Right colectomy for cancer: validity of laparoscopic approach

Ann. Ital. Chir., LXXV, 6, 2004

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Introduction

The laparoscopic (or video-assisted) approach, for right colectomy is considered, today, a surgical procedure with wide demonstration of feasibility and full safeness (19, 22, 24).
The phases of the learning curve are also well defined (2).
Instead, there are still a lot of controversies as to the reliability of the procedure in relation to the results in the distance about the neoplastic pathology.
The aims of the study are: confirming the feasibility and the validity of the procedure through the relevant aspects of the postoperative course, the morbidity and the mortality; evaluating the possible influence on the results at a distance in the neoplastic pathology, through the personal data, and, above all, the literature examination but also through some references about the immunological alterations.

Material and method

In the period 1998-2002 we treated 17 patients with carcinoma of the right colon, subdivided into two groups: 7 patients were operated with mininvasive approach (Laparoscopic-Assisted Right Colectomy: LARC) and the other 10 were treated in a traditional way.

Riassunto

EMICOLECTOMIA DESTRA PER CARCINOMA: VALIDITÀ DELL'APPROCCIO LAPAROSCOPICO

La emicolectomia destra video-assistita per carcinoma è una procedura con dimostrata fattibilità. Lo scopo di questo studio è di valutarne gli eventuali vantaggi.
Nel periodo 1999/2002 sono state eseguite 7 emicolectomie destre laparoscopiche per carcinoma. Abbiamo confrontato i risultati ottenuti con un gruppo di 10 pazienti operati con approccio tradizionale nel periodo 1998/2002. In entrambi i gruppi la stadiazione oncologica era sovrapponibile.
I risultati immediati sono stati i seguenti: durata media dell'intervento 240' nel gruppo laparoscopico contro 150' nel gruppo open; non ci sono state deiscenze anastomotiche nel gruppo laparoscopico contro 1/10 in quello open; sono state assenti le complicanze broncopneumoniche e/o tromboemboliche nel gruppo laparoscopico contro 2/10 nel gruppo open e 1/7 infezioni della ferita chirurgica nel gruppo laparoscopico contro 1/10 nel gruppo open; il ritorno alla dieta normale e la levata nei pazienti operati con tecnica laparoscopica è stato in media di 3 giorni contro 7 giorni per quello open; la degenza postoperatoria media è stata di 7 giorni per il gruppo laparoscopico contro 12 giorni per il gruppo open.
Le due procedure chirurgiche non hanno condizionato delle differenze nella estensione della resezione e della linfadenectomia né una differente incidenza delle deiscenze anastomotiche.
Sono state registrate delle differenze, nel gruppo trattato con tecnica mininvasiva, nella durata degli interventi, nella precoce mobilizzazione dei pazienti ed un minore uso di analgesici, in una più rapida ripresa della peristalsi e dell'alimentazione e da una degenza postoperatoria più breve.
Nel nostro studio questi vantaggi sono stati considerevoli, riducendo complessivamente la morbilità postoperatoria. Il follow-up molto breve a 6 mesi non ha mostrato ripresa della malattia nei pazienti di entrambi i gruppi.
Nella nostra esperienza, la emicolectomia destra video-assistita, per il trattamento del carcinoma del colon, ha confermato vantaggi evidenti nel periodo postoperatorio immediato.
Parole chiave: Emicolectomia destra, carcinoma, laparoscopia.

