Carcinomatosis, Peritoneal

Description/Etiology
Peritoneal carcinomatosis (PC) is a type of metastatic cancer in which tumors form throughout the peritoneum, the membranous lining of the abdominal cavity. PC most commonly occurs when intra-abdominal tumors (e.g., colorectal, stomach, pancreatic, or ovarian) penetrate the peritoneal membrane or following peritoneal seeding (i.e., dissemination of tumor cells within the peritoneal cavity) during surgery. PC generally represents an advanced form of intra-abdominal or pelvic cancer. Rarely, PC develops from metastases of extra-abdominal tumors that have spread through the blood or lymphatic system. PC has traditionally been considered a terminal condition, but new treatments offer hope for prolonged survival.

Diagnosis of PC is based on physical examination, imaging studies, and, in some cases, laboratory tests. Several grading systems exist for staging PC, including the Gilly staging system, which defines four stages as follows: stage 0 is the absence of macroscopic disease; stage 1 denotes tumors less than 5 mm in diameter localized in one part of the abdomen; stage 2 denotes tumors less than 5 mm in diameter located throughout the abdomen; stage 3 denotes peritoneal tumors 5–20 mm in diameter; and stage 4 denotes masses greater than 2 cm in diameter.

Treatment for PC involves surgical removal of all visible tumors combined with chemotherapy. Intraoperative or postoperative direct abdominal delivery of chemotherapeutic agents is recommended because peritoneal absorption of chemotherapy drugs given systemically is generally poor. Intraoperative delivery can be combined with hyperthermia to increase the effectiveness of the treatment. Intraperitoneal hyperthermic chemotherapy (IPHC) involves direct delivery of chemotherapy drugs heated to 105.8–109.4°F/41–43°C, which increases their cytotoxicity. MitoMYcin-c is the most common IPHC administered agent in patients with PC. Intraperitoneal chemotherapy can also be administered postoperatively using catheters or a port installed during surgery. Researchers have reported that the combination therapy of cytoreductive surgery and IPHC substantially prolongs survival in patients with carcinomatosis (Franko et al., 2010).

Prognosis depends on several factors, including tumor burden, tumor type, and the presence or absence of distant metastases. Patients with stage 1 or 2 PC survive significantly longer than those with stage 3 or 4 disease.

Facts and Figures
In patients with colorectal cancer, PC will be identified in 10–15% at the time of initial diagnosis (including 30–50% with advanced disease at the time of primary tumor resection) and the peritoneal surface is the site of recurrence in 10–35% of patients with treatment failure. In ~ 30% of patients with colorectal cancer, PC is the primary cause of death. PC is present in 5–20% of patients undergoing surgery for gastric cancer. In patients with PC secondary to colorectal cancer, chemotherapy alone results in median survival of 5–13 months; cytoreductive surgery with IPHC for early colorectal cancer PC results in median survival of 22–63 months, with a 5-year survival rate varying between 20% and 50%. In cases of ovarian cancer, PC is present in approximately 70% of patients at initial diagnosis.
Risk Factors
Intraoperative trauma during cancer surgery increases the risk for cancer dissemination within the peritoneal cavity and development of PC. Women with the BRCA1 or BRCA2 mutation have an increased risk of developing ovarian cancer, which often results in PC; these mutations are particularly common in women of Ashkenazi Jewish descent.

Signs and Symptoms/Clinical Presentation
The most common signs and symptoms of PC are ascites and bowel obstruction. Patients can also experience abdominal distention, abdominal pain, nausea, vomiting, weight loss, and a palpable abdominal mass. Intra-abdominal fluid accumulation can cause dyspnea and urethral obstruction. Abnormal peritoneal enhancement, thickening, and nodularity are also subtle signs of PC, particularly in women with ovarian cancer.

