

## Research Article

### Rewriting the Rules of Abdominal Cancer Care: A Comprehensive Insight into Hyperthermic Intraperitoneal Chemotherapy (HIPEC)

Doerfer R, Ramshorst E, Younan G, Borsig R, Gevensleben E, Straten W

Department of Experimental Oncology and Radiobiology, The Netherlands

**\*Corresponding Author:** Younan G, Department for Experimental Oncology and Radiobiology, The Netherlands

**Citation:** Younan G (2026). Department for Experimental Oncology and Radiobiology, The Netherlands V1(4)

**Copyright:** © 2026 Younan G, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

**Received date:** March 12, 2026: **Accepted date:** March 17, 2026: **Published date:** March 23, 2026

**Keywords:** pharmacological innovation, chemotherapeutic agents, carcinomatosis, systemic chemotherapy, cytoreductive surgery, peritoneal malignancies

#### Abstract

Hyperthermic Intraperitoneal Chemotherapy (HIPEC) represents a paradigm shift in the management of peritoneal malignancies, offering a targeted, high-intensity therapeutic approach following cytoreductive surgery. Unlike conventional systemic chemotherapy, HIPEC delivers heated chemotherapeutic agents directly into the abdominal cavity, maximizing local drug concentration while minimizing systemic toxicity. This article explores the scientific principles, procedural methodology, clinical applications, benefits, limitations, and future prospects of HIPEC. By integrating surgical precision with thermal and pharmacological innovation, HIPEC has emerged as a promising intervention for conditions once deemed terminal, such as peritoneal carcinomatosis. Despite ongoing debates regarding patient selection and long-term outcomes, HIPEC continues to reshape oncological strategies, emphasizing localized control and improved survival rates

#### Introduction

Peritoneal surface malignancies, often arising from cancers such as colorectal, ovarian, gastric, and appendiceal origins, have historically been associated with poor prognosis. Traditional treatment modalities, including systemic chemotherapy, often fail to achieve adequate drug concentrations within the peritoneal cavity. Hyperthermic Intraperitoneal Chemotherapy (HIPEC) has emerged as an innovative approach designed to overcome these limitations by combining surgical and chemotherapeutic strategies into a single, aggressive treatment modality.

#### Principles of HIPEC

HIPEC is typically performed immediately after cytoreductive surgery (CRS), which aims to remove

visible tumor deposits within the abdominal cavity. Once macroscopic disease is eliminated, a heated chemotherapy solution (usually between 41°C and 43°C) is circulated throughout the peritoneal cavity

The rationale behind HIPEC is based on three key principles:

1. **Direct Drug Delivery:** Administering chemotherapy directly into the peritoneal cavity ensures higher local concentrations compared to systemic administration.
2. **Thermal Enhancement:** Heat increases the cytotoxicity of chemotherapeutic agents and enhances their penetration into tissues.
3. **Reduced Systemic Toxicity:** The peritoneal-plasma barrier limits the absorption of drugs into the bloodstream, reducing adverse systemic effects.

#### Procedure Overview

The HIPEC procedure consists of several critical steps:

1. **Cytoreductive Surgery (CRS):** Surgeons remove all visible tumor nodules from the abdominal cavity.
2. **Catheter Placement:** Inflow and outflow catheters are positioned strategically.
3. **Perfusion Phase:** Heated chemotherapy solution is circulated for 30 to 120 minutes.
4. **Temperature Monitoring:** Continuous monitoring ensures optimal therapeutic heat levels.

## Journal of Cancer Research and Cellular Interventions (JCCRCI)

5. **Closure:** After perfusion, the solution is drained, and the surgical site is closed.

There are two main techniques used

- **Open Technique (Coliseum method):** The abdomen is temporarily opened during perfusion.
- **Closed Technique:** The abdomen is closed before circulating the chemotherapeutic solution

### Clinical Applications

HIPEC is primarily used in the treatment of:

- Peritoneal carcinomatosis from colorectal cancer
- Advanced ovarian cancer
- Appendiceal tumors (e.g., pseudomyxoma peritonei)
- Selected cases of gastric cancer
- Peritoneal mesothelioma

Its effectiveness varies depending on tumor type, disease extent, and completeness of cytoreduction.

