

Single centre experience of Robotic primary midline ventral hernias (PMVH) repairs using a novel modular robotic system and comparative study of the two techniques used [robotic Preperitoneal extended Total Extraperitoneal (rPeTEP) vs robotic Transabdominal Preperitoneal (rTAPP)]

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Research Article

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Abstract

Primary midline ventral hernias (PMVHs) are increasingly repaired with preperitoneal mesh. We compared two robotic techniques, robotic transabdominal preperitoneal repair (rTAPP) and robotic preperitoneal extended totally extraperitoneal repair (rPeTEP), performed on a modular robotic system. We retrospectively analysed a prospectively maintained database of consecutive patients who underwent rTAPP or rPeTEP for PMVH at a single centre between July 2023 and May 2026. Primary outcomes were operative time, mesh to defect area ratio (MDAR), conversion rate and postoperative day (POD) 1 pain. Learning curves were assessed by cumulative sum (CUSUM) analysis of operative time. We included 133 patients (rTAPP 82, rPeTEP 51). The rPeTEP group had more divarication of the recti (23.5% vs 9.8%, $p = 0.031$), longer mesh (15.6 vs 14.4 cm, $p < 0.001$) and a higher body mass index. Seven rTAPP procedures (8.5%) were converted to a robotic transabdominal retromuscular repair (rTARM); no rPeTEP procedure was converted. Operative time (65.8 vs 75.9 min, $p = 0.106$) and MDAR did not differ significantly. POD 1 pain scores were lower after rPeTEP (1.43 vs 1.84, $p < 0.001$). All patients were discharged on POD 1 and met textbook outcome criteria through POD 30. CUSUM turning points occurred at 18 cases for rTAPP and 25 for rPeTEP. Both techniques were feasible and safe. rPeTEP allowed repair of extensive divarication with less early pain, whereas rTAPP accommodated concomitant intra-abdominal surgery and showed a shorter learning phase in this single-surgeon series. Larger multicentre studies with longer follow-up are needed.

Introduction

Primary midline ventral hernias (PMVH) constitute the majority of ventral hernias. They are often small to medium sized accompanied by various degrees of obesity in middle aged individuals [1–3]. The goal of repairing these hernias is to provide a sub-lay repair with adequate mesh overlap and minimal wound morbidity, preferably with simultaneous plication of divarication of recti where present [2, 4]. There are multiple surgical techniques for achieving the above goals [2]. Preperitoneal mesh position causes least disturbance to the abdominal wall and abdominal cavity and minimal invasive approaches have shown better results in terms of decreased wound related morbidity and earlier return to work [3, 5]. Robotic approach appears to be beneficial for creation of a peritoneal flap in patients with PMVHs due to the ergonomic ease of dissection in a tremor free environment with stable vision [1, 2].

Robotic Trans-abdominal Pre-peritoneal (rTAPP) mesh repair has been the conventional robotic repair for a PMVH [1, 5, 6]. The recent description of the robotic Preperitoneal extended total extraperitoneal (rPeTEP) technique by Valenzuela et al [1, 2] has shown that a consistent and versatile repair for PMVHs and associated divarication is possible by remaining totally extra peritoneal.

We hereby present the short term results, describe the technical nuances and discuss the merits and demerits of rPeTEP performed using a novel modular robotic system. We have also compared the rPeTEP technique to rTAPP approach for the repair of PMVHs at our institution.

Material and Methods

This is a retrospective cross sectional observational study conducted at a single tertiary care teaching hospital.

As this was a retrospective observational analysis of anonymised data collected during routine clinical care, formal ethics committee approval was not required.

All patients who underwent an rPeTEP and rTAPP repairs for PMVHs between July 2023 and May 2026 were included in the study.

All patients with incisional or recurrent hernias and PMVHs repaired by any other technique were excluded from this study.

The records of patients were accessed from a prospectively maintained database in the hospital, all identifying information was excluded.

The study is reported in accordance with the STROBE statement [7]. Hernias were classified according to the European Hernia Society (EHS) classification [8], and patients were graded using the Ventral Hernia Working Group (VHWG) system [9].

Demographic and preoperative data including age, sex, Body Mass Index (BMI), comorbidities, American Society of Anesthesiologists (ASA) grade and previous surgeries was noted. Operative time, defect size, mesh size, presence of divarication, blood loss, complications and conversion to other procedure were also noted. Post operative data regarding surgical site occurrences and infections, recurrence and pain were also captured at POD 1, 7, 14 and 30.

The primary outcomes for comparison were operative time, mesh to defect area ratio (MDAR), conversion rate and post operative pain.

Secondary outcomes were post operative outcomes as per textbook results and cumulative-sum (CUSUM) analysis for either technique [10, 11].

Textbook results were defined in our study as the absence of skin and soft tissue infection, surgical site occurrence, pain requiring medical intervention and recurrence at Post operative day (POD) 7, 14 and 30 [10, 12, 13].

All patients underwent routine preoperative tests, an ultrasound abdomen and pre anaesthetic check up, as per our hospital protocol. Injection Cefuroxime 1.5 g was administered 45 minutes before induction to all patients.

The surgical technique used for rTAPP was through the standard 3 left lateral ports placed sufficiently away from the midline to enable creation of a peritoneal flap [6].

After closure of the defect, the mesh was placed in the preperitoneal space with minimal or no fixation and flap closed with an absorbable suture [5].

Our technique has been described in detail in a previous publication [6].

The technique for the novel rPeTEP procedure is hereby described in detail.

Surgical technique for rPeTEP:

The procedure was performed under general anaesthesia with the patient supine and arms tucked by the side of the patient.

The operating table was extended at the patients lower back region to make an approximately 10 degrees angle (Fig. 1) [2, 3].

This angulation increased the abdominal musculature length which provided more space for manoeuvring the instruments, also it allowed for full range of movement of the robotic arms when working on the abdominal wall [3].

A foley's catheter was inserted in all patients.

Placement of trocars and docking:

An optical trocar entry was performed in all patients from the suprapubic region [1-3].

The first trocar was placed immediately above the pubic bone(Fig 2a). The obturator of the trocar was removed once the trocar tip was seen to enter the suprapubic fat space after passing through the rectus muscle fibres (Fig. 2b).

The initial dissection was performed using the telescope tip (Fig. 2). This dissection was proceeded towards the left of midline where we try to create approximately 8 cm of space so that there was adequate distance between the optical trocar and the working arm of the robot. After confirming the adequacy of dissection and checking the direction of insertion using a hypodermic needle, the first working trocar was inserted to the left of midline. Further dissection was performed with an instrument in the working trocar to create a similar space to the right of midline.

