ABCDDV/763

ABCD Arq Bras Cir Dig
2011;24(1): 64-67

Review Article

# TOTAL MESORECTAL EXCISION BY LAPAROSCOPY

*Excisão total do mesorreto por laparoscopia*

Guilherme Cutait de Castro **COTTI**, Ulysses **RIBEIRO-JR**, Caio **NAHAS**, Sergio **NAHAS**, Wilson **POLLARA**, Ivan **CECONNELLO**

From Department of Digestive Surgery, University of São Paulo, São Paulo,Brazil.

**ABSTRACT - *Introduction*:** Surgical treatment of rectal cancer has undergone great technical refinement after total mesorectal excision. The possibility of laparoscopic approach still remains controversial. Thus, an updated review of the matter is relevant to help to guide physicians in surgical treatment. ***Method***: It was done an extensive review of papers on databases available through Medline / Pubmed, Lilacs and Scielo crossing the following keywords: colorectal cancer, laparoscopic surgery, surgery. ***Conclusion***: To date, there still remains a matter of controversy whether the treatment of rectal cancer should be routinely performed by laparoscopy. There are no published data that support the achievement of minimally invasive total mesorectal excision for rectal cancer treatment outside the research protocol, notably a lack of survival rates and local recurrence with at least five years of follow-up.

**HEADINGS** – Colorectal neoplasms. Laparoscopy. Surgery.

**Correspondência:**
Guilherme Cutait de Castro Cotti,
e-mail: gustavo.onco@terra.com.br

Conflict of interest: none
Financial source: none

Submited: 19/08/2010
Accepted for publication: 21/12/2010

**RESUMO – *Introdução*:** O tratamento cirúrgico do câncer do reto passou por grande refinamento técnico após a incorporação da excisão total do mesorreto. A possibilidade de tratamento por laparoscopia ainda permanece como motivo de controvérsia. Assim, uma revisão atualizada do assunto é pertinente para ajudar a orientar a conduta aos pacientes com esse tumor. ***Método***: Foram consultadas as bases de dados disponíveis pelo Medline/Pubmed, Scielo e Lilacs cruzando os seguintes unitermos: câncer colorretal, laparoscopia, cirurgia. ***Conclusão***: Até a presente data, ainda permanece motivo de controvérsia se o tratamento do câncer de reto deve ser realizado de forma rotineira por laparoscopia. Não existem dados na literatura que suportem a realização minimamente invasiva da excisão total do mesorreto para o tratamento do câncer de reto fora de protocolo de pesquisa, especialmente pela ausência de índices de sobrevida e de recidiva local com pelo menos cinco anos de seguimento.

**DESCRITORES** - Neoplasias colorretais. Laparoscopia. Cirurgia.

## INTRODUCTION

Surgical treatment of rectal cancer has undergone great technical refinement after the merger of total mesorectal excision (TME), first proposed by Heald in 1982[9]. One of the main benefits attributed to TME was the dramatic reduction in local recurrence rates associated with surgical treatment, since the TME promotes the resection of the rectum with all the perirectal fat containing lymph-vascular tissue[6,10].

Although the first case series of laparoscopic colorectal operations published in 1991[12] have presented patients with colorectal adenocarcinoma underwent laparoscopic resection, the possibility of treatment of colorectal cancer by laparoscopy remained a source of controversy until recently, when published the first major randomized prospective studies showing equivalence between the oncological results comparing laparoscopic surgery with conventional surgery[5,23]. Thus, it was confirmed that it is possible - through minimally invasive - perform resection with satisfactory oncological criteria, with adequate lymphadenectomy, without increased risk of implants in the regions of the trocars and five-year survival was statistically similar to that obtained by conventiona[7]. Therefore, with equal benefit of radical oncological standpoint, it is still possible to obtain the other advantages associated with the use of laparoscopy, such as: less blood loss, lower rate of hospital stay,

early return to activities and lower rate infection[3,5,20,23].

However, these studies have several criteria for selection of patients and almost always do not include patients with adenocarcinoma of the extraperitoneal rectum. Thus, although the surgical treatment of rectal cancer by laparoscopy with performance of TME is feasible[4,24] and come running in many centers, further scientific validation through prospective and randomized, in particular as regards to long-term oncological outcome.

The aim of this study was to review literature on the evidence available that compare surgical outcomes between laparoscopic vs conventional TME.

## METHODS

Was consulted the databases available through Medline/Pubmed, SciElo and Lilacs crossing the following keywords: colorectal cancer, laparoscopic surgery.

