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The Advantage of Implementation of Enhanced Recovery After Surgery (ERAS) in Pain Management during Elective Abdominal Hysterectomy

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Abstract
Objective: *To study the effects of introducing an Enhanced Recovery After Surgery (ERAS) protocol modified for gynecological surgery, on Pain Management and Postoperative complications following elective abdominal hysterectomy.* ***The aim was to*** *apply Enhanced Recovery After Surgery (ERAS) protocol for elective abdominal hysterectomy.* ***Methods:*** *the study used a quasi-interventional research design.* ***Setting****: The study was conducted at the New General Mansoura Hospital, Mansoura city, Dakahlia Governorate from October 2017 to October 2018. The study sample was 60 participant women admitted to the previously mentioned setting.* ***Tools****: I- Structured Interview Questionnaire: This tool included two parts: Part one: Patient's General Characteristics; included name, age in years, BMI kg/m2, ASA classification, residence, marital status, educational level, job, and health insurance. Part two: includes two sections: Patient's Obstetrics history; included parity, gravidity, mode of previous delivery, abortion, and contraceptive methods. Patient's medical history, included Diagnosis, presence of cardiac disease or not or Diabetes Mellitus. The second tool: A structured Enhanced Recovery After Surgery (ERAS) Protocol. The third tool: Patients' satisfaction checklist after applying ERAS Protocol.* ***Results:*** *Compared to the control group, it was observed that only one fifth of the intervention group has severe pain, with a statistically significant relation (FET: 40.00; P: <0.001). It was observed that there is no body of the intervention group has postoperative bleeding, other infections and Sub-ileus among the intervention group compared to the minority (3.3%) of the control group.* ***Conclusions:*** *The ERAS protocol shows promise and appears to be worthwhile for widespread implementation among patients undergoing elective abdominal hysterectomy; it was found to be beneficial in reducing the postoperative pain, without increasing postoperative complications.* ***Recommendation,*** *study recommended applying ERAS protocol in order to have better pain relieve and reduce postoperative complications.*
Key words: *Abdominal hysterectomy, Enhanced Recovery After Surgery, pain*

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I. Introduction

In recent times, various protocols have been introduced for enhanced recovery after surgery (ERAS). These ERAS protocols encompass multimodal perioperative management principles to minimize surgical stress and potential complications, accelerate patient recovery, and achieve effective analgesia[11]. ERAS protocols have been developed to address perioperative complications that cannot be resolved by a single method alone[6]. The ERAS protocols involve multiple factors that work in conjunction to reinforce each other and reduce stress and cytokine levels, promote trauma repair, and reduce the rate incidence of complications[2].

ERAS protocols limiting intraoperative and postoperative opioid use by replacing them with different medications and non-pharmacological therapies[10]. Patient and family counseling on perioperative opioid use, anxiety, and pain catastrophizing are important steps. Perioperative use of opioid-free anesthesia and analgesia regimens implemented as a significant component of ERAS protocols has proven to reduce or replace opioid use[5].

Pain is one of the most distressing symptoms of the perioperative period and an ideal management strategy remains elusive. The ERAS protocols seek to reduce the physiological response to the surgical insult[12]. Twenty-four core elements are distributed along the patients' pathway administered by different departments and professionals working in synergy between one element and the next. The protocols are under continuous

audit and implement effective changes as new evidence comes to light to reduce LOS, complications, pain, and readmissions[18].

When the ERAS programs have been successfully implemented the length of stays in hospital have been decreased by 35-40 percent. This advantage was observed without a concurrent increase in complications or re-admission rate[3]. Some studies have observed a decline in surgical (anastomotic leaks, etc.), and non-surgical complications (nosocomial infections, etc.) in the post-operative period. ERAS was also associated with an earlier return to work and productivity[14]. After the major surgeries with help of fast track protocols, the client will or will not have full energy to perform some of the activities as the basic human needs, will need help, support and/or will not be able to tend to him/herself because of movement restriction, unconsciousness etc[17]. From this time, it will become the nurse role to identify those needs and disabilities and tend to them involving the physician therapeutic plan. Once the nurse has found the needs, she will need to establish a nursing care plan which will assist her to make patient a follow up and ensure that the needs have been covered and tended to that individual to accomplish the goal set and henceforth good health in the future. The nurse's role within the enhanced recovery after surgery (ERAS) programs is clearly vital as part of the multidisciplinary team, as the individual responsible for inter professional communication, individualized education and self-care techniques training (among others) to empower the client, clarify doubts and avoid inaccurate beliefs[13]. Numerous studies illustrate that nurses attain an important role in better development and implementation of the RR programs in everyday clinical practice**.** The enhanced recovery programs, which allow an earlier discharge, lead to the need for more careful supervision of clients at home, and telephone follow-up is an excellent tool for this purpose. The study also showed that roughly 50% of clients, after discharge, had contact with the nurse of the program and not only with the doctor, emphasizing the role of nurses in the follow-up of their clients, even outside the context of hospitalization[9].

II. The study's aim

Apply Enhanced Recovery After Surgery (ERAS) protocol for elective abdominal hysterectomy.