Once the second working trocar had been placed, no further dissection was performed manually as that could cause peritoneal rents which would shrink the working space due to pneumoperitoneum [2, 3].

The robot was docked from the head end of the patient.

We used the SSI Mantra^R (Sudhir Srivastava Innovations Pvt Ltd, Gurugram, Haryana, India) which is a modular robotic system, hence the camera arm was placed on the head end and the two working arms were placed on either side of the patient (Fig. 3) [2, 3, 6].

This configuration helped by keeping the robotic instruments' orientation more horizontal thus avoiding clashing of the instruments with the patient's thighs.

Creation of space:

For the robot assisted dissection - monopolar curved shears (MCS) was taken in the right arm (Arm 1) and grasping forceps (GPF) in the left arm (Arm 2).

The dissection was commenced initially laterally in the fatty suprapubic triangle to find the preperitoneal plane and define the arcuate line and posterior rectus sheath posterior to which lies the correct plane of dissection [2, 3].

Once this was done, attention was focused to the midline where the preperitoneal flap leads to the umbilicus and the hernial defect in most patients.

The dissection was proceeded cranial to the defect to achieve a margin of 5 to 7 cm above the defect or define the divarication upto its most cranial extent [2].

Subsequently the peritoneal flap was enlarged laterally on both sides with gentle traction and sharp cold dissection.

A space of 10 to 12 cm from right to left and approximately 15 cm in the craniocaudal plane was developed by visual impression and confirmed by measurement after closure of the defect and plication of divarication [1, 2].

Closure of defect and placement of mesh:

The defect was closed using a 1-0 delayed absorbable barbed suture in a running fashion [1-3]. The closure was performed horizontally if there was no associated divarication and vertically in cases with divarication (Fig. 4) [1, 3].

All peritoneal rents were closed using a 3-0 monofilament delayed absorbable suture [1-3]. A macroporous, medium weight polypropylene mesh was placed after tailoring the size to the dissected space [1-3]. No fixation was used in most cases, however a central anchoring stitch was placed in selected cases where the mesh appeared to migrate caudally [1-3]. Deflation was done under direct vision after undocking the robotic arms to ensure no folding of the mesh after final placement [1, 3].

Post operatively the patients were allowed orally and ambulated after 3 hours. They were discharged on POD 1 after foley's catheter removal and passage of urine. Subsequently the patients were followed up on POD 7, 14 and 30 on an outpatient basis.

Statistics:

Continuous variables are summarised as mean $\pm$ standard deviation together with the median and interquartile range (IQR), and categorical variables as number and column percentage. Continuous variables were compared between the two groups using the independent-samples t-test when the data were normally distributed in both groups, and the Wilcoxon–Mann–Whitney U test when they were not. Categorical variables were compared using Pearson's χ^2 test, or Fisher's exact test when expected cell counts were small. For each comparison, we also report the between-group difference, as a difference in means for continuous variables or a difference in proportions for categorical variables, with its 95% confidence interval (CI). A two-sided p value < 0.05 was considered statistically significant.

Results

Table 1 summarises the baseline characteristics of the entire study cohort while table 2 explores and compares the demographic profile of the two study groups - rTAPP and rPeTEP.

Table 1: Baseline characteristics of the study cohort (n = 133). Values are mean $\pm$ SD with median (IQR) where indicated, or n (%). SD, standard deviation; IQR, interquartile range; BMI, body mass index; VHWG, Ventral Hernia Working Group.

Parameter	Value (n = 133)
Age (years), mean $\pm$ SD	45.46 $\pm$ 12.15
Median (IQR)	44.00 (36.00–59.00)
Gender – Female	53 (39.8%)
Gender – Male	80 (60.2%)
Diabetes mellitus	10 (7.5%)
Hypertension	19 (14.3%)
Smoking	1 (0.8%)
BMI (kg/m ²), mean $\pm$ SD	27.17 $\pm$ 4.67
Median (IQR)	25.30 (24.60–27.93)
BMI $\geq$ 30 kg/m ²	28 (21.1%)
VHVG grade 1	115 (86.5%)
VHVG grade 2	18 (13.5%)
Previous abdominal surgery	24 (18.0%)
Transverse defect size (cm), mean $\pm$ SD	2.91 $\pm$ 0.75
Longitudinal defect size (cm), mean $\pm$ SD	2.93 $\pm$ 0.88
Single defect	123 (92.5%)
Umbilical site	122 (91.7%)
Divarication of recti	20 (15.0%)
Operative time (minutes), mean $\pm$ SD	72.03 $\pm$ 26.13
Median (IQR)	60.00 (50.00–90.00)
Mesh width (cm), mean $\pm$ SD	11.40 $\pm$ 2.11
Mesh length (cm), mean $\pm$ SD	14.84 $\pm$ 2.15
No mesh fixation	122 (91.7%)
Concomitant surgery	11 (8.3%)
POD 1 pain score, mean $\pm$ SD	1.68 $\pm$ 0.63
Discharge on POD 1	133 (100.0%)

Table 2: Demographic profile of the rTAPP and rPeTEP groups (n = 133).

Parameter	rTAPP (n = 82)	rPeTEP (n = 51)	p value
Age (years)	47.33 ± 13.20	42.45 ± 9.60	0.015
Median (IQR)	45.00 (36.00–59.00)	42.00 (37.00–47.50)	
Age < 40 years	29 (35.4%)	19 (37.3%)	0.014
Age 40–60 years	35 (42.7%)	30 (58.8%)	
Age ≥ 60 years	18 (22.0%)	2 (3.9%)	
Female	38 (46.3%)	15 (29.4%)	0.052
Male	44 (53.7%)	36 (70.6%)	
Diabetes mellitus, n (%)	2 (2.4%)	8 (15.7%)	0.007
Hypertension, n (%)	5 (6.1%)	14 (27.5%)	<0.001
Smoking, n (%)	1 (1.2%)	0 (0.0%)	1.000
BMI (kg/m ²)	26.34 ± 4.42	28.49 ± 4.79	0.001
Divarication of recti	8 (9.8%)	12 (23.5%)	0.031

Umbilical hernias accounted for 92.7% (76/82) of the rTAPP group and 90.2% (46/51) of the rPeTEP group, with epigastric hernias making up the remainder ($p = 0.748$), and medium-width defects predominated at 82.9% (68/82) and 86.3% (44/51), large-width defects forming 17.1% and 13.7% respectively ($p = 0.607$). Divarication of the recti was more often noted in the rPeTEP group, at 23.5% (12/51), than in the rTAPP group, at 9.8% (8/82), a difference of 13.77 percentage points (95% CI 0.48 to 27.07) that reached statistical significance ($p = 0.031$).

