

Comparing the Outcomes of Fast-Track Hysterectomy and Routine Abdominal Hysterectomy

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ABSTRACT

Background & Objective: Hysterectomy is one of the major gynecologic operations. This procedure can be performed by different methods including abdominal, vaginal, and laparoscopic hysterectomy. In fast-track hysterectomy (FTH), patients do not receive opioids during surgery and there is no need for a 12-hour pre-surgery hospitalization. Patients are encouraged to eat and move at most 6 hours after operation. This study was performed to compare the outcomes of FTH with those of routine abdominal hysterectomy (RAH).

Materials & Methods: This case-control pilot study was carried out on 82 candidates for hysterectomy at Kowsar Training Hospital in Qazvin, Iran, during 2016. Patients were divided into two randomized groups of FTH and RAH. Parameters such as pain *visual analogue scale* (VAS) after 3, 6, 12, and 24 hours, diet tolerance, analgesic dose, postoperative nausea and vomiting, hospital stay, postoperative adverse effects, gas passing time, and readmission were investigated and compared between two groups.

Results: Analgesic use, gas passing time, and hospital stay were significantly lower in the FTH group ($P=0.0001$). While postoperative nausea and vomiting, adverse effects, food tolerance, and readmission rate were the same in both groups ($P>0.05$). Moreover, diet tolerance was observed in all patients. In general, pain VAS was lower in FTH with significant difference at 3rd ($P=0.002$) and 12th ($P=0.001$) hours, and at suture removal time ($P=0.026$).

Conclusion: It can be concluded that FTH may result in reduced pain, analgesic use, gas passing time, and hospital stay in comparison with RAH.

Keywords: Hysterectomy, Pain Management, Hospitalization, Case-Control



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Introduction

Hysterectomy is one of the major gynecologic procedures and the second most common surgery in women after cesarean section (1), which could be performed via different methods, including abdominal, vaginal, and laparoscopic hysterectomy (2-5). Although routine abdominal hysterectomy (RAH) is still the most frequently performed procedure and the only available technique for enlarged uteri (6), there are some challenges associated with it and the pre-, peri-, and post-operative measurements (7-9). On the other hand, surgery and anesthesia generally have negative impacts on human physiology and cause unpleasant feelings in patients (10-13).

Fast-track surgery is a multi-modal strategy that reduces the hormonal response to surgery-induced stress and improves post-operative recovery without a need for re-hospitalization (14-18). This approach prevents and reduces post-operative pain, nausea and vomiting, paralytic ileus, weakness, and fatigue, and relies on the following principles: to inform the patient about the process of surgery, safe painless recovery with minimum doses of opioids, minimal invasive surgery, improved management of post-surgery pain and nausea, reduced fasting time before surgery and rapid feeding after surgery, early walking after surgery, and intravenous fluid therapy during surgery, avoiding

the insertion of nasogastric tube and drain, administration of topical anesthetics to control pain, and thromboembolism prophylaxis (19-23).

This strategy is rarely investigated in gynecologic surgeries (19, 24, 25) and in particular there is no report of such practice from Iran. This study was designed to compare the results of FTH with those of RAH in Kowsar Training Hospital, Qazvin, Iran.

Materials and Methods

Study Design and Setting

This prospective randomized case-control pilot study was carried out on 82 patients between 30-60 years old, eligible for hysterectomy, who had attended the Obstetrical and Gynecological Clinic at Kowsar Training Hospital in Qazvin, Iran.

The patients were randomly divided into two equal groups of 41 members. Data collection was carried out through the completion of a questionnaire specifically designed for this study. Patients' demographic and clinical information including age, gravidity, history of other diseases and abdominal surgery, degree of pain based on VAS at 3, 6, 12, and 24 hours post-operation, tolerance to the normal diet, administered painkiller dose, postoperative nausea and vomiting, duration of hospital stay, time of first gas passing, and readmission were recorded.

Severity of Nausea and Vomiting

The severity of nausea was rated in three categories and marked as no nausea, mild nausea without vomiting and need for antiemetic agent, and severe nausea and vomiting in need of antiemetic therapy which was treated with ondansetron 4 mg, intravenously injected, when necessary. The presence of nausea and vomiting were recorded 3, 6, 12, and 24 hours post-operation in the study checklist.

