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Original Research Article

Effectiveness of enhanced recovery after surgery protocol in major gynecological surgeries: a cross-sectional study

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ABSTRACT

Background: Objectives of the study include: assessment of effectiveness of perioperative outcome of components of enhanced recovery after surgery protocol (ERAS-P) - pre-operative, intra-operative, post-operative and compliance of participants to ERAS-P.
Methods: A prospective cross sectional study was conducted at Sri Chamarajendra Government, Teaching MCH hospital in one year.80women fulfilling selection criteria were selected for elective major gynecological surgeries under ERAS-P. Components of ERAS-P include: pre-operative, intra-operative, and post-operative were practiced and the outcomes include the length of hospital stay, post-operative pain assessment, return of bowel function, admission to discharge interval, cost of treatment, complications, repeat hospitalization, and patient satisfaction rate were assessed.
Results: Among 80 participants, distribution of cases were- abnormal uterine bleeding (AUB-L) leiomyoma-37.5%, uterine prolapsed-32.5%, adnexal mass-8.8%, adenomyosis-in 7.5%, and others 5%. The average length of hospital stay was 24 hours for laparoscopic salpingectomy, 48 hours for laparoscopic surgery, 72 to 96 hours for vaginal hysterectomy and laparoscopic surgery and 96 hours for TAH±BSO. The visual analogue scores indicated pain levels among participants with the mean score at 6 hours' post-surgery-5.51 for major surgeries and <4.00 for minimal invasive surgeries.
Conclusions: The implementation of ERAS-P is observed to be associated with reduction in duration of hospitalization, early mobilization, need based pain management, high satisfaction, lower complications, and repeat hospitalization.

Keywords: ERAS-P, Visual analogue pain score, Major gynecological surgery, Total abdominal hysterectomy, Regional anesthesia, preoperative, Perioperative care, Post-operative care

INTRODUCTION

The enhanced recovery after surgery protocol (ERAS-P) represents a modern approach to perioperative care, focusing on optimizing patient outcomes and accelerating functional recovery versus conventional method. The term "ERAS" was coined by a group of surgeons in London as ERAS-P study group, initially focusing on colorectal, hepatobiliary, gynecological oncology, and urological surgery.[1] The implementation of ERAS protocols has emerged as a standard perioperative surgical care during major surgery.[1] There is limited available data on the application of ERAS programs in major gynecological surgeries at government hospitals in India with limited resources. Kehlet and Mogensen introduced a protocol aimed at promoting faster post-surgical recovery.[2] Later many studies have published their observations after major surgical procedures.

Elective hysterectomy, laparotomy, and laparoscopic surgeries are the common surgical procedures in gynecological practice.[3] The implementation of the ERAS protocol in major surgeries showed several benefits such as shorter length of stay, planned postoperative pain management, rapid return of bowel function, reduced complications and re-hospitalization rates, low cost

incurred, improved patient satisfaction.[4a,4b,7] This study was initiated to study effectiveness of ERAS-P at limited resources.

Agnaldo et al described the components of ERAS-P in major gynecological surgery as described by RCOG as a structured, standard practice for women undergoing elective gynecologic surgeries with improved quality of life.[5,6] The National Specialized Commissions on Gynecologic Endoscopy, Endometriosis and Oncological Gynecology of the Brazilian Federation of Gynecology and Obstetrics Associations in the Febrasgo Position Statement, endorses the implementation of ERAS-P through standardized guidelines.[12]

The three key components: pre-operative, intra-operative, and post-operative care.

Pre-operative

This phase includes pre-admission counselling and optimization of preoperative assessment for fitness, avoiding standard preoperative preparation such as enema, and skin preparation.

Intra-operative

Key practices during this stage involve goal-directed fluid therapy (GDT) and the utilization of minimally invasive surgical techniques and anaesthesia. The protocol also emphasizes minimizing the routine use of nasogastric tubes, drains, and catheters to enhance recovery.

Post-operative

After surgery, patients are encouraged to begin early feeding and mobilization, self-assessed pain score directed analgesia, early removal of tubes, catheters and drains is promoted with early mobilization of patients.[2]

For the successful implementation of the ERAS pathway, a multidisciplinary team approach is essential, alongside active patient involvement in their personalized, goal-oriented recovery program. Given the positive outcomes observed in other surgical fields, such as colorectal surgery, there is a growing interest in exploring the perioperative care and the advantages of ERAS protocols in gynecological surgical management.[11]

The ERAS protocols across major gynecological procedures, optimizes patient need based care healthcare delivery in public hospitals with limited resources, where services are free of charge under various health schemes, making them highly accessible to those in need. Given the high demand for hospitalization in public hospitals, where bed availability is often limited, this study focuses on ERAS protocols that help hospital administration by reduced total duration of hospital stay.[7] The present study aims to study the effectiveness of ERAS-P in major elective gynecological surgeries in OBG department.