Table 3: Operative details of the rTAPP and rPeTEP groups (n = 133).

Parameter	rTAPP (n = 82)	rPeTEP (n = 51)	p value
Operative technique			<0.001
rTAPP	75 (91.5%)	0 (0.0%)	
rPeTEP	0 (0.0%)	51 (100.0%)	
Robotic Trans-Abdominal Retromuscular repair (rTARM) (conversion from rTAPP)	7 (8.5%)	0 (0.0%)	
Operative time (minutes)	75.90 ± 29.09	65.80 ± 19.19	0.106
Type of fixation — no fixation	74 (90.2%)	48 (94.1%)	0.076
Type of fixation — sutures only	2 (2.4%)	3 (5.9%)	
Type of fixation — tacker	6 (7.3%)	0 (0.0%)	
Concomitant surgery, n (%)	10 (12.2%)	1 (2.0%)	0.051

Table 4: Early postoperative outcomes of the rTAPP and rPeTEP groups (n = 133).

Parameter	rTAPP (n = 82)	rPeTEP (n = 51)	p value
POD 1 pain score	1.84 ± 0.60	1.43 ± 0.61	<0.001
Discharge on POD 1, n (%)	82 (100.0%)	51 (100.0%)	1.000
Textbook outcomes POD 7	82 (100.0%)	51 (100.0%)	1.000
Textbook outcomes POD 14	82 (100.0%)	51 (100.0%)	1.000
Textbook outcomes POD 30	82 (100.0%)	51 (100.0%)	1.000

Beyond statistical significance, the strength of the association between the operative approach and each study variable was quantified — by the point-biserial correlation coefficient for the continuous variables and by Cramér's V for the categorical variables. Among the continuous variables, the POD 1 pain score and mesh length showed the strongest association with the approach, with coefficients of 0.32 and 0.28 respectively, both corresponding to a medium effect size, while body mass index (0.22), age (0.20), operative time (0.19), mesh width (0.16) and the number of defects (0.11) reflected small effects; the transverse and longitudinal defect diameters showed little or no association (0.04 and 0.06). Among the categorical variables, the operative technique was, by the design of the comparison, completely determined by the group (Cramér's V = 1.00). Of the remaining categorical variables, hypertension (0.30), VHWG classification (0.28), the categorised age band (0.25) and diabetes mellitus (0.24) showed the strongest, though still low, associations, followed by divarication, the type of fixation and concomitant surgery (each 0.18–0.19), gender (0.17) and the categorised BMI (0.16); the EHS site and width, the

history of previous abdominal surgery, the grouped number of defects and smoking showed little or no association.

Table 5: Summary of parameters differing significantly between the rTAPP and rPeTEP groups (n = 133).

Parameter	rTAPP (n = 82)	rPeTEP (n = 51)	p value	Higher in
Age (years)	47.33 ± 13.20	42.45 ± 9.60	0.015	rTAPP
Age ≥ 60 years	18 (22.0%)	2 (3.9%)	0.014	rTAPP
Diabetes mellitus	2 (2.4%)	8 (15.7%)	0.007	rPeTEP
Hypertension	5 (6.1%)	14 (27.5%)	<0.001	rPeTEP
BMI (kg/m ²)	26.34 ± 4.42	28.49 ± 4.79	0.001	rPeTEP
VHWG grade 2	5 (6.1%)	13 (25.5%)	0.001	rPeTEP
Divarication of recti	8 (9.8%)	12 (23.5%)	0.031	rPeTEP
Mesh length (cm)	14.37 ± 2.07	15.61 ± 2.07	<0.001	rPeTEP
POD 1 pain score	1.84 ± 0.60	1.43 ± 0.61	<0.001	rTAPP

The cumulative-sum (CUSUM) of operative time was computed as $S_j = \sum (X_j - \mu)$ for $j = 1..i$, where X_j is the operative time of the j-th case and μ is the group mean operative time. The case located at the peak (maximum) of the CUSUM curve was taken as the turning point separating the learning phase from the proficiency phase; a best-fit polynomial was overlaid for corroboration. Operative time and covariates were compared between phases using the Welch t-test or Mann–Whitney U test according to the Shapiro–Wilk normality result; $p < 0.05$ was significant.

All 82 rTAPP cases were ordered chronologically by date of surgery (range 01/08/2023 to 17/05/2026) and numbered 1 to 82 and all 51 rPeTEP cases were ordered chronologically by date of surgery (range 16/05/2025 to 28/05/2026) and numbered 1 to 51. The group mean operative time (75.9 minutes for rTAPP and 65.8 minutes for rPeTEP) and best-fit polynomial (degree 5, $R^2 = 0.906$ for rTAPP) and (degree 6, $R^2 = 0.842$ for rPeTEP) was determined.

The learning curve for rTAPP was overcome after 18 cases (22% of the series). Mean operative time fell from 96.4 ± 32.1 min in the learning phase (cases 1–18, $n=18$) to 70.1 ± 25.6 min in the proficiency phase (cases 19–82, $n=64$); Mann-Whitney U ($p = 0.002$). as shown in Fig. 5

The learning curve for rPeTEP was overcome after 25 cases (49% of the series). Mean operative time fell from 71.4 ± 19.0 min in the learning phase (cases 1–25, $n=25$) to 60.4 ± 18.1 min in the proficiency phase (cases 26–51, $n=26$); Mann-Whitney U ($p = 0.012$). as shown in Fig. 6

Discussion

Preperitoneal repairs require very gentle and meticulous handling of the thin peritoneal layer which is why the robotic platform is ideal for these operations as it filters tremors and provides stable vision & ergonomic ease [1–3]. However, even with these advantages, at times, it may get very difficult to raise a large peritoneal flap for placement of an adequately sized mesh [1, 5]. We encountered this situation on several occasions while performing rTAPP repair due to which we had to convert 7 out of 82 cases to an rTARM repair [14]. The other option could have been conversion to an Intra Peritoneal Onlay Mesh repair which involves placement of an intraperitoneal prosthesis [14]. The difficulty in raising a peritoneal flap is less in an rPeTEP repair as we enter the preperitoneal plane from a site where there is abundant fat and proceed to area with increased preperitoneal fat before approaching the peritoneum underlying the linea semilunaris where there is minimal preperitoneal fat [2, 3].

