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II. POSTERS

II.a) Anesthesia / Early recovery / Preoperative preparation / Nutrition

A01

A PROSPECTIVE AUDIT OF PERIOPERATIVE HEMODYNAMIC VARIABLES IN CYTOREDUCTIVE SURGERY (CRS) AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (HIPEC)

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Objectives

To study the intraoperative and postoperative variations in haemodynamics and determine the predictors of number of days of ICU stay, hospital stay, morbidity and 30 and 90-day mortality in patients undergoing CRS and HIPEC.

Methods

All the patients undergoing CRS and HIPEC were included in the study. Intraoperative periodical arterial blood gas and venous blood gas analysis were done. Peritoneal Carcinomatosis Index (PCI) Score, Completion Cytoreduction (CC) Score and the need for diaphragmatic stripping were recorded. The haemodynamic variables (Flotrac^{TM}) were noted every 30 minutes during the cytoreductive phase, every 10 minutes during the HIPEC phase, every 30 minutes during the reconstruction phase. In the postoperative period, 22 readings were noted over a period of 48 hours.

The patients were divided into two groups based on the postoperative outcome using Clavien Dindo classification. First group comprised of patients with Clavien Dindo grades 1 and 2, i.e., the patients who had minor complications in the postoperative period. The second group comprised of patients with Clavien Dindo grades 3, 4 and 5, i.e., the patients with major postoperative complications. The demographic values, intraoperative and postoperative data were subjected to descriptive analysis to obtain mean values. The mean values were compared between the two groups.

Results

35 patients underwent CRS and HIPEC in 18 month duration. The first group had 22 patients and the second group 13 patients with complications. There were 4 deaths in the postoperative period. Comparison of haemodynamic parameters between the group 1 and 2 was done. Major complications group had lower mean arterial pressures compared to the minor complication group during HIPEC phase. There was no significant difference in heart rate between the groups. CVP remained high in the HIPEC phase in the complication group. PPV remained lower in HIPEC phase in the complication group, probably due to higher fluid infusion in the major complication group. Cardiac output and cardiac index remained lower throughout the procedure in the major complication group compared to the other group. Similarly stroke volume and stroke volume index remained lower in the major complication group compared to the minor complication group throughout the surgery.

Conclusion

CRS and HIPEC is a complex surgery with significant postoperative morbidity and mortality, with variations in patient haemodynamics in intraoperative as well as postoperative period.

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A02
PIPAC – ANAESTHESIA CONSIDERATIONS FOR A NOVEL APPROACH TO CHEMOTHERAPY

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Objectives

Peritoneal carcinomatosis has been associated with a very poor prognosis and hence a palliative approach is normally taken. (1)

Systemic chemotherapy beneficial in the treatment of systemic metastases but not against peritoneal spread. (1)

2 modes of Intraperitoneal chemotherapy have been found to address the depth of drug penetration and peritoneal spread:

- Hyperthermic IntraPEritoneal Chemotherapy and CytoReductive surgery (HIPEC and CRS)

- Pressurised IntraPeritoneal Aerosol Chemotherapy (PIPAC)

PIPAC
Used to induce regression of the peritoneal metastasis.
Patient's quality of life improved by lowered morbidity due to decreased drug systemic toxicity. (2)

Advantages:
- laparoscopic procedure, easy repeatability
- higher drug concentration within tumour cells due to pressurized vaporization;
- less haemodynamic instability.

Methods

PIPAC Procedure Keypoints

Administration of the chemotherapeutic agents via a nebulizer connected to a pressure injector which is connected to the trocar.

Scavenging system required for the evacuation of the remnant chemotherapeutic.

Average PIPAC procedure takes about 2 hours. (1)

Safety Precautions: 3 different levels of containment:
- air-tight pneumoperitoneum;
- laminar air flow and dilution capacity of the operating room;
- remote application of cytostatics from outside the operating room. (1)

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Results

Pre-Anaesthesia:

Routine workup with detailed history & preop blood investigation.

Anaesthesia Procedure:

Entire Procedure done under general anaesthesia; patient intubated to ensure a secure airway during the PIPAC administration.

TIVA technique for induction and maintenance of anaesthesia due to loss of scavenger system to surgical side.

During the administration of PIPAC, anaesthetist will be in an isolated room.

Conclusion

Anaesthesia Equipment & Setup:

Monitors for normal laparoscopic procedure:
- ECG monitoring
- Pulse oximetry & capnography
- BP monitoring – noninvasive/invasive
- BIS monitoring

TIVA pumps, syringe pumps & intravenous tubings with intravenous access all extended to reach the patient from the adjacent room.

Non-reflux tubing for TIVA propofol to prevent backflow.

Pumps should be connected to powerpoints

Drug trolley, IV fluids & resuscitation drugs should be available within the adjacent room.

The adjacent room should have a window to view the patient & monitor readings during the PIPAC administration.

A03

THE IMPACT OF POSTOPERATIVE MECHANICAL VENTILATION ON OUTCOME AFTER CYTOREDUCTION AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Objectives

Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) may be associated with intraoperative hemodynamic changes and potential morbidity. We evaluated outcomes of patients who required intraoperative vasopressor (IVP) use and post-operative mechanical ventilation (POMV) while undergoing CRS/HIPEC.

Methods

An IRB approved retrospective review was performed for patients who underwent CRS/HIPEC for PC. Clinicopathologic, intraoperative and perioperative variables and outcomes are described.

Results

Seventy patients (median age 55.5 years, 64% female and 69% Caucasian) underwent CRS/HIPEC. The median peritoneal cancer index (PCI) score was 11.0 (1–39) and 95% underwent completeness of cytoreduction (CCR) score of 0/1. Forty-nine patients (70%) required IVP and 28 (40%) required POMV. Patients who required POMV had a higher PCI (18.1 vs 12.0, 0.016) and were more likely to require multivisceral resection of >4 organs (71% vs 43%, 0.019). POMV was associated with a longer intraoperative duration of IVP use (223 minutes vs 120 minutes, 0.010), requirement of IVP use greater than 120 minutes (80% vs 38%, 0.004), and continued IVP requirement at the end of CRS/HIPEC (25% vs 7%, 0.036). Patients requiring POMV had longer anesthesia and operative times (648 vs 516 minutes and 598 vs 441 minutes, respectively, <0.0001 and <0.0001). Patients requiring POMV had a higher blood loss (996 vs 442 mL, <0.0001), required greater intraoperative fluid administration (5.6 vs 4.0 Liters, 0.003), and had higher rates of red blood cell (82% vs 50%, 0.006) and fresh frozen plasma (39% vs 5%, <0.0001) transfusions. POMV patients had longer ICU and hospital stay (4.25 days vs 2.0 days, <0.0001 and 11.3 days vs 8.4 days, 0.001, respectively, and were more likely to experience a major complication (29% vs 7%, 0.016). Patients who required POMV were able to extubate within 14.5 hours (10–211 hours) and 3 patients (11% vs 0%, 0.030) required reintubation. On multivariable analysis, duration of IVP use greater than 120 minutes (0.017), FFP transfusion (0.028) and operative length (0.008) were independently associated with the need for POMV after CRS/HIPEC.

Conclusion

POMV is associated with increased perioperative morbidity for patients undergoing CRS/HIPEC. Operative length and duration of IVP use greater than 2 hours are associated with increased risk of POMV. Preoperative counseling of about the potential need for POMV is necessary for patients undergoing CRS/HIPEC.

A04

PERIOPERATIVE IMPACT OF GOAL DIRECTED FLUID THERAPY AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Objectives

Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is associated with long operative time, significant fluid requirements, and high morbidity. We examine the impact of a goal-directed fluid therapy (GDFT) protocol on perioperative outcomes after CRS/HIPEC.

Methods

A retrospective review was performed for patients undergoing CRS/HIPEC from 2011–2017. A GDFT program was implemented in 2014 at our institution. Patients treated with a GDFT protocol were compared to those managed with standard fluid therapy (SFT).

Results

Seventy patients underwent CRS/HIPEC (31 SFT and 39 GDFT). The GDFT group received less intraoperative fluid (3.9 L vs 5.6 L, $p = 0.002$), more colloid (1.5 L vs 1.1 L, $p = 0.005$), were less likely to require mechanical ventilation (20% vs 64%, $p < 0.001$) and had a shorter intensive care unit stay (2.4 days vs 3.5 days, $p < 0.001$). GDFT patients were more likely to have an epidural (74% vs 39%, $p = 0.004$), had reduced opioid requirement (morphine equivalent dose; 116 mg vs 238 mg, $p < 0.001$), underwent Foley catheter and nasogastric tube removal sooner with earlier institution of liquid diet ($p < 0.05$ for all) and had a shorter hospital length of stay (8.9 days vs 10.4 days, $p = 0.03$) than SFT patients. GDFT use did not have an impact on survival and was not independently associated with reduced morbidity.

Conclusion

GDFT use is associated with reduced intraoperative fluid, need for mechanical ventilation, reduced ICU and hospital length of stay while epidural use reduces narcotic requirement. The impact of a GDFT protocol on postoperative morbidity requires further study.

A05

DOSE DEPENDENT EFFECT OF RED BLOOD CELLS TRANSFUSION ON PERIOPERATIVE AND LONG TERM OUTCOMES IN PERITONEAL SURFACE MALIGNANCIES TREATED WITH CYTOREDUCTION AND HIPEC

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Objectives

Cytoreductive surgery (CRS) and hyperthermic intra-peritoneal chemotherapy (HIPEC) are associated with increased red blood cell transfusion (RBT) demand. Although the deleterious effects of RBT are documented in various settings, its effect in this setting is obscure. In this study we aimed to evaluate the effects of different grade RBT on the short and long-term outcomes of CRS and HIPEC.