METHODS

Type of study

It was a cross-sectional and descriptive study. This study was conducted in one year among participants with selection criteria, admitted for elective major gynecological surgeries in Department of Obstetrics and Gynaecology, at Sri Chamarajendra Government, Teaching MCH public Hospital, in Hassan, Karnataka, India. This descriptive study was initiated after obtaining the permission from institutional research committee and ethical committee.

Sampling method

Convenience sampling method was used.

Sample size

The calculated sample size (n) was 80.

Selection criteria

Inclusion criteria

Participants undergoing elective major gynaecological surgeries, such as abdominal hysterectomy, vaginal hysterectomy, laparotomy for adnexal/ovarian masses (benign and malignant), tubal recanalization, myomectomy, and laparoscopic procedures were included.

Exclusion criteria

Women with unstable hemodynamics, emergency gynecological surgeries such as ruptured ectopic pregnancies, peritonitis, and emergency laparotomy, multi-organ dysfunction, and women not willing to participate in study were excluded. After approval from the Institutional Ethics Committee, women admitted for elective major gynaecological surgery, who fulfilled the inclusion criteria were enrolled for the study, after Informed consent on a proforma.

Place for study

The study was conducted at Sri Chamarajendra Government, Teaching MCH Hospital, in Hassan, Karnataka, India.

Study period

The duration of the study was from 01 February 2024 to 31 March 2025.

Outcomes assessed

The observations were outcome indicators such as: the length of hospital stay (LOS), post-operative pain

assessment, return of bowel function, surgical complications, re-hospitalization, patient satisfaction, cost effectiveness of ERAS versus conventional protocol for major surgery, and pain assessment by self-reported pain scoring as per Wong baker's visual analogue score (Figure 1) that was practiced in decision making for post-operative analgesia.

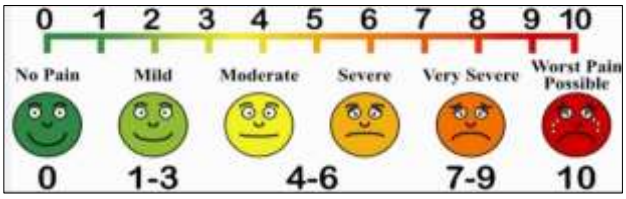

Figure 1: Wong Bakers visual pain score: score of >5 indicate need for analgesia.

Methodology

Women needing major gynecological surgery were screened on outpatient basis for fitness for surgery, anesthesia after evaluation for co morbidities and specific conditions with special investigations such as electrocardiography (ECG), chest X-ray, renal function and liver function tests, hematological tests, thyroid function tests, and other diseases specific investigations. All the selected participants were admitted and screened for fitness for anaesthesia and surgery. A patient information sheet was provided to the participant. They were subjected to pre-operative, per-operative and post-operative protocol as per ERAS program attached to case sheet as a proforma. The ERAS-P components were as stated below. The ERAS protocols were practiced in 3 parts: pre-operative, intra-operative, post-operative care and outcome were documented on a proforma sheet. Following ERAS-P was followed among selected participants.

Preoperative components

Patient counselling and education

Patient satisfaction and effective counselling in the ERAS protocol were-comprehensively counselled with patient information sheet for ensuring active patient participation, by sharing information on conventional and ERAS-P protocol procedure, anaesthesia, preoperative and postoperative protocols, and potential complications during informed consent.

Patient preparation for surgery

Routine investigations, including chest X-rays and ECG were done on outpatient basis, along with additional investigations such as 2D echocardiogram, PAP smear, and endometrial biopsy were performed when indicated in the participant. Any pre-existing medical conditions—such as hypertension, diabetes, renal diseases, asthma, or cardiac issues were stabilised. As against the conventional fasting for 12 hours, preoperative oral diet restriction for 6 hours for solid foods and 2 hours for liquid diet was advised.[8,9] Mechanical bowel preparation such as rectal enema was avoided, preferring medical bowel evacuates with polyethylene glycol-118 gm, and electrolytes 12-14 hours before the surgery.[10,11] Oral liquids were permitted in sips. Preoperative medications such as anxiolytic were administered. Injectable antibiotic was given1hour prior to surgery (1 gm of intravenous ceftriaxone, 40 mg of intravenous pantoprazole and 4 mg of intravenous ondansetron) were given. Additional pre medications were given as indicated on medical conditions. The compliance to WHO surgical safety checklist was practised before OT transfer.