Conversely, in rTAPP we usually approach the preperitoneal plane from a point underlying the linea semilunaris where it is most difficult to handle [1]. This appears to be the reason for no conversions in the rPeTEP group [2, 3].

Another advantage of approaching the midline from a suprapubic approach is the ready access to the entire midline which enables us to repair the divarication of recti effectively without dividing the posterior rectus sheath [1, 2].

Before starting PeTEP operations our policy was to perform a robotic extended view total extra peritoneal (r-eTEP) for patients with significant divarication spanning more than 3 centimetres above or below the umbilicus [15].

This policy was due to the inability to create a peritoneal flap large enough for such repair during rTAPP repairs [5, 16].

Our results also show that divarication was more often repaired in the rPeTEP group as compared to rTAPP group.

Moreover, the divarication repairs in rTAPP are only those which were limited to 3 cm above or below the umbilicus while in rPeTEP all lengths of divarication could be addressed [2].

The length of mesh used in rPeTEPs is significantly more as compared to rTAPP due to the increased dissection in the craniocaudal direction which is often required for exposing the entire length of divarication for proper repair [2, 3, 5].

The MDAR however is not significantly different in the two groups.

The rTAPP approach scores over the rPeTEP when the patient has to undergo concomitant intra abdominal surgery. In our experience, only one patient with rPeTEP underwent a concomitant surgery (rectopexy) which required double docking with separate ports placed for both operations. On the contrary 10 concomitant surgeries which included 3 inguinal hernia repairs and 7 cholecystectomies were performed concomitantly with rTAPP requiring minor docking adjustments and fewer ports for

execution. There were no increased complications noted in these patients related to the hernia or the concomitant surgery.

POD 1 pain scores were significantly better in rPeTEP patients which may have been due to the lower port positions in the rPeTEP operation and insufflations being mainly in extraperitoneal space as compared to the rTAPP [14, 17].

There were increased number of concomitant surgeries in the rTAPP group so we conducted an analysis after excluding these cases from the data and found that the POD 1 pain scores were still significantly lower in the rPeTEP group ($p < 0.001$).

Patients with history of previous abdominal surgery were more often subjected to rTAPP as this approach affords intraperitoneal exploration and safe initial entry.

In patients with a prior lower midline or Pfannenstiel scar it may be tricky to enter the preperitoneal space directly due to possibility of adhesions of urinary bladder or bowel to the anterior abdominal wall.

With increasing experience in the rPeTEP technique we are now able to safely enter the preperitoneal space by either making extra ports for safe entry under vision or by open access to the suprapubic preperitoneal space directly [1, 2].

The number of patients with previous abdominal surgery undergoing rTAPP were not significantly higher than rPeTEP in our experience ($p = 0.577$).

The rTAPP group had higher number of patients with age over 60 years which may have been due to these patients more often having previous abdominal surgeries.

The strength of association with the type of procedure for this categorical variable, as determined by the Cramér's V method was not found to be high.

CUSUM analysis was performed for both the techniques to determine the learning curve for the same [10, 11].

The learning curve was overcome after the first 18 cases for rTAPP as compared to 25 cases for rPeTEP. All surgeries were performed by a single surgeon with ample experience in laparoscopic and robotic extraperitoneal and trans abdominal hernia surgeries.

Thus the rPeTEP technique appears to be more difficult to learn as compared to rTAPP [2, 14].

The difficulty appears primarily due to the initial approach for rPeTEP which involves working in a very small space initially to create at least 8 cm working space for the first trocar entry and subsequently similar space on the other side for the second working trocar [2, 3].

The total operative time for rPeTEP was however lower than rTAPP bordering on statistical significance ($p = 0.106$) thus showing promise that once sufficient experience is gained this technique can be more efficient as compared to rTAPP [1–3].

The strength of our study lies in the large experience with both techniques over a relatively short period on a novel modular robotic system [6].

We have discussed the merits and demerits of both operations after performing them. Our study provides key insights for proper procedure selection in different situations for PMVH repairs.

Our study is limited by the retrospective design, significant number of older patients in the rTAPP group and relatively small numbers for CUSUM analysis.

Larger multi centric trials are needed for more meaningful results on learning curve [2, 3].

Our study has a very short follow up data thus precluding any comment on long term recurrence rates [1, 3].

Conclusion

Our experience in robotic repair of PMVHs shows that both rTAPP and rPeTEP are feasible and safe using the novel modular robotic system. rTAPP is more suited for patients requiring concomitant intra abdominal surgery. rPeTEP is better for repair of concomitant divarication of recti and also a less painful operation than rTAPP. Of the two techniques, rTAPP appears to be easier to learn.

Declarations

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Competing interests The authors have no relevant financial or non-financial interests to disclose, including any relationship with the manufacturer of the robotic system used in this study.

Author contributions Conceptualization: Magan Mehrotra; Methodology: Magan Mehrotra; Formal analysis: Magan Mehrotra; Investigation: Magan Mehrotra (principal operating surgeon); Project administration: Magan Mehrotra; Data curation: Anurag Pasula; Writing – original draft preparation: Magan Mehrotra; Writing – review and editing: Anurag Pasula. All authors read and approved the final manuscript.

Ethics approval This was a retrospective observational study based on routinely collected clinical data with all identifying information removed. The study was performed in line with the principles of the Declaration of Helsinki. The Institutional Ethics Committee, Apex Hospital, confirmed that formal ethical approval was not required.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent to publish Participants provided informed consent for publication of their data and images.