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Methods

We analyzed 231 patients with diffuse malignant peritoneal mesothelioma (DMPM) and 273 patients with pseudomyxoma peritonei (PMP) operated in our unit. RBT was categorized according to the amount of packed red blood cell units (PRBCs) administered (0, 1–2, 3-5, >6). The effects of RBT on long-term oncological outcomes (progression free survival (PFS) and overall survival (OS)) were assessed using multivariate analysis.

Results

Overall, 74% of the patients were transfused with a mean of 2 PRBCs (range: 0–37). Transfusion level correlated with operative time, surgical extent (as measured by the peritoneal carcinomatosis index), and age. Postoperatively, patient with major transfusion (>6 PRBCs) had increased mortality rate (11.1%, $p = 0.01$) and length of hospital stay (31.2 ± 16.8 days, $p = 0.01$) in comparison to other levels of RBT. RBT was dose-dependently associated with oncological outcomes in both DMPM and PMP for both PFS (HR = 1.40, 95% confidence interval (CI): 1.12–1.74, $p = 0.003$; HR = 1.44, 95% CI: 1.15–1.81, $p = 0.001$, respectively) and OS (HR = 1.57, 95% CI: 1.21–2.03, $p = 0.001$, HR = 1.43, 95% CI: 1.15–1.90, $p = 0.01$, respectively).

Conclusion

Our data show a dose-dependent relationship between RBT and oncological outcomes. Further research to develop transfusion sparing protocols is needed in this extensive surgical procedure.

A06
NO NEED FOR POSTOPERTIVE ICU-TAILORED PERIOPERATIVE CARE FOR THE HIPEC PATIENT

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Objectives

Our objective was to develop a perioperative management for the HIPEC patients that minimized the postoperative problems and thereby transferred the postoperative caretaking from ICU to the postoperative care unit.

Methods

Excessive fluid administration with subsequent postoperative respiratory complications is a common problem, so is hyponatremia due to insufficiently replaced sodium during the HIPEC treatment. Preoperative hyperthermia leading to vasodilation and a need of vasopressor may require postoperative ICU care. Preoperative shifts in body temperature disturbs the thermoregulation and may lead to postoperative shivering, which is highly oxygen consuming and harmful to the postoperative patient. By controlling fluid therapy, balancing sodium concentration, avoiding hyperthermia and preventing shivering we would be able to reach our objective.

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Results

By using goal directed fluid therapy with oesophageal doppler, fluid administration was well controlled throughout surgery and excess fluid administration avoided. Median postoperative fluid balance was +3500 ml. Throughout the HIPEC phase, intravenous sodium infusion was administrated, and sodium level measured every 10 minutes. Thereby plasma sodium was kept within normal values throughout the surgery.

In order to control body temperature, patients were cooled down to 34°C–34.5°C- pre- HIPEC, which resulted in no patient reaching a maximum temperature higher than 39°C during the HIPEC treatment.

Approximately 30 minutes before end of surgery, intravenous clonidine which has shown to increase the shivering threshold, was administrated. This resulted in a decrease in occurrence of postoperative shivering from 80% to less than 10%.

In May 2013, 8 months after the operation of the first HIPEC patient, the postoperative care of this patient group was transferred from ICU to the postoperative care unit. The complication rate is low (Clavien Dindo 4a+4b in 0.8%) and the median stay at hospital is 16 days.

Conclusion

CRC and HIPEC is a demanding procedure for the patient, but by tailoring the perioperative treatment regarding certain focus areas such as fluid treatment, perioperative sodium balance, core temperature control, and prophylactically treatment of postoperative shivering, postoperative care after this extensive surgery can be tended at the postoperative care unit instead of in the ICU. Above all, this is a great advantage for the patient and but also implies a significant socioeconomic saving.

A07

ANAESTHETIC MANAGEMENT OF CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY – DEVELOPMENTS LEADING TO A REDUCTION IN MORTALITY AND MORBIDITY RATES

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Objectives

Our centre has a high volume of CRS with HIPEC cases. Grade 3 and 4 morbidity dropped from 13.7% to 6.7% and mortality reduced from 3% to 0.7% over the last 20 years. This study reports the anaesthetic and perioperative care at our centre and discusses the developments that have contributed to this reduction in morbidity and mortality.

Methods

A retrospective observational study of 147 patients undergoing CRS and HIPEC.

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Results

71 (48.3%) patients had pseudomyxoma peritonei, 4 (2.7%) patients had mesothelioma of peritoneal origin and 72 (49%) patients had peritoneal carcinomatosis from colorectal origin. All patients underwent resection followed by intra-operative HIPEC. Mean operative time was 452 (±SD 117) minutes. 49 (33.3%) of patients required a splenectomy, 9 (6.1%) of patients required a partial gastrectomy and 53 patients (36%) of patients required stripping of the diaphragms. 123 patients (83.7%) of patients received HIPEC with mitomycin C, 24 (16.3%) of patients received cisplatin HIPEC. 114 (77.5%) of patients received 60 minutes of HIPEC, 33 (22.5%) of patients received 45 to 30 minutes of HIPEC. 146 (99.3%) patients received a thoracic epidural. All patients underwent intraoperative coagulation surveillance and received blood products according to our centre protocol. All patients received tranexamic acid intraoperatively. 104.7 (±45.5) mls/kg was the mean volume of total fluid administered intraoperatively. 61 (41.5%) patients received a mean of 751 (±1002) mls of human albumin solution (4.5%). 90 (61.2%) patients did not require any packed red cell transfusion intra-operatively, the mean volume of packed red cells required intra-operatively was 1.0 units (SD ± 1.5 units). Cryoprecipitate was given to 111 patients (75.5%). 147 (100%) patients were admitted to a critical care environment immediately post-operatively.

Conclusion

The high caseload and low number of operators has resulted in a significant pool of expertise in the perioperative care of this group at our centre. This and other data supports centralisation of services to amass expertise in one institution, however there will also be an effect from a global learning curve. Over 1200 cases, we have developed a protocol for blood product and coagulation management, perioperative fluid and haemodynamic management, analgesia, temperature control and post-operative care. This allows early extubation and recovery, contributing to a significant reduction in morbidity and mortality.

A8

OUTCOMES IN PATIENTS ON HOME PARENTERAL NUTRITION WITH INTESTINAL FAILURE SECONDARY TO ADVANCED PERITONEAL MALIGNANCY

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Objectives

The purpose of this study was to investigate survival rates, safety and life expectancy in those with end stage advanced peritoneal malignancy who received home parenteral nutrition (HPN).

Methods

A retrospective analysis was completed on the medical notes of known patient's who received HPN in a high volume peritoneal malignancy centre between 1st January 2012 and 31st January 2017.

Results

There were 15 patients in total, 11 (73%) with low grade pathology and 4 (27%) with high grade. The mean survival for patients on HPN with low grade disease was 426 days (14.2 months). The mean survival in the 4 with high grade disease was 139 days (4.6 months). Complications were infrequent but significant and debilitating when they occurred.

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Conclusion

The use of HPN significantly prolonged life in those with low grade peritoneal malignancy in comparison to previously documented literature. Those with high grade malignancy showed less favourable outcomes. HPN still remains a contentious issue in those with high grade tumours but each case must be judged on an individual basis.

A09

PHASE II RANDOMIZED STUDY ON TISSUE UPTAKE AND PHARMACOKINETICS OF CISPLATIN ACCORDING TO DIFFERENT INTRA ABDOMINAL PRESSURES DURING HIPEC NCT02949791

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Objectives

To evaluate the effects of high intra-abdominal pressure (IAP) during hyperthermic intraperitoneal chemotherapy (HIPEC) on penetration of cisplatin into the residual neoplastic and normal tissues, cisplatin pharmacokinetics, and short-term surgical outcomes.

Methods

Patients with peritoneal metastasis from colorectal cancer (PM-CRC) or pseudomyxoma peritonei (PMP), completely cytoreduced were randomly assigned to HIPEC with low or high IAPs. HIPEC was performed using closed abdomen technique for 60 minutes. High IAP was obtained increasing the total volume of perfusate maintaining the same cisplatin concentration (42 mg/l°of°perfusate). Platinum determination was performed using an Inductive Coupled Plasma Mass Spectrometry system. Randomized groups were stratified according to tumor type. To consider the multiple sampling in the three tissues types of interest, we performed linear mixed models to assess the differences of cisplatin concentration between IAP arms. We also compared AUC perfusate/plasma ratios (Wilcoxon-Mann-Whitney) and rates of perioperative severe complications (chi-square) between the two arms.

Results

38 cases (9 PM-CRC and 29 PMP) were randomly assigned to IAP arms (n = 19 each. Median IAPs were 19 mmHg and 11 mmHg in the high and low arms, respectively. Cisplatin concentrations did not differ in the tumor residual tissues and in the muscular fascia [22.8 ng/mg (SD: 25.5) vs. 15.9 ng/mg (SD: 13.3), p = 0.181] and [50.3 ng/mg (SD: 40.1) vs. 42.0 ng/mg (SD: 38.3), p = 0.426, respectively], whereas in the mesenteric peritoneum it did [5.4 ng/mg (SD: 7.82) vs. 2.7 ng/mg (SD: 2.9), p = 0.048]. There were no differences in the pharmacokinetic advantages between the two arms. High IAP did not increase the number of perioperative severe complications (NCI-CTCAE.v3).

Conclusion

The present data favored the high IAP in terms of mesenteric peritoneum distribution of cisplatin and with not concerns related to safety. High IAP could be considered for cc-0 microscopic cytoreduction.