Intraoperative component

Anaesthesia

Depending on surgery, suitable anaesthesia were used such as regional block/general anaesthesia, and indicated, multimodal analgesia was practised.

Pain management

Pharmacologic pain management was achieved avoiding opioids. A multimodal approach involved administering two pain relievers with distinct mechanisms of action, such as NSAIDs and paracetamol.

The intraoperative zero balance fluid therapy with Ringer's lactate and dextrose normal saline (DNS) were administered at a rate of 2-4 ml/kg/hour. Standard care was taken to minimise blood loss, hypotensive anaesthesia, minimal skin incision and tissue handling and duration of surgery, optimal use of minimal invasive surgery, avoiding insertion of drains and tubes as practised.

Post-operative care

Fluid management

The use of intravenous (IV) fluids was optimised with fluids administered at a rate of 75 ml/hour until oral intake was permitted. Postoperatively, all participants were given chewing gum in 8 hours after surgery, and early bowel and patient mobilization was encouraged. Foley catheter removal were performed after 8-12 hours.

Nutritional care

Oral liquids were introduced 12 hours after major surgeries. Following medications were administered.

Antibiotics

Intravenous ceftriaxone 1 gm and 500 mg injection metronidazole 8th hourly.

Analgesics

Pain management included dermal patches of 1 gm diclofenac sodium according to patient indication, based on visual pain score assessed as >moderate score. Nausea and vomiting prevention was done by IV injection of 40 mgm pantoprazole twice daily for 48 hours post operatively.

Thromboprophylaxis

Injection enoxaparin 40 mcg subcutaneously was given based on indications. Medications for co-morbidity were continued.

Wound care

Dressings were changed on the third postoperative day, and wound cleaning was performed using a 2% povidone iodine solution. Early mobilisation within in 24 hours, and deep Breathing exercises were practiced by the participant.

Postoperative pain assessment

Patient reported pain levels using the Wong-Baker visual analog scale (VAS) at 6, 12, 24, and 48 hours after surgery was utilized for analgesic drug given as dermal analgesic patch when VAS score was greater than moderate pain. Based on the comorbidities and on indication patients were transferred to the ICU or postoperative wards. Duration of hospital stay and patient comfort were assessed by exit interview to after ERAS and conventional protocols.

Statistical analysis

The outcomes were documented on a proforma and results were analyzed as descriptive statistics and results were shown in percentages. Statistical analyses were performed using the statistical package for the social sciences (SPSS) package v25. Quantitative variables were shown as mean, median. The duration of hospitalization and complications were compared between the ERAS-P and conventional protocols by using student's t test and the $\chi 2$ test. The statistical significance was level $p<0.05$

RESULTS

Distribution of cases based on indication for surgery

Among 80 participants enrolled, in 37.5% indication was abnormal uterine bleeding (AUB-L, leiomyoma), pelvic organ prolapsed-32.5%, 8.8% participants with adnexal mass, AUB-A (adenomyosis)-7.5%, ovarian neoplasm-10%, and 12% in other conditions as shown in Figure 2.

Distribution of major gynecological surgery procedure

39% total abdominal hysterectomy with or without bilateral salpingo-oophorectomy, 25% vaginal hysterectomy with pelvic floor repair, 8.75% laparotomy for adnexal masses (including ovarian and paraovarian cysts), 12% laparoscopic surgery and 14.5% other gynecological surgeries such as ovarian cystectomy-8.75%, fothergill's surgery-2.25%, sacro-spinous vaginal vault suspension-2.25%, tubal recanalization-2.5%, and leiomyoma excision-1.5% as in Figure 3.