Pervenuto in Redazione il 2 Settembre 2004

Abstract

Aim: *Laparoscopic assisted right colectomy for carcinoma is a procedure with demonstrated feasibility. We want to evaluate the advantages.*
Material: *In the period 1999/2002 we have executed 7 laparoscopic right colectomy for carcinoma. We have compared the results with one group of 10 patients traditionally operated in the period 1998/2002. In both groups the oncologic staging was almost the same.*
Results: *Immediate results: operative time was 240' for laparoscopy vs. 150' for open operation; no anastomotic dehiscence for laparoscopy vs. 1/10 for open; no bronchopulmonary-thrombotic complications for laparoscopy vs. 2/10 for open, but there was 1/7 wound infection for laparoscopy vs. 1/10 for open; the return to the mobilization and normal diet was 3 days for laparoscopy vs. 7 days for open; the postoperative stay was 7 days for laparoscopy vs. 12 days for open.*
Discussion: *The two procedures did not condition differences neither in the extension of the resection and of the lymphectomy nor a different incidence of the anastomosis dehiscences. Differences were noted, in the operative time, in a more precocious mobilization with a minor use of analgesics, in a more rapid renewal of peristalsis and of feeding with a lower postoperative stay. These advantages are remarkable in our study, by reducing the postoperative morbidity. The very brief follow-up of almost 6 months, did not show a relapse of the disease in patients of both series.*
Conclusion: *In our experience, laparoscopic-assisted right colectomy confirmed evident advantages in the immediate postoperative period for the treatment of the colonic cancer.*
Key words: Right colectomy, cancer, laparoscopy.

In the data of these patients, it is evident the non prevalence of one sex over the other and their concentration in the VI and VII life decade.
The patients' general conditions (cardiopulmonary and metabolic status) and above all, the subdivision into stages of the neoplastic disease (Tab. I) were similar in both groups.

We report the detailed technical aspects of the video-assisted laparoscopic surgical treatment: the dissection starts from the right parietocolic region, then there is the mobilization of the cecum and of the ascendant colon and of the last ileal loop. In this phase the cure is to respect the Toldt lamina to preserve the retroperitoneum and not to involve the right ureter in the operative field. The section of the hepatocolic ligament, the mobilization of the hepatic flexure, the separation of the gastrocolic ligament from the transverse colon complete the mobilization of the right colon and allow its separation from the duodenum, finishing, in this way, all the phase of the preparation of the operative field according to the criteria of the oncologic surgery.
The second phase correspond to the vascular section, by starting from the ileocolic vessels and proceeding with the vessels for the right flexure of the colon.
By tightening the mesentery, the vessels must be identified, isolated and linked.
In the same way the medium colic vessels can be prepared and dissected.
In our experience, in a few cases, we have also executed, the extracorporeal section of the ileocolic and colic vessels by means of the service mini-laparotomy (5-7 cm) in order to achieve a more accurate lymphatic dissection along the superior mesenteric vein.
In this way the surgical procedure is completed with a service mini-laparotomy (5-7 cm) in the right superior abdominal quadrant that allows the extraction of the operative specimen, the intestinal section and the extracorporeal ileocolic anastomosis, side to side manual, or end to lateral with stapler EEA n. 25.
The mininvasive surgical intervention, so codified, certainly offers the full warranty of the respect of all the rules of the traditional oncologic surgery: minimal touching of the tumour, correct section of the vessels, en bloc removal of the mesenteric nodes.
The laparotomic interventions were executed according to the standard technique.

Tab. I – LARC FOR CANCER. PATIENTS AND PROCEDURES UTILIZED

17 carcinomas of the right colon overlappable for stadium			
1999 - 2002 Laparoscopic assisted right colectomy (for carcinoma) 7 patients (5 females - 2 male) Mean age 76 years No conversions		1998 - 2002 Traditional right colectomy (for carcinoma) 10 patients (6 females - 4 males) Mean age 73 years –	
Stadium I	No patients	Stadium I	No patients
Stadium II	4	Stadium II	5
Stadium III	3	Stadium III	4
Stadium IV	No patients	Stadium IV	1