### Advantages of HIPEC

- **Enhanced Local Control:** Targets microscopic residual disease effectively
- **Improved Survival Rates:** Particularly in selected patient populations
- **Single-Session Treatment:** Combines surgery and chemotherapy in one procedure
- **Lower Systemic Side Effects:** Compared to traditional chemotherapy

### Limitations and Risks

Despite its advantages, HIPEC is not without challenges:

- **Complexity of Procedure:** Requires specialized surgical expertise
- **High Morbidity Risk:** Potential complications include infection, bleeding, and organ dysfunction
- **Patient Selection:** Not all patients are suitable candidates
- **Limited Accessibility:** Available only in specialized centers

### Current Research and Future Directions

Ongoing studies are focused on:

- Optimizing drug selection and temperature protocols
- Identifying biomarkers for better patient selection
- Combining HIPEC with targeted therapies and immunotherapy
- Evaluating long-term survival outcomes through randomized trials

Advancements in technology and clinical research may further refine HIPEC protocols, making them safer and more widely accessible

### Conclusion

Hyperthermic Intraperitoneal Chemotherapy has redefined the therapeutic landscape for peritoneal malignancies by integrating surgical and chemotherapeutic strategies into a unified approach. While it is not universally applicable, HIPEC offers a significant survival advantage in carefully selected patients. As research continues to evolve, this technique holds the potential to become a cornerstone in the multidisciplinary management of advanced abdominal cancers

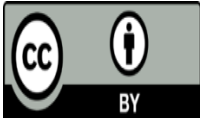
### References

1. Van der Graaf, W.T.A.; Blay, J.Y.; Chawla, S.P.; Kim, D.W.; Bui-Nguyen, B.; Casali, P.G. et al. Pazopanib for metastatic soft-tissue sarcoma (PALETTE): A randomised, double-blind, placebo-controlled phase 3 trial. *Lancet* 2012, 379, 1879–1886.
2. Thomassen, I.; van Gestel, Y.R.; van Ramshorst, B.; Luyer, M.D.; Bosscha, K.; Nienhuijs, S.W.; Lemmens, V.E.; de Hingh, I.H. Peritoneal carcinomatosis of gastric origin: A population-based study on incidence, survival and risk factors. *Int. J. Cancer* 2014, 134, 622–628.
3. Maghazachi, A.A. Compartmentalization of human natural killer cells. *Mol. Immunol.* 2005, 42, 523–529
4. Wu, C.E.; Esfandiari, A.; Ho, Y.H.; Wang, N.; Mahdi, A.K.; Aptullahoglu, E.; Lovat, P.; Lunec, J. Targeting negative regulation of p53 by MDM2 and WIP1 as a therapeutic strategy in cutaneous melanoma. *Br. J. Cancer* 2018, 118, 495–508.
5. Chawla, S.; Van Tine, B.A.; Pollack, S.; Ganjoo, K.; Elias, A.; et al. Phase 2 study of CMB305 and atezolizumab in NY-ESO-1+ soft tissue sarcoma: Interim analysis of immunogenicity, tumor control and survival. *Ann. Oncol.* 2017, 28, 521–538.
6. Hyman, D.; Chatterjee, M.; Langenberg, M.H.G.; Lin, C.C.; Suárez, C.; Tai, D.; Cassier, P., et al. Dose- and regimen-finding phase I study of NVP-HDM201 in patients (pts) with TP53

## Journal of Cancer Research and Cellular Interventions (JCCRCI)

- wild-type (wt) advanced tumors. Eur. J. Cancer 2016, 69, S128–S129.
7. Zamaï, L.; Ahmad, M.; Bennett, I.M.; Azzoni, L.; Alnemri, E.S.; Perussia, B. Natural killer (NK) cell-mediated cytotoxicity: Differential use of TRAIL and Fas ligand by immature and mature primary human NK cells. J. Exp. Med. 1998, 188, 2375–2380.
  8. Lison, S.; Weiss, G.; Spannagl, M.; Heindl, B. Postoperative changes in procoagulant factors after major surgery. Blood Coagul. Fibrinolysis 2011, 22, 190–196.

## Journal of Cancer Research and Cellular Interventions (JCCRCI)



This work is licensed under Creative Commons Attribution 4.0 License DOI:10/JCCRCI/2026/019

**Your next submission with****Olites Publishers will reach you through the below assets**

- We follow principles of publication led by the Committee on Publication Ethics (COPE).
- Double-blind peer review process which is just as well as constructive.
- Permanent archiving of your article on our website
- Quality Editorial service
- Manuscript accessibility in different formats (PDF, Full Text)
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

Learn more: [Journal of Cancer Research and Cellular Interventions - Olites Publishers \(olitespublishing.com\)](https://olitespublishing.com/)