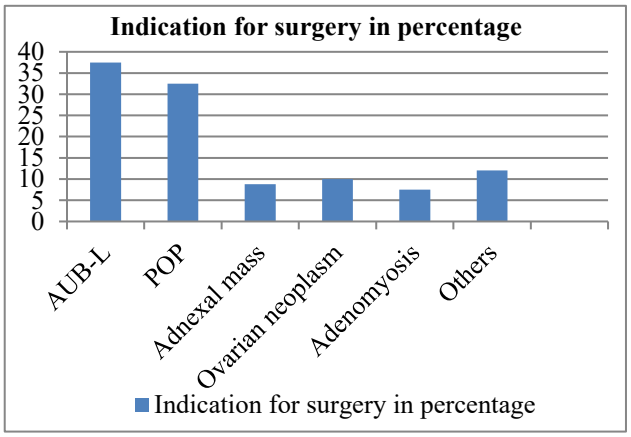

Figure 2: Distribution based on diagnosis of participants.

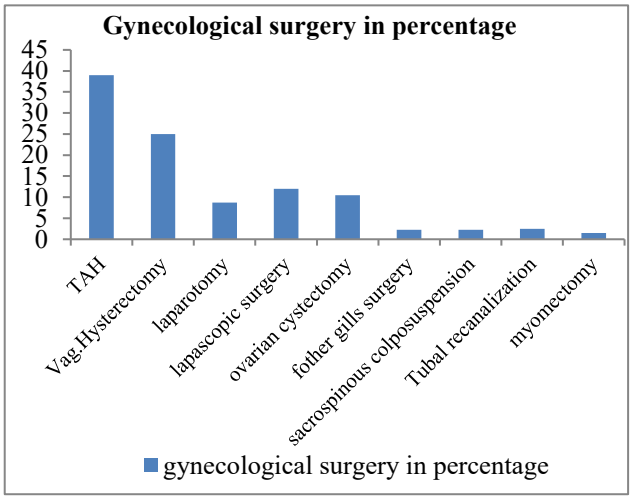

Figure 3: Distribution of major gynecological surgery.

Age distribution

The mean age of the participants was 47.2 years, and the mean body mass index (BMI) was 32.2 kg/m^2 as shown in Figure 4.

Duration of hospital stay

As shown below in Figure 5, that was 24 hours for laparoscopic salpingectomy in 3.75%, 48 hours for lap surgery in 6.25%, 72 to 48 hours for vaginal hysterectomy/NDVH with/without pelvic floor repair and laparoscopic procedures in 51.25%, and 96 hours for TAH ± BSO in 38.75%. Mean duration of hospital stay in ERAS

program was 92 hours and in conventional it was 145 hours.

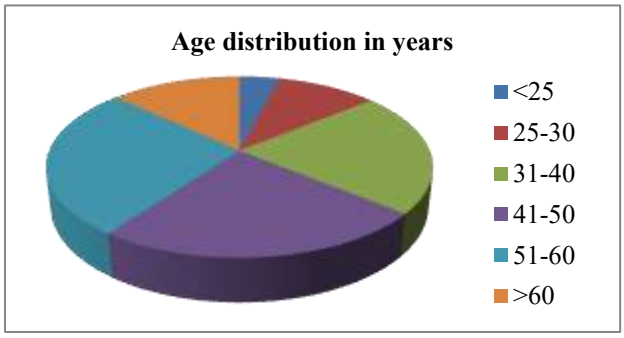

Figure 4: Distribution based on age of participants.

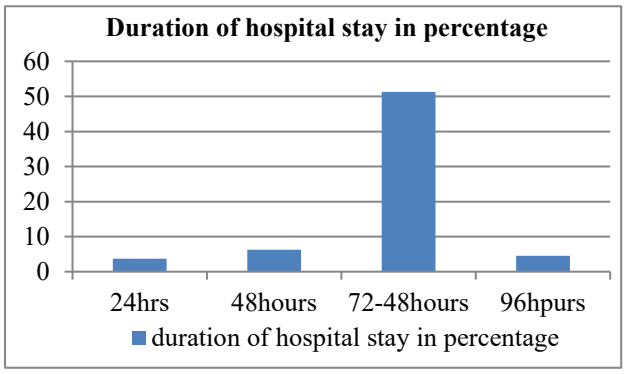

Figure 5: Distribution of cases on duration of hospital stay.

Post-operative pain assessment

The VAS indicated lower pain levels some participants. The mean score at 6 hours' post-surgery was 5.51 for major surgeries and moderate for laparoscopic and NDVH surgeries a p value of <0.001, indicating statistical significant difference. At 12 hours, the mean score was >4.01 for major surgeries and 2.88 for minor surgeries, again with a p value of <0.001, which is statistically significant. After 24 hours, the mean score dropped to 2.56 for major surgeries and 1.25 for minor surgeries, maintaining a p value of <0.001, reflecting statistical significance as shown in Figure 6.

