

Peripartum Hysterectomy: Is There Any Difference Between Emergent versus Planned Surgery ?

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Abstract

Aim: The aim of the study was to compare the outcomes of emergent and planned peripartum hysterectomy. **Methods:** This retrospective cross-sectional study was conducted in two hospitals. Maternal and neonatal outcomes were compared according to the emergent and planned peripartum hysterectomy. **Results:** Totally 34020 deliveries were evaluated retrospectively and 66 peripartum hysterectomy cases were analyzed. Of these patients, 31 cases were planned surgery and 35 cases were emergent surgery. The patients who underwent planned peripartum hysterectomy had lower rate of blood transfusion (83.9% vs. 100%, $p=0.014$), higher postoperative hemoglobin levels (9.9 ± 1.3 vs. 8.3 ± 1.3 , $p<0.001$) compared with the emergent hysterectomy group. The birth weight was lower although the apgar scores were higher in the planned surgery compared with the emergent cases. **Conclusion:** The planned peripartum hysterectomy with a experienced team provide less need for transfusion and improved neonatal outcomes in regard to the emergent peripartum hysterectomy.

INTRODUCTION

Peripartum hysterectomy(PPH) is an important surgical procedure that is typically used to prevent maternal mortality from uterine hemorrhage and sepsis. PPH was firstly performed at the end of the 19th century as a life-saving procedure¹. The incidence of PPH varies in a range between 0.2 to 6.09 in 1000 deliveries^{2,3}. The important risk factors for PPH are age, previous cesarean sections, previous uterine surgery, labor induction, placental invasion abnormalities and uterine atony^{4,5}. The recent studies reported that the most common indication for PPH was placental invasion anomalies^{3,6} although the uterine atony and uterine rupture were the most frequent reasons to perform PPH in the past^{7,8}. The trend in increasing cesarean sections might change the indications in favour of placental invasion anomalies⁹. Most of the PPH was performed in an unplanned or emergent situation to prevent life-threatening hemorrhage after unsuccessful conservative approaches such as prostaglandins, tamponade and compression sutures within 24 h of a delivery. The morbidity or mortality rate increase with unprepared conditions such as lack of surgical experience and insufficient blood transfusion. Contrary, the prenatally diagnosed and planned cesarean hysterectomy provide low intraoperative bleeding and complications¹⁰. It also allows surgeons to be prepared for safe surgical procedures, to prevent morbidities with no increase in intra/postoperative complications¹¹. The aim of this study was to compare the intra- and post-operative outcomes and neonatal outcomes of patients who underwent emergent or planned peripartum hysterectomy.

MATERIALS AND METHODS

This retrospective study was conducted in the department of obstetrics and gynecology of two hospitals(One tertiary center, one government hospital) over a period of 23 years. This study was approved by the Research Ethics Committee of the Eskisehir Osmangazi University Faculty of Medicine (Ref. No: E.98130-2019/19). All women who underwent peripartum hysterectomy were included to the study population. The peripartum

hysterectomy was defined as hysterectomy done after 24 weeks of gestation and with or within 24 hours of delivery. The data of the patients were collected from the medical record of the hospitals. The records of the patients were reviewed for maternal characteristics such as age, gravidity, parity, gestational age, previous cesarean delivery, mode of delivery. The preoperative laboratory parameters and indications of surgery were also recorded. The exclusion criteria were as follows; delivery before 24 weeks of gestation and hysterectomy after 24 h of delivery. The type of the surgery, intraoperative and postoperative complications were investigated. The transfusion of blood products such as red blood cell and fresh frozen plasma that given during and after surgery were measured. The neonatal outcomes were also evaluated with birth weight and apgar scores. The patients were categorized as emergent and planned peripartum hysterectomy and the data were compared according to this categorization. The emergent peripartum hysterectomy was approved as uncontrollable bleeding with conservative treatment modalities such as prostaglandins, oxytocics and balloon tamponade. The hysterectomies in emergency was performed especially in uncontrollable bleeding, and shock or if it was a previous hemodynamic or hemostatic restoration. Moreover, any type of vascular control was performed with hysterectomy in emergency if necessary. The planned peripartum hysterectomy was defined as planned cesarean hysterectomy generally scheduled at the 34 to 37 weeks of gestation. We scheduled the planned peripartum hysterectomy with a dedicated team that consist of experienced gynecologic oncologist and maternal fetal medicine specialist. The preoperative evaluation was performed to determine the specific markers of abnormal placentation with the using of gray-scale and doppler ultrasound. We administered antenatal corticosteroids before 34 weeks. We performed midline vertical incision and the uterus was entered at the fundus. The uterine incision was closed and the dissection of retroperitoneum and bladder was performed carefully by an experienced surgical team including a gynecologic oncologist. As far as possible, total abdominal hysterectomy was the main approach but subtotal hysterectomy was performed in some cases.

