

# Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for peritoneal surface malignancy

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Peritoneal surface malignancies have historically presented a treatment challenge for clinicians. Not infrequently, epithelial cancers can seed the peritoneal cavity. Neoplasms of the appendix can result in peritoneal dissemination of disease and pseudomyxoma peritonei; in colon cancer, up to 25% with recurrent disease will develop a peritoneal surface predominant pattern of recurrence (1), and among those resected advanced gastric cancer, the majority of patients who recur in the first five years following surgery will develop peritoneal disease (2). Among the approximately 21,290 cases of ovarian cancer cases estimated to be diagnosed in 2015 (3), most will present in an advanced disease state, many with evidence of peritoneal carcinomatosis. In addition to epithelial derived cancers, 10-15% of the approximately 2,500 cases of malignant mesothelioma diagnosed in the U.S. will develop in the peritoneal cavity (4). For all these tumor histologies, cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has been considered in the treatment algorithm for selected patients.

Over time, CRS/HIPEC has seen an increased utilization in treating select patients with peritoneal disease patterns previously considered inoperable, and has been associated with favorable survival outcomes. In patients with colorectal peritoneal carcinomatosis, a recent retrospective study of 539 patients undergoing a complete cytoreduction reported a median overall survival of 32.6 months (5). No doubt these observed improved outcomes compared to historical cohorts are multifactorial, reflecting improvements in systemic therapies, refinements in surgical techniques and perioperative care, and a better understanding of tumor biology contributing to better patient selection for surgery. Nonetheless, the remarkably favorable data are compelling

and speak for the importance of consideration of CRS/HIPEC in the context of a multidisciplinary approach for patients with peritoneal surface malignancy.

This issue of *Journal of Gastrointestinal Oncology (JGO)* focuses on CRS/HIPEC and its application for various cancers. A paper led by the editors highlight some of the important historical developments in the evolution of CRS and HIPEC. Dr. Paul Sugarbaker and colleagues share their extensive expertise discussing surgical techniques of CRS/HIPEC and pharmacology of intraperitoneal chemotherapy, while Dr. Goodman provides an excellent review of the selection of chemotherapeutic agents used for this procedure. Dr. Low presents an interesting summary on the use of MRI in the pre-operative evaluation and surveillance of patients being considered for or treated with CRS/HIPEC. Finally, each of the five tumor histologies discussed above is considered in depth in a separate manuscript, including two original papers studying CRS/HIPEC for high grade appendiceal cancer and ovarian cancer.

Also in this issue is an important section on quality issues pertaining to CRS/HIPEC, including a review paper discussing the morbidity and mortality associated with the procedure. These procedures can be extensive, and not without risk, and consideration of these factors in the clinical decision making is essential. Dr. Lambert provides a very thoughtful synopsis of the palliative role of CRS/HIPEC, and Dr. Turaga discusses the impact of surgical volume in centers of these procedures on surgical outcomes. Dr. Votanopoulos presents a review of the indications and outcomes following repeat HIPEC surgery, which can be sometimes considered in select patients. Finally, Dr. Nash discusses current prospective clinical trials involving CRS with HIPEC.

While there remains much to be learned from ongoing trials, the field of CRS/HIPEC has made substantial progress over the past several decades. Developments in this area will likely continue to complement ongoing advances in systemic therapies; indications for and observed outcomes of surgery will change as the understanding and treatment approaches of tumors develop. Most importantly, the field should remain committed to embracing new knowledge through rigorous scientific study. Peritoneal surface malignancy remains to date a challenging clinical program, but ongoing and evolving multidisciplinary approaches, including CRS/HIPEC for selected patients, have provided new optimism for treating patients with historically few options.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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