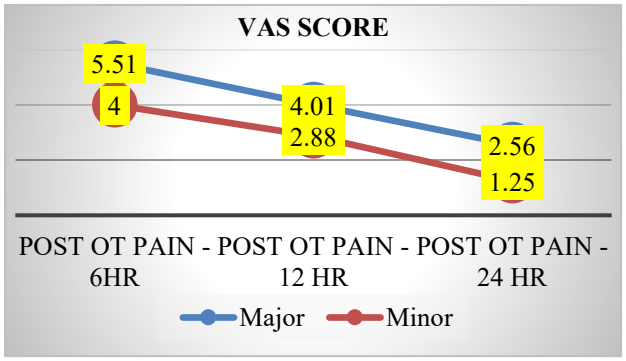

Figure 6: Distribution based on visual analogue score.

Cost difference among conventional and ERAS surgical protocols

Conventional surgery protocol cost was Rs. 3100+ hospital charges for 7 days excluding OT expenses, cost incurred in ERAS protocol was Rs. 2545+ hospital stay charges for 4 days, excluding OT expenditure. There was no significant difference of cost for drug expenditure, but duration of hospital stay was different in each category, with early mobilization and introduction of oral diet in ERAS-P that was considered for early discharge from hospital. The drugs for anesthesia and surgery were provided at government hospital. Drains and tubes were avoided in ERAS-P as against routine conventional surgical protocols. Hence patient satisfaction was better with ERAS-P due to early mobilization and discharge from hospital.

Complications

In ERAS, 2 of 80 (2.5%) cases reported for wound complications such as superficial gaping of wound, requiring secondary suturing and 1 (1.25%) case had pelvic/vaginal vault infection after vaginal hysterectomy needing higher antibiotic and aspiration, 1 (1.25%) underwent electrocautery of vaginal vault granuloma. No participants reported febrile illness nor urinary tract infection.4participants returned for post-surgical menopausal hot flushes who were advised short term estrogen replacement therapy, which was not a post-surgical complication.

DISCUSSION

ERAS program aims early recovery from major surgery, with good compliance and patient satisfaction by minimal medication, early oral intake and shorter hospital stay duration resulting in minimal complications and re admission rate as concluded by Nady et al.[7] The successful implementation of the ERAS protocol requires prospective evaluation and supervision. This includes assessing protocol adherence, identifying deviations, correcting them, and optimizing clinical outcomes to enhance early recovery, enhancing patient's quality of life and satisfaction, with a positive compliance of client for positive outcome The initial implementation of the ERAS protocol faced challenges due to numerous clinical and behavioural changes. Multiple meta-analysis and literature reviews initiated this study on acceptability and effectiveness of ERAS protocol in a government teaching hospital.

The mean age of the participants in present study was 47.2 years, and the mean BMI was 32.2 kg/m² in comparison with the observations by Yoong et al in a similar group of patients.[4] Young et al studied the post-operative outcomes of ERAS among 50 vaginal hysterectomies versus conventional care and observed a median patient age -49.0 versus 51.0 years, parity 2.0 versus 2.0, in a demographically similar group as present study.

Nadi et al observed that implementation of ERAS protocols in gynecologic surgery was associated with a significant reduction in hospital stay, low use of parenteral fluids, comparable pain control with no increase in complication rates.[7] Forsmo et al found that patients in the ERAS group had a median hospital stay of 5 days, compared to 8 days for those receiving standard care.[8] Similarly, Bednarski et al observed a significant reduction in duration of hospital stay with ERAS protocols, in groups among combined minimally invasive surgery.[23] Shetiwy et al reported a notably shorter hospital stay of 4.49 days for the ERAS group, in contrast to 13.31 days for the conventional care group.[24] Mari et al observed reduced hospital stays of 5.9 days, for those treated under ERAS protocols, compared to 10.9 and 7.2 days in conventional surgical care.[25] In present study, it was 24 hours for laparoscopic salpingo-oophorectomy in 3.75% paticipants,48 hours for laparoscopic surgery in 6.25%, 72 to 96 hours for vaginal hysterectomy/NDVH, laparoscopic procedures in 51.25%, and 96 hours for TAH ± BSO and laparotomy among 38.75%.The shortened duration of hospitalization not only demonstrate faster recovery times, early mobilization and bowel movements, but also have maximum implications in healthcare resource management, potential reduction in costs and increased bed availability at high work load public hospitals. Surgical departments may adopt the ERAS protocol for optimal outcomes with low procedure related cost.

