

Original article

Study of anaesthetic implications in hyperthermic intraperitoneal chemotherapy: Observational study

Dr Dev Kumar Harkawat

Anaesthesiologist, Asian Cancer Hospital, Jaipur, India
Corresponding author: Dr Dev Kumar Harkawat



Abstract:

Introduction:Hyperthermic intraperitoneal-chemotherapy(HIPEC) is basically considered to be a high-concentration, heating chemotherapy regimen that is administered directly into the abdomen during surgery. HIPEC combined with cytoreductive surgery (CRS) has emerged over time as an effective multimodal treatment option for selected patients with peritoneal surface malignancies. This study focuses on the anaesthetic implications and outcome in these cases.

Methodology: This observational study was conducted in our hospital for one year duration. All patients operated with hyperthermic intraperitoneal chemotherapy were included in our study with proper anaesthetic support. A total of 32 patients were selected under these criteria. Purposefully we selected all the interaperitoneal chemotherapy patients for this study. We defined standard anaesthesia protocol for these procedures and were followed by our team with strict compliance.

Results: In our study, mean patient age was 46 ± 7.02 with male: female ratio was 2:3 with BM Index was 26.11 ± 3.89 . Maximum patients reported cardiovascular comorbidities. (35%) Among reported patient carcinoma were, gastric as 35 % , colon as 6% , appendix as 18 % while systemic as 3 % . In our study, major surgical complications were reported in 3 patients while death is reported in only one patient.

Conclusions: From this study, we conclude that cytoreductive surgery with HIPEC is a high-risk procedure with major hemodynamic and metabolic alterations. In addition to underlying disease and surgical complexity, we have high-lightened that anesthesia management has a significant impact on patient outcome.

Keywords: Anesthesia, hyperthermic intraperitoneal chemotherapy, postoperative care

Introduction:

Hyperthermic intraperitoneal chemotherapy (HIPEC) is being considered to a high-concentration, heating chemotherapy regimen that is administered directly into the abdomen during surgery. HIPEC combined with cytoreductive surgery (CRS) has emerged over time as an effective multimodal treatment option for selected patients with peritoneal surface malignancies.

With HIPEC, the 10-year survival rate is 70%-80%. For primary peritoneal tumors/malignant mesothelioma, the previous median survival was 9-14 months. With HIPEC, the five-year survival rate is nearly 70%. [1]Traditionally, these types of malignancies were considered to be in view incurable and suitable for salvation only. Intraoperative and postoperative pain control can be achieved with an epidural anaesthesia.[2,3] This study focuses on the

anaesthetic implications and outcome in these cases.

Methodology:

This observational study was conducted in our hospital for one year duration. All patients operated with hyperthermic intraperitoneal chemotherapy were included in our study with proper anaesthetic support. A total of 32 patients were selected under these criteria. Purposefully we selected all the interaperitoneal chemotherapy patients for this study. We defined standard anaesthesia protocol for these procedures and were followed by our team with strict compliance.

Anaesthesia and perioperative data were collected from patient records.

Anesthesia was performed according to the institutional guidelines using propofol or volatile anesthetics, with a very restrictive transfusion management and through an extensive hemodynamic strict monitoring.

Combined anesthesia, including continuous thoracic epidural anesthesia (TEA), was the technique of choice. After surgery, patients were transferred to the intensive care unit or post-anesthetic unit (PACU). However, due to the lack of standardization at this early stage,

individual treatment was the responsibility of the treating anaesthesiologist.

Herewith we only highlighted the surgical output on the basis of final outcome only. (Postsurgical complications and patient mortality)

Results:

Table 1) Reported patient summary (n=32)

Parameter	Mean	SD
Age (Years)	46	7.02
Male: female	2:3	
BM Index	26.11	3.89

In our study, mean patient age was 46±7.02 with male: female ratio was 2:3 with BM Index was 26.11±3.89.

Table 2) Reported patients comorbidities (n=32)

Comorbidities	Number of patients	Percentage
Cardiovascular	11	35
Respiratory	2	6
Renal	5	16
Neurological	3	10
Endocrine	3	10
Others	2	6

Maximum patients reported cardiovascular comorbidities. (35%)

Table 3) Reported patients carcinoma (n=32)

Carcinoma	Number of patients	Percentage
Gastric	11	35
Colon	2	6
Appendix	6	18
Systemic	10	33
Others	4	12

Among reported patient carcinoma were, gastric as 35 % , colon as 6% , appendix as 18 % while systemic as 33 % .

Major surgical complications:

In our study, major surgical complications were reported in 3 patients while death is reported in only one patient.

Discussion:

HIPEC is an effective treatment for cancers in the lining of the abdominal cavity, including pseudomyxoma peritonei, mucinous adenocarcinoma of the appendix and peritoneal mesothelioma. Additionally, peritoneal metastases from colon cancer can often be successfully treated with HIPEC. Cytoreductive surgery (CRS)

combined with hyperthermic intraperitoneal chemotherapy (HIPEC) is a treatment choice for peritoneal cancer. However, patients commonly suffer from severe postoperative pain. The pathophysiology of postoperative pain is considered to be from both nociceptive and neuropathic origins.

