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## Application of enhanced recovery pathway in abdominal wall reconstruction surgery in a tertiary care hospital in Andhra Pradesh

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### Abstract

**Aim & Objective:** Enhanced recovery pathways are well-defined perioperative evidence based interventions in a protocol manner for standardising techniques involved in drug selection, dose, reduce cost and facilitate in early discharge by monitoring mortality rates. The hypothesis of the study is the application of enhanced recovery pathway after surgery in abdominal wall reconstruction could result in potential decrease in hospital stay.

**Methods:** The study is performed in the period of February 2017 to June 2019 and a total of 100 cases and 100 controls undergoing abdominal wall reconstruction were included. Enhanced recovery pathway after surgery is used to identify the results with respect to duration of the stay.

**Results:** It was observed from the study results that, there was no change noted in the duration of stay and regular diet. The readmission rate is decreased and in analysis of subgroups we found, factors associated with duration of the stay were < 5 days with hernia.

**Conclusion:** To conclude, administration of enhanced recovery pathways after surgery could not show a limitation in duration of stay. It was obviously noted that quality of baseline life scores, less operative times and small hernia defects were in co-ordination with duration of stay.

**Keywords:** ERAS, recovery, abdominal reconstruction, duration

### Introduction

Enhanced recovery programs have shown to be safer and effective to traditional care. The implementations of enhanced recovery protocols are associated with decreased or invariable morbidity and mortality. The use of Enhanced recovery after surgery in open and laproscopic surgeries were studied and the use of this expanded to other specialities like genitourinary, orthopaedic and other organ based operation<sup>[1-3]</sup>.

Another important feature of Enhanced Recovery protocols is their ability to accelerate to return of organ function or prevent their decline. In the other hand, ERAS pathways have the ability to improve patient quality of life in case of long term post-surgical periods. The factors like reduced need for day time sleep reduced fatigue, reduced number of days that patients require sick leave all been reported in patients for whom ERAS was implemented<sup>[4-6]</sup>.

The ERAS protocols are also been developed for ventral hernia repair, demonstrating shorter times to regular diet and a decrease in LOS by > 2. Although these studies suggest a benefit of enhanced recovery pathways for patients undergoing ventral hernia repair, the utility of ERAS pathways in complex abdominal wall reconstruction with larger defect requiring separation of components remains largely unknown. Therefore, the study hypothesis is that implementation of an ERAS pathway for ARW would result in faster recovery and decreased LOS<sup>[7-10]</sup>.

### Materials and Methods

A core group of hernia surgeons followed universal protocol according to the literature available on ERAS pathways for patients undergoing AWR at Great Eastern Medical School & Hospital. A comparison was made between current postoperative care and ERAS pathway. Under inclusion criteria, patients with repair of midline, incisional, or flank hernias were pooled and patients undergoing parastomal hernia repairs or complex autologous tissue reconstruction or bridging repairs were excluded from the study. Along with them patients who were unable to be extubated immediately after operation were also excluded.

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Methodology includes a pain control multimodal approach with transversus abdominis plane blocks (TAP blocks) which were performed by the surgeon in assistance with 20 ml of bupivacaine liposomal suspension diluted in 80 ml of 0.9% NaCl and injecting 50 ml of the solution per side in 6 various locations during operation. After the operation, patients were given intravenously 0.2 mg of patient controlled analgesia for every 6 minutes and discontinued on 3<sup>rd</sup> day of post operation when patients were tolerating a balanced regular diet. On first day of post-operative day, 650 mg of acetaminophen and 300 mg of gabapentin were given for every 6 hours. On post-operative day 2, oral intake of Oxycodone 5mg was given followed by intravenous ketorolac.

Regular diet including Bowel regimen of milk of magnesia 30 ml two times a day and 100 mg of docusate was also given similarly. Liquid diet is given from the day of post-operative day and intravenous fluids were slowly limited with specific goal directed fluid and IV fluids. Patients were started with initial amount of 75 ml/h of IV fluids with decreasing rate as diet till

third day. Regular laboratory checkups were done post-operatively. Catheters were placed after induction of anesthesia and was removed once the patient is recovered. In addition to that subfascial drains were also used and were removed when the output is less than 30 ml/24hours.

Patients were considered for discharge when they are on regular diet with normal bowel movements and when the pain is in control with oral administration of medicines. The general goal is to discharge on the 4<sup>th</sup> or 5<sup>th</sup> day. With the aid of surgeons, physicians and nurses a standard order set was prepared with in the medical record electronically. Sample size calculation was performed based on the data of LOS of 6 days along with a standard deviation of 2 days.

The study group is compared with the historic data group with AWR before implementation of ERAS protocol that was obtained through chart review retrospectively. Demographic characterization is done. Statistical analysis is performed by using 2 sample t test and Mann-whitney test and significance was measured.