In our study, complication rate was reduced by 15% when compared to previous conventional treatment that is similar to previous studies which explain that implementing ERAS can reduce complication rates by 20% as stated by Lassen et al and Goodman et al.[9,10] Early bowel mobilization by encouraging gum chewing, discouraging the routine use of nasogastric tubes in surgery, early removal of indwelling urinary catheters, and minimal use of abdominal drain were practiced in major gynaecological surgery. Only in 2 surgeries abdominal drain used was removed after 48 hours that enhanced client satisfaction.

Reduced preoperative fasting time and avoiding mechanical bowel preparation were analysed quoting limited indications.[9-11] A Cochrane review of 22 randomized controlled trials by Charoenkwan et al analyzing preoperative bowel preparation, found no evidence that a shortened fasting period increased the risk of aspiration, regurgitation, or related complications.[12] A meta-analysis of five randomized controlled trials by Siedhoff et al and Ryan et al in laparoscopic surgery found no benefit of bowel preparation in terms of improving surgical field visibility or reducing operative time in pelvic surgery.[13,14] Meta-analysis by Barber et al, Varadhan et al, Degroo et al, Li et al and Althobaiti et al supported these trends, demonstrating advantages of ERAS protocol lower mortality rates in patients undergoing colorectal surgery, supported by Barber et al in their meta-analysis.[14-16,25] Jemenis et al in his cohort study, reported that reducing the preoperative fasting period enhances patient quality of life and satisfaction, as prolonged fasting can be uncomfortable, especially in co-morbid conditions that contribute to increased patient anxiety.[20] Maund et al, Arnold et al and Althobaiti et al concluded that rectal enemas and mechanical bowel preparations can be omitted in gynecological/pelvic surgeries.[15,16,26] In present study we practiced 6-8 hours fasting period for solid foods and allowed the consumption of clear liquids up to 2 hours before pelvic surgery for benign conditions, traditional bowel preparations by rectal enema that embarrasses women is skill dependent evacuation of colon that was avoided and medical bowel preparations with oral polyethylene glycol-118 gms, was well accepted by participants.

In the present study, there was no significant intergroup differences between ERAS and conventional methods in post-operative pain scores <24 hours as indicated by visual analogue scores among participants. The mean score at 6 hours' post-surgery was 5.51 for major surgeries and 4.00 for minor surgeries, with a statistical significant difference. At 12 hours, the mean score was 4.01 for major surgeries which is statistically significant. After 24 hours, the mean score dropped to 2.56 for major surgeries in both groups maintaining a p value of <0.001, reflecting statistical significant difference. Evidence suggests that ERAS protocols improve postoperative pain management by reducing reliance on opioids. Shon et al and El Rahman found that patients in the ERAS group had significantly lower opioid consumption (19 mg versus 32 mg) while maintaining a VAS pain score of <3, reduced pain scores significant compared to those receiving conventional care (VAS:3 versus 4.6).[22]

Consistent with Turaga's et al findings, our review indicates ERAS protocols were associated with shorter hospital stay, fewer postoperative complications, and quicker recovery milestones. Li et al also observed low surgical site infections, supporting adoption of ERAS in clinical practice.[24,25] Zhang et al and Azhar et al observed low infections and complication in ERA-Wang et al and Zhao et al stated that the median hospital charges for a patient decreased by 15.6% in ERAS group compared with conventional care.[4,21,23-25] The median length of stay was reduced by 51.6% and the patients discharge <24 hours was increased by 5-fold (78.0 versus 15.6%), frequency of catheter use (82.0% versus 95.6%) and use of vaginal packing (52.0 versus 82.2%) were lower in ERAS group, but inpatient readmission rate were similar in both groups. Relph et al and Woong et al observed a cost savings of 9.25% in ERAS by reducing length of hospital stay by 51.6%.[3] Cost incurred were not different in present study except longer hospital stay in conventional group (92 versus 140 hours) that was associated with added expenses to patient attenders.[4]

Shon et al observed that patients with compliance over 80% had a significant reduction in postoperative complications -20.4% versus 41.2% versus 38.1%, and length of stay after surgery, high patient satisfaction and

postoperative pain, early mobilization and early removal of urinary catheter.