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A10
FAST-TRACK PERIOPERATIVE MANAGEMENT IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAOPERITONEAL CHEMOTHERAPY

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Objectives

The management of peritoneal carcinomatosis secondary to ovarian, gastrointestinal and appendiceal cancer, as well as primary peritoneal malignancies, has significantly changed with the implementation of cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. The present study reports the outcomes of the implementation of a fast-track perioperative management of such patients.

Methods

33 patients (6 males–27 females), with a mean age of 55, 6 years (34–72) underwent CRS and HIPEC from August 2017 to December 2017. The most common primary malignancy was ovarian cancer (17 patients). Patient outcomes were evaluated by length of ICU stay, length of hospital stay, 30-day mortality and morbidity, and readmission for complications related to the procedure. Complications were recorded according to the Clavien–Dindo classification system.

Results

The mean intraoperative PCI score was 17,9 (3–32). The mean operation time was 298 minutes (220–390). Optimal cytoreduction (CC-0/1) was achieved in 27/33 patients (81,8%). The mean postoperative ICU stay was 1 day, and the mean postoperative hospital stay was 8 days (6–15). There was no mortality related to the procedure. Adverse events were documented in 9/33 patients (27,2%). Severe complications (Grade III/IV) were encountered in 6 cases and consisted of 3 cases of pleural effusion, 1 case of epilepsy that required readmission in ICU, 1 case of ureteral obstruction, and 1 case of wound infection requiring surgical debridement. Delayed readmission for late complications was recorded in 2/33 patients (6%).

Conclusion

The implementation of fast-track perioperative protocol in patients undergoing CRS and HIPEC does not come with an additional burden in terms of morbidity or mortality.

A11
"NOBODY TELLS YOU HOW TO CARRY ON LIVING AFTER YOU HAVE WON THE FIGHT" – INTERVIEWS WITH CANCER PATIENTS

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Objectives

During the PIPAC meeting in Tuebingen in October 2017 we formed an interest group to evaluate the holistic management of patients with peritoneal disease.

Methods

Our patient representative subsequently conducted interviews with a focus group of cancer patients and their families.

Results

Patients reported in 3 domains: 1. Self-perception/perception of illness, 2. support structures and 3. treatment-related.

Perception was dominated by anxieties and fear about loss and separation, uncertainty how to communicate the illness to others, the temptation to just let things happen and remain passive, loss of interest in hobbies and activities, and the feeling of not being a complete and whole human being any more. Eating and food intake was a central theme, with patients having had to change their nutrition and meal times, despite efforts to maintain normality. Much consideration was given to death and dying, and the impact that the process has on others.

Support structures included the immediate family and close friends, fellow patients and like-minded people, as well as pets and faith/religion. Patients valued conversations with friends and exchange of advice with other patients. There was perceived little support via official hospital structures and health insurance, with lengthy bureaucracy and applications for supportive therapies, medications, unemployment benefits and pensions. Some patients felt that available additional therapeutic adjuncts and alternative therapies were unnecessary and/or too costly. Patients who had completed their cancer journey valued how the diagnosis put emphasis on time spent together with loved ones, helped them to realize whom they could rely on and the lasting value of true friendships. However, as one patient put it aptly: “One learns many ways to fight against death. But nobody tells you how to carry on living after you won the fight”.

Patients made several suggestions for improvement of treatment and a shift to make it more patient centered. There were recommendations to bring an accompanying person along for all consultations, a call for doctors to focus on the patient and not on a computer screen during the consultation, the inclusion of dietary advice during consultations, as well as recommendations for wider implications of the illness, such as the need to write a will.

Conclusion

The interviews provided insight into the patient perspective and will inform the construction of a questionnaire to reach a wider patient audience.

A12
RISK FACTORS ASSOCIATED WITH WOUND COMPLICATIONS AFTER CYTOREDUCTIVE SURGERY (CRS) AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (HIPEC)

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Objectives

Wound complications after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) occur in up to 8% of patients undergoing this procedure. This study aims to determine risk factors associated with post-operative wound complications, in order for better pre-operative counselling and institution of preventive measures.

Methods

299 patients with peritoneal malignancies who underwent CRS and HIPEC from January 2001 and February 2018 at the National Cancer Centre Singapore were included in this study. Clinical parameters, haematological results and postoperative outcomes were recorded.

Results

23 (8%) patients developed post-operative wound complication. Univariate analysis identified low pre-operative albumin levels, use of neoadjuvant chemotherapy before CRS and HIPEC, longer operative duration, increased intra-operative blood transfusion, enteric resection, and rectal resection as significant factors. On multivariate analysis, rectal resection remains an independent risk factor for wound complication.

Conclusion

Pre-operative malnutrition is a potentially correctable factor that may reduce post-operative wound complications in patients undergoing CRS and HIPEC.

A13
PERIOPERATIVE ANAESTHETIC MANAGEMENT FOR CYTOREDUCTIVE SURGERY AND HEATED INTRAPERITONEAL CHEMOTHERAPY: INFLUENCE ON MORBIDITY AND MORTALITY IN PERITONEAL TUMOURS. A SINGLE CENTRE EXPERIENCE

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Objectives

Cytoreductive surgery with heated intraperitoneal chemotherapy (CRS-HIPEC) is a recognised treatment for peritoneal malignancies. The complexity of surgery, thermal insult and length of anaesthesia have major effects on cardiorespiratory performance, fluid balance, metabolic outcomes and coagulation function perioperatively. We evaluated these variables in a specialised centre-of-excellence on a consecutive series of patients over two years.

Methods

A retrospective review of anaesthetic and critical care records in 288 patients undergoing CRS+/-HIPEC was undertaken. Data from analysis of intraoperative fluid (IF) administration, cardiovascular monitoring, temperature, glucose homeostasis was collated; postoperative time of extubation and pain management were also evaluated. Length of CCU and hospital stay, CCU readmission rate, postoperative morbidity using JCOG-modified Clavien-Dindo (CD) score and 30-day mortality were thereafter determined.

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Results

239 patients (83%) had CRS+HIPEC, 49 (17%) CRS alone. Thoracic epidurals were sited in 250 (87%) patients. The median IF for CRS+HIPEC were 10.92 and 12.03 ml/kg/h for actual and adjusted body weight; IF for CRS alone were 11.18 and 12.59 ml/kg/h. Immediate postoperative extubation was achieved in 100% with 225(94.1%) CCU admissions. CRS+HIPEC median CCU stay was 42.92 h; 25.73 h for CRS alone. Uncomplicated (CD0) recovery occurred in 41.78%; CDI/II complications 54.67%; CDIII/IV 3.56%. CCU readmission rate was 4% (n = 9). There were no fatalities during CCU stay; 1 patient died within 30 days.

Conclusion

CRS+HIPEC can be offered with low morbidity and mortality. We advocate invasive perioperative haemodynamic monitoring and goal-directed IF with a preference for crystalloids over colloids. Immediate extubation, CCU admission and thoracic epidural analgesia should be the desired goal and aimed for all planned open procedures.

A14

THE EFFECT OF INTRAOPERATIVE FLUID ADMINISTRATION ON OUTCOMES OF PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Objectives

To determine the effect of intraoperative fluids administered during cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) on post-operative patient outcomes.

Methods

This was a retrospective cohort study of prospectively collected data. Data was collected from anaesthetic charts of patients undergoing CRS/HIPEC from February 2010 to June 2017 at a single institution.

Results

A total of 335 patients formed the cohort study. The median total volume of fluid transfused per case was 11,050 (IQR, 8500–15,200) mLs. The median volume of crystalloid and albumin transfused per case was 7500 (IQR, 6000–9000) mLs and median blood products (which included packed red blood cells (PRBC), fresh frozen plasma (FFP) and cryoprecipitate) was 3300 (IQR, 1700–6400) mLs. Patients who received higher amounts of intraoperative fluid had a longer hospital length of stay (LOS) (34 vs 22.5 days; p = <0.001), extended ICU admission (5.3 vs 3.2 days; p = <0.001) and a 24% increase in grade 3 and 4 complications (p = <0.001). When corrected for weight and PCI, higher amounts of total volume administration resulted in longer hospital stay (31.5 vs 24.8 days; p = <0.001), increased transfusion of blood products resulted in longer hospital LOS (31.2 vs 25.2 days; p = 0.047) and longer ICU admission (4.7 vs 3.6 days; p = 0.03). On multivariable analysis, when correcting for confounding factors, less blood product transfusions showed a decreased LOS in hospital by 4.8 days (p = 0.01) and fewer grade 3 and 4 complications (OR 0.59; 95% CI, 0.35–0.99; p = 0.048).

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Conclusion

Intraoperative fluid administration has an independent effect on hospital LOS, ICU admission and complications.

A15

IMPLEMENTATION OF AN ENHANCED RECOVERY PROGRAM AFTER COMPLETE CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: CAN IT BE APPLICABLE AND IS IT EFFICIENT?

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Objectives

Enhanced recovery programs (ERP) after colorectal and upperGI surgeries have proven efficient but only few data exist after complete cytoreductive surgery (CCRS) and hyperthermic intraperitoneal chemotherapy (HIPEC). The aim of this study was to evaluate the efficiency of the implementation of an ERP after CCRS and HIPEC and to propose an adapted ERP to such procedures, based on our experience.

Methods

In June 2016, an ERP after surgery has been implemented for all patients operated on in the department of digestive surgery at Hautepierre hospital, Strasbourg, France. We included for this study all consecutive patients operated on for CCRS and HIPEC between June 2015 and December 2017, regardless of the peritoneal disease. A prospective series of 32 patients (group A) to whom the ERP was implemented between July 2016 and December 2017 was compared to a retrospective series of 21 patients operated on between June 2015 and June 2016 to whom the ERP was not yet implemented (group B). Groups were compared according to the 17 criteria of our program. A statistical Bayesian analysis was preferred due to the small number of patients in our cohort.