Data availability The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

References

1. Valenzuela Alpuche HA, Regin Torres F, Saucedo González JP (2024) Early results of eTEP access surgery with preperitoneal repair of primary midline ventral hernias and diastasis recti. A 33 patient case series of PeTEP. *Surg Endosc* 38:3204–3211. <https://doi.org/10.1007/s00464-024-10832-9>
2. Arias-Espinosa L, Claus CM, Malcher F, Valenzuela Alpuche HA (2024) Robotic preperitoneal extended totally extraperitoneal (R-PeTEP) technique description for ventral hernia repair: preliminary results. *Updates Surg* 76:2715–2722. <https://doi.org/10.1007/s13304-024-02002-2>
3. Equisoain-Azcona A, García-Quijada García J, Sanz-Ongil R et al (2025) Totally extraperitoneal approach with preperitoneal repair for the treatment of midline hernia defects: a case series and single-center experience. *J Abdom Wall Surg* 4:14611. <https://doi.org/10.3389/jaws.2025.14611>
4. Bittner R, Bain K, Bansal VK et al (2019) Update of guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS))—Part A. *Surg Endosc* 33:3069–3139. <https://doi.org/10.1007/s00464-019-06907-7>
5. Maatouk M, Kbir GH, Mabrouk A et al (2023) Can ventral TAPP achieve favorable outcomes in minimally invasive ventral hernia repair? A systematic review and meta-analysis. *Hernia* 27:729–739. <https://doi.org/10.1007/s10029-022-02709-4>
6. Mehrotra M, Kumar CG (2025) Initial experience of SSI Mantra robot-assisted transabdominal preperitoneal repair of primary ventral hernias. *J Minim Access Surg* 21:141–146. https://doi.org/10.4103/jmas.jmas_344_23
7. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative (2014) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Int J Surg* 12:1495–1499. <https://doi.org/10.1016/j.ijssu.2014.07.013>
8. Muysoms FE, Miserez M, Berrevoet F et al (2009) Classification of primary and incisional abdominal wall hernias. *Hernia* 13:407–414. <https://doi.org/10.1007/s10029-009-0518-x>
9. Breuing K, Butler CE, Ferzoco S, Ventral Hernia Working Group et al (2010) Incisional ventral hernias: review of the literature and recommendations regarding the grading and technique of repair. *Surgery* 148:544–558. <https://doi.org/10.1016/j.surg.2010.01.008>
10. Wegdam JA, de Jong DLC, de Vries Reilingh TS, Schipper EE, Bouvy ND, Nienhuijs SW (2022) Assessing textbook outcome after implementation of transversus abdominis release in a regional

- hospital. *J Abdom Wall Surg* 1:10517. <https://doi.org/10.3389/jaws.2022.10517>
11. Kudsi OY, Gokcal F, Bou-Ayash N, Crawford AS, Chung SK, Chang K, Litwin D (2021) Learning curve in robotic transabdominal preperitoneal (rTAPP) ventral hernia repair: a cumulative sum (CUSUM) analysis. *Hernia* 25:755–764. <https://doi.org/10.1007/s10029-020-02228-0>
 12. Kolfschoten NE, Kievit J, Gooiker GA, van Leersum NJ, Snijders HS, Eddes EH et al (2013) Focusing on desired outcomes of care after colon cancer resections; hospital variations in ‘textbook outcome’. *Eur J Surg Oncol* 39:156–163. <https://doi.org/10.1016/j.ejso.2012.10.007>
 13. Ramia JM, Soria-Aledo V (2022) Textbook outcome: a new quality tool. *Cir Esp (Engl Ed)* 100:113–114. <https://doi.org/10.1016/j.cireng.2021.06.021>
 14. Zaman J, Teixeira L, Patel PB, Ridler G, Ata A, Singh TP (2023) From transabdominal to totally extra-peritoneal robotic ventral hernia repair: observations and outcomes. *Hernia* 27:635–643. <https://doi.org/10.1007/s10029-023-02767-2>
 15. Belyansky I, Daes J, Radu VG et al (2018) A novel approach using the enhanced-view totally extraperitoneal (eTEP) technique for laparoscopic retromuscular hernia repair. *Surg Endosc* 32:1525–1532. <https://doi.org/10.1007/s00464-017-5840-2>
 16. Kudsi OY, Gokcal F, Bou-Ayash N, Crawford AS, Chang K, Chudner A, La Grange S (2022) Robotic ventral hernia repair: lessons learned from a 7-year experience. *Ann Surg* 275:9–16. <https://doi.org/10.1097/SLA.0000000000004964>
 17. Kumar N, Palanisamy NV, Parthasarathi R, Sabnis SC, Nayak SK, Palanivelu C (2021) A comparative prospective study of short-term outcomes of extended view totally extra-peritoneal (e-TEP) repair versus laparoscopic intraperitoneal on lay mesh (IPOM) plus repair for ventral hernia. *Surg Endosc* 35:5072–5077. <https://doi.org/10.1007/s00464-020-07990-x>