Wijk et al, in case control study reported reduced length of stay after ERAS protocol from a mean of 2.6 (SD 1.1) days to a mean of 2.3 (SD 1.2) days. The patients discharge rate at 2 days was significantly increased from 56% pre-ERAS to 73% after ERAS. No differences were found in complications (5% versus 3.5% in primary stay, 12% versus 15% within 30 days after discharge), reoperations (2% versus 1%) or readmission (4% versus 4%), that was similar in present study.[18,22]

ERAS-P is evidence-based, cost saving, requires no new resources or technology, and improves patient quality of life and the benefits are appreciable, without increasing readmissions. Their findings emphasize the wide applicability of ERAS protocols and its adoptability in other surgical specialty and clinical settings worldwide to implement cost cutting and improvises the availability in small hospital settings.

Limitations

Future research among larger groups may focus on large multi-centeric trials that standardize and tailor ERAS protocols. Long-term studies exploring the sustained effects of ERAS on patients' quality of life and functional recovery are essential to understand the longer benefits of ERAS protocols.

CONCLUSION

The implementation of ERAS-P is an evidence based recommendation for significant reduction in duration of hospital stay, high satisfaction due to patient indicated pain management, early mobilization, less use of enema and drains/catheters that increase patient compliance, lower rate of complications and re-admissions. ERAS-P enhanced the understanding of perioperative physiology that has led gynecological surgeons to recognize the importance of perioperative care to shorten duration of hospitalization that saves time, manpower and cost to patients with better bed turn over in small hospitals.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Batchelor TJP, Rasburn NJ, Abdelnour-Berchtold E, Brunelli A, Cerfolio RJ, Gonzalez M, et al. Guidelines for enhanced recovery after lung surgery: recommendations of the Enhanced Recovery After Surgery (ERAS®) Society and the European Society of Thoracic Surgeons (ESTS). Eur J Cardiothorac Surg. 2019;55(1):91-115.
2. Dickson E, Argenta PA, Reichert JA. Results of introducing a rapid recovery program for total abdominal hysterectomy. Gynecol Obstet Invest. 2012;73(1):21-5.
3. Yoong W, Sivashanmugarajan V, Relph S, Bell A, Fajemirokun E, Davies T, et al. Enhanced Recovery After Surgery (ERAS) Team for Gynaecology and Anaesthesia. J Minim Invasive Gynecol. 2014;21(1):83-9.
4. 4a.Relph S, Bell A, Sivashanmugarajan V, Munro K, Chigwidden K, Lloyd S, et al. Cost effectiveness of enhanced recovery after surgery programme for vaginal hysterectomy: a comparison of and post-implementation expenditures. Int J Health Plann Manage. 2014;29(4):399-406. 4b.Yoong W, Sivashanmugarajan V, Relph S, Bell A, Fajemirokun E, Davies T, et al; Enhanced Recovery After Surgery (ERAS) Team for Gynaecology and Anaesthesia. Can enhanced recovery pathways improve outcomes of vaginal hysterectomy? Cohort control study. J Minim Invasive Gynecol. 2014;21(1):83-9.
5. Silva Filho ALD, Santiago AE, Derchain SFM, Carvalho JP. Enhanced Recovery After Surgery (ERAS): New Concepts in the Perioperative Management of Gynecologic Surgery. Rev Bras Ginecol Obstet. 2018;40(8):433-6.
6. Wodlin NB, Nilsson L, Kjølhede P. Health-related quality of life and postoperative recovery in fast-track hysterectomy. Acta Obstet Gynecol Scand. 2011;90(4):362-8.
7. Nikodemski T, Biskup A, Taszarek A, Albin M, Chudecka-Głaz A, Cymbaluk-Płoska A, et al. Implementation of an enhanced recovery after surgery (ERAS) protocol in a gynaecology department - the follow-up at 1 year. Contemp Oncol (Pozn). 2017;21(3):240-3.
8. Forsmo HM, Pfeffer F, Rasdal A, Sintonen H, Körner H, Erichsen C. Pre- and postoperative stoma education and guidance within an enhanced recovery after surgery (ERAS) programme reduces length of hospital stay in colorectal surgery. Int J Surg. 2016;36(Pt A):121-6.
9. Abola RE, Gan TJ. Preoperative Fasting Guidelines: Why Are We Not Following Them?: The Time to Act Is NOW. Anesth Analg. 2017;124(4):1041-3.
10. Charoenkwan K, Nantasupha C, Muangmool T, Matovinovic E. Early versus delayed oral feeding after major gynaecologic surgery. Cochrane Database Syst Rev. 2024;8(8):CD004508.
11. Arnold A, Aitchison LP, Abbott J. Preoperative Mechanical Bowel Preparation for Abdominal, Laparoscopic, and Vaginal Surgery: A Systematic Review. J Minim Invasive Gynecol. 2015;22(5):737-52.
12. Santiago AE, Silva Filho AL, Cândido EB, Ribeiro PA, Rosa eSilva JC, Primo WQ, et al. FEBRASGO position Statement: Perioperative management in gynecological surgery based on the ERAS program. 2022;2:202-9.

