Reevaluating the role of dilation and curettage in the diagnosis of pregnancy of unknown location

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Objective: To evaluate the clinical utility of dilation and curettage (D&C) in diagnosing ectopic pregnancy (EP).
Design: Retrospective cohort study.
Setting: University hospital.
Patient(s): Clinically stable women (n = 321) who underwent a diagnostic D&C with no visible intrauterine pregnancy (IUP) on transvaginal ultrasound or those with an abnormal hCG trend.
Intervention(s): None.
Main Outcome Measure(s): EP or IUP made by final pathologic review.
Result(s): Overall, 73.2% of the patients were ultimately diagnosed with EP and 26.8% were found to have a nonviable IUP. Those with EPs had significantly lower initial hCGs than those with nonviable IUPs and were more likely to have had a history of an EP. On ultrasound, the overall impression, the presence of free fluid, and the endometrial echo complex correlated well with the final diagnoses but did not have 100% predictive value.
Conclusion(s): D&C remains valuable to differentiate EP from nonviable IUP and to avoid misdiagnosis and unnecessary exposure to methotrexate. Low initial hCG values and ultrasound findings such as a thin endometrial echo complex and the presence of free fluid are associated with but are not diagnostic of an ectopic pregnancy. (Fertil Steril® 2011;96:659–62. ©2011 by American Society for Reproductive Medicine.)

Key Words: Ectopic pregnancy, dilation and curettage, methotrexate

Ectopic pregnancy (EP) remains a leading cause of maternal death (1). Diagnostic tools, including transvaginal ultrasonography (TVUS) (2) and β-hCG curves, have been refined over the past decade to optimize early detection and reduce mortality (3–5). EP is suspected when the hCG level is >2,000 mIU/mL and no intrauterine gestation is seen or when abnormal patterns of hCG are observed. In these scenarios, definitive diagnosis can be achieved by performing dilation and curettage (D&C) (6).

Clinicians often choose to abandon D&C in the diagnostic evaluation and administer methotrexate to all those suspected to have EP. This strategy avoids a surgical procedure with associated risks. However, failure to ascertain accurate diagnosis may have implications for counseling about future risk of EP and may lead to unnecessary exposure to methotrexate, a chemotherapeutic agent.

The utility of D&C in the diagnosis of EP was previously studied, revealing that the presumed diagnosis of EP is incorrect in 40% of cases (6). Since then, ultrasound resolution has improved and hCG curves have been refined, possibly allowing for more accurate diagnosis of EP (3–5). The primary objective of the present study was to reevaluate the clinical utility of D&C in diagnosing EP.

MATERIALS AND METHODS

This was a retrospective cohort analysis of all patients undergoing D&C as part of evaluation for EP at Los Angeles County–University of Southern California (USC) Medical Center between January 1, 2004, and December 31, 2007. No patients in this analysis were presumptively treated with methotrexate before pathologic review of their uterine curettings. This study was approved by the USC Institutional Review Board.

During the study period, D&C was routinely performed on all women considered to be "at risk" for EP: 1) no visible intrauterine pregnancy (IUP) with hCG >2,000 mIU/mL; 2) abnormal rise in hCG level, defined as <50% increase in 2 days (5); or 3) abnormal fall in hCG level, defined as <20% decline in 2 days (3). Potential subjects were identified by review of a pathology database and medical records. All ultrasounds were performed at the bedside by gynecology residents, which is standard at this institution. D&Cs were performed under conscious sedation.

Final diagnosis was based on the presence or absence of chorionic villi on permanent histology of the uterine curettings. When salpingostomy or salpingectomy was performed, pathologic analysis of the removed tissue confirmed the diagnosis of EP.

Data collected included age, race, days of amenorrhea, pregnancy history, initial hCG levels, hCG trends, time to diagnosis, ultrasound impressions, surgical pathology, and method of treatment. If clinical suspicion of EP warranted immediate intervention, only a single hCG value was available. Ultrasound impressions were designated as "suspicious for EP," in the presence of free fluid, thin endometrial echo complex (EEC), or mass without gestational sac, or "probable IUP," when an intrauterine sac was seen without a yolk sac or fetal pole. In comparing the two outcome groups, statistical significance was determined using chi-square or Fisher exact test for categoric variables and independent *t* test or Wilcoxon rank sum test, as appropriate, for continuous variables. A P value of $< .05$ was considered to be statistically significant. All data were analyzed with the use of SAS 9.2 (SAS Institute).

