OBJECTIVE: To establish normal ultrasonographic findings for the postpartum uterus.

STUDY DESIGN: We performed a prospective cohort study on women delivering during the study period. Ultrasounds were performed abdominally within 48 hours of delivery. Measurements of the endometrial cavity and remarkable findings such as echogenic debris or uterine abnormalities were documented. Additionally, we followed patients during their hospital course for bleeding complications and the need for medical or surgical treatment of such complications.

RESULTS: Of the 114 patients enrolled during our study period, 79 (69%) delivered vaginally and 35 (31%) delivered by cesarean; 39 (34%) were primiparous and 75 (66%) were multiparous. The mean endometrial cavity measurement was 1.15 ± 0.3 cm. There was no difference in endometrial cavity when evaluating parity (p = 0.26) or vaginal versus cesarean delivery (p = 0.8). Echogenic material in the endometrial cavity was noted in 22 (19%) of the 114 patients. The presence of echogenic material was significantly higher following vaginal delivery (p = 0.008). None of the patients had a complication in the postpartum period.

CONCLUSION: An endometrial cavity measurement of < 1.2 cm after a vaginal or cesarean delivery should be considered normal. Presence of echogenic material in the endometrial cavity appears to be a normal variant. (J Reprod Med 2015;60:3–5)

Keywords: endometrial cavity, postpartum, postpartum hemorrhage, retained products of conception, ultrasound, uterine atony.

Postpartum hemorrhage is a relatively common complication, occurring in 2.4% of deliveries. It is often associated with retained placental fragments. Ultrasonography is a modality used to evaluate the endometrial cavity in cases where postpartum bleeding is excessive and there is a suspicion for retained products of conception. Many such cases require surgical intervention with dilation and curettage. Additionally, patients who undergo cesarean delivery are also at risk for postpartum hemorrhage, more commonly related to uterine atony rather than to retained products of conception. In order to use ultrasound to evaluate the postpartum...
uterus, expected values for the endometrial cavity should be established.

Previous studies have been performed using ultrasound to evaluate the postpartum uterus, with findings for average endometrial cavity measurements of 0.6–1.38 cm. Those studies evaluated endometrial cavity measurements at different time intervals following delivery, and most evaluated only women following vaginal delivery. The purpose of this study was to establish normal ultrasonographic findings for the postpartum uterus after both vaginal and cesarean deliveries.

Materials and Methods

We performed a prospective cohort study on women delivering at Hartford Hospital, Hartford, Connecticut, from 1/2009 to 11/2009. Inclusion criteria were postpartum women ≥ 18 years of age who were willing to participate. Exclusion criteria were postpartum fever (> 100.4°F [38°C]), dilation and curettage, hemorrhage (estimated blood loss > 500 cc for vaginal delivery and > 1,000 cc for cesarean delivery), and known uterine anomaly. Approval for the study was obtained from the Institutional Review Board at Hartford Hospital.

All ultrasounds were performed abdominally within 48 hours of delivery using a Philips EnVisor ultrasound machine (Philips, Bothell, Washington) either in the labor and delivery suite or the postpartum floor by a single senior OB/GYN resident. Written informed consent was obtained prior to each ultrasound. Measurements of the endometrial cavity were performed, as well as documentation of any remarkable findings such as echogenic debris or uterine abnormalities. The mean endometrial cavity thickness was measured in the longitudinal plane (Figure 1). Transverse images were also obtained to fully evaluate for areas of increased thickness or debris.

Patients were followed during their hospital stay for any bleeding complications, including the need for medical or surgical treatment of such complications. Demographic data including patient age, race, gravidity, parity, and history of prior complications related to delivery were obtained from medical records. Obstetric variables including birth weight, length of labor, and type of delivery were also obtained.

Analysis of variance (ANOVA), Student’s t test, and \( \chi^2 \) were used to compare measurements in multiparous patients versus primiparous patients and in post-vaginal delivery patients versus post-cesarean delivery patients. Means and standard deviations were used to evaluate the endometrial cavity thickness. Results were considered statistically significant if the p value was < 0.05.

Results

A total of 114 women met the above criteria and were willing to participate in the study. Of those, 79 patients (69%) delivered vaginally and 35 (31%) delivered by cesarean; 39 patients (34%) were primiparous and 75 (66%) were multiparous. During the study period the mean postpartum endometrial cavity measurement for the entire study group was 1.15 ± 0.3 cm (Figure 1). For primiparous patients the mean postpartum endometrial cavity was 1.19 ± 0.4 cm and 1.12 ± 0.3 cm in multiparous women; this difference was not statistically different (p = 0.26). For vaginal deliveries the mean postpartum endometrial cavity was 1.15 ± 0.3 cm and 1.14 ± 0.3 cm for cesarean deliveries; this difference was not statistically significant (p = 0.8). The endometrial cavity was similar for primary cesarean (1.2 ± 0.4 cm) and repeat cesarean delivery (1.03 ± 0.3 cm) (p = 0.8).
Echogenic material in the endometrial cavity was noted in 22 (19%) of the 114 patients; 14 of those patients were multiparous and 8 were primiparous (Figure 2). One of those patients had a primary cesarean delivery, and the other 21 patients had vaginal deliveries. Echogenic material was not seen in any the patients following repeat cesarean delivery. The presence of echogenic material was significantly higher following vaginal delivery ($p = 0.008$).

**Discussion**

Sokol et al. evaluated 40 patients following vaginal delivery and found a mean endometrial thickness of $1.1 \pm 0.6$ cm. Deans and Dietz evaluated 94 patients and found a mean endometrial thickness of $1.38$ cm for patients following both vaginal and cesarean delivery, although only 2 patients were delivered by cesarean section.

Sokol et al. found 40% of patients with echogenic material seen on ultrasound, which is higher than our findings. Edwards and Ellwood had similar results, with echogenic mass in 51% of patients following normal vaginal deliveries. They found no correlation between the duration or amount of bleeding in those patients versus patients without this ultrasound finding. While we included patients that had been delivered by cesarean section, there was only 1 patient with echogenic material seen after cesarean, so this would not account for the difference. Koskas et al. evaluated 30 patients following cesarean delivery and found a mean endometrial thickness of $1.3 \pm 0.2$ cm 1–3 hours after delivery and $1.0 \pm 0.2$ cm 24 hours after delivery. One patient had a heterogeneous mass seen at 24 hours after repeat cesarean delivery. Those results are also consistent with our findings that echogenic material is seen less commonly following cesarean delivery.

The strengths of our study include (1) a large number of patients, (2) both vaginal and cesarean deliveries were included, and (3) ultrasounds were done by a single provider. A possible weakness of our study is the lack of long-term follow-up to determine whether patients had bleeding complications following discharge.

We found that an endometrial cavity measurement of $< 1.2$ cm after either a vaginal or cesarean delivery should be considered normal. Our results also support that echogenic debris may be a normal finding in postpartum women. The finding of echogenic material may be less common after cesarean delivery. This information may be useful in evaluation of the postpartum patient with excessive bleeding.

**References**