13. Siedhoff MT, Clark LH, Hobbs KA, Findley AD, Moulder JK, Garrett JM. Mechanical bowel preparation before laparoscopic hysterectomy: A randomized controlled trial. Obstet Gynecol. 2014;123(3):562-7.
14. Barber EL, Van Le L. Enhanced Recovery Pathways in Gynecology and Gynecologic Oncology. Obstet Gynecol Surv. 2015;70(12):780-92.
15. Varadhan KK, Neal KR, Dejong CH, Fearon KC, Ljungqvist O, Lobo DN. The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open colorectal surgery: a meta-analysis of randomized controlled trials. Clin Nutr. 2010;29(4):434-40.
16. de Groot JJ, Ament SM, Maessen JM, Dejong CH, Kleijnen JM, Slangen BF. Enhanced recovery pathways in abdominal gynecologic surgery: a systematic review and meta-analysis. Acta Obstet Gynecol Scand. 2016;95(4):382-95.
17. Spanjersberg WR, Reurings J, Keus F, van Laarhoven CJ. Fast track surgery versus conventional recovery strategies for colorectal surgery. Cochrane Database Syst Rev. 2011;(2):CD007635.
18. Wijk L, Franzen K, Ljungqvist O, Nilsson K. Implementing a structured Enhanced Recovery After Surgery (ERAS) protocol reduces length of stay after abdominal hysterectomy. Acta Obstet Gynecol Scand. 2014;93(8):749-56.
19. Bisch SP, Jago CA, Kalogera E, Ganshorn H, Meyer LA, Ramirez PT, et al. Outcomes of enhanced recovery after surgery (ERAS) in gynecologic oncology - A systematic review and meta-analysis. Gynecol Oncol. 2021;161(1):46-55.
20. Jimenez JCV, Serrano BT, Muñoz EV, Pérez BS, Jimenez Lopez JS. New surgical realities: implementation of an enhanced recovery after surgery protocol for gynecological laparoscopy-a prospective study. Perioper Med (Lond). 2021;10(1):52.
21. Harrison RF, Li Y, Guzman A, Pitcher B, Rodriguez-Restrepo A, Cain KE, et al. Impact of implementation of an enhanced recovery program in gynecologic surgery on healthcare costs. Am J Obstet Gynecol. 2020;222(1):66.e1-66.e9.
22. Shen Y, Lv F, Min S, Wu G, Jin J, Gong Y, et al. Impact of enhanced recovery after surgery protocol compliance on patients' outcome in benign hysterectomy and establishment of a predictive nomogram model. BMC Anesthesiol. 2021;21(1):289.
23. Kannan V, Ullah N, Geddada S, Ibrahiam A, Munaf Shakir Al-Qassab Z, Ahmed O, et al. Impact of "Enhanced Recovery After Surgery" (ERAS) protocols vs. traditional perioperative care on patient outcomes after colorectal surgery: a systematic review. Patient Saf Surg. 2025;19(1):4.
24. Turaga AH. Enhanced Recovery After Surgery (ERAS) Protocols for Improving Outcomes for Patients Undergoing Major Colorectal Surgery. Cureus. 2023;15(7):e41755.
25. Li N, Wei S, Qi Y, Wei W. The effects of enhanced recovery after surgery on wound infection, complications, and postoperative hospital stay in patients undergoing colorectal surgery: a systematic review and meta-analysis. Int Wound J. 2023;20:3990-8.
26. Althobaiti TS, Alkhamash MO, Almalki AS, Alkhwildi JA, Abdulaziz YA, Alanazi AA, et al. Enhanced recovery program (ERAS) and colorectal surgery: a systematic review and Meta-analysis. Ann Med Health Sci Res. 2020;10:1089-94.

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