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A Study on Various Approaches of Abdominal Wall Reconstruction (AWR) in the Management of Complex Ventral Hernia

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Abstract

Introduction: Ventral hernia repair has been a source of great frustration for general surgeons throughout the 20th century. The recurrence rates following primary repair of ventral hernias have been notoriously high.

Aims and Objectives

The primary objective was to study the outcomes of each repair in terms of surgical site infections and complications following the repair of abdominal wall in ventral hernia repairs by anterior compartment separation, posterior compartment separation with transverse abdominis release and Rives stoppas technique.

The secondary objective was to study the recurrence and recovery, mortality following the repair of abdominal wall in ventral hernia repairs by anterior compartment separation, posterior compartment separation with transverse abdominis release and Rives stoppas technique.

Material and Methods: In this prospective interventional study, the population consisted of a total number of 60 patients reporting to the Department of General Surgery, at a tertiary care hospital in Maharashtra, India.

The study duration was two years from April 2022 to May 2024.

This study was approved by the Institute Ethics Committee. Written informed consent was also obtained from all the patients before enrolling them in the study after a clear explanation in their own language.

Data collection included detailed history, thorough clinical examination, contrast-enhanced computed tomography (CECT)/Plain computed tomography scan, and ultrasonography (USG) of the abdomen.

Result: A total of 60 patients as per the inclusion criteria were studied, out of these 25 patients underwent RS repair for defect size 10 cm and <=15 cm) and 15 patients were treated with PCS+TAR repair and 20 patients with ACS repair.

Discussion: In current Abdominal Wall Reconstruction (AWR) pathway, including the checklists and information documents and use with a step by step evidence and experience-based approach to identified the multiple factors associated with good outcomes. The intra-operative variables like the mean operative time for the repair of a large ventral hernia were 176 mins. The mean operative time for RS repair was 170.4± 15 mins while for TAR repair was 188.8 ± 22 mins.

Keywords: Morbidity, Open Mesh Repair, Ultrasonography**,** Ventral Hernia.

Introduction

A protrusion through the anterior abdominal wall fascia characterizes a ventral hernia. A major problem that complicates 11-23% of abdominal laparotomies is ventral abdominal wall hernias. Because the failure rates of hernia repairs range from 25 to 54% for primary suture repair and up to 32% for open mesh repair, the capacity to conduct a dependable, permanent ventral hernia repair with low morbidity and recurrence rate has become a major issue for today's general surgeon.

The retromuscular (Rives-Stoppa) hernia repair is an additional innovative method that was initially reported in the early 1970s. This approach makes advantage of the area that extends approximately 6-8 cm on either side of the midline, between the rectus muscle and the posterior rectus fascia.

There was a need to investigate the surgical outcomes of various techniques utilized in the treatment of big ventral hernias because these conditions are common in our area. Since there is a dearth of information on the benefits or drawbacks of various methods, it is necessary to assess them and provide standards for effective administration. The present study was thus undertaken to assess the short-term surgical outcomes in terms of recurrence, pain, surgical site infections and complications following ACS, TAR and RS procedures in the repair of the ventral hernia.

Aims and objectives

The primary objective was to study the outcomes of each repair in terms of surgical site infections and complications following the repair of abdominal wall in ventral hernia repairs by anterior compartment separation, posterior compartment separation with transverse abdominis release and Rives stoppas technique.

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Materials and Methods

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before enrolling them in the study after a clear explanation in their own language.

Data collection included detailed history, thorough clinical examination, contrast-enhanced computed tomography (CECT)/Plain computed tomography scan, and ultrasonography (USG) of the abdomen.

Inclusion criteria

Both males and females aged 18-70 years falling under the American Society of Anesthesiologists (ASA) classification I and II with midline ventral hernias

Defect size ranging from 4- 15 cm.

