Impact of Glucose Concentration of Perfusate on Perioperative Outcomes in Patients Undergoing Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy

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Introduction

- Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is commonly used to treat peritoneal surface malignancies.
- The procedure carries a high rate of morbidity and prolonged recovery.
- Previous work evaluating direct peritoneal resuscitation with dextrose-containing peritoneal dialysate in trauma settings has shown favorable impact on bowel edema, intestinal blood flow, and functional recovery.
- In 2015 there was a practice shift from a 1.5% dextrose perfusion solution (low-dextrose) to a 2.5% solution (high-dextrose).

Hypothesis

- The higher concentration dextrose perfusate (mirroring a peritoneal dialysate solution) will be associated with faster return of bowel function and fewer complications.

Methods

- This was a single center retrospective chart review identifying patients undergoing CRS/HIPEC from 2008 to 2019.
- Perioperative outcomes, including time to return of bowel function and diet, length of stay (LOS), and perioperative complications were compared.
- Disease burden (assessed by peritoneal carcinomatosis index) and degree of debulking were compared using prospectively recorded standardized assessments.
- Peak intraoperative and daily postoperative glucose levels were recorded.
- Comparisons were made using chi square test, Fisher’s exact test, Student’s t-test, or Wilcoxon rank sum test. Repeated measures ANOVA used to compare differences in post-op glucose levels.

Results

- Table 1. Preoperative Variables
  - Age, median (IQR): 55 (46-65) vs 55 (47-65) (P value: 0.99)
  - Race, median (IQR): White 70 (95.9%) vs 24 (100%) (P value: 0.57)
  - Sex, median (IQR): Female 74 (51.6%) vs 16 (66.7%) (P value: 1.0)
  - Diagnosis, median (IQR): Gastrointestinal 106 (75.3%) vs 82 (54.2%) (P value: 0.02)
  - Prior Chemo, median (IQR): 43 (58.9%) vs 15 (62.5%) (P value: 0.76)
  - PTT, median (IQR): 0.86 (0.76-0.98) vs 0.86 (0.75-0.95) (P value: 1.0)
  - Hemoglobin, median (IQR): 12.3 (11.9-12.8) vs 12.2 (11.9-12.6) (P value: 0.38)
  - Peritoneal tumor burden, median (IQR): 86 (66-104) vs 78 (56-95) (P value: 0.21)
  - Disease burden (assessed by peritoneal carcinomatosis index) and degree of debulking were compared.

- Table 2. Operative Factors
  - Operative time, median (IQR): 341 (290-397) vs 303.5 (290-371.5) (P value: 0.23)
  - Operative time, median (IQR): 9 (5.5-14) vs 9 (6-15) (P value: 1.0)
  - Operative time, median (IQR): 5 (4-6) vs 4 (4-5) (P value: 0.89)
  - Perfusion time, median (IQR): 14 (12-17) vs 13 (12-15) (P value: 1.0)
  - Perfusion time, median (IQR): 34 (27-41) vs 30 (26-37) (P value: 0.89)
  - Perfusion time, median (IQR): 2.5% (n=24) vs 1.5% (n=73) (P value: 0.44)

- Table 3. Postoperative Outcomes
  - Length of Stay, days, median (IQR): 12 (9-17) vs 10 (8-15) (P value: 0.29)
  - Return of function, days, median (IQR): 7 (5-10) vs 7 (5-10) (P value: 0.34)
  - Return to Oral Diet, days, median (IQR): 6 (5-7) vs 6 (5-7) (P value: 0.87)
  - Return to Oral Diet, days, median (IQR): 6 (5-7) vs 6 (5-7) (P value: 0.87)
  - Return to Oral Diet, days, median (IQR): 10 (8-12) vs 10 (8-12) (P value: 0.87)
  - Return to Oral Diet, days, median (IQR): 36 (49.3%) vs 5 (20.8%) (P value: 0.014)
  - Return to Oral Diet, days, median (IQR): 22 (30.1%) vs 16 (25.0%) (P value: 0.20)
  - Return to Oral Diet, days, median (IQR): 24 (48.6%) vs 15 (29.2%) (P value: 0.06)
  - Return to Oral Diet, days, median (IQR): 2 (2.5%) vs 1 (42.5%) (P value: 1.0)

Conclusions

- Use of 2.5% dextrose-containing perfusate with HIPEC administration appears safe for CRS/HIPEC operations.
- The higher dextrose solution does not negatively impact intra- or postoperative glucose levels and may be associated with a decreased risk of complications.

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