ORIGINAL ARTICLE

Evaluation of endometrial thickness after vaginal delivery and cesarean section during 24 hours after delivery

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ABSTRACT

Background: Depending on the physiological need, the uterine environment, especially the endometrium, has markedly changed during pregnancy.Also, in postpartum period, it was also shown significant changes in both uterine anterior-posterior diameter and endometrial thickness.
Aim: To evaluate the physiological changes of endometrial thickness during the postpartum period and to determine the underlying factors associated with it.
Methods: In this cross-sectional study,all pregnant women undergoing uncomplicated delivery at Yas Hospital Complex, an educational tertiary center, related to Tehran University of Medical sciences, Tehran, Iran., either by normal delivery or cesarean delivery was included into the study. Approximately 24 hours after delivery, subjects underwent abdominal and pelvic ultrasound at dorsolithotomy position. Midsagittal and axial planes were used to measure endometrial thickness.
Results: The mean endometrial thickness was 8.10±3.50 mm.There was a significant inverse correlation between endometrial thickness and gestational age (correlation coefficient -0.228, P value 0.021). The mean endometrial thickness in subjects with normal vaginal delivery and cesarean section was 8.65±2.65 mm and 7.62±3.61 mm respectively, which was significantly higher in subjects with normal vaginal delivery (P value = 0.012).
Conclusion: The mean endometrial thickness at 24 hours postpartum is estimated to be 8.10±3.50 mm in the selected Iranian population.This index is significantly influenced by the mood of delivery so that greater endometrial thickness in normal vaginal delivery is expected than cesarean section.
Keywords: Endometrial thickness, postpartum,

INTRODUCTION

Most information about the status of the uterine cavity have been assigned from the histological assessments[1,2], however, with the development of imaging techniques, especially ultrasonography, the physiological and pathological changes associated with the uterine cavity after delivery have been easily and deeply possible[3].Also, the findings of various imaging techniques, such as ultrasound, computed tomography scan (CT), or magnetic resonance imaging (MRI), have also been fully confirmed[4,5].Type of delivery and the gestational age are both crucial factors in assessing structural and diametric changes in the uterus after delivery[6].Despite the availability of such imaging techniques in evaluating uterine cavity changes after childbirth, there are still controversies regarding the results of various studies.

There have also been few studies of changes in endometrial size and thickness, which have led to conflicting results.Firstly, regarding two uterine diametric features including anterior-posterior diameter and endometrial thickness, a review of studies has shown that, first, these diameters showed significant differences over the days and weeks postpartum.In general, prematurity is associated with a decrease in the anterior-posterior diameter of the uterine cavity and anterior-posterior diameter was more in vaginal delivery than in cesarean section. Moreover, in vaginal delivery, endometrial thickness is higher than that observed in cesarean section[5,7-11].

To date, most studies have investigated the "abnormal" uterine ultrasound images of the uterus and little attention has been paid to endometrial thickness normally occur in postpartum period. The aim of this study was to evaluate the normal ultrasonographic images of the uterus as well as to evaluate the endometrial thickness after normal vaginal delivery and cesarean section.

MATERIALS AND METHODS

In this cross-sectional study,all pregnant women undergoing uncomplicated delivery at Yas Hospital Complex in Tehran, an educational tertiary center, related to Tehran University of Medical sciences, Tehran, Iran in 2019, either by normal delivery or cesarean delivery were included into the study.By definition, uncomplicated childbirth was defined as having the following characteristics: being single pregnancy, delivery between 35 and 42 weeks of gestation, the absence of postpartum hemorrhage, no needing blood transfusion after childbirth, no needing prostaglandin use, no requiring embolization of the uterine arteries, and no requiring any further surgeries in early post-partum period. In this regard, those with bleeding more than 500ml, multiple pregnancies, and gestational age less than 35 weeks of pregnancy, homeostasis disorders, preeclampsia, abnormal placenta formation, or uterine leiomyoma were all excluded.