The Statistical Package for the Social Sciences(SPSS) Version 15.0(SPSS Inc., Chicago, IL) was used to analyze the data. Demographic parameters and clinical outcomes were analyzed with mean \pm SD(standard deviation) and median values. Kolmogorov–Smirnov normality test was used to evaluate the distribution of the parameters. Normally distributed data were analyzed by using independent sample t test. Mann-Whitney U test was used to compare the non-parametric continuous and categorical data. The percentages were compared with Pearson chi-square test or Fisher Exact test. A p value of <0.05 was considered statistically significant.

RESULTS

There were 34020 deliveries during the study period. A total of 66 peripartum hysterectomies were performed with an incidence of 1.9 per 1000 deliveries. We analyzed 66 patients who underwent peripartum hysterectomy. Mean age of patients was 31.3 ± 5.5 years. The gravidity ranged between 1 and 12 with a mean of 3.9 ± 2.4 . The average gestational age was 35.7 ± 3.7 weeks. Of these 66, 14(21.2%) women delivered vaginally and 52(78.8%) women had cesarean section. Half of the patients($n=33$) had at least one previous cesarean section. The most common indications for overall study population was placenta accreta($n=26$, 39.4%) and the second one was uterine atony($n=20$, 30.3%). Twenty-four(36.4%) patients had subtotal abdominal hysterectomy and in 42 patients(63.6%), total abdominal hysterectomy was performed. We scheduled planned hysterectomy in 31(47%) patients, while emergent hysterectomy was performed in 35(53%) cases. Table 1 summarizes the demographic and clinical parameters of emergent and planned surgery groups. The mean gestational age was significantly lower in the planned hysterectomy group($p=0.002$). Moreover, more than 90% of the patients in the planned group delivered after 34 gestational weeks. We showed the indications of hysterectomy for study groups(Table 2). The uterine atony was the most common indication in the emergent group, whereas abnormal placentation was the most common indication in the planned group(57.1% and 67.7% , respectively). We compared the blood transfusions, postoperative laboratory values and intraoperative complications between the emergent and planned hysterectomy groups(Table 3). The planned hysterectomy group was required significantly lower blood products in the intra- and post-operative period. The postoperative Hb and the differences of pre- and post-operative Hb values were also significantly different among study groups. The complication rates were similar for emergent and planned surgery groups. The duration of hospital stay was lower in the planned surgery but it did not reach any statistical signi-

ficance. Table 4 presented that the neonatal outcomes were significantly different between emergent and planned hysterectomy groups. The mean birth weight was significantly lower in the planned group, it might be related to the lower gestational weeks on the surgery time. Although we have demonstrated the lower birth weight in the planned group, the apgar scores were significantly better than the emergent hysterectomy group($p<0.01$).

DISCUSSION

The present study showed that the most common indication for PPH was placental invasion anomalies. The planned peripartum hysterectomies provided lower morbidities and better neonatal outcomes compared to emergent cases whereas the emergent peripartum hysterectomies needed higher blood product requirements.

