Comparing Clinical Outcomes of Robotic Assisted Procedure and Open Laparotomy in CytoReductive Surgery (CRS) and Heated IntraPeritoneal Chemotherapy (HIPEC) for Peritoneal Carcinomatosis (PC)

Jason Xu
Pomona College

Jason Xu, Rohit Sharma, MD
Cancer Care and Research Center

Background: Peritoneal carcinomatosis (PC) is a severe cancer, typically of abdominal origin, that has metastasized to the peritoneum. Before the advent of two advanced therapies, CytoReductive Surgery (CRS) and Heated IntraPEritoneal Chemotherapy (HIPEC), PC was considered a terminal illness within just a few years. Both CRS and HIPEC have demonstrated promising outcomes for various patients with PC, but the extensive abdominal incision performed during the open laparotomic version of these procedures has, in some studies, been associated with higher mortality, morbidity, and prolonged hospitalization. More recent studies have shown that robotic CRS and HIPEC is both feasible and safe. Robotic CRS/HIPEC may also provide superior visualization and range of motion intraoperatively, but only a few studies have been done that have compared open vs. robotic CRS/HIEPC on postoperative outcomes

Methods: A retrospective cohort was assembled of PC patients who received CRS/HIPEC since 2008 at a single institution, the Marshfield Clinic Health System (MCHS) in central Wisconsin. Demographic and clinic data were extracted and entered into a database, stratified by patients who received robotic or open CRS/HIPEC. Statistical analyses were conducted using the SAS statistical software. Univariate and multivariable regression models were used to assess associations between open vs. robotic CRS/HIPEC on key outcomes, including hospital stay, blood loss, operative time, and 90-day readmissions.

Results: There were 85 patients, 70 in the open and 15 in the robotic CRS/HIPEC groups, who met study eligibility criteria. In univariate analyses, only underlying peritoneal carcinomatosis index (PCI) significantly differed between groups. Demographic and clinical characteristics were statistically similar. In multivariable analyses where patients with high PCI score were excluded, there were significant differences in estimated blood loss Open group 346 ml vs. Robotic group 169 ml ($p = 0.028$), and operative time open group 8.5 hours vs. Robotic group 10.5 hours ($p = 0.0015$).

Conclusions: More confirmatory research is needed in larger samples, but robotic CRS/HIPEC is associated with significantly reduced blood loss relative to open laparotomic approach. Despite the robotic approach taking a longer time to complete, it may also result in shorter hospital stays and less risk of rehospitalization.