RESULTS

Three hundred eighty-seven patients at risk for EP underwent a diagnostic D&C over the study period. Sixty-three patients' records were unavailable for review. Three patients had molar gestations and were

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TABLE 1

Comparison of clinical and demographic factors between patients diagnosed with ectopic pregnancy (EP) and those with nonviable intrauterine pregnancy (IUP).

	All (n = 321)	EP (n = 235)	Nonviable IUP (n = 86)	*P* value
Age (y)	31 (15–47)	32 (15–45)	31 (17–47)	.527[a]
Amenorrhea (d)	49 (6–380)	49 (6–380)	51.5 (18–184)	.165[a]
hCG (mIU/mL)	998 (11–48,110)	731 (11–39,836)	2806.5 (47–48,810)	<.001[a]
Gravidity	3 (1–12)	3 (1–12)	3 (1–10)	.650[a]
Parity	1 (0–8)	1 (1–8)	1 (0–7)	.230[a]
History of EP	36 (11.2)	33 (14.0)	3 (3.5)	.008[b]
Race				.289[b]
Latin American	250 (77.9)	181 (77.0)	69 (80.2)	
African American	26 (8.1)	19 (8.1)	7 (8.1)	
European	16 (5.0)	10 (4.3)	6 (7.0)	
Asian	23 (7.2)	21 (8.9)	2 (2.3)	
Other	6 (1.9)	4 (1.7)	2 (2.3)	
Serial hCG trend[c]				.628[b]
Rise		56 (23.8)	16 (18.6)	
Fall		23 (9.8)	7 (8.1)	
Single value		126 (53.6)	53 (61.6)	
Plateau		30 (12.8)	10 (11.6)	
Time to diagnosis				.347[b]
Immediate		120 (51.1)	49 (57)	
Delayed		115 (48.9)	37 (43)	

Note: Values are presented as median (range) or n (%).
[a] Wilcoxon rank sum statistical test.
[b] Chi-square analysis or Fisher exact test.
[c] Patterns of serial hCG levels were defined as a rise if the hCG increased by >50% in 2 days (5), a fall if it decreased by >20% in 2 days (3), and a plateau if it failed to rise or fall.

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excluded from the analysis. We chose to exclude molar pregnancies from this study, because our aim was to focus on the use of ultrasound in diagnosis of EP. Table 1 compares clinical factors between those diagnosed with EP and those with nonviable IUP. There was a statistically significant difference in hCG at initial evaluation and in the proportion of women with a history of EP between the two groups. There was no difference in initial hCG value or days of amenorrhea between the two groups. Of the 321 women, 235 (73.2%) had a final diagnosis of an EP and 86 (26.8%) a final diagnosis of nonviable IUP (Table 2). The odds of EP were 3.82 times higher when the initial hCG was <2,000 mIU/mL (69.4% EP) with an abnormal hCG trend than when the initial hCG was >2,000 mIU/mL (30.6% EP). When salpingostomy or salpingectomy was performed, pathologic analysis confirmed the diagnosis of EP in all cases.

The association of initial ultrasound impression and final outcome is presented in Table 3. In the entire cohort, 10.6% had an ultrasound impression of "probable IUP," 28.7% were "suspicious for EP," and 60.7% were "nondiagnostic." The number of women diagnosed with EP differed based on the ultrasound impression ($P<.001$). As expected, the odds of diagnosis of EP were significantly decreased when the ultrasound impression was "probable IUP" and significantly increased when the impression was "suspicious for EP."

Specific characteristics of the ultrasound examinations were found to be associated with final outcome (Table 3). Women in this study whose ultrasounds showed free fluid in the cul-de-sac had a greater chance of having EP (odds ratio 3.78, 95% confidence interval 1.80–7.95). In addition, median preoperative EEC was significantly lower in the EP group compared with the nonviable

TABLE 2

Final diagnosis of clinically stable women with a presumed EP.

	EP (n = 235)	Nonviable IUP (n = 86)	OR (95% CI) for EP	*P* value
All patients	235 (73.2)	86 (26.8)		
hCG <2,000 mIU/mL	163 (69.4)	32 (37.2)	3.82 (2.28–6.41)	<.001[a]
hCG >2,000 mIU/mL	72 (30.6)	54 (62.8)		

Note: Values are presented as n (%). CI = confidence interval; OR = odds ratio; other abbreviations as in Table 1.
[a] Chi-square analysis.

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