients (Group I) with 605 patients less than 90 years of age (Group II). The groups were analyzed as to the occurrence of postoperative complications, length of hospital stay, the type of surgery performed and the ASA classification. The Clavien-Dindo classification was also used to categorize complications that occurred.

Those without indication for emergency surgery, with no history of recurrent colorectal cancer, with no fixed, palpable mass and without involvement of adjacent structures were considered suitable for the laparoscopic approach. All surgeons involved had performed 20 or more colorectal laparoscopic surgeries and had the necessary knowledge regarding the principles of cancer surgery.

Statistical analysis was performed using Stata (version 9.1) and SPSS (version 20.0). The level of significance was 0.05. The statistical tests used were the asymptotic Pearson Chi-square, to compare gender between the groups, and the tests of proportions for postoperative complications and types of surgical techniques. The Mann-Whitney test was used to compare length of hospital stay, and the exact Pearson Chi-square test was used to compare ASA.

**Results**

The sex distribution was similar between the groups (Table 1). The average age in Group I was 92.2, ranging from 90 to 96, and in Group II was 62.1 years since, in the latter group,
the youngest patient was 20 years old and the oldest was 89 (Table 2).

The mean lengths of hospital stay in Group I and in Group II, considering only patients who received discharge, were 17.3 days and 8.75 days, respectively. One patient in Group I was admitted for at least 56 days due to several complications, such as AMI, wound infection, and bronchospasm crises. The patient with the shortest hospital stay in this group was 6 days (Table 3). Comparing the same variable only in the nonagenarian group, among those undergoing laparoscopic or conventional procedures, demonstrated a shorter hospital stay in those with minimally invasive access (5 patients, 13 days) in relation to those with open surgery (19.5 days, 12 patients), but with \( p > 0.05 \) (Table 4).

<table>
<thead>
<tr>
<th>Complications</th>
<th>&lt;90 years n (%)</th>
<th>&gt;90 years n (%)</th>
<th>( p )-value*</th>
<th>Clavien-Dindo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralytic ileus</td>
<td>27 (4.5)</td>
<td>0 (0.0)</td>
<td>–</td>
<td>IVA</td>
</tr>
<tr>
<td>Sepsis</td>
<td>25 (4.1)</td>
<td>2 (11.8)*</td>
<td>0.128</td>
<td>IIIA</td>
</tr>
<tr>
<td>Wall abscess</td>
<td>17 (2.8)</td>
<td>1 (5.9)</td>
<td>0.456</td>
<td>IV</td>
</tr>
<tr>
<td>Anastomotic fistula</td>
<td>14 (2.3)</td>
<td>1 (5.9)</td>
<td>0.346</td>
<td>IV</td>
</tr>
<tr>
<td>SRIS</td>
<td>10 (1.7)</td>
<td>0 (0.0)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Peritonitis</td>
<td>8 (1.3)</td>
<td>1 (5.9)</td>
<td>0.120</td>
<td>IVA</td>
</tr>
<tr>
<td>Neurogenic bladder</td>
<td>7 (1.1)</td>
<td>0 (0.0)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>6 (1.0)</td>
<td>1 (5.9)</td>
<td>0.061</td>
<td>IV</td>
</tr>
<tr>
<td>AMI</td>
<td>0 (0.0)</td>
<td>1 (5.9)</td>
<td>–</td>
<td>IVB</td>
</tr>
<tr>
<td>Ileostomy obstruction</td>
<td>0 (0.0)</td>
<td>1 (5.9)</td>
<td>–</td>
<td>IIIA</td>
</tr>
<tr>
<td>Hypertensive crisis</td>
<td>1 (0.2)</td>
<td>1 (5.9)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>UTI</td>
<td>2 (0.4)</td>
<td>1 (5.9)</td>
<td>0.001</td>
<td>–</td>
</tr>
<tr>
<td>Others</td>
<td>61 (10.1)</td>
<td>0 (0.0)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Presented complications</td>
<td>220 (36.3)</td>
<td>7 (35.2)</td>
<td>0.926</td>
<td>–</td>
</tr>
</tbody>
</table>

SIRS, systemic inflammatory response syndrome; AMI, acute myocardial infarction; UTI, urinary tract infection.

* \( p \)-value calculated by using the Mann–Whitney test

** Clavien-Dindo classification of surgical complications.
Elderly patients clearly have a higher prevalence of comorbidities. The risk inherent in surgery is directly related to the number of concurrent diseases and to the patient’s physiological reserve. The fact that colorectal cancer is the third most diagnosed in the world, associated with the aging trend of the population, leads to the increasingly frequent diagnosis of this disease.

In a randomized, prospective study, the applicability of laparoscopic colorectal surgery was evaluated in 16 elderly patients, with 9 being 90 years or older and 7 between 80 and 89 years. In this trial, there were no statistically significant differences as to the anesthetic-surgical risk (ASA score), postoperative morbidity, surgical time, blood loss and time required to resume oral intake. There was no need for conversion to open surgery and no patient died after the intervention. All postoperative complications were treated by conservative methods, including an anastomotic fistula in the octogenarian group.