Severity of Pain and First Gas Passage

To analyze the degree of pain more accurately based on VAS, 3 categories were considered as below:

- Slight pain: scored as 0, 1, 2, and 3
- Moderate pain: scored as 4, 5, and 6
- Severe pain: scored as 7, 8, 9, and 10

The degree of pain was recorded 3, 6, 12, and 24 hours post-operation in the study checklist. Moreover, the time of the first passage of gas was questioned and noted.

Postoperative Complications

Post-operative complications include severe bleeding, need for blood transfusion, need for reoperation for any reason associated with hysterectomy, deep vein thrombosis (DVT) and pulmonary embolism, rehospitalization, urinary tract infection, Foley catheter remaining in place at discharge, wound complications including bleeding and infection, vaginal cuff bleeding and infection and

severe prolonged post-operative ileus were also recorded.

Discharging the Patient

The women who could walk and tolerate a normal diet had easy urination, manageable pain with oral painkillers, no fever, and no signs of intestinal obstruction were ready to be discharged. If a patient did not feel well enough to be discharged for any reason, the cause for the inability to discharge was recorded. The patients were re-examined for the presence of any complication one week after discharge during suture removal.

Treatments on the Patients

Treatments on FTH Group:

- Following admission, the patients did not require fasting and could drink two glasses of filtered sweet fluid 2 hours pre-operation.
- Fluid therapy was limited to 500 mL ringer solution within an hour prior to surgery.
- The patients received 100 mg diclofenac suppository immediately before surgery.
- Antiemetic prophylaxis was achieved by intravenous injection of 8 mg betamethasone following induction of anesthesia.
- Once the patient was transferred to the ward, 100 mL lactated ringer's solution was given until the permission for oral nutrition.
- The painkiller was 100 mg diclofenac rectal suppository (every 8 hours) and in cases of more severe pain, ketorolac was administered. Preferably, no opioid was used.
- Patients were encouraged to move and walk 6 hours post-operation.
- The patients were allowed to drink at least 6 hours after surgery if tolerated.
- Foley catheter was immediately removed following mobilization.

Treatments on RAH Group:

- Patients were required to keep fasting for 12 hours before the surgery.
- hydration was unlimited and based on the decision made by the anesthesiologist in charge.
- Fluid replacement therapy during surgery was equal to the volume of fluid loss.
- After the operation, the volume of fluid replacement therapy was unlimited (3 L 1:3 and 2:3 per 24 hours).
- Patients were allowed to walk and eat filtered liquid foods 24 hours post-surgery.
- Foley catheter was left until the next morning.

General Treatments

- Antibiotic prophylaxis was performed for all patients according to the hospital routine guidelines.
- Anticoagulant prophylaxis was given according to the hospital protocols.
- Foley catheter was inserted before surgery.
- General anesthesia was induced by intravenous injection of propofol 1-2 mg/kg and fentanyl 1-2 µg/kg followed by tracheal intubation facilitated by intravenous injection of atracurium 5 mg/kg and continued by propofol perfusion 100-120 µg/kg/min.
- According to the decision made by the anesthesiologist, the administration of atracurium and fentanyl was repeated.
- Ephedrine 5-10 mg was also injected when systolic pressure showed 30% reduction compared to the baseline pressure.
- The anesthesia methods used for both groups were almost similar except for the application of fentanyl for the FTH group, which was only injected at time of anesthesia induction and was not repeated during the surgery if possible.
- Hysterectomy was performed according to the hospital routine guidelines.
- Diclofenac rectal suppository (100 mg) was re-administered at the end of surgery.
- Hemodynamic status of patients in both groups was monitored according to the routing protocols used in the ward.

Ethical Statement

This study was approved by the Ethics Committee of Qazvin University of Medical Sciences (Code: IR.QUMS.REC.1395.318) on 20.08.2018 and performed after submission of a written signed informed consent form by each patient.

Statistical Analysis

Data were analyzed using SPSS® software, version 24. Qualitative variables were presented as frequency tables and frequency percents and those of quantitative variables were calculated as mean ± standard deviation. Statistical tests included Fisher's exact test, Chi-square test, and independent t-test. P-value equal to 0.05 was considered statistically significant.

