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Original Research Article

Enhanced Recovery after Digestive Surgery at the Dalal Jamm National Hospital Center: A Randomized Prospective Study in Adults

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Abstract: ***Objective***: To evaluate the practice of RAAC at the Dalal Jamm National Hospital Center (CHNDJ). ***Patients and Methods***: Prospective randomized single-center study over a 12-month period (January-December 2023) in the intensive care and general surgery departments of Dalal Jamm Hospital. Data analysis was performed using Excel and SPSS software. ***Results***: During the study period, 107 patients were included, divided into two groups: an RAAC group (n=64) and a control group (n=43). The average age was 46.03 years, with a predominance of females and a sex ratio of 0.79. Hepatobiliary surgery was the most common type of surgery performed (45%), followed by colorectal surgery (23%) and pancreatic surgery (13%). Gallstones were the main indication (33%), followed by colorectal tumors (21%) and duodenopancreatic tumors (13%). For the RAAC group, postoperative pain was controlled at H2 vs. H12 for the control group. The average time to ambulation was at H3 vs. H5 for the control group, and feeding was resumed at H8 vs. D1 for the control group. In our series, four cases of postoperative ileus were noted in the control group. The outcome was favorable in 98% of the RAAC group vs. 86% of the control group. Anastomotic leakage was the main surgical complication (n=3). Mortality was 7% in the control group and zero in the RAAC group. The average length of stay was 6 days (2-21 days) for the RAAC group vs. 8 days (2-13 days) for the control group. ***Conclusion***: The implementation of ERAS has reduced postoperative morbidity and mortality, shortened the average length of stay, and improved recovery in patients undergoing digestive surgery.

Keywords: Enhanced Recovery, Digestive Surgery, Dalal Jamm.

INTRODUCTION

ERAS is a multimodal approach that implements a set of perioperative measures aimed at improving the functional outcome of patients undergoing surgery, particularly digestive surgery [1]. The comprehensive and coordinated care of the patient aims to restore their previous physical and mental abilities as quickly as possible. This program reduces perioperative metabolic stress and, consequently, the morbidity of surgical patients [2]. The ERAS concept has established itself as the main advance in the surgical management of patients in many surgical specialties, particularly in the field of digestive surgery [3].

The objective of our study was to evaluate the practice of RAAC at the Dalal Jamm National Hospital Center in Guédiawaye, Dakar.

PATIENTS AND METHODS

This is a prospective, single-center, randomized, descriptive, and analytical study conducted over a 12-month period from February 2023 to January 2024. Stratified randomization by type of surgery was performed at a 1:1 ratio using R software. A random allocation sequence was generated by computer prior to the study using R v 4.2.2 for MacOS.

We included all adult patients under the age of 80 scheduled to undergo the following procedures: Gastrectomy, cholecystectomy, small bowel resection, colectomy, retroperitoneal surgery, anterior rectal resection, abdominoperineal amputation, caudal splenopancreatectomy, hepatic segmentectomy, esophagectomy, cephalic duodenopancreatectomy, and adrenalectomy.

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Exclusion criteria were: emergency surgery, ASA ≥ 4, age ≤ 16 and ≥ 80, and severe or poorly controlled comorbidities (cardiac, pulmonary, diabetes, immunodeficiency, coagulopathy) and specific treatments (anticoagulant therapy for curative purposes, long-term corticosteroid therapy).

This enhanced recovery after surgery protocol includes recommendations for the entire perioperative period.

In the preoperative phase, the patient is prepared for surgery: optimization corresponds to stopping smoking and/or drinking alcohol at least one month before surgery. Prehabilitation involves preoperative physical activity, which should be encouraged. Nutritional assessment (carried out in our department by measuring BMI and albumin levels) is also important (oral nutritional supplements are taken for 7 to 10 days in at-risk patients).

Systematic colonic preparation is not performed for right or left colon surgery (unlike lower rectum or anal canal surgery, where preparation is still recommended). Confusogenic drugs are avoided if possible. Premedication is not systematic. Patients are allowed to drink a carbohydrate-containing beverage (e.g., 20 ml of apple juice) up to two hours before surgery and must stop eating six hours before surgery.

During the intraoperative phase, a multimodal analgesia strategy is implemented: epidural or spinal analgesia with morphine or perisurgical infiltration of local anesthetics. During the operation, the volume of infusions received by the patient must be limited (avoid an intraoperative infusion volume ≥ 2.5 L) with the injection of crystalloids at a dose of 1–4 mL/kg/h, and euvolemia must be monitored in the event of hemorrhage. Hypothermia should be avoided as much as possible by using warming measures (warm saline, heated blanket).

In the postoperative phase, the nasogastric tube is removed on day 0 at the end of the procedure (depending on the type of surgery), in the operating room, before extubation. Multimodal analgesia (IV analgesics, spinal or epidural anesthesia, local anesthesia, NSAIDs) is used.

Patients are encouraged to mobilize as early as possible: they are helped to get up on the day of or the day after the operation, followed by early resumption of walking.