**Table 1:** Pre-Post ERAS operative care

	Pre-ERAS	Post - ERAS
Diet	Regular diet	Advancement in diet for speed recovery
Fluids	Various intraoperative fluids and postoperative regimens	Fluids were limited
Foley catheters	Routinely placed and continued with epidural in place	Discontinued from day 2
Nasogastric tubes	Placed in bowel resection, enterotomy, prolonged breakdown of adhesions	Not used
Pain control	Epidural Variable non-narcotic regimens	TAP block + PCA Tylenol- gabapentin

## Results

The results revealed that pre and post ERAS seem to be similar along with similarity in demographic variables. Hernia width was same for pre and post ERAS groups and it was also noticed a large number of recurrent hernias in both groups.

With respect to LOS, there is not much change according to ERAS protocol. There were no complications noted for about 30 days till re-examination. Another subgroup analysis is performed to identify the factors associated with long and short term stays. It was found that increased quality of life and short operative times with smaller defects in LOS of less than 4 days

and decreased preoperative quality of life is noted in case of LOS more than 6 to 8 days.

**Table 2:** Demographic variables of patient

	Pre- ERAS	Post-ERAS	P value
Age	59± 12	56 ±13	0.57
Sex			
Male	46	52	0.02
Female	54	48	
BMI(kg/m <sup>2</sup> )	34.2± 3.2	31.0± 5.2	0.10

**Table 3:** Operative variables

	Pre-ERAS	Post- ERAS	P value
<b>Procedure</b>			
TAR	98	90	0.23
Hernia	2	5	
Retrorectus	0	5	
<b>CDC wound class</b>			
1	85	90	0.19
2	9	6	
3	6	4	
<b>Mesh</b>			
Biological	3	2	
Synthetic	97	98	0.35
Hernia width	16 cm	15.9 cm	0.95
Hours of Operative time	3.5 -4 hours	3.4 - 4	0.41

**Table 4:** Post-operative variables

	Pre-ERAS	Post- ERAS	P value
LOS(d)	5	5	0.70
Time of regular diet	2.9-4	3	0.12
Discontinuation of PCA and catheter	2-4	3	0.02
Anemia	1	2	
Hypotension	5	0	
<b>Inpatient complication</b>			

Yes	28	34	0.52
NO	72	66	
<b>Readmission</b>			
Yes	8	11	0.59
No	92	89	
HerQles 30 day post-operative	43-45.2	48	0.09
Raw pain score 30- day post-operative care	57.9-59	52.3	0.11

## Discussion

The development of ERAS pathway for patients undergoing AWR is a multimodel approach for post-operative recovery. It was noted that, with the introduction of this pathway, there was not much change noted in the LOS and diet as compared to PCA use which was decreased and is not significant. Another good observation is that, there were no complications for about 30 day readmissions.

The ERAS protocol is developed by using epidurals in patients undergoing posterior component separation. In fact in a study conducted by prabhu *et al.*, it was found that epidurals were linked with more complications and longer LOS. Hence, in our study instead of epidurals we used TAP blocks. It was confirmed from the literature that use of alvimopan post operatively minimizes time of return if bowel moments and due to this majority of our patients does not require alvimopan which was not included in our protocol [11-13].

The overall LOS noted was 5 days in our study and noted that there was no decrease in LOS by following ERAS protocol which is in contrary to several studies. Jensen *et al.* performed an observational study by evaluating the effects of ERAS pathway on small number of patients undergoing ventral hernia by retro rectus repair for defects > 10 cm. They found decrease in LOS from 6 to 3 days with no complications differed during readmission [8,9]. In contradictory to that, in our study population majority of the patients required a posterior component separation repair. Noted that our patient population had larger defects and require operation for repair and hence are not comparable. Studies performed may also suggest that patients with more complex hernias have less baseline HerQles scores, by using these scores, size of hernia and operative course, we can predict the patients appropriate ration who will be discharged earlier with assistance of ERAS pathway. This approach identifies the patients who are at higher risk for a long LOS and benefit to enhance postoperative recovery [14].

The limitations of the study were, the study design is not powered to screen the differences in demographic variables and hence unable to draw conclusions pertaining to differences in clinical outcomes. The study can be further improvised by modifying the existing pathway to gain optimal recovery of patients. The major possibilities might also involve hernia defect, increased quality of life scores and less operative times. With the study results, we were able to find out the factors linked with shorter LOS. Some other factors might also explain our unchanged LOS. In addition, in our tertiary care center, many different hernias with more defects were noted and with the sub group analysis, it was found that a longer LOS is associated with size of the hernias. Our ERAS pathway allowed for standardization and well-formed postoperative protocol for patients representing multimodel approach.

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