Results

All of the patients (mean age of 46.2±10 years) were considered as candidates for hysterectomy due to benign indications including uterine leiomyoma and abnormal uterine bleeding with no response to medical

treatments. As shown in [Table 1](#), based on the independent t-test, the frequency distributions of age, gravidity, and BMI were similar in both groups ($P>0.05$). Foley catheter was removed after 6-12 hours (mean: 7.8±2.1) from the FTH group and after 24 hours from the RAH group. As presented in [Table 1](#), the independent t-test showed a statistically significant difference between the two groups with regard to the painkiller dose (diclofenac rectal suppository), time of first gas passage, and postoperative hospital stay, so that lower values were observed in the FTH group ($P=0.0001$). Furthermore, there was no significant difference between the groups in ketorolac administration.

[Table 2](#) presents underlying diseases and a history of previous abdominal surgery in both groups, showing benign indications for hysterectomy in all cases ($P>0.05$).

Application of statistical tests including Fisher's exact test and Chi square test demonstrated that there was no significant differences between the two groups regarding the types of techniques used to incise the abdomen. Two patients in the RAH group and 4 in the FTH group were subjected to subtotal hysterectomy and the rest had a total hysterectomy. Altogether, ovaries were saved in 63 patients; 33 patients in the control group and 30 in the case group with no significant difference between the two study groups ([Table 3](#)).

VAS criteria were classified into three categories marked as mild (scores 0-3), moderate (scores 4-6), and severe (scores 7-10). As stated in [Table 4](#), the difference in the degree of pain at 4 time intervals and also at the time of suture removal was less in the FTH group; nevertheless, the level of pain was significantly lower in the FTH group at time intervals of 3 and 12 hours and at time of suture removal, compared to the RAH group.

All patients were tolerant to oral nutrition and the majority of patients in the case group received their meal after 6 hours and only two patients had their nutrition after 10 hours due to severe vomiting. In the FTH and RAH groups, 12 patients (29.2%) and 16 patients (39.1%) experienced nausea and vomiting, respectively, and no significant difference in the degree of nausea and vomiting was observed between the two groups ($P=0.32$). Ondansetron 4 mg was intravenously injected into both groups to treat nausea and vomiting that produced no side effects. The complications observed in our study included one case of admission to ICU from the case group due to hypertension which increased the hospital stay to 72 hours. Moreover, there were 4 cases of re-hospitalization from the case group and 2 patients from the control group suffering from wound dehiscence and diabetes who were re-admitted for debridement and wound healing. No significant difference was found between the two study groups regarding the amount of re-hospitalization.

Table 1. Frequency distribution of demographic characteristics, used painkiller dose, the time for the first passage of gas, and the duration of hospital stay in both study groups

Variables	Groups		P-value
	FTH	RAH	
Age (year)	46.9±10.3	45.6±9.7	0.31
Gravidity	3.2±1	3.3±1.8	0.43
Body mass index (BMI)	29.2±6.6	28.8±8.5	0.21
Number of ketorolac injections	4±3.3	4.5±1.2	0.1
Number of rectal diclofenac suppository used	2±1.8	5.1±2.2	0.0001
Time of first gas passage (hour)	16.6±5.8	23.2±5.1	0.0001
Duration of postoperative hospital stay (hour)	33.7±11.7	48	0.0001

Table 2. Frequency distribution of underlying diseases and history of previous abdominal surgery in two study groups

Group	Diabetes		Hypertension		Other diseases		Previous Surgery	
	n	%	n	%	n	%	n	%
FTH	11	24.8	4	9.7	24	58.5	23	56
RAH	12	29.3	10	24.4	25	61	19	46.3
Total	23	28	14	17.7	49	59/7	42	51.2

Table 3. Abdominal incision techniques used in two study groups

Groups	Midline n (%)	Pfannenstiel incision n (%)
FTH	8 (19.5)	30 (73.1)
RAH	12 (29.2)	29 (70.7)
P value	0.28	0.44

Table 4. Degree of pain at 3, 6, 12, and 24 hours postoperative in two study groups based on VAS criteria

Time interval	Groups	Degree of Pain (based on VAS)			P-value
		Mild	Moderate	Severe	
3 hours	FTH	0	7 (17)	34 (83)	0.0001
	RAH	0	0	41 (100)	
6 hours	FTH	0	18 (43.9)	23 (56.1)	0.16
	RAH	0	14 (34.1)	27 (56.9)	
12 hours	FTH	0	40 (97.5)	1 (2.5)	0.02
	RAH	2	29 (70.7)	10 (24.3)	
24 hours	FTH	11 (26.8)	30 (73.2)	0	0.62
	RAH	7 (17)	34 (82.9)	0	
Suture removal	FTH	41 (100)	0	0	0.01
	RAH	35 (85.3)	6 (14.7)	0	