Figures

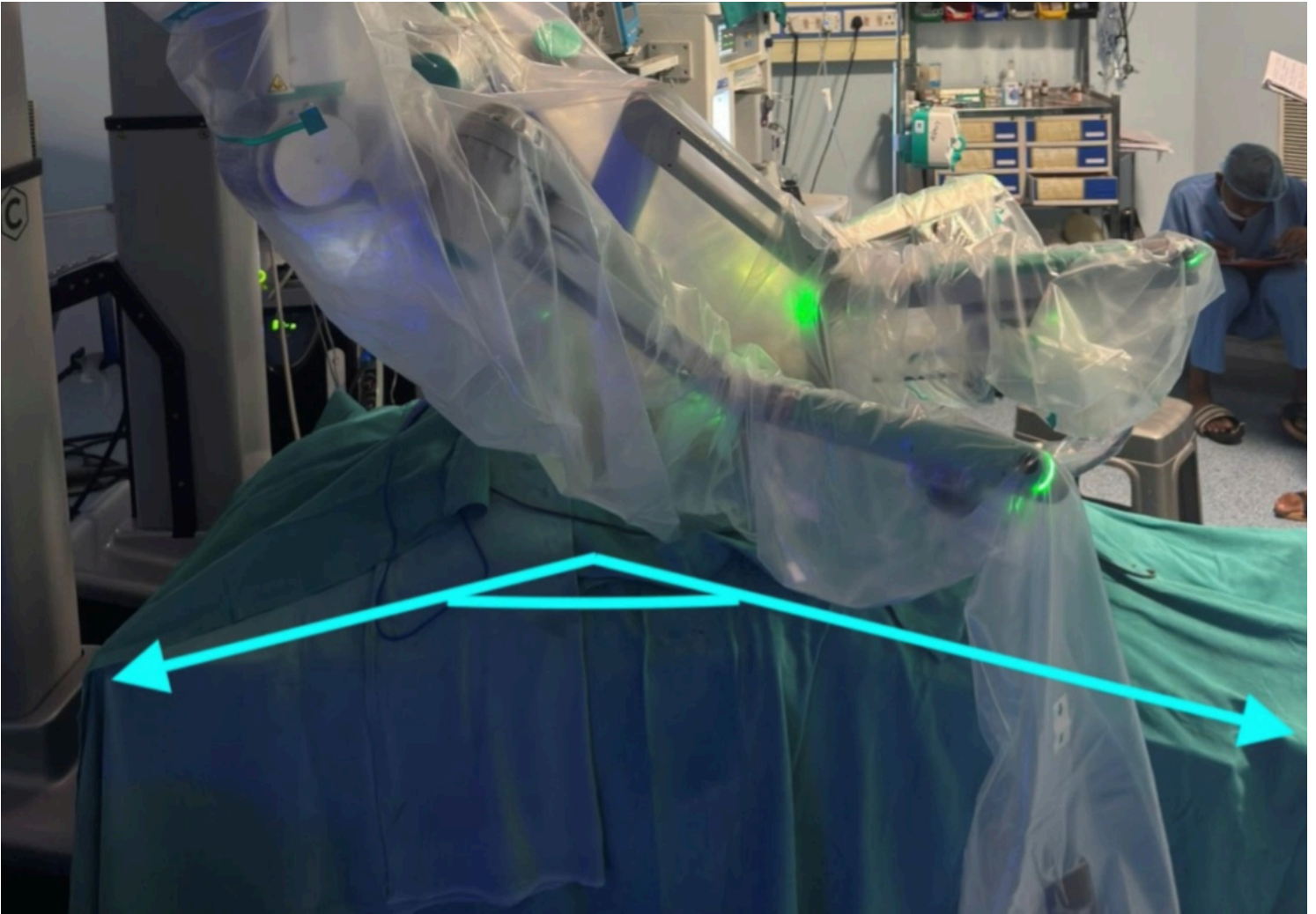


Figure 1

Operating table extended at 10 degrees - patient positioning.

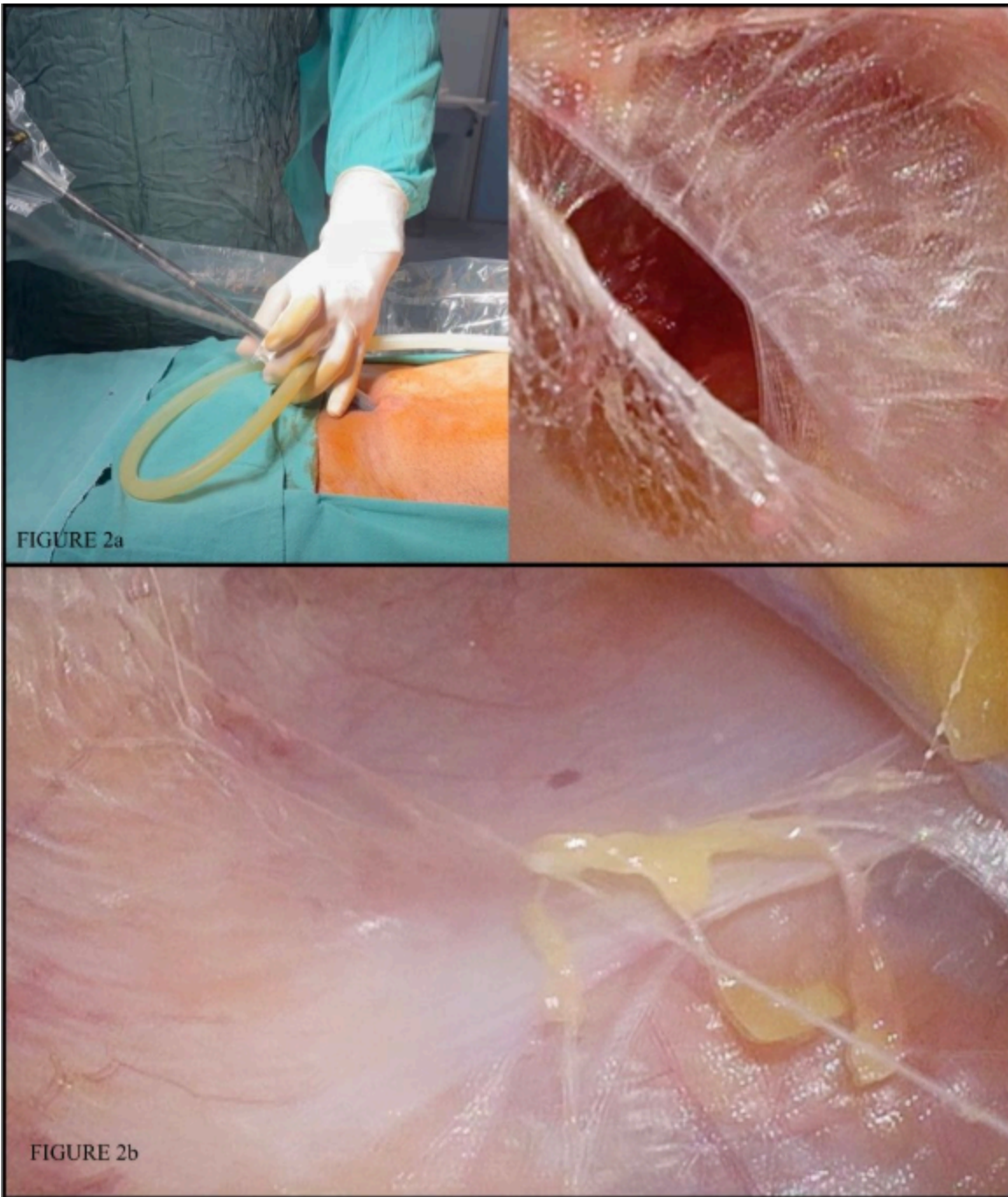


Figure 2

View of the suprapubic space after optical trocar insertion - showing the external view and initial internal view (2a) and internal view after scope dissection (2b).