Assessment
› Patient History
  • Risk factor assessment should include asking about a known history of BRCA1 or BRCA2 mutation, Ashkenazi Jewish decent and a history of previous surgery for intra-abdominal or pelvic tumors and the presence of wound sites with increased susceptibility to seeding with tumor cells
› Physical Findings of Particular Interest
  • One or more palpable abdominal masses and/or increased abdominal girth might be present
› Laboratory Tests That May Be Ordered
  • Serum CA-125 level is typically elevated in patients with ovarian cancer
  • Serum carcinoembryonic antigen (CEA) level is usually elevated in patients with colorectal or gastric cancer
  • Serum CA 19-9 level is usually elevated in patients with appendiceal cancer
› Other Diagnostic Tests/Studies
  • MRI and CT scan of the abdomen will identify peritoneal masses if present
  • Radionuclide scans can identify peritoneal hemangiomas if present
  • Abdominal ultrasound might indicate ascites
  • Cytology performed on peritoneal lavage specimen can identify malignant cells if present

Treatment Goals
› Promote Optimal Physiologic Function and Reduce Risk of Complications
  • Monitor vital signs, all physiologic systems, and laboratory/other diagnostic study results; report abnormalities and treat, as ordered
  • Frequently assess for pain and other discomfort; administer prescribed analgesics and other symptomatic relief. Monitor treatment efficacy and for adverse effects
    – Notify the treating clinician of unresolved pain, and request referral to a pain management clinician if warranted
  • Assess fall risk due to dyspnea, pain, and adverse effects of analgesics; maintain patient safety (e.g., airway, circulation, and prevention of injury)
  • Follow facility pre- and post-treatment protocols if patient becomes a candidate for surgery (e.g., for tumor removal, catheter/port installation, or intraoperative chemotherapy) or a procedure (e.g., postsurgical chemotherapy with CARBOplatin or CISplatin with PACLitaxel; or IPHC); reinforce pre- and post-treatment education and verify completion of informed consent documents
    – Follow facility protocols for hazardous drug use if IPHC is used (e.g., patient’s blood and bodily fluids are considered contaminated for 48 hours after the procedure; for more information, see Red Flags, below)
      - Closely monitor all physiologic systems and for hyperthermia above desired levels; adjust temperature-regulating blankets, as appropriate
  • Monitor weight and encourage maintenance of a healthy body weight
  • Request referral to a registered dietician for patient evaluation, nutritional education, and dietary supplementation
  • Encourage rest and provide a quiet environment; reposition for comfort, as necessary
› Monitor Treatment Efficacy and for Adverse Effects and Complications
  • Report abnormalities and assist with treatment, as ordered
    – Postsurgical complications include bleeding, wound dehiscence, bowel obstruction, and infection
    – Adverse effects of systemic or intraperitoneal chemotherapy include nausea, vomiting, alopecia, central nervous system toxicity, myelosuppression, and urotoxicity
Complications of IPHC include nerve impingement, deep vein thrombosis (DVT), fluid imbalances, hematological toxicity, and acute renal toxicity. Complications related to catheters/ports include infection, peritonitis, and intestinal bleeding or obstruction; maintain excellent hygiene around catheter/Port.

Support Emotional Well-Being and Educate

- Assess anxiety level and coping ability of patient and family. Provide emotional support and promote a positive self-image for patients who have experienced a dramatic change in lifestyle due to PC-related functional limitations.
- Educate and encourage discussion regarding PC pathophysiology, potential complications, risk factors, risks and benefits of treatment, and individualized prognosis.
- As appropriate, request referral to a mental health clinician, facility chaplain, or the patient’s clergyperson for counseling strategies of coping with having a life-threatening illness and end-of-life issues, if appropriate.
- Social worker for identification of local resources for in-home services, outpatient care, transportation, financial services, hospice, and support groups.

Food for Thought

- In a retrospective study involving 41 subjects with PC of ovarian cancer origin aimed at investigating tumor detection rates between ultrasound and CT scan researchers found that ultrasound tumor detection rates were significantly higher for metastases to the pelvic region compared to CT scan and concluded that ultrasound can diagnostically complement CT scans for identifying ovarian cancer metastases in bowel and pelvic surfaces (Qi., et al 2017).

Red Flags

- The toxicity of IPHC is not well established; exposure to chemotherapeutic agents is contraindicated in individuals who are pregnant, breastfeeding, planning to conceive in the near future, or immunocompromised, and in those with blood dyscrasias.

What Do I Need to Tell the Patient/Patient’s Family?

- Emphasize the importance of ongoing medical surveillance to monitor for recurrent disease following tumor resection; frequent MRI or CT scans of the abdomen can be necessary.
- Seek immediate medical attention for new or worsening signs and symptoms (e.g., ascites, pain, weight loss) and for complications or side effects of treatment (e.g., bleeding, fever, DVT).
- Attend a support group for contact with others who face similar health challenges.

References