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Study on efficacy of enhanced recovery after surgery protocol in ventral hernia repair in tertiary health care center.

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Abstract :

Introduction: ERAS (Enhanced recovery after surgery) are evidence based protocols associated with improved patient outcomes . ERAS represent a multimodal approach to peri operative care with the goal of improved recovery, outcomes and value. Hernias of the abdominal wall are quite common having a prevalence of 1.7% for all ages and 4% for those older than 45 years . ERAS is feasible after abdominal wall reconstruction, leading to reduced length of stay without increasing the rate of complications or readmissions. Aim of this study was to examine the efficacy of ERAS protocols in patients undergoing abdominal wall reconstruction and its implementation as standard in centres performing abdominal wall reconstruction.

Methods: This prospective study was conducted at Chettinad Hospital and Research Institute, involving 60 patients with ventral hernia who underwent ventral hernia repair. Patients fulfilling the inclusion criteria were randomised in two groups after obtaining informed consent. Patients were randomized using odd even method. Patients were deemed stable for discharge once they were tolerating a regular diet, voiding spontaneously, having bowel movements, and pain was controlled with oral medications. The goal was for discharge on POD4 or POD5 if the aforementioned criteria were met. Postoperative follow up will be done periodically. Basic demographics and American Society of Anesthesiologists classification were obtained. In addition, we recorded operative variables, such as type of hernia repair. Postoperatively inpatient and 30-day complications were tracked. Groups were compared, with primary outcome being length of stay. Data was analyzed using measures such as the mean, standard deviation continuous variables , frequency, and percentages categorical variables

Results: Mean age in eras group was found to be 44.86±11.87years, conventional group was 49.4±12.54 years. The number of hospitalized days of the patient's in ERAS group was 5.53±0.76 days, in conventional group was 9.36 ± 0.75 days. In ERAS group, 2 patients had seroma formation and 3 patients had surgical site infections. In conventional group, 4 patients having seroma formation and 10 patients having surgical site infections

Conclusion: The results shown above indicate that patients having anterior abdominal wall surgery benefit from implementation of ERAS protocol. In comparison to the traditional method, it is linked to a decreased length of stay and incidence of complications in the hospital.

Introduction:

The concept of perioperative therapy, known as "wait and see," was as tactic and passive approach in the past. It included physicians reacting to various postoperative issues as they arose. The implementation of improved recuperation techniques, which were first effective in colorectal surgery [1], resulted in a fundamental change in approach towards preoperative and postoperative management.

Reconstruction of abdominal wall has evolved in past twenty years to include surgical repair techniques which effectively helps in managing hernias of different sizes and complexities. Various preoperative and postoperative factors, including some that can be modified and are

individual to the patient, can potentially impact the outcomes of abdominal wall reconstruction (AWR). Given that wound morbidity can greatly affect an individual's capacity to resume normal activities and their overall quality of life, the clinical results of acute wounds are strongly linked to the wound healing process. The primary and most common complication that arises in individuals undergoing abdominal wall reconstruction (AWR) is surgical site infection (SSI). This complication is associated with increased hernia recurrence, hospital readmission, re-surgery [2, 3]. The primary objectives of Enhanced recovery after surgery (ERAS) are to standardize, enhance perioperative medical treatment. These evidence-based protocols are designed to achieve these objectives. In emergency surgical settings, the time available for evaluating, diagnosing, and operating on patients is considerably shorter compared to elective surgical settings. The modified physiology results in a diverse array of symptoms, which in turn increases the likelihood of illness and death. The ERAS protocol is widely recognized and extensively utilized in the realm of elective surgery, including abroad spectrum of surgical procedures, including those pertaining to the gastrointestinal (GI) system as well as other areas of the body. In contrast, the field of emergency surgery has not had the same level of advancement.