Results

A total of 53 consecutive patients were included. The median age was 58 years and the median PCI was 9 (IQR: 0–31). Both groups were comparable for basic characteristics. The hospital length of stay decreased between the 2 groups: 22.2 days (IQR 8–55, group B) versus 19.4 days (IQR 9–57, group A) as well as the major morbidity rate (group B = 33% vs group A = 25%). The gastric tube, urinary catheter and abdominal drainages were all removed faster in the group A (mean post-operative day (POD) 3.27 vs 6.25, POD 6.66 vs 7.33 and POD 8.59 vs 10.67, respectively). The compliance rate to the ERP was 60% in the group A. Based on our first results and compared to the historical ERP after surgery, we realized that our ERP needed to be adapted for CCRS and HIPEC for the following items: removing of the gastric tube (before POD 3), of the urinary catheter (before POD 5), walk (at POD 2) and light food recovery (before POD 4). With the ERP implementation, the probability that the compliance to the ERP was superior in the group A than in the group B was 72.5%.

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Conclusion

The implementation of an ERP after a CCRS and HIPEC procedure reduces its morbidity and shortens the length of stay. However some items of the ERP must be adapted to such a heavy surgery.

A16

PREDICTIVE FACTORS FOR FAST AND UNCOMPLICATED POSTOPERATIVE COURSE IN PATIENTS TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY – A SINGLE CENTER EXPERIENCE

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Objectives

Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are often associated with a high rate of morbidity and mortality. As surgical techniques and perioperative management are improving patient's outcome, new concepts like enhanced recovery after surgery (ERAS) need to be evaluated.

Methods

We analyzed the postoperative course and complications of 368 consecutive patients treated with CRS and HIPEC between 02/2005 and 10/2017. We correlated the postoperative hospital stay and complications with patient related factors.

Results

The median postoperative stay was 14 (1–375) days, while the median intensive care unit stay was 3 (0–368) days. The postoperative complication rate was 39.7%, in-hospital mortality 3.0%. In total 19.8% of the patients developed surgical complications, while 27.2% developed medical complications. Factors associated with a postoperative stay ≤14 days were underlying disease (OR 2.23; $p = 0.03$) and patient age (OR 2.59, $p = 0.01$), while patients treated with subtotal colectomy (OR 2.90; $p = 0.004$), liver resection (OR 2.49; $p = 0.013$), and splenectomy (OR 3.19; $p = 0.002$) stayed significantly longer in hospital. Factors like age (OR 3.20; $p = 0.02$), pelvic peritonectomy (OR 2.28; $p = 0.02$), rectal (OR 3.5; $p = 0.001$), pancreatic (OR 2.18; $p = 0.03$) or liver resection (OR 2.76; $p = 0.006$) were associated with a higher complication rate. Focusing on the development of our center, the medical complication rate did not significantly improve (28.4 vs. 26.7%; $p = 0.42$) when comparing from 2005–2010 period with that from 2011–2017 in contrast to the surgical complication rate (31.4 vs. 15.4%; $p = 0.001$), proving a learning curve. Patients with postoperative complications did not show decreased overall median survival (30.5 vs. 32.6 months; $p = 0.69$).

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Conclusion

Patients associated with a low complication rate and a hospital stay ≤14 days, were young patients, with gastric cancer or patients without major colonic, liver or pancreatic resection. Whilst the surgical complication rate has been significantly reduced during the last 13 years, the medical complication rate was unaffected and further efforts are needed to improve results, including the evaluation of ERAS programs.

A17
GOAL-DIRECTED THERAPY IN CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Objectives

Cytoreductive Surgery (CS) with Hyperthermic Intraperitoneal Chemotherapy (HIPEC) in peritoneal carcinomatosis (PC) treatment causes significant hemodynamic, metabolic and hematological alterations. A great disparity is observed in the perioperative management of these patients. We present the results of the application of an anesthetic protocol based on hemodynamic Goal Directed Therapy (GDT) in CRS and HIPEC. The evolution of the hemodynamic, metabolic and hematological parameters during the intraoperative period and the first 72 postoperative hours was analyzed.

Methods

Prospective, observational study of all CRS and HIPEC patients from March 2014 to May 2017. Hemodynamic and clinical parameters were registered during surgery and the first 3 postoperative days. We correlated intraoperative data with the postoperative course until the seventh day.

Results

We included 92 patients, with an average age of 58 years old (±10.9) and 62% rate of females. 38% of PC was due to ovarian carcinoma and 47% were due to colorectal carcinoma. Peritoneal Carcinomatosis Index (PCI) (median and ranges) was 10 [0–39], 99% received epidural analgesia. Median Cardiac Index (CI) was 3.15 l/min–1/m-2 [1.79–5.60]), and Systolic Volume Variation (SVV) was 10% [3%–17%], both remained within the normal values in all surgery phases. A large difference was observed between the minimum and maximum range of fluid therapy administered (9.8 ml/kg/h [5.3–24.3]). A direct relationship was observed between PCI and surgery duration, fluid therapy and intraoperative transfusion percentage ($p < 0.02$). No correlation was proven between temperature increase during HIPEC and CI values ($p = 0.986$). We recorded a 34% rate of use of norepinephrine and 87% of patients were extubated in the operating room. Grade III-IV postoperative complications were 26%, and one patient died (1%).

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Conclusion

We found a great variability in the intraoperative fluid therapy needs of the patients. The use of a GDT Anesthetic Protocol in CRS and HIPEC makes it possible to individually adjust the fluid therapy and vasoactive drugs use, avoiding over-hydration and ensuring hemodynamic stability in all surgery phases. The absence of a hyperdynamic state during HIPEC, may be due to the normovolemia accomplished.

A18

EARLY IDENTIFICATION OF PSYCHOLOGICAL RISK - PRE-OPERATIVE PSYCHOLOGICAL SCREENING IN PERITONEAL MALIGNANCY PATIENTS: A SERVICE EVALUATION

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Objectives

Research into the psychological management of surgical patients has emphasized the importance of preoperative state of mind on post-operative adjustment [Ali et al., 2014]. In Basingstoke and North Hampshire Hospital, all elective peritoneal malignancy patients are screened by a Clinical Psychology team member prior to undergoing surgery. The screening combines paper-based psychometric scoring (Patient Health Questionnaire-9 and GAD 7) and clinical evaluation. Patients are given a rating of Green (low), Amber (moderate) or Red (high) of their risk of developing problematic adjustment in the post-operative period and clinicians are alerted to this. The objective of this study is to evaluate whether the screening process is facilitating early detection of risk in peritoneal malignancy patients.

Methods

The evaluation took a pragmatic retrospective approach. Data was used from screenings between December 2017 and February 2018. Patients' notes were examined to identify documentation of problematic adjustment, which for the purposes of the study, was defined broadly to include any of the following: hallucinations, vivid nightmares; paranoia; attention impairment; anxiety symptoms including hypervigilance; agitation, aggression disengagement from staff; and notable emotional distress or tearfulness. The presence or absence of these symptoms was then compared to the patient's initial screening result.

Results

Out of 30 patients examined, 26 received pre-operative screening. For the patients who had an initial score of Red, 100% went on to experience problematic adjustment. For patients who were scored Green, only 6% went on to experience such symptoms. For patients who were scored Amber, 40% experienced symptoms. On closer examination of the Amber group, patients who had been given an Amber rating based on clinical assessment rather than paper-based score 66% did experience symptoms, whereas in Amber patients with a low clinical suspicion, 0% went on to experience problematic adjustment.

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Conclusion

The pre-operative screening process that is used is offering good predictive value for the detection of risk of problematic adjustment in peritoneal malignancy patients. Clinician-based assessment is more sensitive than paper-based scoring alone; this adds weight to the use of clinical psychologists in the pre-operative screening process. Further research should be undertaken within this area to optimise psychological management of this patient group.

A19
VARIATIONS IN INTRAOPERATIVE FLUID ADMINISTRATION DURING CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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Objectives

To examine the variability of fluid administration during cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC)

Methods

This retrospective cohort study included consecutive patients undergoing CRS/HIPEC between 2010–2017 at St. George Hospital, Sydney. Anaesthetic charts were reviewed and volumes of crystalloids, albumin and blood products were extracted. Results were stratified by anaesthetist, tumour type and tumour volume as depicted by the peritoneal cancer index (PCI)

Results

Twelve consultant anaesthetists were involved in the surgeries of 335 patients. The median total volume of intraoperative fluid (IOF) administered per case was 11,050 mL (range, 3000–45,700) at a rate of 17 ml/kg/hr (interquartile range [IQR], 12–23). The median volume of blood products administered was 3330 ml (IQR, 1700–6400) at a rate of 5 ml/kg/hr (IQR, 3–9). Over 7200 units of blood products were used in all surgeries. IOF rates varied substantially with PCI. There was a clear linear relationship seen with every increase in PCI by one point resulting in an increase of 0.2 ml/kg/hr fluid ($p < 0.001$). Equally, the proportion of blood products increased with increasing PCI at the cost of crystalloid and albumin administration. When comparing tumour types, the median IOF rate was almost double in colorectal cancer compared to other tumour types ($p < 0.004$). There was significant variation in the rate of blood products administered between individual anaesthetists ($p < 0.001$)

Conclusion

To our knowledge, this is the first ever detailed report on the volumes and types of fluids administered during CRS/HIPEC. Outcome analyses will facilitate an informed discussion regarding standardisation of treatment and fluid administration protocols for these complex patients.