Results

The immediate postoperative results of the two groups of patients (treated one with the traditional laparotomic approach and the other with the video-assisted procedure) were compared. It is in evidence the longer time length of the laparoscopic procedure than the laparotomic intervention (240 minutes vs. 150 in mean), but this is well balanced by a shorter postoperative stay and by a better comfort.
The patients who underwent a LARC, had a more rapid resumption of the intestinal activity, of the alimentation, and, on the whole, a shorter hospital stay.
The differences between the two procedures about the postoperative morbidity were not very meaningful: a prevalence of bronchopneumonic and/or thrombotic complications (20% vs. 0%) was obvious in the patients that underwent the laparotomic access, because of a longer postoperative bed rest.
The differences in the anastomotic dehiscences and in the infections of the laparotomy were not so evident, and, however, not waited, because of the equality of the two procedures.
The operative mortality was absent in both groups (30 days) (Tab. II).
The medium term results about the supposed possibility of changing the evolution of the neoplastic disease, in case of laparoscopic approach can represent a better point of discussion.
We can consider the following criteria: local relapse of the neoplastic disease, lymphatic and distant metastasis, disease related to neoplasia; the possibility of port-site metastasis must be also added for the laparoscopic approach.
All the precautions were applied at the moment of the extraction of the operative specimen from the service laparotomy: slow desufflation through the trocars, toilet of the mini-laparotomy with iodopovidone solution, protection of it with laparotomic towels.
In this experience we did not report port-site metastasis.
The least follow-up was 24 months, up to 5 years in some cases. We register one decease related with the neoplasia in a patient undergoing an open intervention, 10%, 14 months later after the intervention.
One case (10%) of local relapse of the disease appeared in a patient operated in a traditional way. Among the patients treated with mininvasive procedure, one case of hepatic metastasis (14.2%) (Tab. III) must be included.
The two surgical procedures are essentially overlappable on the basis of the analysis of these medium term results.

Tab. II – LARC FOR CANCER. POSTOPERATIVE IMMEDIATE RESULTS

17 carcinomas of the right colon assimilable for stadium

	LARC	*Laparotomic operation*
Operative time length	240 minutes	150 minutes
Anastomosis dehiscences	–	1/10 (10%)
Bronchopneumonic or thrombotic complications	–	2/10 (20%)
Wound infections	1/7 (14.2%)	1/10 (10%)
Resumption to a normal diet/ mobilization	3 days	7 days
Postoperative stay	7 days	14 days

Tab. III – LARC FOR CANCER. RESULT AT DISTANCE

17 carcinomas of the right colon overlappable for stadium

Laparo		*Open*	
Implantation of the neoplasia in port-site	No	Deaths related with the neoplasia	1/10 (10%) 14 months
Distant metastasis	1/7 (14.2%)		

Follow-up: range 24-60 months

Discussion

The immediate results, related to the control of the postoperative pain, to the precocious resumption of peristalsis and of alimentation, to the mobilization and, so, in favourable cases, to a possible precocious hospital dismissal of the patient, are really and completely favourable to the video-assisted approach in the treatment of the right colon neoplasia.
The analysis of the numerous and old literature, about this subject, widely confirms the so favourable results (23, 6, 21).
We can believe that a more comfortable and shorter postoperative course is an unquestionable advantage for the patient.
The risk and the prevalence of bronchopneumonic and thrombotic postoperative complications related to a lengthened bed rest, are reduced.
The shorter hospital stay and the minor number of postoperative complications help reduce the total cost of the therapeutic treatment.
There is also the postoperative morbidity of the intervention: technical problems in tying and cutting the ileocolic and right colic vessels, such as haemorrhages, haematomas, lesions of the superior arterious-venous mesenteric axis, anastomotic dehiscences, infections of the surgical wound. Besides it must be added the operative mortality.
Also for these aspects of surgical technique, the available data in literature widely confirm the overlap of the results in both procedures (14, 10, 26).
In the field of the immediate results, the data that we had, are widely confirmed by the literature. The mininvasive approach allows a sure and ready resumption of the intestinal function by eliminating and/or reducing