ERAS consists of four separate phases: preadmission, preoperative, intraoperative and postoperative. Each of these phases comprises a multitude of distinct components. The management of ERAS pathways is challenging in emergency situations due to the short preadmission and preoperative periods. Conversely, a multidisciplinary approach allows for the integration of care features throughout all stages of an ERAS protocol to the maximum extent feasible. The sequence of numbers [1, 2, 3]

Enhanced Recovery after Surgery protocol referred to as "fast-track" program, aims to enhance patient satisfaction, minimize problems, and decrease the hospitalization duration for post-surgical recovery. To accomplish this objective, minimally invasive surgical techniques are employed, and any chronic illnesses, nutritional inadequacies, or fluid imbalances are identified and corrected before the operation [2]. Furthermore, throughout the surgical procedure, it is imperative to effectively manage the patient's pain and body temperature, while also administering fluids in a targeted manner. To achieve the goals of ERAS, it is imperative to enhance nutrition during the postoperative period, along with initiating early mobilization and promptly removing catheters and drains [3].

Previous research has investigated the use of ERAS procedures in patients who have had colorectal, urologic, gastric, and pancreatic surgery [4–7]. These methods have demonstrated a substantial influence in reducing length of hospital stay, alleviating postoperative pain, enhancing early mobility, lowering occurrence of severe medical consequences.

The effectiveness of enhanced Recovery after Surgery in difficult Abdominal Wall Reconstruction is not well understood [8-10]. To our knowledge, only one first meta-analysis has been published so far, which contains two non-randomized trials that compare the clinical results of ERAS with normal methods for AWR.

The major purpose is to assess the duration of hospital stays and the rate of readmission. The secondary objective of this study is to evaluate postoperative complications such as surgical site infections, seroma formation, and wound healing.

AIM

To assess length of hospital stay.

To assess postoperative complications such as surgical site infections.

Materials and methods :

The Prospective cohort study was conducted in Department of General Surgery at Chettinad Hospital and Research Institute in the year 2023. An analysis of the current perioperative treatment, Enhanced Recovery after Surgery (ERAS) approach. The study comprised patients who were receiving surgical repairs for midline, incisional, or flank hernias. All wound classes from all centers for disease control were covered. Patients who were undergoing bridging repairs, repair of Parastomal hernia, or sophisticated autologous tissue restoration with free myocutaneous flaps were not included in the study. Furthermore, patients who were unable to have their endotracheal tubes removed immediately after surgery were not included in the study. After receiving informed consent, patients in the inclusion criteria will be randomly assigned to one of two groups. Patients were allocated using the odd-even randomization approach. Patients were considered suitable for discharge provided they were able to tolerate a normal meal, urinate without assistance, have regular bowel movements, and manage their pain with oral drugs. The objective was to achieve discharge on post-operative day 4 or 5 if the specified conditions were satisfied. The attending surgeons, resident-physicians, mid-level doctors, and nurses were instructed on the new protocol.

Regular postoperative follow-up will be conducted at regular intervals. Following permission from our Institutional Review Board, we executed the ERAS methodology and collected data in a prospective manner. Essential demographic and patient attributes, including age, gender, body mass index, smoking habits, existing medical conditions, and American Society of Anesthesiologists categorization, were collected. Furthermore, we documented key factors related to the surgery, including the specific method utilized to repair the hernia, the duration of the operation, the dimensions of the hernia opening , and the kind and dimensions of the mesh employed. Following the surgery, the duration until the patient could resume a normal diet, the duration until the epidural or patient-controlled analgesia (PCA) was stopped, and the occurrence of problems during the hospital stay and within 30 days after the surgery were monitored. The groups were compared, with the primary result being the duration of hospitalization. The data were summarized using the mean and standard deviation for continuous variables, and counts and percentages for categorical variables.

INCLUSION CRITERIA :ASA1-3, AGE 20 to 80 yrs.

Patients undergoing repairs of midline, incisional or flank hernias

EXCLUSION CRITERIA : Uncontrolled Diabetes, ASA 4-5, AGE >75yrs. Patients undergoing Parastomal hernia repairs, bridged repairs or complex autologous tissue reconstruction with free myocutaneous flaps were excluded. In addition, patients who were unable to be extubated immediately postoperatively were excluded.