Exclusion criteria

Patients who were considered unfit for the major surgical procedures

Patients who do not give consent for the study

Pregnant and lactating mothers

Result

Table 1: Age distribution

Age range (years)	ACS		PCS+TAR		RS		P value
26-35	0	0%	0	0%	1	4%	0.16
36-45	2	10%	2	13.3%	16	64%	
46-55	15	75%	11	73.3%	3	12%	
56-65	1	5%	1	6.6%	2	8%	
66-75	2	5%	1	6.6%	3	12%	

Figure 1: Age distribution

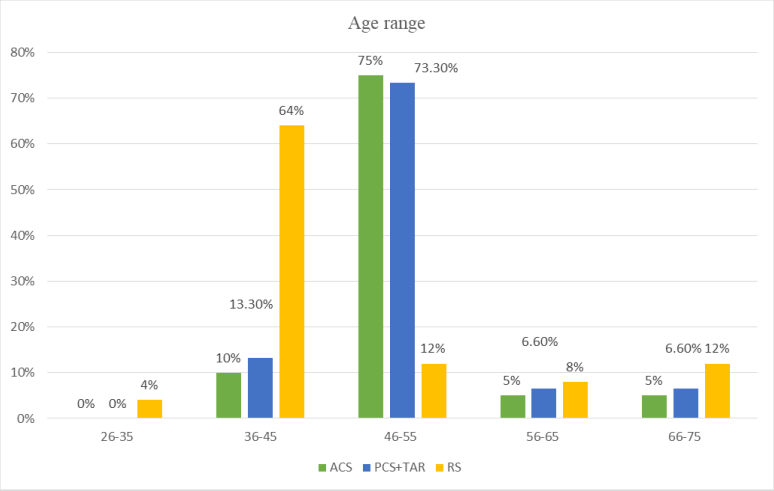


Table 2: Sex distribution

Sex	ACS		PCS+TAR		RS		P value
Males	10	50%	8	53.3%	12	48%	0.33
Females	10	50%	7	46.6%	13	52%	

Figure 2: Sex distribution

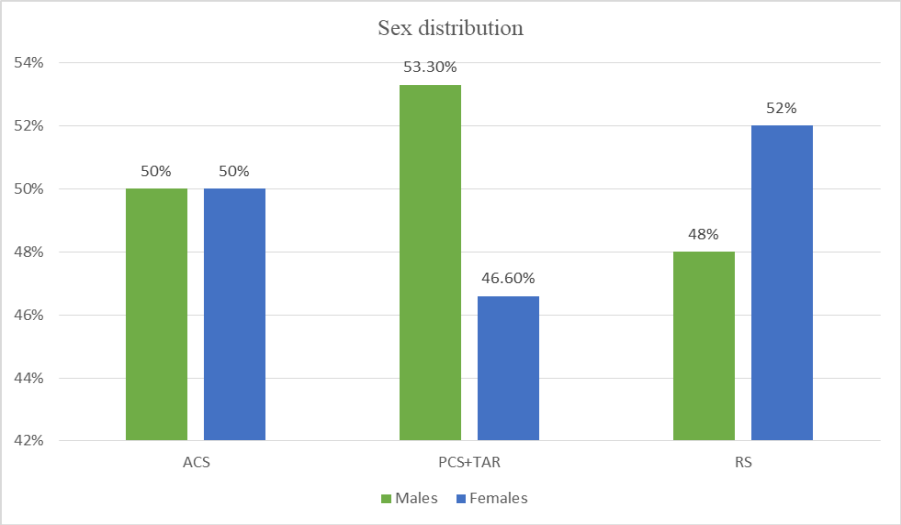


Table 3: Obesity

Obesity	ACS		PCS+TAR		RS		P value
Yes	15	75%	10	66.6%	19	76%	0.34
No	5	25%	5	33.3%	6	24%	