The incidence of PPH varies in a wide range. In a large-scaled meta-analysis, the incidence was found as 0.9 per 1000 deliveries⁶. A retrospective cohort study from Pakistan showed higher incidence as 4.01 per 1000 deliveries¹². We have also observed PPH yielding an incidence of 1.7 per 1000 deliveries in a previous study from our tertiary center¹³. There are several studies that assessed the peripartum hysterectomies and the incidence may change among countries and centers whether they have sufficient antenatal care for pregnancies. In some studies from Turkey, the incidence of PPH was established between 0.3 and 5.38 per 1000 deliveries^{7,14-17}. Sharma et al. found much higher incidence as 6.9 per 1000 deliveries³. Our incidence was similar to the previous literature and accordance with another Turkish studies. The most common indication was uterine atony in the past^{7,8}. However, the main indication has been evolved over recent years from uterine atony to abnormal placentation¹⁸. The rising cesarean delivery rates may result to the placental pathologies so it increases the rates of peripartum hysterectomy^{6,19-21}. Van den Akker et al. evaluated approximately 8 million deliveries and they reported that placental abnormalities were the most common indication for PPH and followed by uterine atony⁶. In a recent study, Kazi found that emergent peripartum hysterectomy was performed for hemorrhage primarily due to uterine atony¹². Senturk et al. put forward that the incidence of PPH was higher in the east of Turkey and the main indication was uterine atony and rupture¹⁷. The increasing use of uterotonics and cesarean rate may explain the conversion of main indication from uterine atony to abnormal invasive placentation for PPH^{3,6,19,22-24}. The morbidly adherence of placenta become prominent as an indication especially in planned cesarean hysterectomy³. Briery et al. reported that uterine atony was responsible in over half of the patients for emergent peripartum hysterectomy and placenta accreata was the second frequent indication in this group¹¹. In a retrospective study, Sharma et al. showed that placenta accreata was found in all of elective peripartum hysterectomy patients³. We found similar results in accordance to the recent literature. The cesarean rate has increased over the years and this rate was observed as 63.6% in our study population. Therefore, the placental abnormalities consisted of 56% of patients. We have also determined that the reason of peripartum hysterectomy was only abnormal placental pathologies in planned hysterectomy group. We have performed total abdominal hysterectomy(63.6%) for patients and there was no significant differences between emergent and planned hysterectomy group in terms of surgical type. Subtotal hysterectomy is more desirable for surgeons because removal of the cervix may be difficult due to possible dilated cervix in the peripartum hysterectomy cases. Total abdominal hysterectomy was performed more frequently in our study. Some studies demonstrated that subtotal abdominal hysterectomy is more suitable especially in placental invasion abnormalities, and the morbidities was lower than total abdominal hysterectomy cases^{7,20}. However, some researchers proposed to make total abdominal hysterectomy if the patient status is in good condition and they indicated that total abdominal hysterectomy should be considered to prevent hemorrhage from the cervix^{5,8}.

It was established that intra-operative bleeding was higher in emergent peripartum hysterectomy group compared to scheduled cases^{8,11}. In a recent prospective-cohort study, Seoud et al. have observed lower intra-operative bleeding in elective surgery group and they also found that lower blood products were transfused in the elective cases²⁵. In parallel with the higher blood loss, the transfused blood products increase in peripartum hysterectomies. In our study, we observed that red blood cell transfusion was given to all of the patients in the emergent group, although 83.9% of the patients needed to get transfusion in the planned surgery group($p=0.014$). We have also determined that lower fresh frozen plasma transfusion was required