In our study, 5 of the 17 nonagenarian patients underwent the laparoscopic approach with no need for conversion. Moreover, as there were no statistically significant differences regarding most complications when evaluated separately, postoperative morbidity might not be a parameter to contraindicate surgery in the over-90 population. However, it is worth remembering that in the analysis of the whole, of the most severe complications with respect to the Clavien-Dindo classification, Group I prevailed with p < 0.05.

In a retrospective study, 289 patients between 80 and 95 years were evaluated. 150 patients underwent the laparoscopic approach and 139 underwent open surgery, with colorectal cancer as the most common indication. The group that underwent open surgery showed the greater number of mortalities, longer hospital stays, higher incidence of paralytic ileus and increased morbidity, with all those variables showing p < 0.05. These data suggest that laparoscopic colectomy may be a preferable option for the elderly, including patients over 90.

Similar results were published by Chaudhary et al., highlighting the fact that the laparoscopic approach should not be contraindicated for colorectal cancer patients based only on age, and that elective surgery in the elderly is safe with acceptable rates of morbidity and mortality.

Another retrospective series, examined short- and long-term results in 44 nonagenarian patients having colorectal cancer who underwent elective or emergency surgery. This series, in agreement with the present study, shows that females prevailed with 10/17 cases. This result, however, was without statistical significance (p = 0.568). The predominance (48/74) was attributed to the greater life expectancy among women.

Postoperative mortality was 23% (11/44), with 12% in elective surgeries (3/25) and 42% in emergency procedures (8/19). Only one mortality occurred among patients with ASA I–II, and there was evidence of an increase in the death rate among those with a higher ASA score. The 5-year survival was 43% and 20% in patients ASA I–II and III, respectively. The averages for length of hospital stay (12 days vs 17.3 days) and mortality...
rate for elective surgeries (12% vs 17.6%) were lower than in the present study. In the latter, one patient from Group I was admitted for 56 days due to various postoperative complications.

Consequently, to the detriment of statistically significant evidence as to the greater length of hospital stay in the nonagenarian group, such hospital stay was not accompanied by a higher rate of complications. This suggests, therefore, that this variable cannot be adopted as a parameter that contraindicates the surgical approach in this population, as reported by Roscio et al.9,10

Also in this context, due to the trend toward shorter hospital stays among those undergoing laparoscopy, the nonagenarian group is related to lower hospital costs compared to those within the same age range undergoing open surgery, according to the report of Bottino et al.11

Moreover, of the three mortalities reported in Group I, two were classified as ASA III and only one was classified as ASA I. It is worth noting that, comparing the prevalence of complications according to ASA classification, there was predominance only among ASA III patients in Group I. Therefore, considering the fact that the greater number of ASA III and IV patients in Group I was statistically significant, this makes ASA a reasonable device for predicting the results and evaluating the applicability or not of surgical intervention in these patients. This is similar to the results described by Jeong et al.12 In this latter study, an interesting account was given of the laparoscopic postoperative success of a 102-year-old patient with colorectal cancer.

Another descriptive, retrospective study, that compared the profile of 52 octogenarian patients (Group I) with 386 patients younger than 80 years (Group II), from 2007 to 2011, found an average length of hospital stay equal to 9.3 days and a rate of postoperative complications of 28.84% in the group of octogenarians.4 Thus, according to these data, it was observed that nonagenarians have a hospital stay (17.3 days) and a postoperative complication rate (36.2%) higher than octogenarians. The right colectomy was also the most prevalent surgery and sepsis the most common postoperative complication in the group described, as with the nonagenarian sample evaluated here.

Regarding colorectal cancer, the increased age was associated with decreased specific survival and this difference was related to a decrease in the use of radical surgery. However, studies have shown that the 5-year survival rate has been equal among both elderly and young patients when the appropriate surgical treatment is performed. So, whenever possible, surgery should be offered as the first treatment of choice to elderly patients with colorectal cancer.13

The non-randomized and retrospective nature of the present study were considered limiting factors of this work, opening the possibility for bias in the selection of patients between the two groups. The data analyzed showed that nonagenarian patients present no greater rate of complication, when compared with younger patients. This shows that advanced age, in and of itself, should not be a reason to contraindicate surgery for the elderly, unless their clinical condition and physiological parameters do not permit large resections. However, they spend more time hospitalized, resulting in higher hospital costs. All results indicate that colorectal surgery can be performed in this group with acceptable rates of morbidity and mortality in patients with low preoperative risk (ASA I/II). The clinically significant advantages of laparoscopic surgery, according to the evidence already largely consolidated in the literature, have social and economic implications in an aging society, justifying the return of these patients to a productive life in a timely manner.

### Conflicts of interest

The authors declare no conflicts of interest.

### REFERENCES