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A20
TOWARDS A SPECIFIC QUALITY OF LIFE SCALE FOR PERITONEAL SURFACE MALIGNANCIES: INSIGHTS FROM PAKISTAN

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Objectives

There have been significant advancements in the management of peritoneal surface metastases (PSM) over the last few decades with improvement in oncological outcomes. Quality of life (QoL) is a very important outcome for patients with peritoneal surface malignancies. There have been many scales used for assessment of QoL for PSM but a score specific for PSM is lacking. We looked at the perspective of our population that can contribute towards development of a QoL tool specific for PSM.

Methods

EORTC QLQ-C30 (version 3) was used to assess baseline QoL of patients presenting to the PSM service at Patel Hospital, Karachi, Pakistan. In addition, the patients were asked to list their most troubling symptoms in the order of severity as well as the activities that they missed the most. Frequency of ascitic drainage procedures and admissions with intestinal obstruction were also documented as they are very pertinent to QoL in advanced PSM.

Results

Between January and April 2018, 8 patients were evaluated for baseline QoL using EORTC QLQ-C30 version 3. There were 4 patients with colorectal peritoneal metastases, two patients with ovarian cancer, one patient with gastric cancer and one patient with primary peritoneal cancer. Median scores on the QLQ-C30 Functional scales for patients based on treatment offered is depicted in Table 1. The most common troubling symptom reported was Constipation, followed by abdominal pain, vomiting and distension. The most frequently missed activity was job in males and cooking and household chores in females.

Table 1: QoL functional scales.

Functional scale	Global health status/QoL	Physical functioning	Role functioning	Emotional functioning	Cognitive functioning	Social functioning
Curative CRS+HIPEC	70	50	75	79	100	58
Palliative CRS+HIPEC	37	50	8	46	75	25
No Surgical Intervention Offered	21	33	0	71	66	58
Overall	38	50	9	75	92	42

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Conclusion

The Global health status, Physical functioning, Role functioning and social functioning scores on the QLQ-C30 were significantly affected in patients with PSM. The severity of these scores varied based on curative surgery, palliative surgery or no surgery offered, likely related to the severity or extent of disease process. In our population, job or household activities were frequently the most missed activities by the patients and this as well as common symptoms should be considered while devising a QoL assessment tool.

A21
ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL IMPLEMENTATION FOR CYTOREDUCTIVE SURGERY (CS) WITH HEATED INTRAPERITONEAL CHEMOTHERAPY (HIPEC)

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Objectives

ERAS is a multi-modal perioperative care plan to optimize the physiologic response to surgery and promote recovery. Implementation of an ERAS protocol for patients who underwent CS with HIPEC was analysed for quality assessment and improvement. Initial implementation in 2015 included addition of IV acetaminophen, ketorolac or meloxicam to traditional narcotic pain regimens. Full ERAS protocol included further addition of up to 11 different spinal, IV and PO pain control modalities with narcotics only for breakthrough pain.

Methods

Data was collected retrospectively and analyzed to determine if there were outcome differences based on partial or full ERAS protocol. Some of this data has been previously analyzed. For comparison of continuous variables, we utilized the Mann-Whitney test; for categorical variables, the Fisher's exact test. A multivariable Poisson regression model was utilized to predict length of stay and variable inclusion beyond ERAS protocol was considered if there was a significant unadjusted relationship. All analyses were conducted with SAS version 9.4, p-values < 0.05 were considered significant.

Results

Fifty four serial patients (17 men, 37 women, age 32–80, average 55.6 years) who underwent CS with HIPEC from September 2015 to January 2018 were reviewed. PCA use dropped from 96% to 29% with full ERAS implementation ($p < 0.001$.) Return of bowel function decreased from 4.0 days (IQR: 4.0–5.0) to 3.0 days (IQR: 2.0–4.0) for the full ERAS group ($p = 0.008$.) Postoperative days to normal diet decreased from 5.0 days (IQR: 4.0–6.0) to 4.0 days (IQR: 3.0–4.0) ($p = 0.007$.) Length of stay decreased from 5.0 to 4.0 post-operative days ($p = 0.05$.) Visceral sparing surgery was not significantly different between groups (57% vs. 64%) ($p = 0.781$.) Readmission and morbidity rates remained stable, 7.7% vs. 7.1% and 15.4% vs. 14.3% respectively ($p > 1.000$).

Conclusion

With implementation of the full ERAS protocol, narcotic use, time to return of bowel function, time to general diet, and hospital length of stay were all decreased. The ERAS protocol appeared to provide clinical benefits for CS with HIPEC patients.

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A22
UTILITY OF BIPAP (BIPHASIC POSITIVE AIRWAY PRESSURE) VENTILATION IN CRS+HIPEC (CYTOREDUCTIVE SURGERY+HYPERTHERMIC INTRAPERIOTNEAL CHEMOTHERAPY)

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Objectives

Purpose of the study was to evaluate the role of BIPAP & factors affecting its use after CRS±HIPEC

Methods

129 patients (33 males, 96 females) undergoing CRS+HIPEC for various primary cancers, between 2012 & 2017, were enrolled in this retrospective study. BIPAP was administered to all patients, intermittently, till inspiratory volume of 70% of pre-op value, O_2 saturation >95% on room air reached without clinical & radiological evidence of pulmonary dysfunction. Patient-disease-factors & periopreative parameters were analyzed for their impact on the BIPAP.

Results

59 patients had CRS & 70 had CRS+HIPEC. Median age, BMI & PCI were 50 years, 24.8 & 19 respectively. ASA distribution: ASA1 = 52, ASA2 = 48 & ASA3 = 29. Intraop epidural analgesia was used in 12 patients (9%) & 77 received intra-op opioids (58%). Median duration of surgery was 8 hrs. Median blood loss & IVF were 700 ml & 6.5lt respectively. Median units of intraop packed cell, albumin &FFP units used were 2 each. On table extubation was done in 9(7%) patients. Median duration of postoperative mechanical ventilation, median duration of BIPAP, median number of BIPAP hrs were 17 hrs, 7 days & 52.5 hours respectively. Respiratory complications occurred in 14 patients (11.3%) atelactasis 7, effusion 4, consolidation 3. Reintubation was done in 14 pts (12 for surgical complications & only 2 for respiratory complications). Usage of BIPAP was not significantly different between CRS only vs CRS+HIPEC.

On univariate analysis: total number of days & hours of BIPAP were significantly higher in PCI > 20 (days: 9.6 vs 7.3, p = 0.007/hrs: 75.3 vs 52.2, p = 0.003),usage of intraop opiods(Days 8.6 vs 4.2; p = 0.004/hrs: 63.9 vs 30.1; p = 0.010), respiratory complications (days:10.8 vs 7.7, p = 0.014/ hrs: 90.3 vs 57.6, p = 0.012), reintubations(days:14.5 vs 7.9, p = 0.000/ hrs 124 hrs vs 54.7 hrs, p = 0.000).

While age >60, diphragmatic stripping increased total BIPAP hours significantly (p = 0.028, 0.043 respectively); Diphragmatic resections, increasing use of intraop albumin increased total BIPAP days (p = 0.030,0.011).

On multivariate analysis only reintubation significantly affected duration of BIPAP in terms of days (p = 0.038).

Conclusion

Patient & disease parameters don't affect BIPAP requirement in CRS+/-HIPEC. HIPEC doesn't add additional demands on ventilation. Reintubation was done mostly for surgical reasons, and it turned out to be the only factor increasing BIPAP usage significantly. Majority of the respiratory complications could be managed with BIPAP without invasive interventions.

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A23
PRE-ADMISSION PSYCHOLOGICAL MANAGEMENT OF PSEUDOMYXOMA PERITONEI PATIENTS – A SERVICE EVALUATION

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Objectives

Research into the psychological management of surgical patients has emphasised the important impact of psychological preparedness for surgery on rehabilitation and recovery (Salzmann et al., 2017). Due to the rarity of the condition, Pseudomyxoma patients are vulnerable to high levels of uncertainty prior to admission (Witham et al., 2008) which could impact upon psychological functioning. The Peritoneal Malignancy Institute at Basingstoke Hospital asked Pseudomyxoma patients about their pre-admission experience to evaluate whether patients feel they receive the information that they need, are meeting the people appropriate to their needs and feel comfortable to follow up if they have questions.

Methods

Self-report questionnaires were sent to all Pseudomyxoma patients who underwent Cytoreductive Surgery and HIPEC between 2015 and 2017 (N = 96; 61 responded). Patients were asked about three pre-admission periods: 1) From referral to outpatient appointment 2) Outpatient appointment 3) From outpatient appointment to admission.

Results

Prior to the initial appointment, 94% of patients reported that they were clear about the reason for their appointment and 70% were clear about what would happen. During the initial outpatient appointment, 100% of patients reported that they liked that both the consultant and nurse specialist were present; 63% indicated that they understood the medical language and 67% understood the scans shown. Subsequent to the outpatient appointment, 96% of patients indicated that they found the follow-up letter helpful and that they understood what their treatment would involve. 97% of patients indicated that they had all the information they needed to prepare for surgery and 95% felt comfortable contacting Basingstoke to ask questions.

Conclusion

Current practices during the pre-admission period are having the desired effect and helping patients manage this difficult period. Approximately 1/3 found medical language and or scans difficult to understand. This is an area for development. Service users' preferences will be prioritised in furture developments.

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A24
INTRAOPERATIVE FLUID ADMINISTRATION PATTERNS DURING CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PATIENTS WITH HIGH VOLUME PERITONEAL DISEASE

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Objectives

To examine the fluid and blood requirements of high tumour volume patients during cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC).

