

# Cytoreductive Surgery with Hyperthermic Intraperitoneal Chemotherapy for Gallbladder Cancer: A Retrospective Review

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Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) often prolongs survival in patients with peritoneal surface disease, yet is generally avoided in patients with peritoneal spread from gallbladder cancer as a result of its aggressive biologic behavior. Therefore, we reviewed our experience with CRS/HIPEC for patients with gallbladder cancer. We retrospectively evaluated the outcomes of CRS/HIPEC procedures performed from 1991 to 2013 using a prospectively maintained database of 1069 procedures. Patient and tumor characteristics, morbidity, mortality, and survival were reviewed. CRS/HIPEC was performed six times in five patients with peritoneal spread from gallbladder cancer. Patients were young (age 28 to 54 years) without pre-existing comorbidities. Eighty per cent had an Eastern Cooperative Oncology Group score of 0 or 1. At CRS, organs resected included omentum (n = 4), liver (n = 3), colon (n = 2), ovaries (n = 1), and diaphragm (n = 1). A complete macroscopic cytoreduction of intraperitoneal disease was achieved in every case. Clavien graded major morbidity was 17 per cent. There was no observed mortality. Median and 3-year survival were 22.4 months and 30 per cent, respectively. CRS/HIPEC may be performed safely in patients with peritoneal dissemination from gallbladder cancer. Carefully selected patients with low-volume disease amenable to complete cytoreduction may experience a meaningful survival benefit.

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**G**ALLBLADDER CANCER REPRESENTS less than four per cent of digestive system malignancies<sup>1</sup> with overall 5-year survival of five per cent.<sup>2</sup> Furthermore, patients commonly present with advanced disease,<sup>2</sup> most of whom will die within one year of diagnosis.<sup>3</sup> Although improvements are being made in systemic therapy,<sup>4</sup> surgery is the primary treatment for patients with early presentation.<sup>5–10</sup> For patients with gallbladder cancer and peritoneal carcinomatosis, the impact of surgery is ambiguous. Although some consider surgical resection inappropriate for patients with peritoneal involvement arising from gallbladder cancer,<sup>6</sup> others have observed long-term survival in radically resected patients with very limited carcinomatosis.<sup>9</sup>

Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has the potential to improve survival in patients with peritoneal

surface disease (PSD) from a variety of neoplasms; however, peritonectomy procedures are less likely to achieve disease control in primaries with significant systemic metastatic potential,<sup>11</sup> yet CRS/HIPEC has been applied to a few cases of peritoneal carcinomatosis from biliary tract origin.<sup>12, 13</sup> The specific outcomes of these procedures are obscured by the large, heterogeneous groups in which they have been reported.

Therefore, we reviewed our experience with CRS/HIPEC for patients with peritoneal carcinomatosis arising from gallbladder cancer. The primary aim was to determine the safety and feasibility of CRS/HIPEC in this population.

## Methods

Patients with a primary diagnosis of gallbladder cancer were retrospectively identified from a prospectively maintained database of 1069 CRS/HIPEC procedures performed from 1991 to 2013. All patients had microscopic confirmation of their malignancy, and no patients were excluded. Patient demographics, comorbidities, procedure characteristics, morbidity, mortality, and survival were reviewed. Institutional Review Board approval was obtained.

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