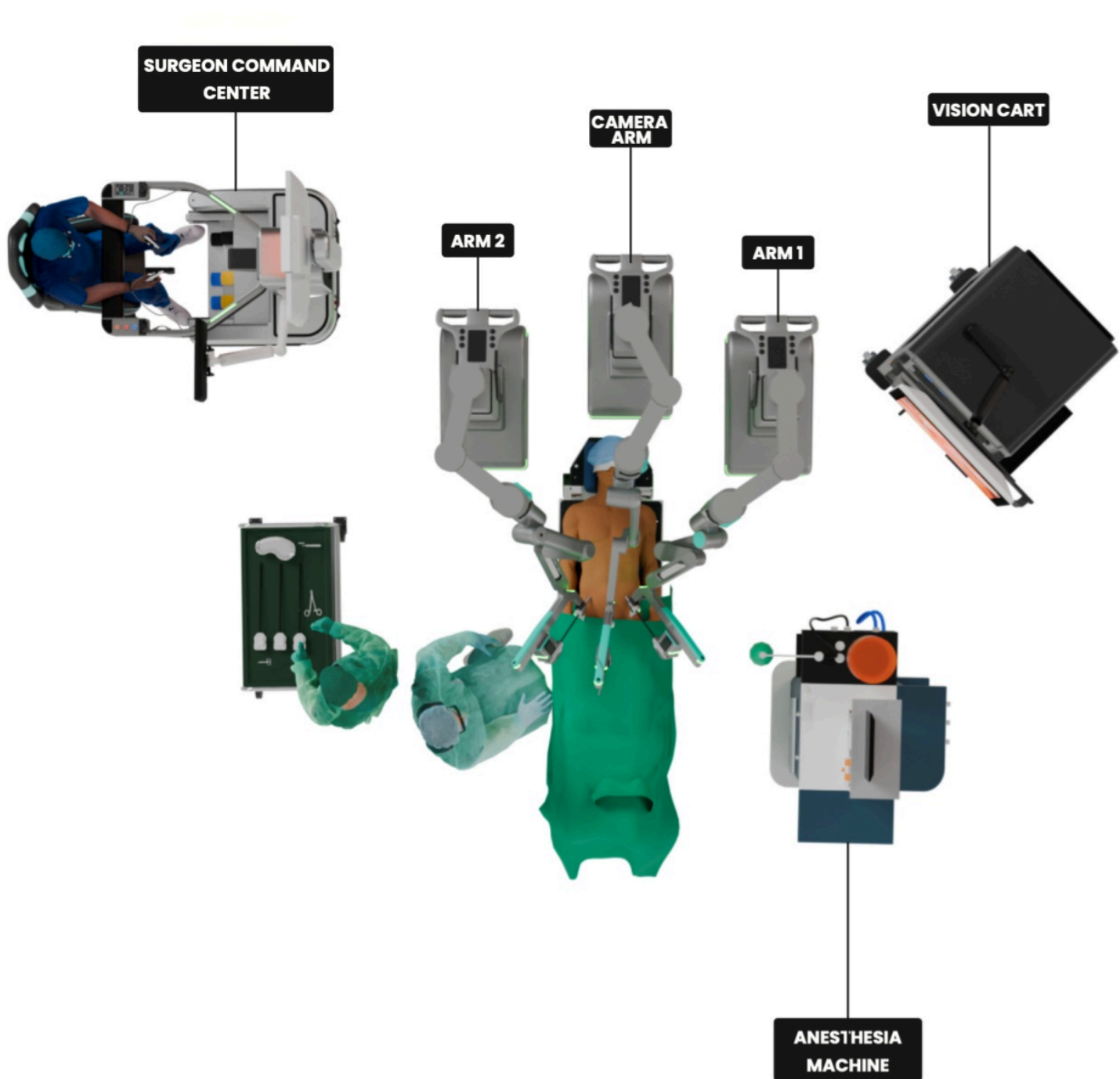


Figure 3

Robotic arms position for PeTEP suprapubic approach.

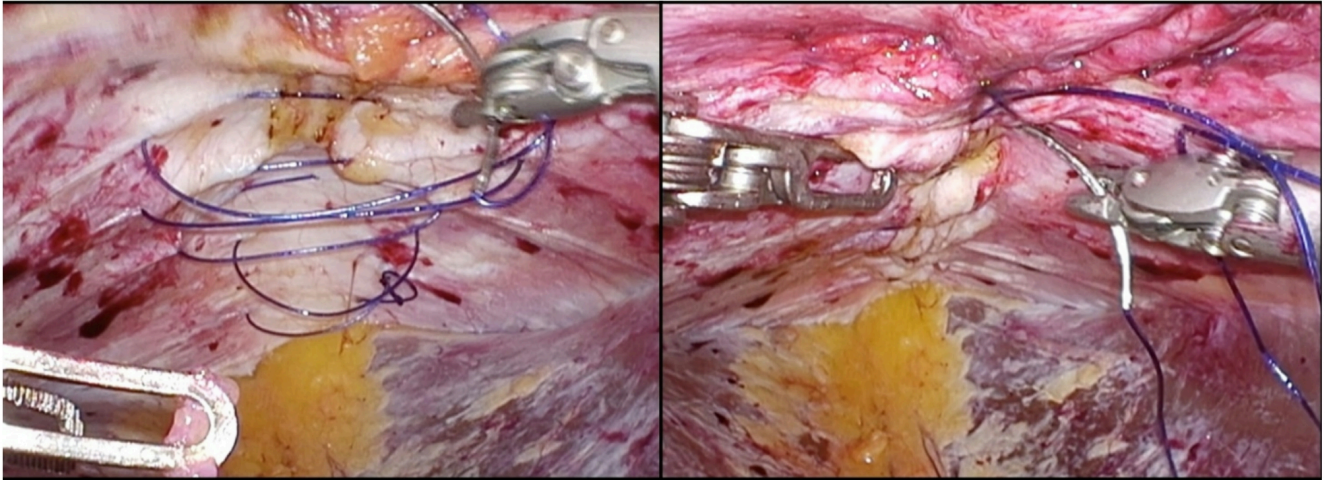


Figure 4

Plication of Divarication along with closure of defect vertically (initial view and final view).