III. Subjects & Method

3.1 - Research Design: A quasi-interventional (quasi-experimental) design was used in this study.

3.2 - Setting: This This study was conducted at obstetrics and Gynecological surgery department, Mansoura New General Hospital in delta region,

3.3 Participants: It consisted of 60 participant women,, who fulfilling the inclusion criteria admitted to the previously mentioned setting.

3.4 **Tools:** four tools were used in this study as the following:

3.4.1- **Tool I:** Structured Interview Questionnaire, it included two parts; this tool included two parts: Part one: Patient's General Characteristics; included name, age in years, BMI kg/m2, ASA classification, residence, marital status, educational level, job, and health insurance. Part two: includes two sections: Patient's Obstetrics history; included parity, gravidity, mode of previous delivery, abortion, and contraceptive methods. Patient's medical history, included Diagnosis, presence of cardiac disease or not or Diabetes Mellitus.

3.4.2- **Tool II:** The second tool: A structured Enhanced Recovery After Surgery (ERAS) Protocol.

3.4.3-**The third tool**: Patients' satisfaction checklist after applying ERAS Protocol.

3.4.4-**The forth tool:** Patients' length of stay in hospital after applying ERAS Protocol.

IV. Methods:

- An official approval for conducting the study was obtained from the research ethics committee of faculty of Nursing of Mansoura University
- An oral consent was obtained from each participant in this study after explaining the study's aim. Participants were assured that the information is confidential and used for study purpose only.
- The participants had the right to withdraw from the study at any time without giving any reasons
- A pilot study was applied on 10% (6) participant of total number to test the simplicity, clarity of the questions. The participants of the pilot study were excluded from the study group. Minor modifications were done accordingly.

V. Results

The data collected were analyzed statistically and the results are categorized as following parts: The collected data were analysed statistically and the results were categorized into the following parts:

Part I: Distribution of the Studied Patients According to Their General Characteristics (Table 5.1).

Part II: Distribution of the Studied Patients According to Their Satisfaction After Applying ERAS Protocol in Relation to Their Pain Level: (Table 5.2).

Part III: Distribution of the Studied Patients According to Their Postoperative complications. (Table 5.3).
Table (5.1) shows the distribution of the studied patients according to their general characteristics. More than half (56.7%) of the intervention group aged 41-50 years compared to more than one third (36.7%) of the control group. Less than three quarters (73.3%) of the intervention group have body mass index (BMI) 25 to less than 30 kg/m^2 as compared to more than one third (36.7%) of the control group. In relation to ASA classification, more than half (56.7%) of the intervention group were class II compared to more than one two third (70.0%) of the control group. The table also showed that sixty percent of the intervention group were lived in rural area compared to more around one third (33.3%) of the control group. Around three quarters (73.3) of the intervention group were married compared to around two third (66.7%) of the control group. Regarding educational level, forty percent of the intervention group were highly educated compared to around one third (30.0%) of the control group. Around half of the intervention and the control group were house wife (53.3%, 50.0% respectively). Finally, forty percent of the intervention group reported that they have health insurance compared to half of the control group.

Table (5.1): Distribution of the Studied Patients According to Their General Characteristics.

Characteristics	Intervention		Control		Significance test
	No	%	No	%	
Age (Years)					
31- 40	7	23.3%	5	16.7%	
41- 50	17	56.7%	11	36.7%	FET:4.758
>51	6	20.0%	14	46.7%	P: 0.06
BMI					
< 25	4	13.3%	9	30.0%	
> 25and < 30	22	73.3%	11	36.7%	FET:7.990
> 30	4	13.3%	10	33.3%	P: 0.023*
ASA classification					
Class I	13	43.3%	9	30.0%	
Class II	17	56.7%	21	70.0%	X2:1.148 P: 0.284
Residence					
Rural	18	60.0%	10	33.3%	
Urban	12	40.0%	20	66.7%	X2:4.286 P: 0.037*
Marital Status					
Married	22	73.3%	20	66.7%	
Divorced	4	13.3%	5	16.7%	FET:0.317 P:0.853
Widow	4	13.3%	5	16.7%	

Table (5.2)presents the Distribution of the studied patients according to their satisfaction after applying ERAS protocol in relation to their pain level. It was observed that only one fifth of the intervention group has severe pain compared to the entire control group, with a statistically significant relation (FET: 40.00; P: <0.001).

Table (5.2) Distribution of the Studied Patients According to Their Satisfaction After Applying ERAS Protocol in Relation to Their Pain Level

Patients' satisfaction after applying ERAS Protocol regarding their pain	Intervention		Control		Test of significance
	No	%	No	%	
Pain					
A. What was your pain level after surgery? (0=no pain and 10=excruciating pain)					
Mild (1-3)	1	3.3%	0	0.0%	FET: 40.00 P: <0.001*
Moderate (4-6)	23	76.7%	0	0.0%	
Severe (7-10)	6	20.0%	30	100.0%	

FET: Fisher exact test *** Significant at P value ≤0.05**

Table (5.3) presents the distribution of the studied patients according to their postoperative complications. It was observed that there is no body has postoperative bleeding, other infections and Sub-ileus among the intervention group compared to the minority (3.3%) of the control group. Wound infection was reported among 6.7% of both groups. There was no statistically significant difference between the studied groups.