Figure 3: Obesity

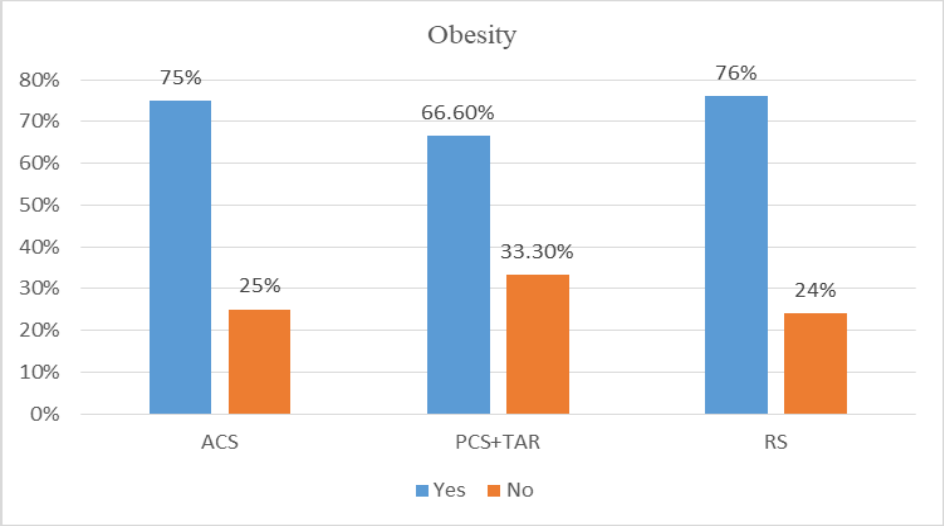


Table 4: ASA class

ASA class	ACS		PCS+TAR		RS		P value
2	5	25%	6	40%	7	28%	0.071
3	11	55%	7	46.6%	13	52%	
4	4	20%	2	13.3%	5	20%	

Figure 4: ASA class

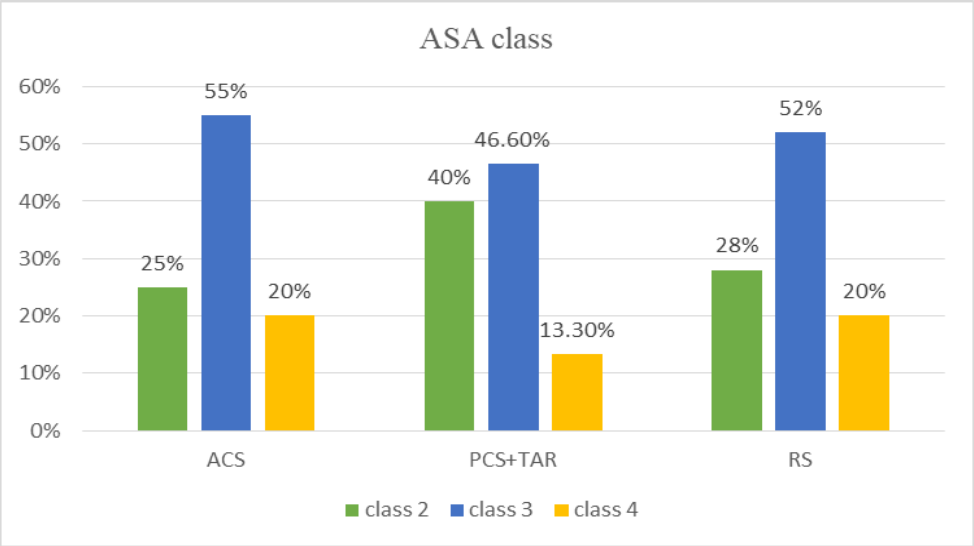


Table 5: Co-morbidities

Co-morbidities	ACS		PCS+TAR		RS		P value
Diabetes	5	25%	3	20%	7	28%	0.056
Immunocompromised	1	5%	1	6.6%	1	4%	0.04
Hypertension	6	30%	2	13.3%	6	24%	0.32
Hypothyroidsm	1	5%	1	6.6%	2	8%	0.03
Chronic obstructive pulmonary disease	1	5%	1	6.6%	1	4%	0.03