Discussion

The concept of "fast-track surgery" was, for the first time, pioneered by Henrik Kehlet in regard to colorectal surgery in Denmark, in the early 1990s. The aim of this approach was to reduce peri-operative stress and accelerate post-operative recovery following elective surgeries (15). Fast-track strategy is rarely investigated in the field of gynecological surgeries (19, 24, 26) and the number of reports on application of this approach and

its associated outcomes in abdominal hysterectomy is limited (26-28).

In the current study, the outcomes of FTH and RAH were compared in 82 candidates of hysterectomy. It was concluded that the prescribed painkiller dose (diclofenac rectal suppository), the time for the first passage of gas, and the duration of hospital stay in the case group were

significantly lower than those found in the control group ($P=0.0001$). However, the amount of ketorolac used in the fast-track group was higher compared to the control group. The occurrence of nausea and vomiting in need for antiemetic therapy, rehospitalization as well as its cause and complications showed no significant difference between the two groups ($P>0.05$). Oral nutrition tolerance was observed in all patients and happened earlier almost 6 hours post-operation in the members of fast-track group. The severity of pain at different time courses was lower in the fast-track group compared to the control group, and the difference was statistically significant after 3 hours ($P=0.04$), 12 hours ($P=0.0001$), and upon suture removal ($P=0.02$).

Nilson *et al.* studied the complications and outcomes of FTH on 162 candidates for hysterectomy. The components of FTH included earlier discharge from the hospital and limitation of intravenous fluid injection. Their study indicated that obesity and underlying diseases were the significant risk factors of infectious processes (29). Regarding this, the factors such as underlying diseases, BMI, and previous history of laparotomy were matched in the two study groups of our study. In another study by Kroon *et al.*, the degree of pain (using VAS criteria) was investigated on 53 subjects of the FTH group. The time to start oral feeding showed a significant difference between the two groups; 4 hours in the first group and 5 hours in the second group. Furthermore, the degree of nausea on the first day after surgery was significantly lower in the first group compared to the second group; a finding inconsistent with our study (24).

Recently, it has been shown that earlier oral nutrition may be beneficial after major gynecological surgeries (30). Likewise, we concluded that early oral nutrition was a healthy and tolerable practice in women subjected to abdominal hysterectomy leading to faster discharge. This result is confirmed by another study by Tavassoli *et al.* (31) Moreover, in many prospective randomized trials on severe abdominal and thoracic traumas, a reduction in the number of infectious events has been reported in patients with early oral nutrition compared to those with parenteral feeding or with no oral nutrition (12, 19, 32, 33).

Subsequently, we found that the rate of nausea and vomiting was not significantly different between the FTH and RAH groups. whereas there are evidence showing that the degree of nausea and vomiting

following enteral feeding in gynecological surgeries can be significantly higher in the group which received earlier oral feeding (34).

Shorter hospital stay is one of the desirable goals within patients' hospitalization and is strongly encouraged (35, 36). Minig *et al.* evaluated the outcomes of fast-track vaginal hysterectomy in a 3-year study in Spain and showed that fast-track strategy is a safe and applicable approach for hysterectomy surgeries (37), a finding which was confirmed in our study. In the current study, the duration of hospital stay was significantly lower in the FTH group and this characteristic was observed in similar studies in which the early commencement of enteral feeding in different types of surgeries was the only objective of investigation (31, 34, 38).

Conclusion

Considering all important aspects of fast-track strategy, it could be concluded that FTH compared to RAH, leads to a lower dose of painkillers, earlier gas passage, shorter postoperative hospital stay, and decreased pain severity; however, the post-operative complications are almost the same. Thus, FTH is recommended for the women candidate for hysterectomy but with no contraindication. Nonetheless, further in-depth and large scale studies with the inclusion of other variables such as administration of local analgesics (epidural and spinal) are recommended for investigating the results of FTH. And finally, because our study was conducted as a pilot study, more studies with larger sample size and multi-center is strongly suggested.

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Conflict of Interest

The authors declared no conflict of interest.

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