Journal of Visceral Surgery (2015) 152, 149—154

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

ORIGINAL ARTICLE

Routine second-look after surgical treatment of colonic peritoneal carcinomatosis

J.B. Delhorme[a,*], E. Triki[a], B. Romain[a], N. Meyer[b], S. Rohr[a], C. Brigand[a]

[a] *Service de Chirurgie Générale et Digestive, Hôpitaux Universitaires de Strasbourg, Hôpital de Hautepierre, avenue Molière, 67200 Strasbourg, France*
[b] *Département de Santé Publique, Hôpitaux Universitaires de Strasbourg, 1, place de l'Hôpital, 67091 Strasbourg cedex, France*

Available online 31 January 2015

KEYWORDS
Peritoneal carcinomatosis;
Colon cancer;
Second-look surgery;
HIPEC

Summary
Background: Surgical procedures that combine both complete cytoreductive surgery (CCRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have improved the survival of patients with peritoneal carcinomatosis (PC). Current imaging and laboratory investigations are not very useful to diagnose PC. This prospective study sought to determine the usefulness of routine second-look surgery (RSLS) combined with HIPEC in the diagnosis and treatment of patients with PC at high-risk for recurrence.
Methods: From 2007 to 2011, RSLS was performed on 14 patients who had undergone a complete initial oncological resection for synchronous colonic PC and/or ovarian metastasis with PC discovered during primary colon cancer surgery after a course of 12 cycles of intravenous chemotherapy, eventually associated with HIPEC.
Results: Pathology confirmed PC in 71% of patients during RSLS, with a median peritoneal carcinomatosis index (PCI) of 10. There was no post-operative mortality, while 7% of patients exhibited Dindo Grade III—IV complications. The 2-year overall survival and disease-free survival rates were 91% and 38%, respectively. Following RSLS and CCRS, peritoneal recurrence was observed in only 8% of patients who had undergone HIPEC.
Conclusion: RSLS combined with HIPEC after initial resection of synchronous colonic PC allows diagnosis and treatment of low-score PC, with limited post-operative complications and increased overall survival rates.

Introduction

Median survival of patients with peritoneal carcinomatosis (PC) of colonic origin has improved from 5.2 months [1] to more than 30 months [2—4] thanks to new surgical techniques including maximal tumor cytoreduction and hyperthermic intraperitoneal

* Corresponding author.
E-mail address: jean-baptiste.delhorme@chru-strasbourg.fr (J.B. Delhorme).

http://dx.doi.org/10.1016/j.jviscsurg.2015.01.002
1878-7886/

chemotherapy (HIPEC) [5]. PC is the second most frequent site of metastatic recurrence (after the liver) following resection of colorectal cancer with curative intent, and represents 50% of recurrences [6]. PC is present at initial diagnosis in 10 to 15% of patients [7].

Pre-operative CT scan before resection of the primary colonic tumor does not always visualize PC when the size of tumor nodules is small [8]. It is therefore not unusual to discover PC during resection of the primary cancer.

According to current recommendations [9], in case of intra-operative discovery of PC, surgical resection should not be performed; the lesions must be described in detail, and the patient should be referred to a specialized center for treatment.

When carcinomatosis is very limited, patients can undergo resection of visible carcinomatosis with subsequent referral to the specialized center. In these patients, however, PC can recur early. One recent study [10] has shown that PC was found in 56% of completely asymptomatic patients at a second-look laparotomy despite complete resection followed by intravenous chemotherapy. Notwithstanding, there are few data concerning this particular subgroup of patients.

The goal of our study was to determine the value of routine second-look surgery (RSLS) after initial complete cytoreductive surgery (CCRS) for synchronous carcinomatosis in a cohort of patients managed in our regional reference center between 2007 and 2011.

Material and methods

This prospective monocenter study included all patients undergoing resection of PC in combination with HIPEC between March 2007 and May 2011 in a University digestive surgery unit in Strasbourg, France.

Inclusion and exclusion criteria

We included patients:

- with synchronous PC and/or ovarian metastases of colonic origin;
- for whom carcinologic resection had been performed (with CCRS) either via laparotomy or laparoscopy, along with primary tumor excision;
- followed by intravenous chemotherapy;
- even if resectable liver metastasis was present.

We excluded patients:

- with PC whose origin was not colonic (rectal, appendiceal, small intestinal);
- for whom resection of PC and/or ovarian metastases was not complete;
- with metachronous PC.

Study design

The initial tumors were staged according to TNM classification drawn from their pathology reports. All included patients underwent 12 cycles of oxaplatin or irinotec or irinotecan-based regimen associated or not with antiangiogenics. Evaluation workup included thoraco-abdominopelvic CT scan and carcino-embryonic antigen levels dosage (CEA) after the 12 cycles of chemotherapy. Pre-operative investigations included cerebral CT scan, cardiology workup, laboratory investigations, as well as anesthesia evaluation.

During RSLS, a complete abdominal exploration was performed via a routine xyphopubic incision. The extension of PC was evaluated according to Sugarbaker's Peritoneal Carcinomatosis Index (PCI) [11] and Gilly's score [12]. Complete tumor cytoreduction combined with HIPEC was performed in all patients with macroscopic PC and/or ovarian metastasis proven by frozen section biopsy, as long as the PCI did not exceed 20/39 [13]. When PC was not histologically-confirmed, HIPEC was performed in all patients who had asked for it during pre-operative consultation. HIPEC was not performed outside these indications. When resectable liver metastases were found, treatment included radiofrequency ablation or resection.

All intra-operatively retrieved tissues were sent to pathology.

After tumor cytoreduction, a closed abdomen HIPEC (with mitomycin C or oxaliplatin, starting in 2009 [13]) was performed. Mitomycin C HIPEC used a hyperthermic (42 °C) immersion of mitomycin C (0.8 mg/kg) in a peritoneal dialysis solution for 90 min. Oxaliplatin HIPEC included intravenous calcium folinate (20 mg/m^2) and 5-fluorouracil (400 mg/m^2). Peritoneal immersion with oxaliplatin was dosed at 360 mg/m^2 diluted in a 5% glucose solution heated to 42 °C for 30 min.

Post-operative morbidity was evaluated according to the Dindo-Clavien classification [14].

Classification of patients

Patients were classified into three groups (Fig. 1): those who had confirmed PC and who were treated with tumor cytoreduction and HIPEC (''cytoreduction + HIPEC'' group); those who had HIPEC without histologic confirmation of PC (''prophylactic HIPEC'' group) and the one who did not have confirmed PC and did not accept prophylactic HIPEC (''no HIPEC'' group).

Patient follow-up

Patients underwent clinical examination at one month, post-operative and then carcinologic follow-up was performed every three months during two years by clinical examination and imaging. CEA was measured every three months.

Statistical analysis

Pre-operative predictive factors for severity of peritoneal involvement were sought and analyzed with the non-parametric Mann-Whitney test for continuous data and Kruskal-Wallis for nominal data.

A Cox model was used to study the effects of different parameters on recurrence-free survival. An adjusted Chi^2 test was used to study dichotomic data. Survival curves were analyzed according to Kaplan-Meier.

Results

Between 2007 and 2011, among 115 patients undergoing operation for PC in our unit, 14 met the inclusion criteria for this study. Patient characteristics are summarized in Table 1. Mean age at the time of RSLS was 53.6 years [range 28—73]. Four patients (28.6%) had resectable liver metastases with no pre-operative imaging evidence of carcinomatosis.