The patient begins eating again in the form of soup on the evening of the procedure, then resumes a normal diet the following day. Chewing gum is also encouraged in cases of colorectal surgery. The urinary catheter is removed as soon as possible, on day 1 or day 2.

Intravenous infusions are reduced and then stopped as soon as oral hydration is sufficient, ideally on the second postoperative day.

The data were collected on the survey form, and data entry and analysis were performed using Word 2010, SPSS, and Excel 2016 software. Qualitative variables were expressed as percentages and quantitative variables as means. The statistical test used was the Chi-square test. A P value < 0.05 was considered significant.

RESULTS

During the study period, 107 patients were included and divided into two groups: a rehabilitation group (RAAC) (n=64) and a group receiving usual care (control) (n=43). The mean age was 46.03 years, with extremes of 16 and 75 years. Females predominated, with a sex ratio of 0.79. Hepatobiliary surgery was the most common type of surgery performed, accounting for 45% (n=47) of procedures, followed by colorectal surgery 23% (n=24), pancreatic surgery 13% (n=14), esophageal surgery 9% (n=10), and gastric surgery 8% (n=9). Gallstones were the main indication for surgery (33%), followed by resection of colorectal tumors (21%), duodenopancreatic tumors (13%), and esophageal tumors (9%). Table I shows the different surgical indications.

Table I: Surgical pathologies

Condition	Diagnosis	Number (n)	Percentage
Hepatobiliary	Gallstones	35	32
	Acute lithiasic cholecystitis	3	3
	Non-lithiasis cholecystitis	1	1
	Biliary tumor	1	1
	HCC liver	7	7
Duodenopancreatic	Pancreatic tumor	11	10
	Bile duct cholangiocarcinoma	3	3
Esophageal	CE 1/3 middle esophagus	10	9
Colorectal	Colonic tumors	9	8
	Rectocolonic polyp	1	1
	High-grade dysplasia of the colon	1	1
	Rectal tumors	14	14

Condition	Diagnosis	Number (n)	Percentage
Gastric	Gastric tumor	9	8
Other	Secreting paraganglioma	1	1
	Retroperitoneal tumor	1	1
	Total	**107**	**100**

In our series, 60% (n=64) of our patients were classified as ASA 2, 39% (n=41) as ASA 1, and 1% (n=2) as ASA 3. ASA 2 was the most common classification in both groups.

All of our patients were nutritional grades 1 and 2, with 96% and 4%, respectively.

In the preoperative phase, the compliance rate was 75.75%. During surgery, this compliance rate exceeded 90% and reached 94% during the postoperative period.

For the RAAC group, postoperative pain was controlled at H2, while it was controlled at H12 for the control group, with a statistically significant difference ($P < 0.001$). Figure 1 shows the postoperative pain progression curve in the two groups.

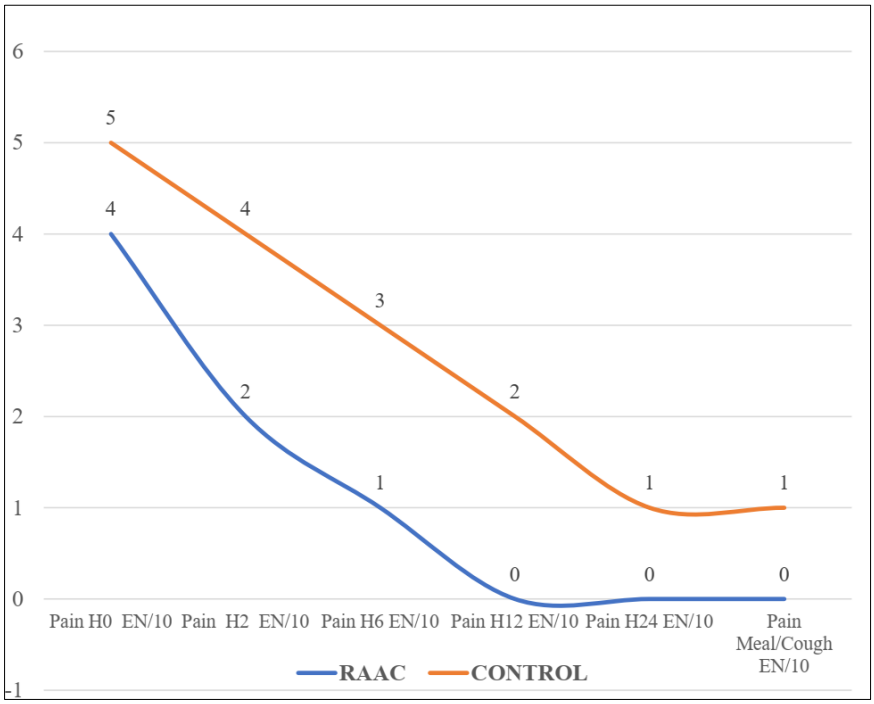

Figure 1: Postoperative pain curve

The average time to ambulation was 3 hours for the RAAC group and 5 hours for the control group. Feeding was resumed at H8 for the RAAC group and on D1 for the control group. In our series, 4 cases of postoperative ileus were noted in the control group. The outcome was favorable in 98% of the RAAC group and 86% of the control group.

