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Epidural analgesia combined with a comprehensive physiotherapy program after Cytoreductive Surgery and HIPEC is associated with enhanced post-operative recovery and reduces intensive care unit stay: A retrospective study of 124 patients

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Abstract

Background: Although Cytoreductive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) confers health benefits in peritoneal carcinomatosis (PC) treatment, it is associated with significant postoperative morbidity and mortality rate with increased length of hospital stay. The goal of this study is to determine whether a new comprehensive physiotherapy program including epidural loco-regional analgesia can improve the quality of care and patients recovery.

Methods: Between 2009 and 2013, 124 patients with PC were operated for CRS and HIPEC procedures. These patients were analyzed and divided in 2 groups by means of time. No Physio group included patients operated from 2009 to 2011 ($n = 57$) having a thoracic patient controlled epidural analgesia (PCEA) but no preoperative physiotherapy program. The Physio group included patients operated from 2012 to 2013 ($n = 67$) having both a PCEA with a preoperative physiotherapy program.

Results: The mortality rate was 1.6% ($n = 2$). The median length of stay in the intensive care unit (ICU) was lower in the Physio group, 2 days vs. 0 for No Physio group ($p < 0.0001$). The first time of mobilization after surgery was shorter in the Physio group (day 3 vs. 2, $p = 0.0043$). The overall satisfaction in the Physio group was achieved in 93% of patients, helping in decreasing fear of surgery and mobilization in 70% and 84% of cases respectively.

Conclusion: Our study demonstrates that a clear pre-operative information and education by a physiotherapist, associated with a PCEA-pain management significantly benefits the patient's post-operative recovery and reduces the length of stay in the ICU.

Keywords: Peritoneal carcinomatosis; Hyperthermic Intraperitoneal Chemotherapy; Comprehensive physiotherapy; Epidural loco-regional analgesia; Enhanced recovery after surgery; Fast track therapy

Abbreviations: CRS, Cytoreductive Surgery; HIPEC, Hyperthermic Intraperitoneal Chemotherapy; PC, peritoneal carcinomatosis; PCEA, patient controlled epidural analgesia; ICU, intensive care unit; ERAS, enhanced recovery after surgery.

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Introduction

Cytoreductive Surgery (CRS) with Hyperthermic Intraperitoneal Chemotherapy (HIPEC), when feasible, is a well-established treatment option for patients with peritoneal carcinomatosis. However, if this treatment has shown beneficial effects on patients survival, its application is reduced to a small window of highly selected patients and performed by a restricted number of specialized medical teams.[1–3] Moreover, the estimation of the overall therapeutic effects of these procedures constitutes a medical controversy, as they are associated with high morbidity and mortality rates.

A recent systematic review of published literature on this treatment reported a mean rate of 3% for mortality and 29% for major morbidity, results similar to those of major gastrointestinal surgeries such as a Whipple's procedure.[4] Diaphragmatic resection during CRS and HIPEC is an independent predictor of surgical mortality. In a study based on a total number of 1077 procedures, Ahmed et al. reported an increased rate of respiratory failure requiring mechanical ventilation and pulmonary effusion requiring thoracotomy of 5% and 2.5%. Those rates increased in cases of diaphragmatic resection up to 11% and 9%.[5]

Enhanced recovery after surgery (ERAS) protocols are peri- and postoperative care pathways initiated in the early 1990s and designed to promote early recovery, reduce complications and shorten hospital stay after elective abdominal surgery. Twenty optimal perioperative care procedures defined in the Consensus review of the colorectal surgery Guidelines established in 2009 were included in these protocols. The success of ERAS depends highly on multidisciplinary teamwork and patient compliance.[6] The efficacy of these protocols was discussed on several published meta-analyses studies, revealing that the length of hospital stay and postoperative complications were significantly reduced in the ERAS-treated group.[7,8] Preoperative counseling as well as patient controlled epidural analgesia (PCEA) and early mobilization with a complete physiotherapy program are the two key elements of ERAS.

In colorectal surgery, the concept of early rehabilitation is associated with reduced postoperative morbidity and hospital stay with a substantial improvement of quality of life.[8–12] In France the surgical and anesthesiology society proposed a common program for enhanced recovery after colorectal surgery.[13] This strategy involves PCEA and patient mobilization from the first day following surgery (D+1). Utilization of epidural analgesia in the perioperative care of patients undergoing CRS and HIPEC has been poorly studied. The safety of patient-controlled analgesia was investigated in a study based on 215 patients, reporting no epidural hematomas or abscesses and a delay in epidural removal because of thrombocytopenia in 0.9% of patients.[14] Moreover, early initiation of epidural analgesic infusions (before HIPEC) was associated with significantly less surgical blood loss and fluid requirements. In our institution, PCEA is suggested during the preoperative anesthetic consultation and patients undergo a postoperative physiotherapy program to promote recovery of respiratory function and physical autonomy. Since November 2011, a preoperative physiotherapy consultation was implemented to improve the postoperative rehabilitation. This study aims at determining the potential impact of a new strategy combining preoperative physiotherapy program with a PCEA on early morbidity after CRS-HIPEC.

Patients and methods

Patient population

Between 2006 and 2013, 375 patients with peritoneal carcinomatosis (PC) were proposed for CRS and HIPEC procedure in our institution. One hundred and thirty two patients (35%) did not receive HIPEC because of the impossibility to achieve complete CRS, as defined by Sugarbacker et al. (CC0 or CC1 resection).[15] Patients whose surgeries were performed between 2006 and 2008 were excluded (43 patients) in order to acquire surgical expertise with a steep learning curve,[16] as well as patients whose medical and nurse records were uncompleted (76 patients). The remaining 124 patient's records were analyzed and divided in 2 groups by means of time. The No Physio group included patients operated from 2009 to 2011 ($n = 57$) having a thoracic patient controlled epidural analgesia (PCEA) but no preoperative physiotherapy program. The Physio group included patients operated from 2012 to 2013 ($n = 67$) having both a PCEA with a preoperative physiotherapy program. The selection process for patients included in the study analysis is detailed in Fig. 1. The study was approved by the institutional ethics committee (Comité d'éthique de la Société de Réanimation de Langue Française No. 11-356).

Data collection

Clinical characteristics of these 124 patients as well as details regarding surgical procedures were analyzed. Rates of mortality and respiratory complications, length of hospital stay, mean day of oral food intake, mean post-operative days of subcutaneous morphine and oxygen stop were compared between the two groups.

Patients who had a preoperative consultation between 2012 and 2013 filled out a satisfaction questionnaire that was returned the day prior to hospital discharge. The evaluated criteria included the clarity of the information shared during the preoperative consultation, the effect of this counseling and breathing exercises on surgery anxiety and fear, but also on pain management, as well as an overall estimation of their satisfaction of this preoperative care.

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