### Results of laparoscopic TME (LTME) vs conventional TEM (CTME)

*Surgical specimen - surgical margin and lymphadenectomy*

Obtaining adequate surgical margins by performing TEM proved crucial in the treatment of extra-peritoneal rectal cancer, since the free edges - especially the radial margin (or circumferential) - were significantly correlated with lower local recurrence rates and improved survival in patients undergoing the CTME[11]. Countless studies attest to the commitment rates similar to the radial margin CTME and LTME. So that Aziz, *et al.*[1] published a metanalysis including eight studies (n=783) that compared the subject and, in fact, no difference in the incidence of positive radial margin between the two techniques (9.5% vs 10.8% in LTME and CTME). In the same metanalysis evaluating 18 studies, was observed no difference between the number of lymph nodes per specimen in both surgeries. These data indicate that it is possible to do LTME with the same oncological radicalism that CTME[1], at least with respect to the surgical specimen obtained, since there are still no randomized prospective studies that compare the incidence of local recurrence and survival in patients submitted to both techniques.

In preliminary analysis published in 2005 of a prospective randomized English study MRC-CLASSIC[8] there was also no statistically significant difference in occurrence of positive radial margin between CTME and LTME (14% vs 16%, respectively). However, although didnot reach statistical significance, the occurrence of positive radial margin undergoing LTEM with sphincter preservation was higher than in the group undergoing CTME with sphincter preservation (12% vs 6%, respectively). When was compared patients who underwent sphincter preservation without TME (abdominoperineal amputation of the rectum), no difference in rates of positive circumferential margin was found between the two groups (20% vs 26% LTME and CTME).

### Local recurrence

Practically there is no data from randomized prospective studies evaluating the occurrence of local recurrence after TME by laparoscopy. Since most studies attests to the similarity between the surgical specimens obtained by laparoscopy and by the conventional approach is not expected to find statistically significant differences in local recurrence after LTME. Among the few data available in literature, only prospective and randomized[14] survival analysis of three years found no significant difference between the rates of recurrence in the group LTME (9.7%) and CTME (10.1%). Even looking only at the subgroup of patients who underwent sphincter preservation with TME, as mentioned above, the study found higher rates (without statistical significance) of positive circumferential margins in patients undergoing LTME with sphincter preservation, but there was no difference in local recurrence in these two subgroups (7.8% vs 7.0% LTME and CTME) after three years of follow-up - which may have occurred because the sample size or because of short follow-up time yet. It is necessary to await the publication of prospective randomized studies with longer follow-up and larger number of patients.

### Survival

The same comments of the item "Local recurrence" are applicable when the focus is the comparison between survival after LTME and CTME. Data from randomized prospective studies focusing them are scarce; there is only the CLASSIC study, published in 2007 whose data refer to the survival of three years[14], and show no statistically significant differences between the two groups either with respect to overall survival and with respect to disease-free survival. When stratified by disease stage or the possibility of sphincter preservation was also not found any statistical difference between both groups.

### Urinary and sexual function

The occurrence of urinary and sexual dysfunction is a complication of any pelvic operation, including resection of rectal cancer with TME. Even with the incorporation of autonomic preserving techniques to TME, the incidence of disorders of the urinary and sexual function varies between 0% to 12% and 10% to 35%, respectively[13]. Although there is evidence that it is technically possible to preserve urinary and sexual function in patients undergoing LTME, especially the males (17), there are few publications available on the subject in the literature. In 2002, Quah, *et al.*[21] published a retrospective analysis of the incidence of urinary and sexual dysfunction in patients with rectal

cancer undergoing both resection and noted that: 1) there was a higher incidence of sexual dysfunction in men undergoing LTME ( especially in patients with large tumors or tumors of the distal rectum); 2) there were no differences regarding urinary dysfunction between the two techniques in both men and women, and 3) there was no difference in sexual function of women. Recently, an analysis was published prospective and randomized on urinary and sexual function compared both procedures, derived from the CLASSIC study[21], with similar conclusions to the study of *Quah, et al.*[21]. The LTME had no negative impact on urinary function, however there was a trend to worsening of sexual function in men but not women. This study evaluated 71.2% (247/347) of patients operated through specific questionnaires and it is certainly the best evidence available so far about this issue and identified that the implementation of TEM and the need for conversion were independent predictors of occurrence of male sexual post-surgical dysfunction.