Anastomotic leakage was the main surgical complication (n=3). There were 2 cases of parietal suppuration. Table III shows the main complications.

Table II: Main postoperative complications

Complications	RAAC	Control
Anastomosis release	1	2
Parietal suppuration	-	2
Hemorrhagic shock	-	1
Pulmonary embolism	-	1

Mortality was 7% in the control group and zero in the RAAC group. The causes of death were: hemorrhagic shock, pulmonary embolism, and postoperative peritonitis.

The average length of stay was 6 days (2-21 days) for the RAAC group and 8 days (2-13 days) for the control group.

The factors associated with failure and poor compliance with RAAC were: age > 70 years and persistent severe postoperative pain beyond 48 hours.

DISCUSSION

CRPA is defined as a multidisciplinary and multimodal perioperative approach. Comprehensive and coordinated patient care aims to quickly restore the patient's previous physical and mental abilities. This program reduces perioperative metabolic stress and, consequently, the morbidity of the operated patient [2].

In our study, biliary and cancerous pathologies were predominant and mainly affected the young population. The average age of our patients was 46.03 years.

These data are supported by the results of the epidemiological study of cancers conducted by DIOP *et al*., in 2016, which showed that the average age of onset of neoplastic disease in Senegal was under 50 [4]. In our study, multimodal analgesia was provided using three local-regional analgesia techniques depending on the type of surgery: epidural analgesia, bupivacaine infiltration of the wound at the end of the procedure, and morphine spinal analgesia. This was combined with the prescription of systemic analgesics based on paracetamol, nefopam, and NSAIDs.

Postoperative pain control was achieved on average at H2 for the RAAC group and at H12 for the control group, with a significant difference (P < 0.001). Kelliher *et al*., 2015, demonstrated that the multimodal analgesia technique implemented in the RAAC protocol enabled early control of postoperative pain [5].

The impact of early mobilization in critically ill patients was recently demonstrated in an international multicenter randomized trial of mobilization in intensive care unit patients [6]. Compared to usual care, early mobilization was associated with a reduction in the length of stay in the surgical intensive care unit and improved functional mobility at discharge. In addition, the absence of early mobilization after abdominal surgery was associated with a threefold increase in the likelihood of developing a pulmonary complication [7].

In our study, for the RAAC group, all patients, depending on the surgery, got out of bed for the first time within the first 12 hours after surgery. There was a statistically significant relationship between postoperative pain control and early mobilization (p<0.001).

Early refeeding, whether solid or liquid, accelerates recovery and reduces postoperative morbidity. In our series, early refeeding was performed in all patients in the cohort. Depending on the type of surgery, the time to refeeding differed according to the treatment group (p=0.005). A Cochrane review conducted in visceral surgery (n=1,437 patients - 17 randomized trials) was published on the subject, using a threshold of 24 hours to define early resumption of feeding. It showed a reduction in the average length of stay of -2 days (-3 / -0.9) (p<0.001) in patients fed within the first 24 hours [8].

In our study, the main complications were anastomotic leakage, postoperative ileus, parietal suppuration, pulmonary embolism, and hemorrhagic shock.

The occurrence of these complications was more pronounced in the control group (14%) than in the RAAC group (2%). This trend did not vary in our study according to age, ASA classification, or type of cancer.

While the reduction in postoperative complications between the two groups is confirmed in favor of the ERAS group, their incidence, particularly in the rehabilitation group, is remarkably lower than that reported in the literature [5-10]. The overall reoperation rate in our study was 6% (postoperative peritonitis, deep collection).

Mortality in our series was 7% (3 patients) in the control group. It varies from 0 to 4.3% in the literature [11-13]. The reduction in length of stay is a logical consequence of the reduction in postoperative complications achieved by the enhanced recovery program [13-15].

Since Kehlet, all studies have shown that the items of enhanced rehabilitation analyzed separately have a positive effect on postoperative morbidity and therefore on the length of stay of approximately 2.5 days [16].

In our study, the average length of stay was 6 days ±3.06 in the RAAC group and 8 days±4.01 in the control group.

The total length of stay in the RAAC group was on average -2.11 days shorter than the total length of stay in the control group (p = <0.001).

This benefit in terms of average length of stay (ALOS) of RAAC programs is found in most randomized studies and meta-analyses, without an increase in readmission rates, regardless of the type of surgery [17, 18]. In our study, the length of hospital stay varied according to the type of pathology. It was shorter for hepatobiliary pathology (02± 1D) and colorectal and gastric cancers (07± 1D) and longer for pancreatic and esophageal pathologies (10 ± 2D).

The limitations of our study are the heterogeneity of surgical indications and the small number of patients. However, our study showed that the

implementation of RAAC could improve the quality of surgical care.

CONCLUSION

The implementation of RAAC has reduced postoperative morbidity and mortality, shortened the average length of hospital stay, and improved the recovery of patients undergoing digestive surgery.

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