Figure 5: Co-morbidities

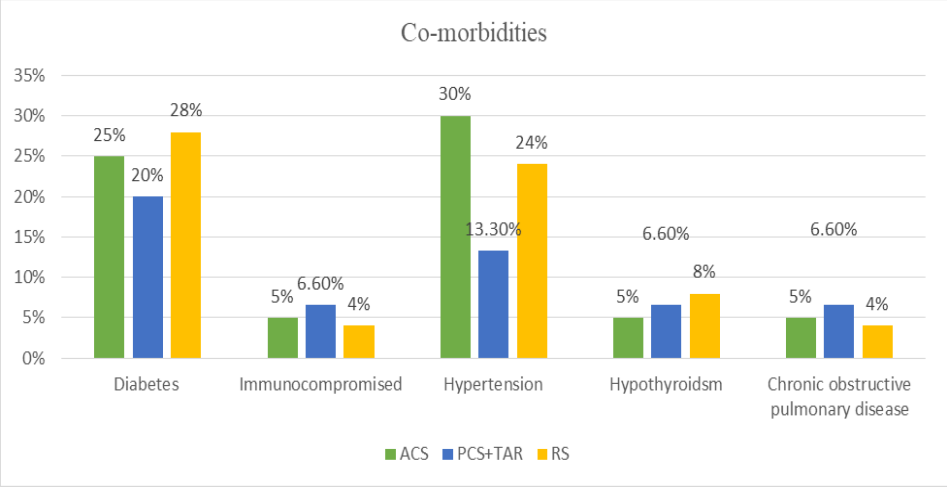


Table 6: Smoking status

Smoking status	ACS		PCS+TAR		RS		P value
Yes	9	45%	8	53%	15	60%	0.27
No	11	55%	7	46%	10	40%	

Figure 6: Smoking status

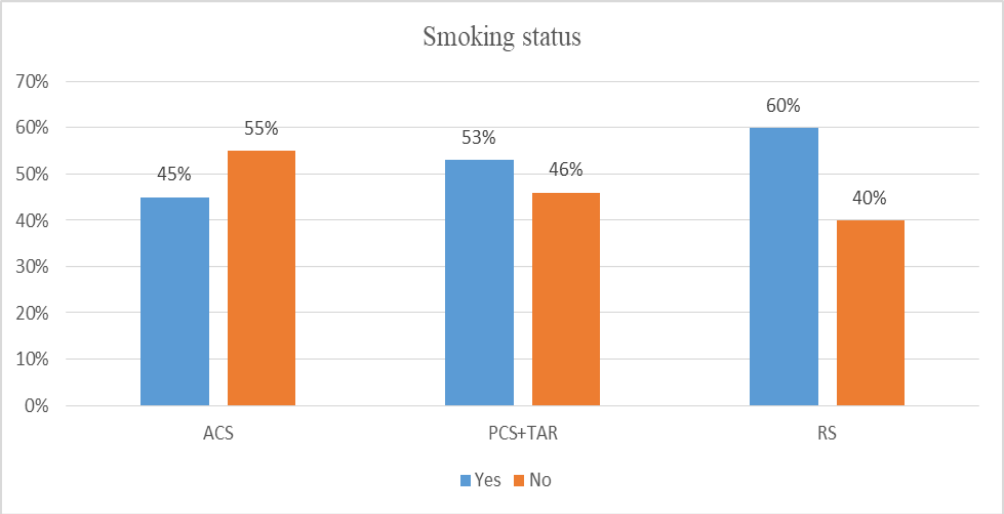


Table 7: Prior hernia repair

Prior hernia repair	ACS		PCS+TAR		RS		P value
None	9	45%	6	40%	9	36%	0.176
Single	5	25%	6	40%	9	36%	
Multiple	6	30%	3	20%	7	28%	