### Conversion

Surgical treatment of rectal cancer by laparoscopy is feasible, but the few studies available indicate high conversion rate, especially in cases of LTME with sphincter preservation[19,22]. CLASSIC study showed the conversion rate of 34% for cases of patients with rectal cancer treated by laparoscopic (vs. conversion rate of 25% for laparoscopic colectomy in the treatment of colon cancer)[8]. Specialized centers with extensive experience, conversion rates are getting smaller. For example, Prof. Rullier, France, in 2007 published their experience with 200 patients undergoing LTME with sphincter preservation, with conversion rate of 15.5%[18]. In this study, the risk of conversion was three times higher for male patients with mechanical colorectal anastomosis (34% vs 11% remaining patients). The fixation of the tumor was a predisposing factor for conversion. It is interesting to underline that the majority of studies indicate a significant increase in morbidity cases undergoing conversion to the conventional[8,18]. Therefore, knowing the predisposing factors for conversions - and seek ways to lessen them - should be the goal to be achieved by surgeons. It is believed that the improvement of laparoscopic staplers to help to reduce the need for conversions especially in male patients[18].

## DISCUSSION

After 17 years of the first publication on laparoscopic colectomy[12], and years of discussions about the adequacy of oncological radicalism by laparoscopy, numerous studies and randomized ones, have demonstrated that colon cancer can be treated by curative minimally invasive with all the major benefits associated with this methodology, and overall survival equivalent to that obtained by the conventional approach (Tables 1 and 2).

**TABLE 1** - Major prospective randomized trials evaluating the treatment of colon cancer with curative intent by laparoscopy[5,8,16,23]

| | Year | Periodic | n |
|---|---|---|---|
| Barcelona | 2002 | Lancet | 208 |
| COST | 2004 | NEJM | 872 |
| COLOR | 2005 | Lancet Oncol | 1248 |
| CLASSIC | 2005 | Lancet | 794 |

n = number of patients

**TABLE 2** - Comparison between the main results of studies on surgical treatment for colon cancer by open and laparoscopic[10]

| | Open | Laparoscopy | p |
|---|---|---|---|
| Age (yr) | 69 | 69 | NS |
| Number of lymph nodes | 12,2 + 7,8 | 11,8 + 7,4 | NS |
| Positive margins | 2,1% | 1,3% | NS |
| Recurrence (local / remote) | 16% | 14% | NS |
| Mortality | 1,6% | 1,4% | NS |

However, as can be observed by reviewing the literature available to date, it may not yet be said for the curative treatment of rectal cancer. Although countless studies have confirmed that the LTME is feasible from a technical standpoint and can produce similar results in the short term when compared with the CTME, no data with sufficient level of evidence with regard to overall survival, disease-free survival and local recurrence rates that support their systematic use. The only prospective, randomized study that evaluated these data with appropriate scientific rigor was published in 2007[14], with only three years of follow-up. The absence of five-year survival has been making major international companies involved with the theme, as the American Society of Colorectal Surgeons and the Society of Gastrointestinal Endoscopists not recognize the LTME as standard in the treatment of rectal cancer with curative intent, recommending its use only within service protocols in centers of excellence and extensive experience in laparoscopic colorectal operations[17].

## CONCLUSION

To date, there still remains a matter of controversy whether the treatment of rectal cancer, especially in cases of tumors located in extra-peritoneal portion, should be routinely performed by laparoscopy. There are no published data that support the achievement of LTME for the treatment of rectal cancer outside of research protocol, especially the lack of survival rates and local recurrence with at least five years of follow-up.