the exposition of the peritoneal cavity and of the viscera, and the absence of a wide laparotomy reduces the postoperative pain significantly. Moreover, the laparoscopic and/or video-assisted surgical times reproduce the operative phases of the traditional approach: so, the specific postoperative morbidity will not be different from the laparotomic intervention.
In fact, in both procedures, the following parameters are the same: the extension of the resection, the oncologically corrected lymphectomy, the safeness and the reliability of anastomosis (extracorporeal, so identical in both procedures), the possibility to utilize the no-touch technique, and its validity should be still demonstrated. The consensus on these aspects is wide in literature (18, 14, 8, 1, 15, 25).
The problems of an equivalent radicality of resection between the two procedures are strictly connected with these technical aspects.
The opinion of radicality is based on the distance of the resection lips from the tumour, on the lymphatic dissection and on the contamination for diffusion of neoplastic cells in the intestinal lumen or on the surrounding organs.
In both our groups the distance from the resection lips from the tumour was always wider than 5 cm; the number of the isolated and examined mesenteric nodes was the same.
The control of the third parameter, that is the intraperitoneal and/or intraluminal diffusion of neoplastic cells, is surely very problematic and uncertain because it is also caused by the advanced stage of the neoplasia (tumour invading the sierosa).
In application of all the prescribed precautions to avoid the intraperitoneal diffusion of the neoplastic cells (careful manipulation of the operative specimen, cleanliness of the operative field with iodopovidone solution and also intraperitoneal chemotherapy after laparoscopic access) the laparoscopic techniques do not show an increased risk of diffusion of neoplastic cells (12).
The possibility of port-site metastasis in the laparoscopic approach is argument under discussion. We can believe that the event is possible but the preventive methods and the accurate application of all the procedures widely described in literature are very effective (2, 4, 3); in this way the additional risks of the laparoscopic approach are cancelled in comparison with the traditional operation where neoplastic implantation on the laparotomic wound are also described (15).
The central problem of the laparoscopic approach in the treatment of the colon carcinoma is surely referred to the results in the distance. In fact confirmations are needed that in the treatment of the neoplastic disease the mininvasive and laparoscopic approaches produce an effect that modifies its natural history, improving the results in terms of survival. In our not numerous and only retrospective experience the available medium term results are similar in both forms of approach. In fact, the data communicated in literature at the moment, widely confirm the same medium and long term results between the two procedures.
Moreover, favourable data for the laparoscopic approach are present in many studies; however, there are no conclusive evaluations at the moment (3, 15, 16, 17, 18, 19, 20, 13) and further control studies are needed.
The motivation of differentiated results in the distance between the mininvasive and open procedures was searched in a different immunological response to the surgical intervention. This problem is surely very complicated in its completeness.
In particular the most difficult but the most significant phase is represented by the passage from evaluating a different immunological answer to singling out the few and favourable specific modifications of the entire immunological order induced by the mininvasive approach, with the effect of a better control of the neoplastic disease.
At present, a few points of the immunological modifications in mininvasive approaches are partly defined. The systemic immunity seems more conserved, or, at least differences were not found in the systemic immunologic response in course of laparoscopic approach compared with the open procedure, the cell-mediated immunity is less altered with the laparoscopic approach and the activity of the cytokines is reduced, whereas the intraperitoneal cell-mediated immunity is influenced by the pneumoperitoneum with CO2 (11, 21, 22, 23, 24). After all these results are still incomplete and not univocal.

Conclusions

In the treatment of the carcinoma of the right colon, both the video-assisted and the traditional laparotomic procedure are to be considered overlappable as to the operative technique, the extension of the resection, the lymphectomy and the specific postoperative morbidity (anastomotic dehiscences, problems connected with the surgical technique).
Instead, the differences are obvious in the operative times (much longer in the laparoscopic approach), in the use of analgesics, in the resumption of the intestinal function, in the mobilization of the patient and in the postoperative stay (all favourable elements for the laparoscopic approach). In our experience, the LARC is a safe and feasible procedure, the obvious advantages are confirmed in the immediate postoperative period in the treatment of the colon carcinoma. A more rapid and comfortable postoperative course with minimal complications is surely very advantageous mostly for the elderly patients.
In this laparoscopic series, the results in the distance are favourable with no local relapse of disease, even if they are retrospective and with few patients.
The utilization of the LARC in the treatment of the colon carcinoma does not close the discussion on the distant results that are favourably influenced by the

mininvasive approach, above all awaiting further evaluations and confirmations.

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