Figure 7: Prior hernia repair

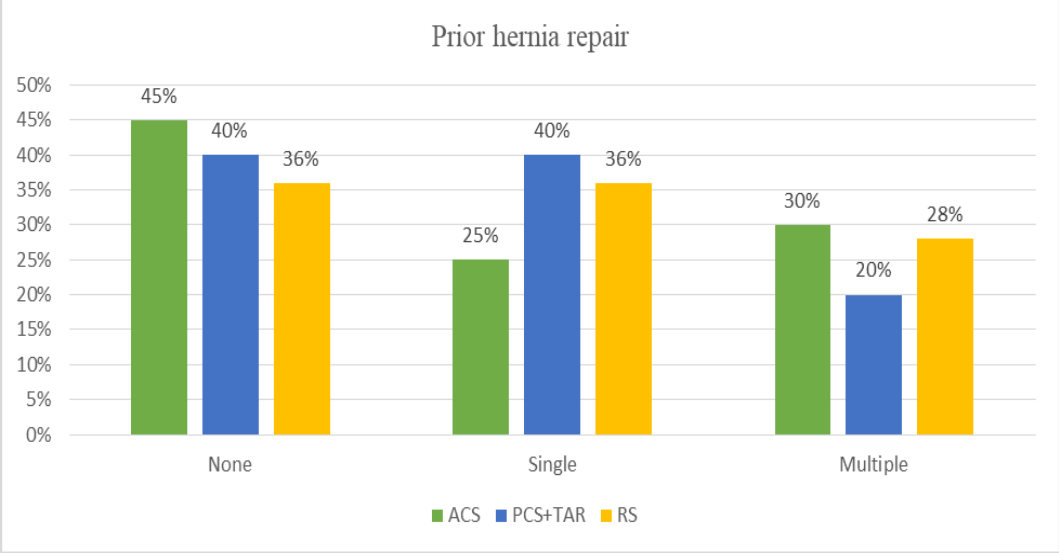


Table 8: Hernia type

Hernia type	ACS		PCS+TAR		RS		P value
Primary	1	5%	1	6.6%	3	12%	0.231
Incisional	19	95%	14	93.3%	22	88%	

Figure 8: Hernia type

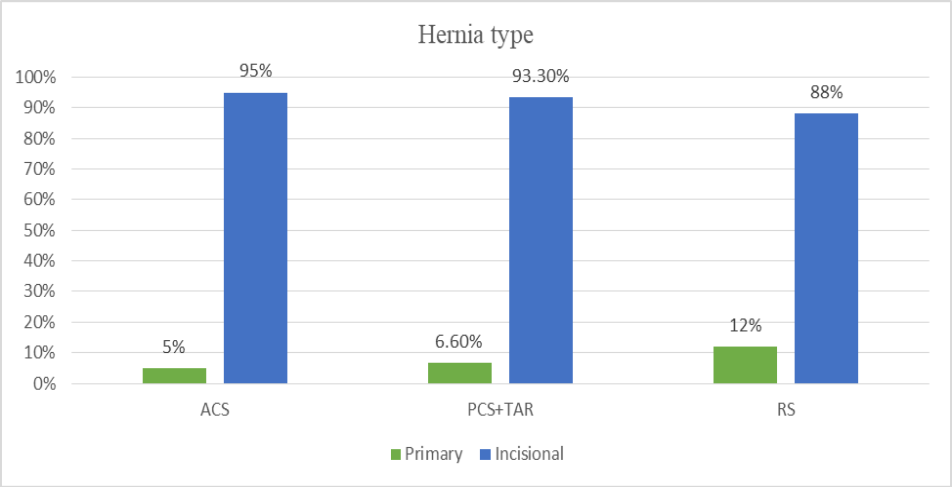


Table 9: Hernia grade

Hernia grade	ACS		PCS+TAR		RS		P value
1	4	20%	2	13.3%	5	20%	0.351
2	11	55%	10	66.6%	13	52%	
3	5	25%	3	20%	7	28%	