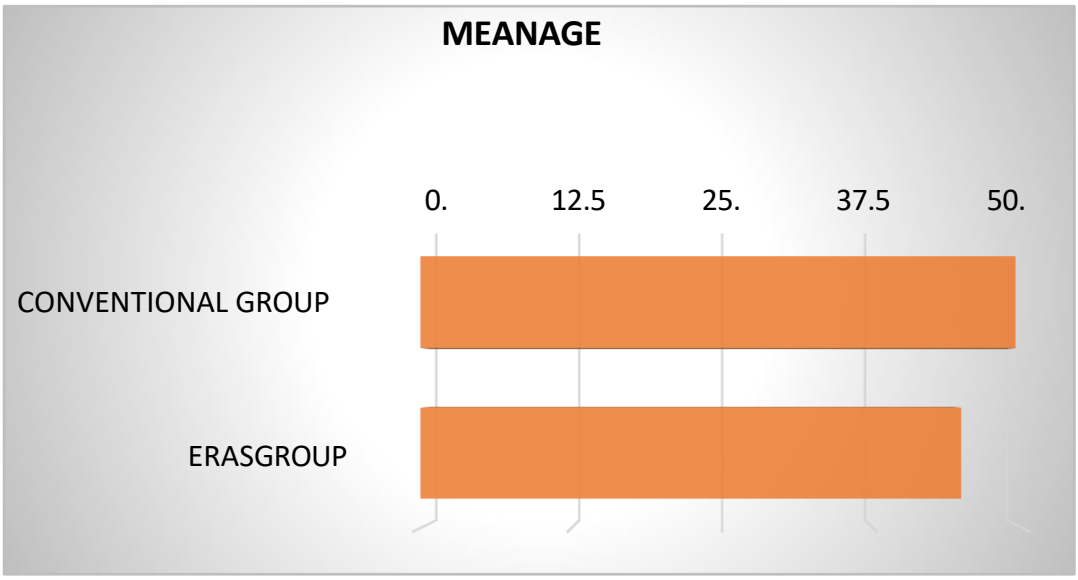
Results and analysis :

Patients mean ages among the group were calculated, tabulated in, Table: 6.1. High mean value was observed in conventional group, it's shown in Graph.1.P-value of mean age 0.081 > 0.05 is statistically not significant.

Table:1 Patients mean age among groups.

AGE	ERAS GROUP	CONVENTIONALGROUP
MEAN	44.86	49.4
SD	11.87	12.54

P VALUE	0.081

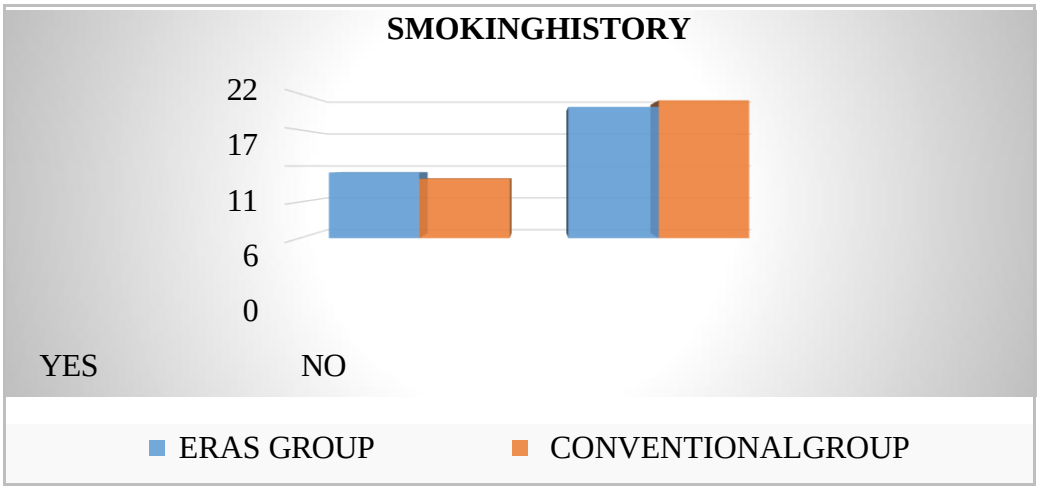


Graph.1 Comparison of mean age of patients among the group

The smoking habits of patients in group were observed and mentioned in Table 2. Higher number of non smokers observed in both groups, it's shown in Graph 2. The smoking patient P-value is 0.781 > 0.05, is statistically not significant

