

FAST FACTS AND CONCEPTS: #412
HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (HIPEC): AN OVERVIEW
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What is HIPEC? Hyperthermic intraperitoneal chemotherapy is a surgical-based cancer treatment utilized for select patients who have tumors that have spread along the peritoneum or lining of the abdominal cavity. These tumors can originate from the appendix, colon, ovary, or stomach. HIPEC is performed in tertiary referral centers by specially trained surgical oncologists and involves the perfusion of heated chemotherapy into the abdominal cavity. It is often done in the operating room in conjunction with cytoreductive surgery (CRS), which is the surgical removal of these tumors (1).

Who qualifies for HIPEC? Institutions offering CRS/HIPEC should have well-structured programs led by fellowship-trained specialists in surgical oncology who closely collaborate with specialists in medical oncology and palliative care. Additional members of the team usually include nutritionists, social workers, and physical therapists. Patient selection is crucial for CRS/HIPEC. Algorithms include factors such as histology, receipt of systemic therapy, timing of and recovery from prior interventions, location and disease burden of tumors, patient care preferences, and functional status. Given the discordance between radiographic and operative findings, a diagnostic laparoscopy surgery is performed to assess the extent of abdominal and peritoneal disease (2). Based on observations from this laparoscopy, the surgeon quantifies the burden and location of peritoneal disease by calculating a PCI, or peritoneal cancer index, score (3). Based on PCI and the input of the multidisciplinary team, the surgeon will determine if a patient is eligible for CRS and/or HIPEC. Patients with an overly extensive abdominal disease burden or distant metastases are typically not offered HIPEC (1). Likewise, if the risk of undergoing a prolonged operation is high due to comorbidities, functional status, or poor psycho-social support, then HIPEC is not recommended. Of those referred, less than half undergo CRS/HIPEC (4,5).

What is the prognosis after CRS/HIPEC? For carefully selected patients, CRS/HIPEC can improve survival, although the extent is dependent on the patient's pathology (6-9). For example, patients who have undergone successful CRS/HIPEC (implying complete removal of all tumor) for pseudomyxoma peritonei from low-grade appendiceal mucinous neoplasms have been documented to have a median survival of 20 years (6). Patients with ovarian cancer who have undergone successful CRS/HIPEC have a median survival of 45.7 months compared to 33.9 months with CRS alone (7). Rates of perioperative mortality and morbidity from CRS/HIPEC are comparable to other major abdominal operations, although this relies on proper patient selection as well (10). Even in otherwise healthy and well-selected patients, there is typically a 6-12-month recovery period before patients resume all normal activities (11,12).

How are the patient's goals of care incorporated into HIPEC decision-making? Given the potential morbidity and lengthy recovery associated, it is important to consider a patient's overall functional status, prognosis, values, psycho-social support, and the ability to cope with recovery. Preoperatively, it is essential to have clear, frank, and open discussions about the trade-offs and best and worst cases given either CRS/HIPEC, symptom focused treatment (e.g. hospice care), or systemic cancer treatment. All patients should be aware that they will not be abandoned medically regardless of what decision is made.

How long does HIPEC take? What occurs during the operation? The total length of the surgical time is largely dependent on the length of the CRS. The median time for CRS/HIPEC is just over 7 hours, although the length of cases can range (13). Typically, after the CRS portion of the procedure, the surgeon will decide whether to proceed with HIPEC, and this decision is usually determined by whether an "optimal" cytoreduction is performed. This usually occurs if any remaining tumor deposits are <2.5mm in size (3). The HIPEC portion involves the physical turning and rocking of the body on the operating table to enhance the perfusion of chemotherapy along abdominal surfaces.

What kind of chemotherapy is used? The chemotherapeutic agents used in HIPEC are selected by the surgical oncologist in consultation with medical oncologists. Common agents include: mitomycin C, platinum-based chemotherapeutics, doxorubicin, 5-fluorouracil, and taxanes (14). Chemotherapy-related toxicity occurs following HIPEC, though likely at lower rates compared with systemic chemotherapy (15).

What are side effects and symptoms of HIPEC? Potential harms include infection, bleeding, cardiac events, damage to adjacent abdominal organs, and poor wound healing. Patients with many comorbidities and a poor functional or nutritional status, are at the highest risk for these complications, hence the importance of preoperative screening by the multidisciplinary team. Common and less severe side effects include constipation, diarrhea, nausea, vomiting, and abdominal pain. Post-operative cognitive decline, depression, translocation from home, and a decrease in emotional well-being have also been described (11). These side effects and post-operative symptoms are often most pronounced in the first three months (11-13).

What is the post-operative course? Since symptom burden and quality of life is most significantly impacted in the first three months after surgery, it is critical to have close follow-up in the immediate postoperative setting. Visits should begin within one week from discharge and involve a multi-disciplinary approach to make targeted interventions based on the physical and psychosocial symptoms.

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