Methods

This retrospective cohort study included consecutive patients undergoing CRS/HIPEC between 2010–2017 at St. George Hospital, Sydney. Anaesthetic charts were reviewed and volumes of crystalloids, albumin and blood products extracted. Results were stratified by tumour volume as depicted by the peritoneal cancer index (PCI) which quantitatively combines the distribution of tumour throughout 13 abdominopelvic regions that receive a lesion size score from 0–3. Patients were grouped by PCI score in increments of five; starting at 0–5 to a maximum of 36–39. There was no standardised approach to IOF management. Fluid and blood product administration was determined by the anaesthetist based on routine haemodynamic and coagulation monitoring.

Results

Patients with a PCI score >35 received substantially higher volumes of intraoperative fluid (IOF,), the median being 16,450 mL (interquartile rage [IQR], 13,820–24,820). This was significantly more than any other PCI group ($p < 0.001$) and almost 4000mL more than patients with PCI 31–35 who received the second highest volume of fluid. The median rate of IOF administration in PCI >35 group was 24 ml/kg/hr which was at least 40% faster than any other PCI group ($p < 0.04$). This was completely accounted for by an increase in the rate of blood product administration. Those with PCI >35 received a median of 8000 mL (IQR, 5275–13,920) of blood products at a rate of 10 ml/kg/hr (IQR, 7.2–15.2) which was more than double the rate of patients with PCI <35 ($p < 0.003$). The proportion of blood products increased with increasing PCI at the cost of crystalloid and albumin administration.

Conclusion

In this study, patients with PCI >35 received significantly more blood products at a quicker rate than patients PCI <35. Given that intraoperative blood transfusions have been linked to increased mortality and morbidity in general surgical patients, it appears likely that higher PCI patients are at increased risk of poorer outcomes because of the IOF requirements during their surgeries. Well-controlled randomised trials would be helpful in determining whether, during CRS/HIPEC, an increased volume or rate of blood products administered is definitively detrimental to patient outcomes.

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A25
FAILURE-TO-RESCUE FOLLOWING CYTOREDUCTIVE SURGERY AND HIPEC IS DETERMINED BY THE TYPE OF COMPLICATION – A RETROSPECTIVE STUDY FROM THE INDIAN HIPEC REGISTRY

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Objectives
To determine factors influencing failure-to-rescue patients with complications following cytoreductive surgery (CRS) and HIPEC.

Methods
A retrospective analysis of patients enrolled in the Indian HIPEC registry was performed. Complications were graded according to the CTCAE classification version 4.3. The 30 and 90-day morbidity were recorded.

Results

378 patients treated between January 2013 and December 2017 were enrolled in the registry by 12 surgeons. 14.5% patients were aged over 65 and only 1.5% over 70. The primary tumor site was ovary in 143 (37.8%), appendix in 106 (28.0%), colorectal in 66 (17.4%), mesothelioma in 23 (6.0%), and uncommon primary sites in 42 (11.1%). The median PCI was 11 [range 0-39] and a CC-0/1 resection was achieved in 350 (92.5%) patients. 310 (82.0%) had CRS and HIPEC; 68 had CRS alone. The HIPEC regimen was cisplatin based in 130 (41.9%) and mitomycin based in 132 (34.9%), oxaliplatin based in 39 (10.4%). Grade 3–4 morbidity was seen 25.1% at 30 days and 32.5% at 90 days. The most common complications were pulmonary complications (6.8%), neutropenia (3.7%), systemic sepsis (3.4%), anastomotic leaks (1.5%) and spontaneous bowel perforations (1.3%). Factors associated with incidence of complications were prior chemotherapy ($p = 0.012$), PCI > 20 (0.022), >1 bowel anastomosis ($p = 0.08$) and surgery before 2014 (0.05). On multivariate analysis, complications were more if surgery was performed before 2014 ($p = 0.04$) and in patients with prior chemotherapy ($p = 0.02$). 25 (6.6%) patients died within 90 days of surgery due to complications. The failure-to-rescue rate was 20.3%. On univariate analysis, pulmonary complications ($p = 0.03$), systemic sepsis ($p < 0.001$) and spontaneous bowel perforations ($p < 0.001$) increased the risk of failure-to-rescue as did PCI > 20 ($p = 0.002$). The only independent predictor was systemic sepsis ($p < 0.001$). Systemic sepsis usually developed from other complications and 69.7% who developed systemic sepsis died of it. The failure-to-rescue rate was also high for pulmonary complications (61.7%) and bowel perforations (60.0%).

Conclusion

Though the grade 3–4 morbidity of 32.5% in this cohort of 378 patients at 90 days may be considered acceptable, the failure-to-rescue rate of 20.3% is high. The failure-to-rescue rate was influenced by the type of complication with systemic sepsis being the only dependent predictor of a higher risk. Thus, strategies to prevent specific complications need to be devised to reduce the mortality from the procedure.

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A26
MANAGEMENT OF HYPERGLYCAEMIA DURING OXALIPLATIN HYPERTHERMIC INTRA-PERITONEAL CHEMOTHERAPY: AUDIT RESULTS

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Objectives

Intravenous 5-Fluorouracil (5-FU) with intra-peritoneal Oxaliplatin is one of the established HIPEC treatments following Cytoreductive Surgery as an alternative to intra-peritoneal Mitomycin. Patients undergoing CRS HIPEC procedures are at a risk of hyperglycaemia due to surgical stress related insulin-resistance, thermal stress response and particularly in patients receiving Oxaliplatin, due to diffusion of glucose into circulation from dextrose-containing perfusate solution. Currently there are no specific guidelines on target intra-operative blood glucose levels for these complex procedures. The Diabetes UK position statement suggests maintaining blood glucose in the range of 6–10 mmol/L (108–180 mgdl-1).

Methods

A retrospective analysis of a consecutive patient list from August 2017–January 2018 who had received Oxaliplatin HIPEC as part of their CRS procedure was requested from the peritoneal tumour services at our site. Medical notes, electronic patient record systems of the hospital and Critical Care Unit (CCU) Metavision were analysed for demographics, ASA, diabetes-risk factors and pre-morbid status, intra-operative factors, insulin administration, time to glucose levels <10 mmol/L (180 mgdl-1), LoS in CCU, LoS hospital and complications related to hyperglycaemia.

Results

Seventeen patients were identified whose notes were thereafter analysed. There were 9 patients whose hyperglycaemia was managed by variable rate insulin infusion VRII (5 pre-morbid diabetes; 4 non-diabetes) and 8 had no VRII intra-operatively (all non- diabetics). There was no difference in mean time for hyperglycaemia to recover to normoglycaemia in either of the groups. There was no difference in post-operative complications i.e., infection, thrombosis and no difference in LoS between the groups.

Conclusion

While VRII was commenced intra-operatively regardless of the patients pre- morbid diabetes status, all diabetics had received VRII. Due to the small cohort of patients analysed, we are not able to comment definitively on the mandatory intra-operative use of VRII; we can however recommend frequent monitoring of blood glucose for all patients receiving Oxaliplatin HIPEC treatment. Insulin should never be administered as a bolus or as an unregulated infusion for these patients. In the long term, we recommend considering non-glucose containing perfusate solutions to reduce the theoretical risk of increased morbidity and mortality.

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A27
LOW RATE OF INTRAOPERATIVE AND POSTOPERATIVE BLOOD TRANSFUSION IN CYTOREDUCTIVE SURGERY AND HIPEC: IS THIS POSSIBLE AT THE BEGINNING OF THE EXPERIENCE?

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Objectives

Cytoreductive surgery and HIPEC is considered an extensive surgical procedure.

Intraoperative allogenic blood transfusion (IABT) is common. Up to 77% of the patients are described to require IABT, with 37% requiring massive IABT (more than 5 units of packed red blood cells). This has been linked to more severe postoperative complications, and impairment in oncological outcomes.

Formal training in peritoneal surface malignancy is advocated by ESSO and PSOGI as a way of shortening the learning curve in this specialty.

We report in this study the results of the initial experience of an HIPEC program structured following ESSO/PSOGI recommendations. We hypothesize that our IABT and postoperative allogenic blood transfusion (PABT) is lower than what is traditionally reported in the literature, and we discuss some explanation.

Methods

The 24 patients that underwent surgical resection for peritoneal surface malignancy in our program were evaluated. The patients were operated between July 2015 and March 2018, all by the same surgeon and team.
It is a descriptive, retrospective study, with data collected from a prospective registry approved by local ethical committee. We reported the rate of IABT/PABT, and the clinical and surgical characteristic of the cohort.

Results
In the 24 patients there were only 25% IABT, and no massive IOBT. POBT rate was 54.2%. Mean PCI was 18.1. Mean operative time was 9 hours, and mean length of hospital stay was 15.2 days. 60 days mortality rate was 8.3%. Major morbidity (Clavien III/IV) was 20.8%. CCR-0/1 rate was 91.7%. Mean age was 52.3 years old. The main indications for the treatment were Pseudomyxoma Peritonei (46%), ovarian cancer (21%), colorectal cancer (17%). After cytoreduction, HIPEC was not performed in two cases (one palliative debulking of Pseudomyxoma, and an omission of HIPEC after extensive cytoreduction in an aged ovarian cancer patient). Due to the low incidence of IOBT and small sample, no statistical correlation was feasible.

Conclusion

We showed a much lower incidence of IOBT comparing to what is generally reported in the literature. Half of the patients did not receive any kind of ABT during the entire hospital staying. Our patients had advanced disease and required extensive procedures, thus the results cannot be attributed to patient selection. When a new HIPEC program is structured following the current recommendation by ESSO/PSOGI, with formal training of the team, good results can be expected even at the beginning of the experience.