Table 2 Smoking of the patients among the group

SMOKING	ERAS GROUP	CONVENTIONALGROUP
YES	10	9
NO	20	21
P VALUE	0.781	

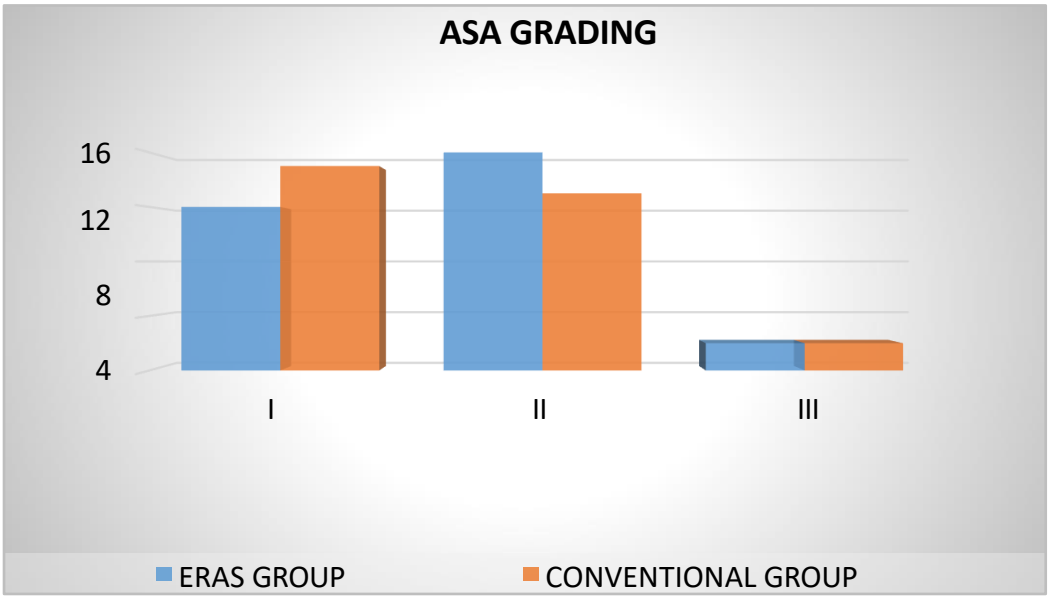


Graph 2 Comparison of smoking among the group

ASA grading of the patients calculated, shown in Table 3.Patients having the ASA of grade I and grade II in both groups observed, it's graphically represented in Graph 3. The p-value 0.724

Table 3 ASA grading of the patients among the group

ASA	ERAS GROUP	CONVENTIONALGROUP
I	12	15
II	16	13
III	2	2
PVALUE	0.724	



Graph 3 Comparison of ASA grading of the patients among the group

Types of Hernia of patients were calculated, tabulated in Table 4. The increased number of umbilical hernia was observed in ERAS group; similarly higher no. of incisional hernia was observed in conventional group. P -value of 0.467 > 0.05 is statistically not significant