After childbirth, all subjects were examined and all cases with the remaining blood clot or part of the placenta were excluded. Patients that underwent cesarean section received 20 units of oxytocin during surgery, 5 units

immediately after surgery, and 30 units during 12 hours postoperatively.Women who had normal vaginal delivery received 5 units of oxytocin after placental removal and 10 units during the first 2 hours postpartum.Approximately 24 hours after delivery, subjects underwent abdominal and pelvic ultrasound at dorsolithotomy position. Before the ultrasound, all subjects were re-examined to ensure that the delivery was uncomplicated. All ultrasound examinations were performed by two expert Perinatologists, using an Affinity 50 Ultrasound Machine, Philips Ultrasound, made in USA, version 2016, and devices with a 3.5-MHz curve probe.Midsagittal and axial planes were used to measure endometrial thickness. Finally, three of the best images obtained from each individual were selected for the study and their average was determined as final value.

The study was approved by ethic committee of Tehran University of Medical Sciences (Ir.tums. medicine. rec.1399.021), code number: 1399.021. At the beginning of the study, all participants signed an informed consent.

For statistical analysis, results were presented as mean ± standard deviation (SD) for quantitative variables and were summarized by frequency (percentage) for categorical variables. Continuous variables were compared using t test or Mann-Whitney test whenever the data did not appear to have normal distribution or when the assumption of equal variances was violated across the study groups. P values of ≤ 0.05 were considered statistically significant. For the statistical analysis, the statistical software SPSS version 23.0 for windows (IBM, Armonk, New York) was used.

RESULTS

In this study, 106 women were evaluated. In terms of contextual characteristics, the mean age of the subjects was 30.02±6.25 years, ranging from 20 to 44 years. The mean BMI was 26.16±4.10 kg/m^2 and the mean gestational age was 36.68±3.31 weeks.Overall, 99 cases (93.4%) were primiparous and 7 cases (6.6%) were multiparous. Abortion was also reported in 3 cases (2.8%). In terms of type of delivery, 24 cases (22.6%) had normal vaginal delivery and 82 cases (77.4%) had cesarean section.

Overall, the mean endometrial thickness was 8.10±3.50 mm.There was no significant correlation between endometrial thickness and maternal age (correlation coefficient 0.124, P value 0.27). The mean endometrial thickness in subjects younger than 30 years of age was 8.08±3.54 mm and 8.12±3.50 mm respectively, with no significant difference (P value 0.956).Also, there was no significant correlation between endometrial thickness and BMI (correlation coefficient -0.068, P value 0.55).The mean endometrial thickness in subjects with BMI below 30 and above 30 was 8.15±3.22 mm and 7.86±4.63 mm respectively, which was not significant (P value = 0.750).However, there was a significant inverse correlation between endometrial thickness and gestational age (correlation coefficient -0.228, P value 0.021) (Figure 1). In this regard, the mean endometrial thickness in subjects with gestational age 35 to 37 and above 37 was 8.59±2.73 mm and 7.98±3.66 mm, respectively (P value was 0.041).Mean endometrial thickness in primiparous and multiparous subjects was 8.15±3.59 mm and 8.38±1.91mm, respectively (P value = 0.557).The mean endometrial thickness in those with and without a history of abortion was 8.88±2.90 mm and 8.80±3.53 mm, respectively (P value 0.695). Also, the mean endometrial thickness in subjects with normal vaginal delivery and cesarean section was 8.65±2.65 mm and 7.62±3.61 mm respectively, which was significantly higher in subjects with normal vaginal delivery (P value = 0.012) (Figure 2).