## REFERENCES


1. Aziz O, Constantinides V, Tekkis PP, Athanasiou T, Purkayastha S, Paraskeva P, Darzi AW, Heriot AG. Laparoscopic versus open surgery for rectal cancer: a meta-analysis. Ann Surg Oncol. 2006;13(3):413-24
2. Bonjer HJ, Hop WC, Nelson H, Sargent DJ, Lacy AM, Castells A, Guillou PJ, Thorpe H, Brown J, Delgado S, Kuhrij E, Haglind E, Påhlman L; Transatlantic Laparoscopically Assisted vs Open Colectomy Trials Study Group. Laparoscopically assisted vs open colectomy for colon cancer: a meta-analysis. Arch Surg. 2007;142(3):298-303
3. Braga M, Vignali A, Gianotti L, Zuliani W, Radaelli G, Gruarin P, Dellabona P, Di Carlo V. Laparoscopic versus open colorectal surgery: a randomized trial on short-term outcome. Ann Surg. 2002;236(6):759-66; disscussion 767.
4. Chung CC, Ha JP, Tsang WW, Li MK. Laparoscopic-assisted total mesorectal excision and colonic J pouch reconstruction in the treatment of rectal cancer. Surg Endosc. 2001;15(10):1098-101.
5. Clinical Outcomes of Surgical Therapy Study Group.A comparison of laparoscopically assisted and open colectomy for colon cancer. N Engl J Med. 2004;350(20):2050-9.
6. Enker WE, Thaler HT, Cranor ML, Polyak T. Total mesorectal excision in the operative treatment of carcinoma of the rectum. J Am Coll Surg. 1995;181(4):335-46.
7. Fleshman J, Sargent DJ, Green E, Anvari M, Stryker SJ, Beart RW Jr, Hellinger M, Flanagan R Jr, Peters W, Nelson H; for The Clinical Outcomes of Surgical Therapy Study Group. Laparoscopic colectomy for cancer is not inferior to open surgery based on 5-year data from the COST Study Group trial. Ann Surg. 2007;246(4):655-62; discussion 662-4.
8. Guillou PJ, Quirke P, Thorpe H , Walker J , Jayne DG, Smith AM, Heath RM , Brown JM ; MRC CLASICC trial group. Short-term endpoints of conventional versus laparoscopic-assisted surgery in patients with colorectal cancer (MRC CLASICC trial): multicentre, randomised controlled trial. Lancet. 2005;365(9472):1718-26.
9. Heald RJ, Husband EM, Ryall RD. The mesorectum in rectal cancer surgery--the clue to pelvic recurrence? Br J Surg. 1982;69(10):613-6.
10. Heald RJ, Ryall RD. Recurrence and survival after total mesorectal excision for rectal cancer. Lancet. 1986;1(8496):1479-82.
11. Heald RJ. Total mesorectal excision is optimal surgery for rectal cancer: a Scandinavian consensus. Br J Surg. 1995;82(10):1297-9.
12. Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic colectomy). Surg Laparosc Endosc. 1991;1(3):144-50.
13. Jayne DG, Brown JM, Thorpe H, Walker J, Quirke P, Guillou PJ. Bladder and sexual function following resection for rectal cancer in a randomized clinical trial of laparoscopic versus open technique. Br J Surg. 2005;92(9):1124-32.
14. Jayne DG, Guillou PJ, Thorpe H, Quirke P, Copeland J, Smith AM, Heath RM, Brown JM; UK MRC CLASICC Trial Group. Randomized trial of laparoscopic-assisted resection of colorectal carcinoma: 3-year results of the UK MRC CLASICC Trial Group. J Clin Oncol. 2007;25(21):3061-8.
15. Kim NK, Aahn TW, Park JK, Lee KY, Lee WH, Sohn SK, Min JS. Assessment of sexual and voiding function after total mesorectal excision with pelvic autonomic nerve preservation in males with rectal cancer. Dis Colon Rectum. 2002;45(9):1178-85.
16. Lacy AM, García-Valdecasas JC, Delgado S, Castells A, Taurá P, Piqué JM, Visa J. Laparoscopy-assisted colectomy versus open colectomy for treatment of non-metastatic colon cancer: a randomised trial. Lancet. 2002;359(9325):2224-9.
17. Laparoscopic Proctectomy for Curable Cancer. Position Statement – ASCRS & SAGES. http://www.fascrs.org/displaycommon.cfm?an=1&subarticlenbr=349, acessado em 29/12/2007
18. Laurent C, Leblanc F, Gineste C, Saric J, Rullier E. Laparoscopic approach in surgical treatment of rectal cancer. Br J Surg. 2007 Dec;94(12):1555-61.
19. Morino M, Parini U, Giraudo G, Salval M, Brachet Contul R, Garrone C. Laparoscopic total mesorectal excision: a consecutive series of 100 patients. Ann Surg. 2003;237(3):335-42.
20. Pikarsky AJ, Rosenthal R, Weiss EG, Wexner SD. Laparoscopic total mesorectal excision. Surg Endosc. 2002;16(4):558-62.
21. Quah HM, Jayne DG, Eu KW, Seow-Choen F. Bladder and sexual dysfunction following laparoscopically assisted and conventional open mesorectal resection for cancer. Br J Surg. 2002;89(12):1551-6.
22. Scheidbach H, Schneider C, Konradt J, Bärlehner E, Köhler L, Wittekind Ch, Köckerling F. Laparoscopic abdominoperineal resection and anterior resection with curative intent for carcinoma of the rectum. Surg Endosc. 2002;16(1):7-13.
23. Veldkamp R, Kuhry E, Hop WC, Jeekel J, Kazemier G, Bonjer HJ, Haglind E, Påhlman L, Cuesta MA, Msika S, Morino M, Lacy AM; COlon cancer Laparoscopic or Open Resection Study Group (COLOR). Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. Lancet Oncol. 2005;6(7):477-84.
24. Weiser MR, Milsom JW. Laparoscopic total mesorectal excision with autonomic nerve preservation. Semin Surg Oncol. 2000;19(4):396-403.