Table (5.3): Distribution of the Studied Patients According to Their Postoperative complications:

Postoperative complications	Intervention		Control		Test of significance
	No	%	No	%	
Postoperative bleeding	0	0.0%	1	3.3%	FET:1.1017 P:0.313
Wound infection	2	6.7%	2	6.7%	----------
Other infection	0	0.0%	1	3.3%	FET:1.1017 P:0.313
Sub-ileus	0	0.0%	1	3.3%	FET:1.1017 P:0.313

FET: Fisher exact test *** Significant at P value ≤0.05**

VI. Discussion

Applying ERAS protocol for elective hysterectomy women will reduce the postoperative pain, without increasing postoperative complication. The following discussion covered the findings related to the stated questions of the study.

Beginning with socio-demographic characteristics as a baseline for comparison, significant differences were not elicited in both groups as regarding age, ASA classification, Marital Status, Educational Level, Occupation, and Health Insurance. Age ranged from 31 to 75 years in intervention group within Mean ± SD (52 ± 13.13), but in the control group, it ranged from 32 to 73 years and the Mean ± SD was 51.4 ± 12.27.

More than half of the intervention group aged 41-50 years compared to more than one third of the control group. In relation to ASA classification, more than half of the intervention group were class II compared to more than one two third of the control group.

Around three quarters of the intervention group were married compared to around two third of the control group. Regarding educational level, less than half of the intervention group were highly educated compared to one third of the control group. About half of the intervention and the control group were house wives. Finally, less than half of the intervention group reported that they have health insurance compared to half of the control group.

This was on line with a study by **Spanjersberg, Van Sambeeck, Bremers, Rosman & van Laarhoven, 2015** [15] titled "Systematic review and meta-analysis for laparoscopic versus open colon surgery with or without an ERAS program" as the baseline characteristics within studies did not differ.

There was a statistically difference between the two groups regarding Body Mass Index (BMI) and their residence; less than three quarters of the intervention group have BMI 25 to less than 30 kg/m^2 as

compared to more than one third of the control group. Finally, regarding their residence, about two thirds of the intervention group lived in rural area compared to one third of the control group.

This differs with the results of a prospective multi-centered study within an ERAS protocol per **Tiefenthal, Asklid, Hjern, Matthiessen & Gustafsson, 2016 [16]** named "Laparoscopic and open right- sided colonic resection in daily routine practice", as there was no difference between the two groups regarding BMI or residence.

By studying the studied patients according to their postoperative complications, it was observed that there was no patient had postoperative bleeding, other infections and Sub-ileus among the intervention group compared to the minority of the control group. Wound infection was the same minimum ratio among both groups and there were no statistically significant differences between the intervention and control group. The same was a study by **Miralpeix et al., 2016[7]** reported that patients didn't have any complications after implementing ERAS.

Conversely, **Williamsson, 2017[19]** found that the rate of cardiopulmonary complications and sepsis was about three quarters in the control group. This is the result of the fast-track pathway, which involves reduced intraoperative fluid administration, early completion of postoperative IV fluid administration and routine antibiotic prophylaxis.

Several studies about pre and post ERAS implementation in major gynecologic surgery by **Modesitt et al., 2016[7]; Kalogera et al., 2016[4]** confirmed that the incidence of postoperative complications and readmissions is more or less stable between the ERAS group and the control group. Despite surgery being more challenging in elderly and/or obese women, **Carter, 2012[1]** demonstrated that equally good outcomes with the same rate of postoperative complications and readmissions as their younger and/or thinner counterparts can be achieved with ERAS pathway.

This paradox between pain scores and pain satisfaction could have been attributed to extensive preoperative advice, the management of pain control expectations and the patient's knowledge that the whole team dedicated itself to pain management, **Kalogera's[4]** study in pre- and post- ERAS implementation showed that patient satisfaction is mainly associated with pain control. This is consistent with another study concluded that patient satisfaction was more closely linked to the perception that care providers did their utmost to control pain than with the pain actually being controlled[11].

VII. Conclusion

- It could be concluded that the outcomes of the current research support its hypothesis; ERAS program is a simple tool that had no negative effects on patients.
- It seems to be effective and safe regardless of patient categories.
- Also, this program reduced the incidence of postoperative complications, increased patients satisfaction and shortened postoperative length of hospitalization.

VIII. Recommendations

According to the results of the current research work, the researchers suggested the upcoming recommendations:

- Further studies regarding ERAS and fast track protocols are needed, focusing on evaluations of more patient-related outcomes, such as patients' experience of the process, quality of life aspects and long-term consequences..
- When comparing the outcomes of minimally invasive procedures such as laparoscopic or abdominal surgery to abdominal surgery, the use of an enhanced recovery regimen should be employed to optimize perioperative care in both groups, to enable a fair comparison.
- Study should be applied for follow up longer than 30 days after surgery.
- Replicate the study on a larger sample for generalizing the findings.

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