A well-functioning epidural anaesthesia reduces the need for intraoperative and postoperative-opioids. In the last two decades, cytoreductive surgery combined with intraoperative hyperthermic chemotherapy

(CRS/HIPEC) has evolved into a treatment option for selected peritoneal cancer patients [4]. Traditionally, peritoneal carcinomatosis was considered a palliative, incurable disease [5]. Peritoneal cancer patients were considered incurable with poor survival until the development of hyperthermic intraperitoneal chemotherapy after optimal cytoreductive surgery. Perioperative management of these procedures is complex and requires optimal cytoreductive surgery followed by intraperitoneal hyperthermia chemotherapy. [6,7]

In our study, mean patient age was 46±7.02 with male: female ratio was 2:3 with BM Index was 26.11±3.89. Maximum patients reported cardiovascular comorbidities. (35%) Among reported patient carcinoma were, gastric as 35 % , colon as 6% , appendix as 18 % while systemic as 3 % .

This allows for long-term survival with good quality of life [8]. Because there is a learning curve when performing CRS/HIPEC, it is recommended that the procedure be centralized to specialized institutions [9]. Regarding anesthesia management and perioperative care, experience is limited and no consensus has yet been found [10]. Several authors have shown significant changes in body

temperature and hemodynamics, changes in blood composition, and the need for massive blood transfusions [11]. From this study, we highlight that cytoreductive surgery with HIPEC is a high-risk procedure with major hemodynamic and metabolic alterations. In addition to underlying disease and surgical complexity, we have shown that anesthesia management has a significant impact on patient outcome.

Conclusions

From this study, we conclude that cytoreductive surgery with HIPEC is a high-risk procedure with major hemodynamic and metabolic alterations. In addition to underlying disease and surgical complexity, we have shown that anesthesia management really being proved that it has a significant impact on patient outcome.

Study limitations:

Current observational studies in view have several limitations. Patient anesthesia management did not follow a strict protocol and there were no predefined exclusion criteria for the study. Rigorous patient management and selection is critical and careful surgical tumor removal is essential for best clinical outcome. Our intention is to highlight this important aspect through this study.

References:

1. Neuwirth MG, Alexander HR, Karakousis GC. Then and now: cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC), a historical perspective. *J Gastrointest Oncol.* 2016;7(1):18-28.
2. Elias D, Goe' re' D, Dumont F, et al. Role of hyperthermic intraoperative peritoneal chemotherapy in the management of peritoneal metastases. *Eur J Cancer.* 2013;50(2):332-340.
3. Raspe' C, Piso P, Wiesenack C, et al. Anesthetic management in patients undergoing hyperthermic chemotherapy. *Curr Opin Anaesthesiol.* 2012;25(3):348-355.
4. Arjona-Sa' nchez A, Medina-Ferna' ndez FJ, Mun' oz-Casares FC, et al. Peritoneal metastases of colorectal origin treated by cytoreduction and HIPEC: an overview. *World J Gastrointest Oncol.* 2014;6(10):407-412.
5. Halkia E, Tsochrinis A, Vassiliadou DT, et al. Peritoneal carcinomatosis: intraoperative parameters in open (coliseum) versus closed abdomen HIPEC. *Int J Surg Oncol.* 2015; Article ID 610597, 6 p.
6. Rodriugez Silva CR, Moreno Ruiz FJ, Estevez IB, et al. Are there intra-operative hemodynamic differences between the Coliseum and closed HIPEC techniques in the treatment of peritoneal metastasis? A retrospective cohort study. *World J Surg Oncol.* 2017;15 (1):51.
7. Schmidt C, Creutzenberg M, Piso P, Hobbhahn J, Bucher M. Peri-operative anaesthetic management of cytoreductive surgery with hyperthermic intraperitoneal chemotherapy. *Anaesthesia.* 2008;63(4):389-395.
8. Webb CA, Weyker PD, Moitra VK, et al. An overview of cytoreductive surgery and hyperthermic intraperitoneal chemoperfusion for the anesthesiologist. *Anesth Analg.* 2013;116(4):924-931
9. Gupta N, Kumar V, Garg R, Bharti SJ, Mishra S, Bhatnagar S. Anesthetic implications in hyperthermic intraperitoneal chemotherapy. *J Anaesthesiol Clin Pharmacol.* 2019 Jan-Mar;35(1):3-11.
10. Neuwirth MG, Alexander HR, Karakousis GC. Then and now: Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC), a historical perspective. *J Gastrointest Oncol.* 2016;7:18-28.
11. González-Moreno S. Peritoneal surface oncology: A progress report. *Eur J Surg Oncol.* 2006;32:593-6.