Figure 9: Hernia grade

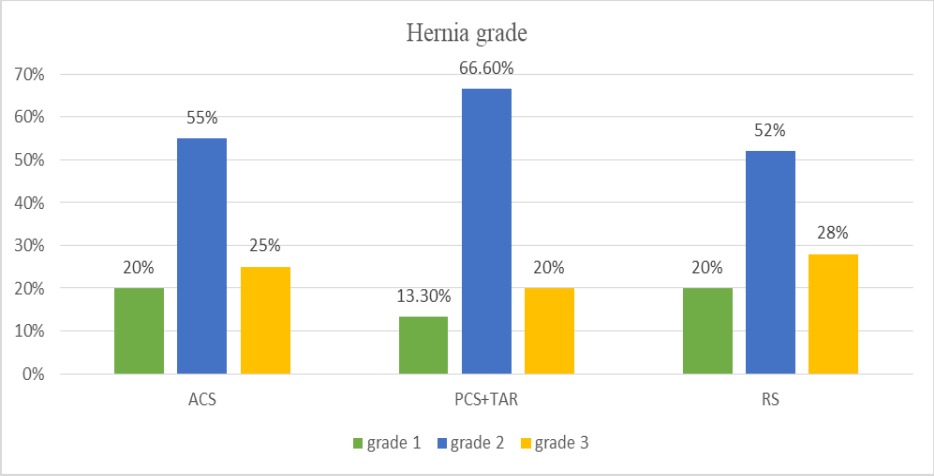


Table 10: Estimated blood loss (ml)

Technique	Mean± SD	P value
ACS	450±150	0.514
PCS±TAR	490±160	
RS	440±110	

Figure 10: Estimated blood loss

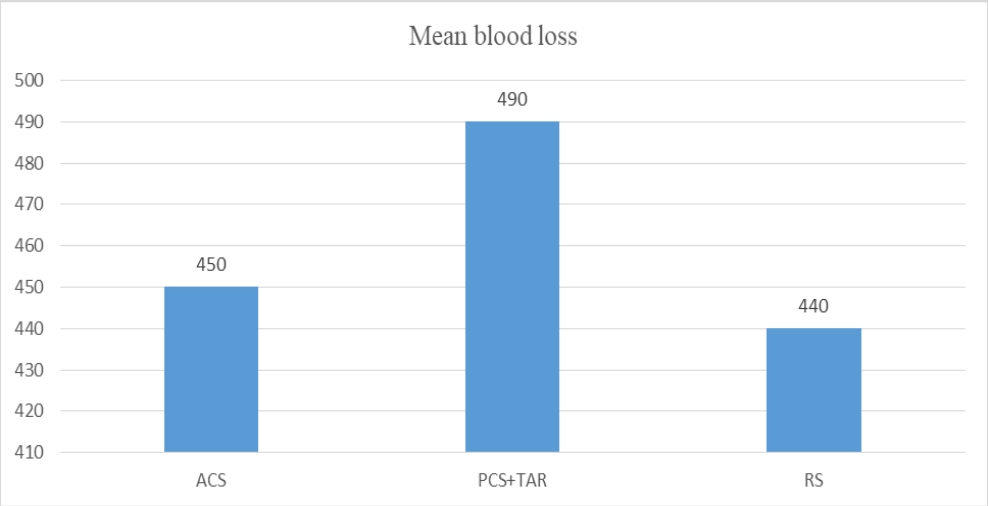


Table 11: Surgery site occurrences

SSO	ACS		PCS+TAR		RS		P value
Seroma	12	60%	6	40%	3	12%	0.415
Wound infection	10	50%	3	20%	0	0%	0.315
Wound dehiscence	7	35%	2	13.3%	0	0%	0.476
Chronic sinus	2	10%	0	0%	0	0%	0.514

