Pre-operative assessment of patients for cytoreduction and HIPEC

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Ovarian Cancer Surgery
New Strategies
Bergamo, Italy
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Background

Cytoreductive surgery with intraperitoneal chemotherapy is a new treatment strategy for peritoneal surface disease, including ovarian carcinomatosis.

A complete surgical resection is required for optimal results to be achieved. However, our ability to predict a complete cytoreductive procedure based on clinical or imaging criteria is not optimal. The final assessment of each case usually occurs at the time of surgical exploration.
Criteria for patient selection

- **Clinical data**: clinical history, well detailed and well documented is a key element when you first evaluate these patients. A good physical exam goes along with it.

- **Concomitant diseases**, such as cardiovascular, pulmonary or other, along with other medical treatment which might influence anesthetic and surgical risks should be identified.

- **Age** – not an absolute contraindication, as long as the patient is fit to undergo major surgery. Surgical efforts and chemotherapy dosage may have to be tailored.

- **Previous surgical procedures** – a thorough review of surgical notes could be of great help, in order to determine the nature of the disease, such as invasiveness, mucinous nature and its location. It can make the cytoreduction riskier and more difficult.
Criteria for patient selection

Prior systemic chemotherapy – may have an influence on the choice of cytotoxic drugs and dosage to be used intraperitoneally. Pre-op associated toxicity, such as neutropenia, should also be considered. Progressive disease under systemic chemotherapy will negatively influence the decision to perform CRS and HIPEC.

• Imaging – the standard radiographic evaluation should be an intravenous and oral contrast enhanced CT scan of the thorax, abdomen and pelvis. It would be best to obtain the imaging as close as possible to the surgical procedure. Preferably no more than one month’s time.
Criteria for patient selection

• **Histological data** – it would be advisable that any pre-existing tumor tissue material be analyzed early in the patient evaluation process, as well as confirmation of the peritoneal spread. Peritoneal surface malignancies are quite rare and require an experienced pathologist. Getting a correct histological diagnosis is of great value. Well differentiated carcinomas will have a better prognosis than the poorly differentiated. The presence of signet ring cells is often associated with poor diagnosis.
Criteria for patient selection

- **Primary site** – Important for the treatment plan. Peritoneal dissemination from gastrointestinal or gynecologic malignancies can be considered for the combined treatment with encouraging results, once the patient is found to be suitable. For carcinomatosis of ovarian origin, for example, a surgical cytoreduction associated with peri-operative intraperitoneal chemotherapy seems a rational approach that could improve the results in these patients. Well differentiated carcinomas will have a better prognosis than the poorly differentiated. The presence of lymph node metastases suggests higher recurrence rate.
Criteria for patient selection

Relative contraindications -
- extra-abdominal metastases
- Liver metastases
- Biliary and ureteral obstruction
- Small bowel involvement
HISTOLOGICAL ASSESSMENT

• It is advisable to analyze any pre-existing tumor tissue early in the pre-operative evaluation process. Peritoneal spread should also be assessed and confirmed, if possible. Peritoneal surface malignancies are quite rare and require an experienced pathologist.
HISTOLOGICAL ASSESSMENT
DPAM (blue) vs. PMCA (red)

Sugarbaker, Cancer J, 2009
HISTOLOGICAL ASSESSMENT

DPAM

Signet Ring
Preoperative CT scan

• The preoperative CT scan of chest, abdomen and pelvis may be of great value in planning treatments for peritoneal surface malignancy. It has been of great help in locating and quantitating mucinous adenocarcinoma within the peritoneal cavity.
Criteria for patient selection

For each patient, CT parameters are usually analyzed:

1) Seven anatomic sites – right hemidiaphragm, left hemidiaphragm, small bowel mesentery, pelvis, subhepatic space, greater omentum and lesser omentum.

2) Tumor volume in different portions of the small bowel. Mucinous cancer on small bowel or small bowel mesentery, greater than 5 cm in diameter, indicates that the mucinous cancer is no longer redistributed, resulting in an incomplete cytoreduction.
DPAM with compartmentalized bowel
DPAM with small bowel encasement
PMCA with mesenteric infiltration
TUMOR MARKER ASSESSMENT

• CEA and CA19-9 are of practical value in the management of patients with mucinous appendiceal malignancy with peritoneal dissemination. Also the least expensive assessment of a patient’s disease. Ovarian cancer patients are well monitored by cancer antigen 125 (CA-125)
Tumor marker assessment

Carmignani, J Surg Oncol, 2004

p=0.0004
**TABLE I. Positive Tumor Markers in Advanced Primary and Recurrent Epithelial Appendiceal Malignancy and in Other Gastrointestinal Cancers**

<table>
<thead>
<tr>
<th>Disease</th>
<th>% Positive CEA</th>
<th>% Positive CA 19–9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epithelial appendiceal cancer</td>
<td>56.1</td>
<td>67.1</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>Gastric cancer</td>
<td>25</td>
<td>44</td>
</tr>
<tr>
<td>Pancreas cancer</td>
<td>61</td>
<td>71</td>
</tr>
<tr>
<td>Esophageal cancer</td>
<td>27.1</td>
<td>4.4</td>
</tr>
</tbody>
</table>

CEA, carcinoembryonic antigen; CA 19–9, cancer antigen.
Interpretative CT classification of small bowel and its mesentery in patients with peritoneal mesothelioma

<table>
<thead>
<tr>
<th>Class</th>
<th>Presence of ascites</th>
<th>Small bowel and mesentery involvement</th>
<th>Loss of mesenteric vessel clarity</th>
<th>CT scan interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Normal Appearance</td>
</tr>
<tr>
<td>I</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Ascites only</td>
</tr>
<tr>
<td>II</td>
<td>Yes</td>
<td>Thickening Enhancing</td>
<td>No</td>
<td>Solid tumor present</td>
</tr>
<tr>
<td>III</td>
<td>Yes</td>
<td>Nodular thickening Segmental obstruction</td>
<td>Yes</td>
<td>Loss of normal architecture</td>
</tr>
</tbody>
</table>

Yan, Cancer, 2005
CT interpretative class I
CT interpretative class II
CT interpretative class III
Conclusions

• Complete clinical assessment necessary
• Histopathology, tumor markers and CT scan can be used to select patients most likely to benefit from a cytoreductive procedure.