Change in quantitative human chorionic gonadotropin after manual vacuum aspiration in women with pregnancy of unknown location

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OBJECTIVE: To determine whether the change in human chorionic gonadotropin after manual vacuum aspiration is predictive of an early abnormal intrauterine pregnancy in women with pregnancy of unknown location.

STUDY DESIGN: This is a prospective cohort study of 23 clinically stable patients with an early abnormal pregnancy who had abnormally rising human chorionic gonadotropins and absence of sonographic evidence of an intrauterine pregnancy or ectopic pregnancy. The change in human chorionic gonadotropin within 24 hours after manual vacuum aspiration was compared with the pathologic diagnosis and the ultimate clinical diagnosis.

RESULTS: Ten patients had ≥ 50% decrease (mean, 74%; range, 58-80%) in human chorionic gonadotropin after manual vacuum aspiration with confirmed chorionic villi on pathology results. Two patients had a > 50% drop in human chorionic gonadotropin but absence of chorionic villi, clinically consistent with complete spontaneous abortion. The remaining 10 patients who had either rising or < 50% decrease in human chorionic gonadotropin post manual vacuum aspiration all had no chorionic villi on pathology results. The sensitivity, specificity, positive predictive value, and negative predictive value of a ≥ 50% decrease in human chorionic gonadotropin after manual vacuum aspiration in predicting an abnormal intrauterine pregnancy were 92% (95% confidence interval [CI], 0.62-0.99), 100% (95% CI, 0.62-1.0), 100% (95% CI, 0.70-1.0), and 90% (95% CI, 0.54-0.99), respectively.

CONCLUSION: A ≥ 50% decrease in human chorionic gonadotropin within 24 hours after manual vacuum aspiration is predictive of an abnormal intrauterine pregnancy, thereby excluding an ectopic pregnancy and expediting the management of women with pregnancy of unknown location.

Key words: ectopic pregnancy, human chorionic gonadotropin, manual vacuum aspiration, miscarriage, pregnancy of unknown location

Ectopic pregnancy is a major cause of morbidity and mortality in reproductive-aged women. When a gestational sac is not visualized on transvaginal ultrasound with quantitative human chorionic gonadotropin (hCG) level above the discriminatory zone (1500-2000 mIU/mL),[1] the pregnancy is classified as an abnormal intrauterine pregnancy (IUP) or an ectopic pregnancy (EP). A suction uterine dilatation and curettage (D&C) can be performed to assist with the diagnosis, because the presence of chorionic villi confirms an IUP.[2] Avoiding uterine evacuation and presuming a diagnosis of an EP can be inaccurate in almost 40% of cases.[3]

Manual vacuum aspiration (MVA) has been shown to be as efficacious, safe, and tolerable as a D&C for first-trimester and incomplete abortions.[4] Moreover, waiting for pathologic diagnosis after uterine evacuation may delay the diagnosis and treatment of EP.

A decrease of greater than 48% in quantitative hCG within 24 hours after a medical abortion is highly predictive of a successful expulsion of an IUP.[5,6] We hypothesize that a decrease of at least 50% in hCG after MVA is predictive of an abnormal IUP in patients with a pregnancy of unknown location (PUL).

Materials and Methods

This is a prospective cohort study approved by the Santa Clara Valley Medical Center Institutional Review Board. Patients with PUL as defined by the following inclusion criteria were recruited: (1) hemodynamically stable and (2) quantitative serum hCG level above 2000 mIU/mL or if under 2000 mIU/mL with abnormally rising levels less than 66% in 48 hours and no evidence of IUP or EP on transvaginal ultrasound by the Radiology Department. Exclusion criteria were as follows: sonographic evidence of EP or IUP including a gestational sac, heavy vaginal bleeding suggestive of passage of "tissue," or inability to tolerate an outpatient MVA.

An MVA was performed outpatient in a standardized fashion and hCG levels were obtained before and after MVA (within 24 ± 4 hours) procedure. The change in hCG from before and after MVA were compared wth the pathologic diagnosis and the ultimate clinical diagnosis. We calculated the sensitivity, specificity, and positive and negative predictive values of ≥ 50% decrease in hCG compared with the absence or presence of chorionic villi