Figure 11: Surgery site occurrences

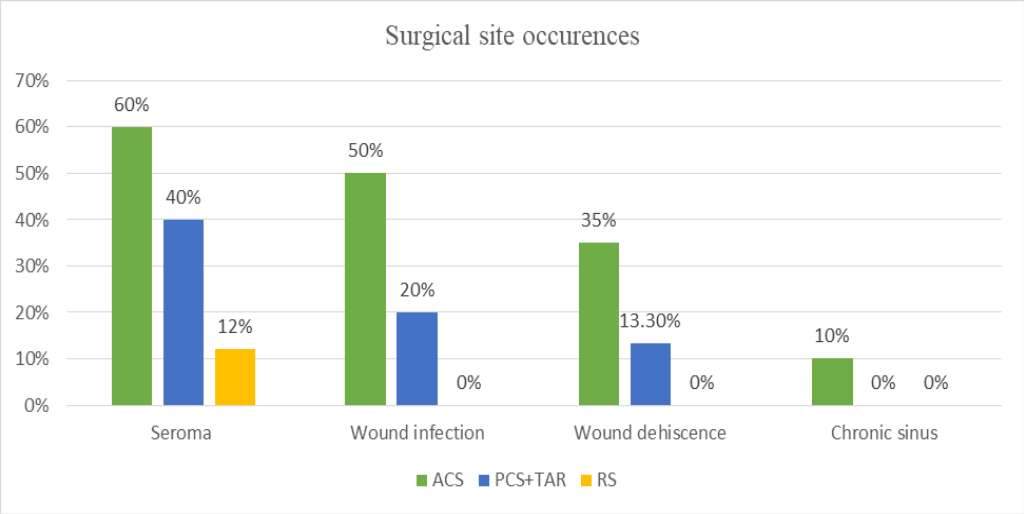
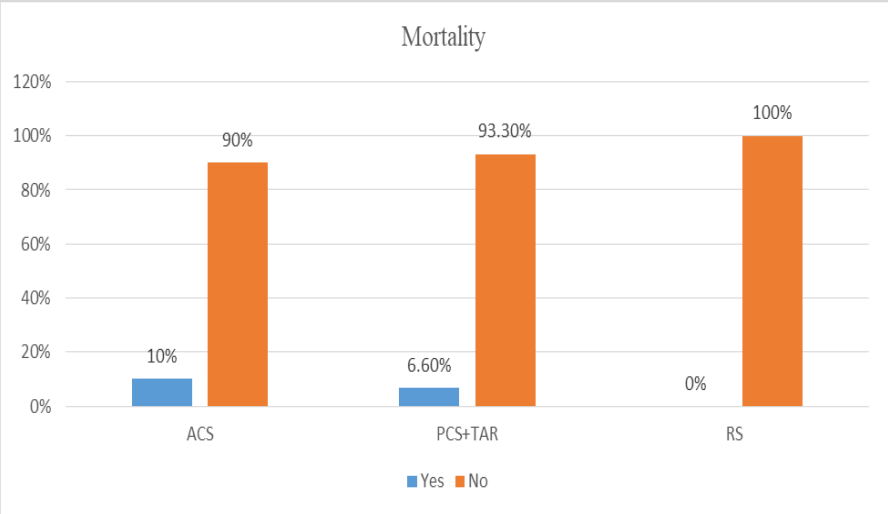


Table 12: Mortality

Mortality	ACS		PCS+TAR		RS		P value
Yes	2	10%	1	6.6%	0	0%	0.241
No	18	90%	14	93.3%	25	100%	

Figure 12: Mortality



Discussion

A total of 60 patients as per the inclusion criteria were studied, out of these 25 patients underwent RS repair for defect size 10 cm and <=15 cm) and 15 patients were treated with PCS+TAR repair and 20 patients with ACS repair.

The data was collected on multiple parameters, including the type of repair, size of the hernia, number of hernia defects (Swiss cheese type defects), divarication, type of mesh, size of the mesh, patient comorbidities, patient BMI, recurrence, and complications.

Prioritizing the reconstruction of the abdominal wall with a broad prosthetic mesh overlap and minimum early and late wound morbidity is the primary objective of any herniorrhaphy**.**

Hernia grade is according to the Modified Ventral Hernia Working Group classification. Majority of the patients had grade 2 hernia in a study by H. Alkhatib, accounting for 59% of all ventral hernias. In our study also, we encountered similar findings where we found 55%, 66.6% and 52% of hernia in grade 2 category in the ACS, PCS+TAR and RS groups respectively.

Conclusion

Abdominal wall reconstruction using PCS with TAR had an equivalent fascial closure to ACS in huge ventral hernias, but PCS with TAR was associated with lower risk of wound morbidity which is believed to be related to the preservation of the abdominal wall blood supply by eliminating skin flaps needed for the ACS. ACS was associated with increased recurrence, when compared to the PCS and RS group over a short period of 4 months.

Recurrence in a shorter period of time is our study may be due to the presence of associated co-morbidities.

RS group showed least post-operative complications, accounting to only 12% of the RS cases. So, rives stoppas technique is more effective for small hernias and is associated with less post-operative complications, surgical site occurrences, mortality and recurrences.

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