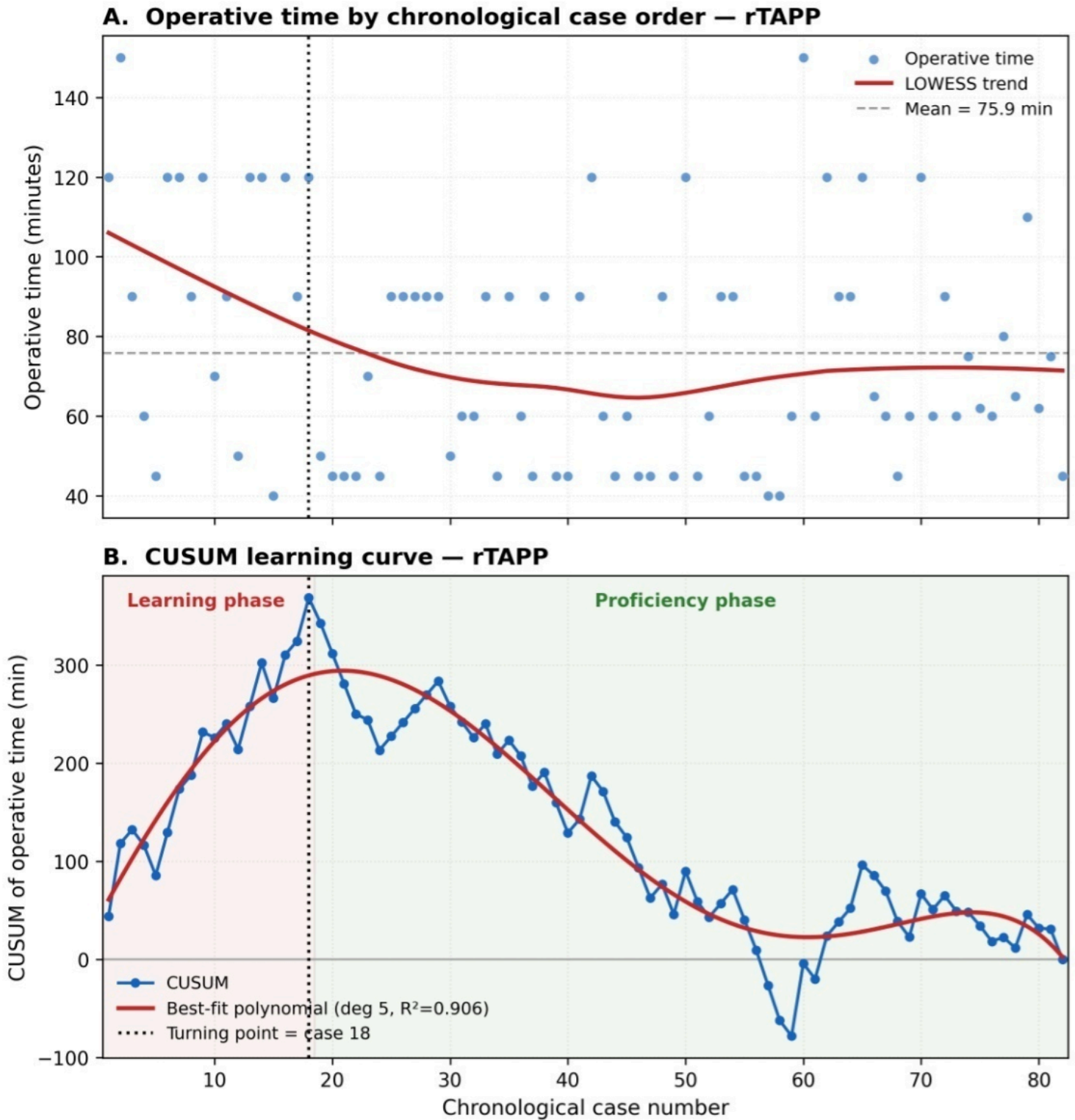


Figure 5

Operative time graph and CUSUM learning curve for rTAPP operation.

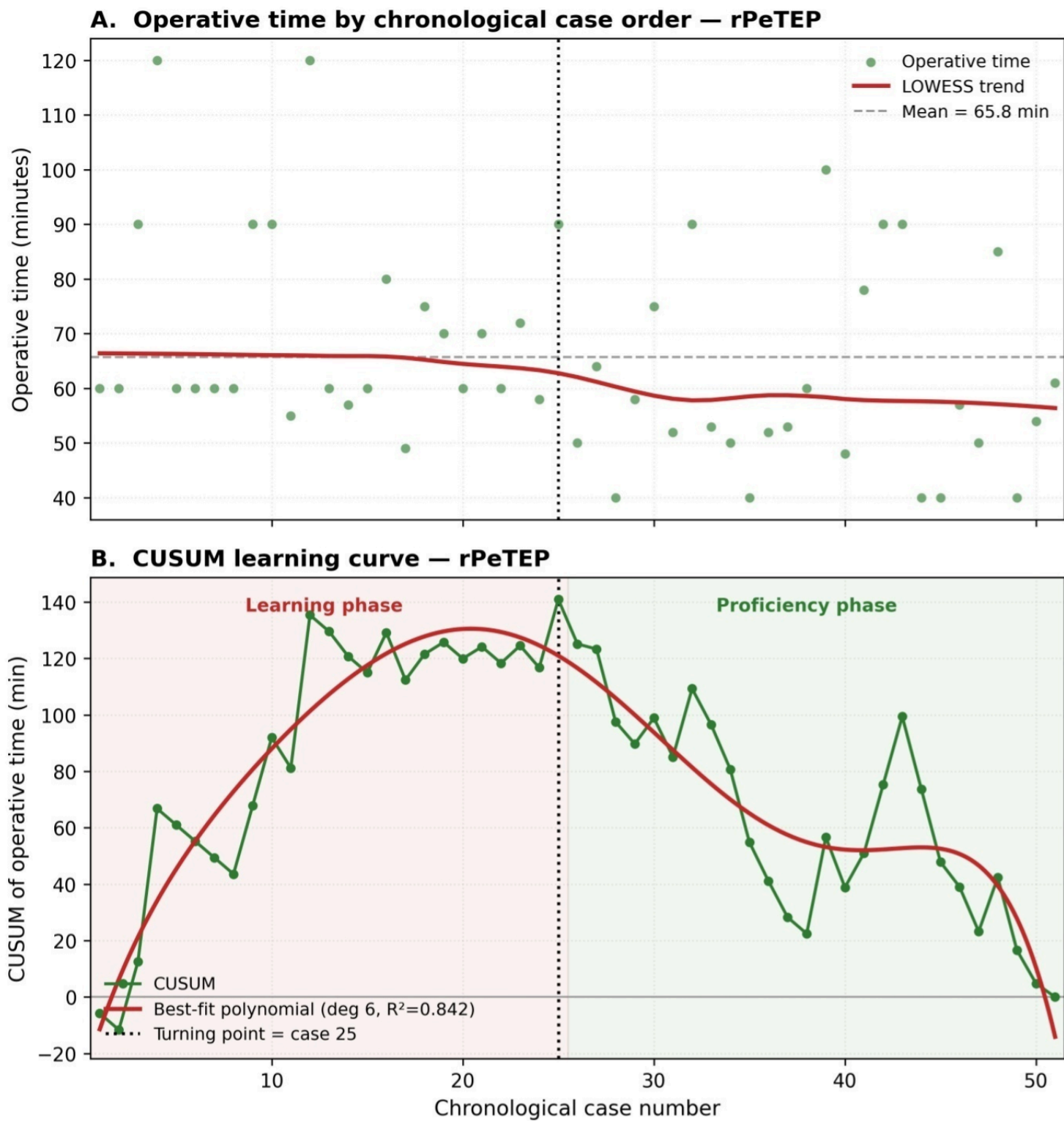


Figure 6

Operative time graph and CUSUM learning curve for rPeTEP operation.