in the planned hysterectomy cases. Wei et al. showed the red blood cell transfusion with a rate of 95%²⁶. Sak et al. found that the red blood cell was transfused to 62.2% of the placenta accreata patients²⁷. Briery et al. compared the transfusion of red blood cell between emergent and planned cesarean hysterectomies and they observed 66% vs. 33% transfusion rate with a mean transfused units of 4.5 vs 1.6, respectively($p < 0.05$)¹¹. A prospective-cohort study has also found that elective surgery was associated with lower blood transfusion rate compared to emergent cases²⁵. In another retrospective study, authors have demonstrated lower post-operative hemoglobin values in the emergent surgery but it did not reach any significance(7.8 ± 1.6 vs. 8.9 ± 2.2 , $p = 0.08$)³. Our study also showed significantly lower hemoglobin levels in the emergent peripartum hysterectomy group. The transfused units of red blood cell and fresh frozen plasma were higher in the emergent group. Similar to our study, Seoud et al. established that the transfusion rate and mean transfused units were higher in the emergent cases²⁵. We have also analyzed the difference between pre-operative and post-operative hemoglobin levels and it revealed lower differences in the planned surgery compared to emergent cases. The higher complication rate is expected in the emergent cases than scheduled surgery. The bladder injury that is the most common complication was observed as 3-20% in several studies^{3,7,12,17,23}. A higher incidence of bladder injury (27.2%) was stated in our study in reference to the literature. The planned hysterectomy groups had higher bladder injury rate than emergent group but not significantly. We thought that the higher rate may be related to the higher incidence of abnormal placental invasion in planned surgery group. Briery et al. showed higher incidence of post-operative complications in the emergent cesarean hysterectomy¹¹. Two studies^{11,25} have established that the number of hospital stays were similar between groups but Pettit et al. have found fewer hospital duration in the planned surgery²⁸. We have also reported slightly higher hospital duration in emergent hysterectomy group, but it did not differ significantly similar to the literature findings.

The neonatal outcomes are important in the peripartum hysterectomies. In emergent situations, these outcomes may be affected negatively, so we can improve the neonatal outcomes by performing planned peripartum hysterectomies in selected patients with proper timing. Seoud et al. demonstrated similar birth weight and apgar scores among elective and emergent cases²⁵. Pettit et al. also compared the neonatal outcomes and showed similar apgar scores between emergent and planned surgeries²⁸. Otherwise, they found higher gestational weeks and birth weight in the planned hysterectomy. Briery et al. obtained that the patients underwent planned cesarean hysterectomy had higher gestational weeks, higher fetal birth weight and apgar scores compared to emergent group, but not significantly¹¹. On the contrary, we have observed that the gestational weeks, and birth weight were higher in the emergent peripartum hysterectomy cases significantly. We also reported that the apgar scores were significantly higher in the planned surgery although the gestational week and birth weight were lower than the emergent surgery group. It may be associated that we administered antenatal corticosteroids to all of the planned surgery prior to the delivery.

The emergent peripartum hysterectomy is a life-saving procedure but it has some post-operative problems. Thus, the planned peripartum hysterectomy may improve the maternal and neonatal outcomes and decreases the complication rates. The prenatal diagnosis of the abnormal placental invasion become significant for performing scheduled surgery in these cases. One third of the placenta accreata cases that antenatally diagnosed still delivered in an unplanned manner²⁸. We think that it is not possible to avoid the emergent cases completely. The ideal delivery time for suspected abnormal placentation cases is still controversial. There was more optimal outcomes in the placenta accreata cases that delivered at the 34 gestational weeks²⁹. American College of Obstetrics and Gynecology (ACOG) recently recommended delivery time at 34 weeks to 35 weeks 6 days especially in suspected case for placenta accreata³⁰. ACOG also suggests to make the deliveries of placenta accreata cases with expert team in a tertiary center¹⁰.

The main limitation of our study was the retrospective nature. The datas of the study population covers a very wide time interval, so the uterine atony was more in the old datas and placental pathologies were more prominent in the recent datas. It might make a selection bias for our study. However, the present study comprehensively compared the emergent and planned peripartum hysterectomies and the sample size of the study was enough according to the previous studies. One of the limitations is the lack of information about the expertise level of surgeons in both study groups. Another important limitation is that we compared the

different indications between emergent and planned surgeries such as uterine atony and placental invasion anomalies; since in uterine atony, anatomy is not distorted than placental invasion anomalies.

In conclusion; we showed that antenatally planning of the peripartum hysterectomy improved the maternal and neonatal outcomes. Prenatal diagnosis of suspected cases provide some modifications to the surgeons during the surgery. According to the above ACOG recommendations, we make an effort to diagnose the suspected cases antenatally and we also currently perform the planned peripartum hysterectomies at 34 weeks to 35 weeks 6 days with an expert multi-disciplinary team. Further prospective studies are needed to investigate the correlation of planned peripartum hysterectomy with perinatal outcomes.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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