Table 4 Type of Hernia of the patients among the group

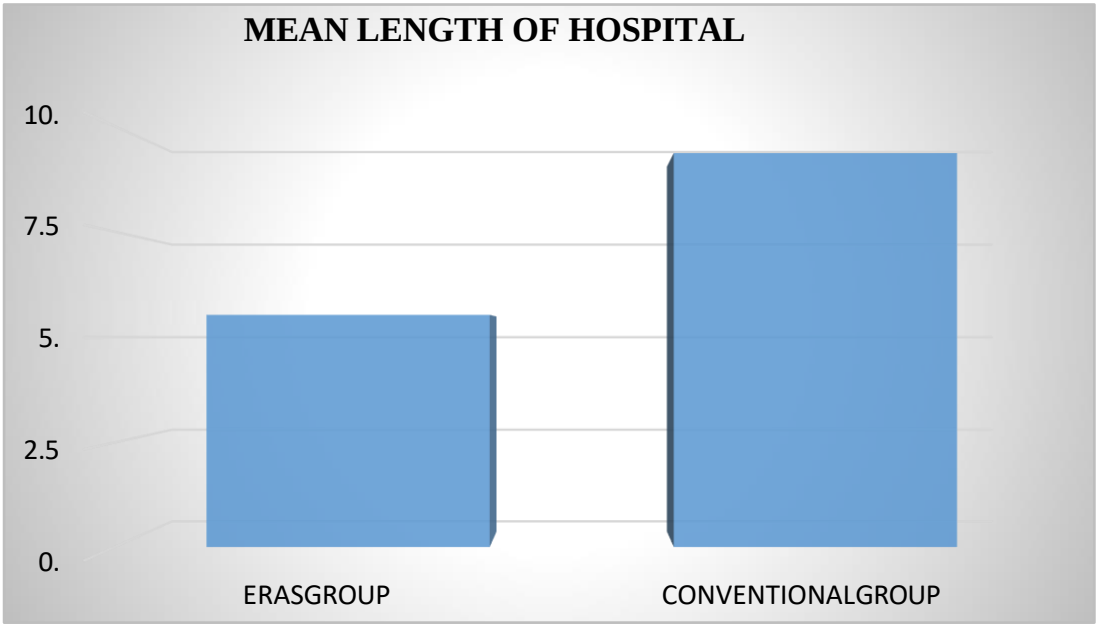
TYPE OF HERNIA	**ERAS GROUP**	**CONVENTIONAL GROUP**
INCISIONALHERNIA	2	13
UMBLICALHERNIA	16	6
VENTRAL HERNIA	9	8
PARAUMBLICAL HERNIA	3	3
P VALUE	0.467	

Graph 4 Comparison of type of Hernia of the patients among the group

The length of hospital stay of the patients calculated was shown in Table 5. Longer hospital stay in patients was observed in conventional group and shown in Graph 5.Thep-value for length of patient hospital stay 0.00001, <0.05is statistically significant was observed.

Table 5 Length of hospital stay of the patients among the group

LENGTH OF HOSPITAL STAY (DAYS)	ERAS GROUP	CONVENTIONAL GROUP
MEAN	5.53	9.36
SD	0.76	0.75
P VALUE	0.00001	

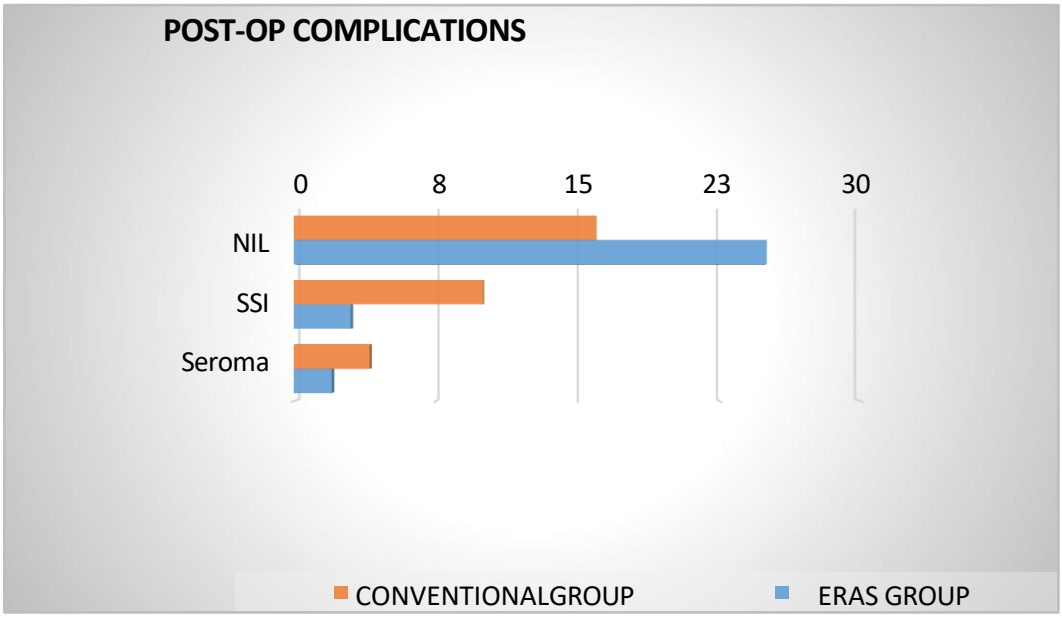


Graph 5 Comparison of length of hospital stay of the patients among the group

In ERAS group, 2 patients having seroma formation and 3 patients having surgical site infections and the remaining are normal. In convention group, 4 patients having seroma formation and 10 patients having surgical site infections and the remaining are normal and it's shown in Table 6 and Graph 6. The p-value is 0.045, <0.05 statistically significant was observed

Table-6 Post-OP complications of the patients among the group

POST-OP COMPLICATIONS	ERAS GROUP	CONVENTIONAL GROUP
Seroma formation	2	4
Surgical site infections	3	10
NIL	25	16
PVALUE	0.045	



Graph 6 Comparison of post-OP complications of the patients among the group.