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A28
EXTENDED USE THORACIC EPIDURALS IN CYTOREDUCTIVE SURGERY

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Objectives

Epidural analgesia has been shown to improve pain scores and reduce respiratory complications in high risk patients undergoing major abdominal surgery. Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has the potential for significant respiratory morbidity and results in a substantial postoperative analgesia requirement, where prolonged use of an epidural catheter is beneficial. The risk of neuraxial infection has raised concerns about the safety of this therapy for extended periods. The reported incidence of epidural abscess in postoperative patients ranges from 1 in 800 to 1 in 2500. The objective of this paper is to investigate the microbiological profile of epidural catheters after prolonged use following CRS and HIPEC.

Methods

A retrospective cohort study of 468 patients undergoing CRS and HIPEC with thoracic epidural analgesia. Duration of epidural therapy, results of microbiological culture of epidural tip and evidence of neuraxial infection were recorded. Epidural catheters were inserted prior to surgery under strict aseptic conditions using 0.5% chlorhexidine skin disinfectant. Where possible, catheters were subcutaneously tunneled. All patients received antibiotics at induction and 2 further doses postoperatively. Epidural infusion of 0.1% levobupivacaine with 2 mcg/ml fentanyl was commenced during the HIPEC phase of surgery and continued thereafter until removal. Epidural catheters were routinely removed at post-operative day 6, unless in the case of accidental disconnection or coagulopathy.

Results

419 (89.5%) epidural catheters remained in situ for >5 days. 310 (66.2%) of catheters remained in situ for 6 days. No patients displayed signs of neuraxial infection. Of those epidural catheters that remained in situ >5 days, 310 (74%) had no microbiological growth after 5 days of culture. There was no statistically significant difference in incidence of positive microbiology results if the catheter remained in for 4 days or less, compared to those that remained in situ for 5 days or longer ($p = 0.227$).

Conclusion

The extended use of epidural analgesia did not increase the risk of bacterial colonization of catheters. There were no cases of infection. In this group where analgesia is challenging and of major benefit, this data supports the extended use of thoracic epidurals.

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A29
PERIOPERATIVE MANAGEMENT IN CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A 2 YEAR RETROSPECTIVE STUDY

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Objectives

Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly performed worldwide despite technically challenging and high morbi-mortality potential. Clinical pathways development and institutional experience are essential to improve outcome and quality of life in this setting.

Methods

A retrospective analysis of patients undergoing elective CRS and HIPEC, in a Portuguese single center, was performed between January 2015 and December 2017. Data included: demographic data, ASA classification, tumor type, peritoneal carcinomatosis index, use of epidural, anesthesia and surgery time, hospital and ICU admission days, chemotherapy type, fluid management, hemoderivatives transfusion, type of hemodynamic monitoring, postoperative complications, reoperation rate and mortality at 30 days of surgery.

Results

n = 22. Mean age: 53 years. Male: Female = 8:14. ASA Classification: ASA I - 4,5%; ASA II - 59,1%; ASA III - 36,4%. Mean hospitalization time: 15,55 days. Mean ICU admission: 3 days. Epidural catheter use: 91%. Mean epidural catheter time: 7,58 days. Hemodynamic monitor and GDT protocol use (PiCCO®-Pulsion): 36,4%. Reoperation rate: 31.8%. Intra-operative blood transfusion: 27,3%. Death rate at 30 days: 4,5%. The use of hemodynamic monitor and GDT protocol was associated with lesser use of colloids (mean colloid volume: GDT group: 62,5 mL and control group: 786 mL, p = 0,003) and ICU admission days (mean ICU days: GDT group:3,1 and control group:3,5; p = 0,001) compared to conventional fluid therapy. The use of a GDT protocol was not associated with crystalloid volume, blood transfusion, hospital admission time or reoperation rate.

Conclusion

Despite great improvements in morbidity and mortality, CRS and HIPEC continues to demand excellent clinical judgement in selecting patients for surgery and experienced multidisciplinary teams. Perioperative GDT protocols guided by cardiac output monitoring devices may reduce the volume administration of colloids and admission in high dependency units compared to conventional fluid therapy regimens.

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A30
ANESTHETIC APPROACH IN CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: 7 YEAR RETROSPECTIVE STUDY IN A PORTUGUESE SINGLE CENTER

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Objectives

Despite paucity in high level of evidence, technical complexity and high morbidity/mortality potential, cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly performed as a treatment strategy for patients with peritoneal disease from either primary tumors or secondary disease in multiple primary tumor sites. The authors report the 7 year experience of CRS/HIPEC in a Portuguese single center, focusing mainly in perioperative management.

Methods

A retrospective analysis of patients undergoing elective CRS and HIPEC, in a Portuguese single center, was performed between January 2010 and December 2017. Data included: demographic data, ASA classification, tumor type, peritoneal carcinomatosis index, use of epidural, anesthesia and surgery time, hospital and ICU admission days, chemotherapy type, fluid management, hemoderivatives transfusion, type of hemodynamic monitoring, postoperative complications, reoperation rate and mortality at 30 days of surgery.

Results

67 patients included, 13 excluded (n: 54). Mean age: 52,8 years. Male:Female = 18:36. ASA Classification: ASA I – 5,6%; ASA II – 48,1%; ASA III- 44,4%; ASA IV: 1,9%. Mean hospitalization time: 20,63 days. Mean ICU admission: 8 days. Epidural catheter use: 70,4%. Mean epidural catheter time: 5,4 days. Use of cardiac output monitoring (COM) and GDT protocols (PiCCO®): 25,9%. Reoperation rate: 12,98%. Intra-operative blood transfusion rate: 48,2%. Death rate at 30 days: 7,4%. Epidural analgesia was associated with lesser morbidity ($p = 0,001$), mortality (Spearman: 0,304, $p = 0,03$) and time of hospitalization (Spearman: 0,366, $p < 0.01$). No epidural hematomas recorded. GDT protocols guided by COM were associated with reduction of volume of fluids ($p < 0,001$) and blood transfusion ($p < 0,001$).

Conclusion

The authors believe that epidural analgesia is a safe procedure with potential to influence morbidity and recommend perioperative GDT protocols guided by COM to guide fluid therapy in CRS/HIPEC patients.

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A31
PAIN CONTROL IN PERITONECTOMY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A 2 YEAR RETROSPECTIVE STUDY

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Objectives

Improved outcome and quality of life after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) led to an increasing number of centers performing such complex procedures. Epidural analgesia has been recommended as a strategy to reduce post-operative morbidity, including post-operative ileus and respiratory complications, regardless of higher risk of spinal haematoma due to coagulation and platelet disorder associated to CRS and HIPEC.

Methods

A retrospective analysis of analgesia regimens in patients undergoing elective CRS and HIPEC, in a Portuguese single centre, was performed between January 2015 and December 2017. Data included: demographic data, ASA classification, tumor type, peritoneal carcinomatosis index, type of analgesia performed, level of epidural, type of epidural analgesia regimens, anesthesia and surgery time, hospital and ICU admission days, chemotherapy type, morbility and mortality rates, patient satisfaction.

Results

n=22, 3 patients excluded. Mean age: 51,7 years. Male:Female ratio = 6:13. ASA Classification: ASA I – 5,3%; ASA II – 63,1%; ASA III – 31,6%. Mean hospitalization time: 16,7 days. Mean ICU admission: 3,84 days. Epidural catheter use: 94,7%. Mean epidural catheter time: 7,7 days. Thoracic epidural catheterization: 76,5%. Lombar epidural catheterization: 23,5%. Reoperation rate: 31.6%. Death rate at 30 days: 5,3%. No epidural haematomas reported. The use of epidural analgesia was associated with lesser mortality ($p < 0,001$), lesser time of post-operative mechanical ventilation ($p = 0,005$) and lesser ICU admission days ($p = 0,004$). Type of epidural placement wasn´t associated with degree of patient satisfaction, ICU and hospitalar admission days and post-operative ventilation hours. No differences between different epidural analgesia regimens and time of ICU or hospital admission or time of post-operative ventilation.

Conclusion

In our study, epidural analgesia was a safe and effective option in CRS and HIPEC, and was associated with shortened duration of post-operative ventilation, lesser mortality and ICU admission days. The authors believe optimal pain control plays a key role in early extubation and mobilization in this setting.

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A32
BUNDLED CARE TO REDUCE SURGICAL SITE INFECTIONS AFTER CYTOREDUCTIVE SURGERY AND HIPEC

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Objectives

Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has been reported to have a high incidence (16%) of superficial and deep surgical site infections (SSI). We implemented an SSI bundle after inception of a regional therapies program in 2016.

Methods

A peritoneal surface malignancy program was established at our institution in 2016. The SSI Bundle consisted of pre-operative chlorhexidine wipes, no mechanical bowel preparation, long acting pre-operative antibiotics (ceftriaxone/metronidazole and ciprofloxacin/metronidazole (for penicillin allergic)), chlorhexidine/alcohol skin preparation, occlusive skin protection during the operation, and maintenance of normothermia. Wound closure was augmented with the Dermabond Prineo system. All HIPECs performed during this period used mitomycin-C in split dosing. Standard NSQIP definitions were used to define superficial and deep SSIs. Data was retrospectively abstracted and analyzed after IRB approval.