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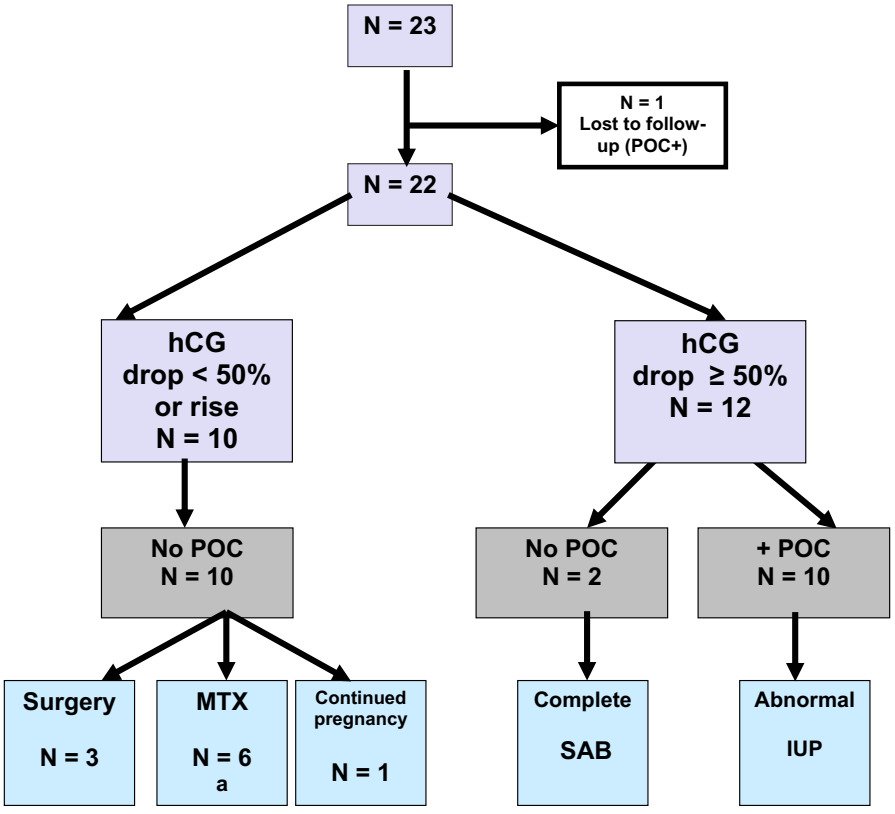
FIGURE
Results and follow-up of patients after manual vacuum aspiration



[a] Four patients had an increase in post-MVA hCG and 2 had a < 50% decrease in post-MVA hCG.

hCG, human chorionic gonadotropin, *IUP*, intrauterine pregnancy, *MTX*, methotrexate; *MVA*, manual vaccum aspiration; *POC*, products of conception; *SAB*, spontaneous abortion.
Rivera. Change in hGC after MVA in women with PUL. Am J Obstet Gynecol 2009.

and the ultimate clinical diagnosis of an abnormal IUP.

RESULTS

Between July 2006 and June 2008, 23 patients were enrolled. One patient was excluded because of failure to follow up for post-MVA hCG. The average age of participants was 29 years (range, 21-42 years) with the following ethnicity: Hispanic (87%) and white (13%). The range of gestational age by last menstrual period was from 5-11 weeks. The MVA cannula sizes used ranged from 4-8 mm. The pre-MVA hCG levels ranged from 172-14,485 mIU/mL. Seventeen (73%) patients had serial hCG levels that abnormally rose < 66% in 48 hours, whereas 6 (27%) patients had no evidence of IUP or EP based on pre-MVA hCG levels above the discriminatory zone. Time interval between before and after MVA hCG levels ranged between 16 hours and 47 hours.

Among the 12 patients with ≥ 50% decrease in hCG, 10 (46%) had a confirmation of chorionic villi on pathology results, with an average decline of 74% (median, 70%; range, 58-80%), consistent with an early abnormal IUP (Figure). The other 2 patients, despite a ≥ 50% decrease in hCG, had no chorionic villi, suggestive of passage of tissue of clinical abnormal IUPs as confirmed by the subsequent hCG decline. Among the 10 patients who did not have a ≥ 50% decrease in hCG (range, -1.5% to +40%), none of them had chorionic villi. Three of these patients (hCG change: -8.7%, +9%, and +40%) were treated with laparoscopic salpingectomy based on symptoms with pathologic confirmation of EP. Among the remaining 6 patients, 4 had a rise in post-MVA hCGs (range, 1.5-16%), whereas, 2 had a drop in hCGs of 9% and 17%, respectively. All of them received a single dose of methotrexate for presumed EP, with subsequent appropriate decline in hCG. Interestingly, 1 patient on follow-up ultrasound showed a continued pregnancy after MVA because of evacuation failure. She eventually underwent a suction D&C for an undesired pregnancy. This patient had a pre-MVA hCG of 4535

TABLE 1
Sensitivity, specificity, PPV, and NPV of a ≥ 50% decrease in hCG compared with pathology (n = 22)

Variable	POC+	POC−	Values
≥ 50% decrease in hCG	10	2[a]	PPV = 10/12 (83%) (95% CI, 0.51-0.97)
< 50% decrease in hCG	0	10	NPV = 10/10 (100%) (95% CI, 0.66-1.0)
	Sensitivity = 10/10 (100%) (95% CI, 0.66-1.0)	Specificity = 10/12 (83%) (95% CI, 0.51-0.97)	

CI, confidence interval; *hCG*, human chorionic gonadotropin; *IUP*, intrauterine pregnancy; *NPV*, negative predictive value; *POC*, products of conception; *PPV*, positive predictive value.
[a] Two patients had no chorionic villi, suggestive of passage of tissue of clinical abnormal IUPs as confirmed by the subsequent hCG decline.
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