Discussion :

The evidence-based practices known as ERAS (Enhanced Recovery after Surgery) are linked to better patient outcomes. A multimodal approach to perioperative treatment, pathways of enhanced recovery after surgery (ERAS) aims in early recovery, outcomes. Protrusion of a peritoneal sac through muscle aponeurotic layer of abdomen is known as abdominal wall hernia. The prevalence of abdominal wall hernia is 1.7% across all age groups and 4% in those over 45 years. After abdominal wall repair, ERAS is possible and can shorten hospital stays without raising the risk of problems or readmissions. This study looked at the effectiveness of ERAS protocols in patients having abdominal wall reconstruction and how often these protocols are used in these types of facilities.

We created an ERAS route with a multimodal approach to postoperative recovery for patients receiving AWR. The ERAS pathway was introduced, and there was a tendency towards decreasing PCA use, but there was no change time to LOS.

Nevertheless, while median days remained constant, the decline in PCA usage was not clinically significant. Shorter hospital stays were common among less complex patients with small hernias and short surgical times. However, it appears that overall, the more complicated hernia patients that make up the majority of our practice did not respond well to our protocol of improved recovery.

A multimodal pain regimen was used in an effort to improve recovery and reduce total narcotic use. This approach has been demonstrated to reduce the need for opioids in patients following ventral hernia surgery. Scheduled administration of gabapentin and acetaminophen, which have been demonstrated to lower pain scores and opioid use, was initiated on POD1, in addition to regional anesthesia.

Nonsteroidal anti-inflammatory drugs (IV ketorolac) were administered in patients who had normal platelets, normal renal function, and minimal bleeding risk at the attending surgeon's discretion. Rescue had access to oral narcotic painkillers with the intention of stopping IV narcotics as soon as feasible.

Mean age in eras group was found to be 44.86±11.87years, conventional group was 49.4±12.54 years. 18 male patients and 12 female patients in eras group, 20 male patients and 10 female patients in conventional group.

The number of hospitalized days of the patient's in ERAS group was 5.53±0.76 days, in conventional group was 9.36 ± 0.75 days.

In ERAS group, 2 patients having seroma formation and 3 patients having surgical site infections and the remaining are normal. In convention group, 4 patients having seroma formation and 10 patients having surgical site infections and the remaining are normal. Our findings showed a significant increase in total

Postoperative complication rates in the conventional approach (46.7% vs.14.3% in the ERAS group P=0.045), which is consistent with study by Shang et al. as the conventional approach led to a significant increase in the incidence of postoperative complications compared with ERAS (37.1% vs. 29.6%, respectively)[11].

The surgical site infection in the conventional group showed significantly more than in ERAS group (10%vs.33.3%;P=0.045).This could be a reflection of the minor adjustments to the immune system brought about by ERAS in contrast to the conventional method. Surgical site infection occurred in 29% of conventional patients compared to just 10% of ERAS participants, which was statistically significant in the statistical analysis (P=0.21). This finding is comparable with the findings of Moshina and colleagues [12]. A prior meta-analysis similarly confirmed the link between ERAS implementation and the lowered incidence of postoperative wound infection (OR:0.39, P<0.001). In contrast, wisely and Barclay discovered nil significant difference in between the two treatments for the incidence of wound infection in postoperative patients(P=0.12),which was encountered in 21% and 14% of patients in the traditional and ERAS groups, respectively [13].

Conclusion :

The results shown above indicate that patients having anterior abdominal wall surgery benefit greatly from implementation of ERAS protocol. In comparison to the traditional method, it is linked to a quicker rate of patient recovery, a decreased length of stay and incidence of complications in the hospital.

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