Results

During the 2016–17 study period, 51 patients underwent 55 procedures. Mean age was 57.3 years (IQR 50–67) with 47% female patients. Adherence to preoperative showering was 96%, and mechanical bowel preparation was used in 5% of procedures. Mean core body temperature during surgery was 36.50C (IQR 36.2–36.90C) and median estimated blood loss was 200 mL (IQR 100–300 mL). Intra-operative transfusion rate was 3.6%. No patients received elective post -operative antibiotics. 4 patients (7%) received at least 2 doses of antibiotics for suspected infection of which 1 (1.8%) had a superficial SSI and seroma, and 3 (5.4%) had a deep SSI requiring placement of a drain. One patient (1.8%) in the cohort developed hospital acquired clostridium difficile infection.

Conclusion

Bundled care and systematic practices established at the inception of a regional therapies program at a large tertiary university hospital resulted in a low rate of surgical site infections. Translation of SSI reduction bundles from other surgical procedures appears feasible in patients undergoing CRS and HIPEC.

A33
EFFECT OF ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM IMPLEMENTATION AMONG PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY, HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (CRS-HIPEC) IN A TERTIARY HOSPITAL IN THE PHILIPPINES

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Objectives

The aim of this study was to assess the outcomes of ERAS implementation in CRS-HIPEC patients in terms of length of stay and complications, and compare them with outcomes of pre-ERAS implementation in CRS-HIPEC patients.

Methods

This is a retrospective analysis of patients who underwent CRS-HIPEC between January 2013 and February 2018, before ERAS implementation (pre-ERAS), and after ERAS implementation (post-ERAS), in The Medical City Hospital. Outcomes measured were LOS, complications, ICU admissions, reoperations, readmissions, and 30-day postop complications.

Results

Twenty-two cases were analyzed (pre-ERAS n = 9, post-ERAS n = 13). Compliance to the ERAS protocol pre-ERAS was 32.8%, while post-ERAS, was 67.0%. The mean LOS pre-ERAS was 14.00 ± 13.93 days. The mean LOS post-ERAS was 8.77 ± 5.12 days. There was statistically significant difference between pre- and post-ERAS LOS. ($p = 0.0408$). There was lesser readmission rate in post-ERAS patients (30% vs 0%, $p = 0.0286$). There was also lesser 30-day postoperative complications in post-ERAS patients ($p = 0.0443$). No significant difference in over-all complications was seen between the two groups (67% vs 69%, $p = 0.134$), as well as ICU admissions ($p = 0.268$), and reoperations ($p = 0.2279$).

Conclusion

Implementation of enhanced recovery protocol in CRS-HIPEC patients at The Medical City Hospital was associated with significantly reduced LOS, readmission, and 30-day postoperative complications. The results suggest implementation of ERAS in CRS-HIPEC cases is feasible, and safe.

A34

REASONS FOR HOSPITAL READMISSION FOLLOWING CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (CRS/HIPEC)

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Objectives

Patients treated with CRS/HIPEC can experience a prolonged and complicated postoperative recovery, including readmission for a declining clinical state. Understanding the reasons for these readmissions can direct interventions to optimize and hasten recovery for patients undergoing HIPEC. We analyzed a group of patients with appendiceal cancer undergoing HIPEC during a five year period to determine the causes and predictors of readmission.

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Methods

Patients with peritoneal surface malignancy due to an appendiceal primary tumor, and treated with CRS/HIPEC at M D Anderson Cancer Center during Jan 1, 2010 to Jan 1, 2015, were identified from a prospective database. The clinical course of these subjects were studied, with emphasis on patient and case characteristics surrounding readmission after discharge.

Results

169 patients were identified who had peritoneal disease arising from an appendiceal primary adenocarcinoma and underwent cytroreductive surgery and HIPEC. Fifty one (30.2%) patients were readmitted within the first 90 days following surgery. Readmission was at a median of 9 days (range 1–69) following discharge, with 22 patients admitted in the first 7 days post discharge and 6 patients readmitted more than 30 days. The reasons for readmission were infectious in 22 patients with 18 having wound or intra-abdominal abscess, and one each with UTI, pneumonia, line infection or C. difficile colitis. 20 had GI complications with 13 having nausea/vomiting/inadequate nutrition, 4 with feeding tube complications, 2 with dehydration due to high ileostomy output and one with a partial small bowel obstruction. Three were admitted for intractable pain, 2 for DVT/PE and 2 for gastrointestinal bleeding. One each was admitted for postoperative MI, and asthenia/malaise. Factors that predicted readmission ($p < 0.5$) on univariate regression were receiving neoadjuvant Avastin, history of diabetes mellitus, and a low preoperative albumin. By multivariate regression, only a low preoperative[MF2] albumin was an independent predictor of readmission.

Conclusion

In this cohort, the rate of readmission following recovery from CRS/HIPEC was high, and usually due to infectious complications or worsening gastrointestinal symptoms leading to inadequate nutrition. Readmission is often within days of initial discharge. This highlights the need, in HIPEC patients, to focus on early signs of intra-abdominal infection, and outpatient interventions to control GI symptoms prior to discharge from the hospital.

A35

A STRATEGY TO AVOID POTENTIAL PROBLEMS IN THE INITIAL LEARNING-CURVE IN HIPEC: HEMODYNAMIC MONITORING AND GOAL DIRECTED FLUID THERAPY

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Objectives

Postoperative metabolic issues are common in cytoreductive surgery and HIPEC. Metabolic acidosis and lactate levels are among the main concerns during the first days after surgery in Intensive Care Unit (ICU). In this study we report the impact of introducing routine Hemodynamic Monitoring (HM) and Goal Directed Fluid Therapy (GDT) early in the experience of a new Peritoneal Surface Malignancy (PSM) program. We describe the behavior of the main metabolic parameters (MP) during the first postoperative days.

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Methods

A retrospective, case-control analysis, was conducted with 24 patients that underwent surgical resection for PSM in a new HIPEC program between July 2015 and March 2018, all by the same surgeon and team. Data retrieving was approved by local ethical committee. After the first 4 cases, cardiac monitoring device (FloTrac/EV1000 system) was implemented. A comparison was made between the patients that received HM/GDT and the patients managed with standard protocol (SP): invasive arterial and central venous pressure. We evaluated arterial gasometry parameters (pH and bicarbonate) and arterial lactate levels, at four time-points: ICU admission, first, second, third and fourth postoperative days. Mann-Whitney and Friedman test was applied during statistical analysis, performed with SPSS v.24 software.

Results

Of the 24 patients operated in the study period, the first 4 were monitored with SP, and the following 20 consecutive patients received HM and GDT.

Mean age was 52.3 years, operative time was 9 hours, and PCI was 18.1, with no difference between groups ($p = 0.794$; $p = 0.477$ and $p = 0.737$ respectively).

Bicarbonate level at ICU admission was significantly higher in the HM/GDT group (20.1 mEq/L × 14.3 mEq/L, $p = 0{,}009$). There was a trend into better arterial lactate levels and pH during the first postoperative days in the HM/GDT group, without statistical significance.

All evaluated MP significantly improved between the admission in ICU until the forth postoperative day ($p < 0.001$).

Conclusion

The early introduction of HM/GDT protocol in a new PSM program has the potential to improve the MP. This could be translated into better clinical conditions at the end of surgery.

The study described the characteristic pattern and behavior of MP during the initial postoperative days, an important information for the ICU team.

We recommend routine adoption of HM/GDT in the perioperative management of patients submitted to cytoreductive surgery and HIPEC, since the first case of a new PSM program.

A36
FLUID OPTIMAL STRATEGY DURING CYTOREDUCTIVE SURGERY (CRS) AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY (HIPEC)

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Objectives

Patients undergoing CRS/HIPEC consume substantial hospital resources due to prolonged lengths of stay (LOS), intensive care unit (ICU) use, and frequent readmissions. Fluid-restrictive strategies may reduce resource utilization but have been linked to increased rates of acute kidney injury. We proposed that a perioperative “fluid optimal” strategy achieves favorable outcomes while preserving resources.

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Methods

A fluid optimal strategy was implemented with the inception of the peritoneal surface malignancy program at a tertiary hospital system in 2016. Components included avoidance of mechanical bowel preparation, goal-directed intra-operative resuscitation (including colloids), and early diuresis (POD 2-3). Patients underwent HIPEC with Mitomycin in split dosing. Outcomes including pulmonary, anastomotic, and renal complications were graded by CTCAE. Resource utilization was measured using LOS (including ICU), and readmissions.

Results

During the study period, 55 procedures were performed on 51 patients, and 47% were female. Mean age was 57.3 years (IQR 50–67) and mean PCI score was 20 (IQR 6–36). The average number of visceral resections and peritonectomy procedures were 3 and 2.4, respectively, and the median operative time was 419 minutes (IQR 294–546). Mean intra-operative fluid administration was 2537 mL crystalloid (IQR 2000–3000 mL) and 1530 mL albumin (IQR 1000–2000 mL) albumin, with a mean blood loss of 272 mL (IQR 100–300 mL). Only 3.6% of procedures required intraoperative blood transfusion. Vasopressors were used in 38 (69.1%) patients at least one hour after initial incision. All patients adhered to the proposed diuretic strategy. Four (7%) required chest tubes, and none developed pneumonia or respiratory failure. One (1.8%) patient developed a Grade II acute kidney injury which resolved without hemodialysis. Resource utilization included mean post anesthesia recovery time of 174 minutes, with 2 patients (3.6%) admitted to the ICU. Median hospital LOS was 6 days (IQR 5–7) and 7 (12.7%) patients were readmitted within 30 and 90 days of surgery. 30-day mortality was 0%.

Conclusion

A fluid optimal strategy appears to reduce resource utilization without significant impact on outcomes. Continuous feedback loops and healthcare delivery implementation science methods allow refinement of such pathways in the absence of large randomized trials.