DISCUSSION

Depending on the physiological need, the uterine environment, especially the endometrium, has markedly changed during pregnancy.Also, in postpartum period, it was also shown significant changes in both uterine anterior-posterior diameter and endometrial thickness.These changes occur physiologically and can be influenced by various underlying parameters such as gestational age[12]. Most studies have focused on pathological changes in the uterus and endometrium during and after labor, but uterine physiological changes have been less evaluated in postpartum period.What we focused on in this study was to evaluate the physiological changes of endometrial thickness during the postpartum period and to determine the underlying factors associated with it.In the present study, 24 hours after delivery, subjects followed by ultrasound evaluation.First, the mean endometrial thickness was estimated to be 8.10±3.50 mm.Second, regarding the relationship between this parameter and the underlying indices, there was first an inverse relationship between gestational age and endometrial thickness, and therefore gestational age (35 to 37 and above 37)wasnot associated with a decrease in endometrial thickness. However, given that early pre-term study was considered as the exclusion criteria and the samples werelate pretermin our study, it cannot be concluded that endometrial thickness is different in both pre-term and term positions.But as a more important finding, there was a significant difference in mean endometrial thickness in both vaginal and cesarean deliveries, in other words, endometrial thickness was significantly higher in subjects with normal vaginal delivery.This finding was similar and consistent with previous studies. Systematic conclusions from previous studies indicate that normal vaginal delivery is associated with thicker endometrium. However, some studies have found inconsistent results.For example, in the study by Lousquy et al[13], endometrial thickness was estimated to be 8.0±5.8 mm 24 h after vaginal delivery and 9.0±5.7mm after cesarean section.In the study of Weissmann-Brenner et al[14], endometrial thickness was measured after uncomplicated normal delivery and 25 cesarean sections and it was observed that the mean of this index for the first group was 8.2 mm and for the second group it was 8.6 mm, but the difference was not significant.Therefore, it was concluded that the type of delivery had little effect on endometrial thickness and this value was approximately equal for vaginal and cesarean delivery.In a study by Deans et al, the study was performed to investigate the postpartum morphology of the uterus. The uterus of 94 women at 24 hours postpartum was examined using ultrasound. The average uterine thickness was 13.8mm and a volume of 35.6 cm respectively(15).This

study shows that even with respect to the average endometrial thickness, there is a significant difference between different communities. In Pellerin et al study, endometrial thickness was not significantly different between those who had undergone normal delivery and cesarean section(16).Therefore, it can be concluded that, firstly, endometrial thickness in the various populations studied has a completely different range and therefore it is not possible to provide a universal normal value for endometrial thickness at the postpartum stage.Of course, at what time the evaluation is done, it is also important that in our study, this evaluation was done within the first 24 hours after delivery, whereas in various studies, the evaluation was carried out between hours after delivery to weeks.In addition, very contradictory results have been obtained regarding the effect of mood of delivery on endometrial thickness. But our study showed that endometrial thickness was higher in normal vaginal delivery than cesarean section, which may be due to the effect of courage after cesarean section changes during postpartum period on uterine wall cellularity and contractility.

Figure 1: The association between gestational age and endometrial thickness

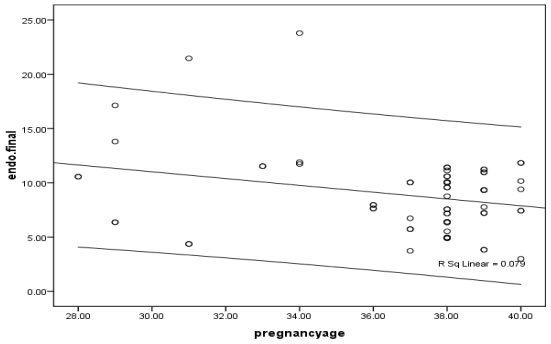
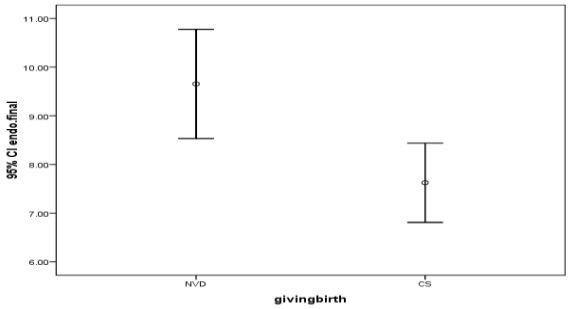


Figure 2: The mean endometrial thickness in vaginal delivery and cesarean section



CONCLUSION

As a final conclusion, the mean endometrial thickness at 24 hours postpartum is estimated to be 8.10±3.50 mm in the selected Iranian population.This index is significantly influenced by the mood of delivery so that greater endometrial thickness in normal vaginal delivery is expected than cesarean section.

Conflict of interest: None to be declared.

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Author Contributions

All authors contributed significantly towards the study.

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