

# Antepartum uterine contraction patterns in twin pregnancies with and without preterm labor and delivering before or after 36 weeks

Ana Rachel Hernández, MD; Víctor Hugo González-Quintero, MD, MPH; Niki Istwan, RN; Debbie Rhea, MPH; Enrique Vázquez-Vera, MD; Amy Alicia Flick, MD; Gary Stanziano, MD

**OBJECTIVE:** The purpose of this study was to identify differences in antepartum uterine contraction frequency (UCF) in twin pregnancies with and without preterm labor (PTL).

**STUDY DESIGN:** Twin gestations enrolled for outpatient surveillance with twice daily electronic uterine activity monitoring and telephonic nursing assessment, without interventional delivery were identified. Mean UCF for each gestational week was compared between women without PTL or preterm delivery (PTD) < 36 weeks (controls) and those with a PTL diagnosis delivering at < 36 weeks (PTL/PTD group), and those with PTL with delivery  $\geq$  36 weeks (PTL/GAD  $\geq$  36 group).

**RESULTS:** Data from 7891 patients with 267,840 monitored hours were analyzed. UCF at each gestational week was significantly higher for patients experiencing PTL with or without PTD compared to control. UCF was similar for patients with PTL with or without PTD < 36.

**CONCLUSION:** Twin pregnancies complicated with PTL have a higher UCF than those that do not experience PTL. Outpatient surveillance may be beneficial in this population.

**Key words:** home uterine contraction monitoring, preterm labor, twin gestation

Almost 60% of twin pregnancies deliver preterm (<37 completed weeks) and almost 12% deliver very preterm (<32 completed weeks).<sup>1</sup> The primary reason for prematurity in twin pregnancies is spontaneous preterm labor (PTL).

Previous investigators have examined uterine contraction frequency (UCF) data that were blinded to the patient and her physician, thus not used in the clinical management process.<sup>2</sup> Newman et al noted that differences in antepartum UCF exist between twin and singleton

pregnancies and in women delivering at term vs preterm, though they concluded that the differences were too small to have significant predictive value.<sup>2</sup> The purpose of the present study was to examine UCF in twin pregnancies with and without PTL enrolled for outpatient surveillance where this data were used in the clinical management process.

## MATERIALS AND METHODS

Included for analysis were data from twin gestations enrolled for outpatient PTL management services having spontaneous onset of labor. The referral for outpatient services was made by each patient's individual health care provider. Enrolled patients consented to the use of their deidentified data for research and reporting purposes. The outpatient PTL management program included patient education from an experienced perinatal nurse regarding signs and symptoms of PTL, twice-daily electronic monitoring of UCF, and telephonic nursing assessment. UCF data were assessed by a nurse, placed into context with patient-reported subjective symptoms, and used to make clinical recommendations regarding patient activity, unscheduled physician office or hospital visits, and outpatient tocolytic adjustments.

The control group was composed of women with delivery at  $\geq$ 36.0 weeks without any antepartum PTL diagnosis or treatment. Group 2 consisted of women experiencing PTL that delivered at <36 weeks, and group 3 consisted of women experiencing PTL but delivered at  $\geq$ 36.0 weeks. The maximum UCF was determined for each monitored day per patient for recordings obtained at 24-34.9 weeks' gestation. The maximum UCF per hour/per day was identified as percent of monitored hours with >2, >4, or >6 monitored contractions. Data were analyzed using various parametric and nonparametric statistical tests as appropriate. Pearson's  $\rho$  was utilized to test correlation between gestational week and maximum UCF within each group.

## RESULTS

Data from 7891 twin pregnancies with 267,840 monitored hours were analyzed. Twin pregnancies experiencing PTL (with or without delivery at <36 weeks) were more likely to have a history of PTD or have a cerclage in the present pregnancy (data not shown). In the population studied, PTL complicated 7235 of 7891 twin pregnancies (91.7%). Of those patients with PTL ( $n = 7235$ ), 4870 (67.3%) delivered at <36 weeks and

From the Department of Obstetrics and Gynecology (Drs Hernández, González-Quintero, Vázquez-Vera, Flick), University of Miami, Miami, FL; and Clinical Research (Drs Istwan, Rhea, Stanziano), Matria Healthcare, Marietta, GA.

Presented at the Society for Gynecologic Investigation 54th Annual Meeting in Reno, NV.

Received July 30, 2007; revised Sept. 21, 2007; accepted Oct. 1, 2007.

Reprints: Víctor H. González-Quintero, MD, MPH, University of Miami, PO Box 016960 (R-136), Miami, FL 33101.

vhgonzalez@med.miami.edu.

0002-9378/free

© 2008 Mosby, Inc. All rights reserved.

doi: 10.1016/j.ajog.2007.10.781

**TABLE**  
Percent of monitored hours revealing uterine contractions

	Control n = 28,832	PTL/PTD < 36 n = 149,822	PTL/GAD ≥ 36 n = 89,186
% of monitored hours with > 2 UC	40.2%	58.1% <sup>a</sup>	61.3% <sup>a,b</sup>
% of monitored hours with > 4 UC	14.4%	29.0% <sup>a</sup>	29.7% <sup>a,b</sup>
% of monitored hours with > 6 UC	5.4%	13.6% <sup>a</sup>	12.9% <sup>a,b</sup>
Mean of maximum UC/hr/day	2.4 ± 2.3	3.5 ± 2.9 <sup>a</sup>	3.6 ± 2.7 <sup>a,b</sup>

*P* < .001 vs <sup>a</sup> Control or <sup>b</sup> PTL < 36.

Hernandez. Antepartum uterine contraction patterns in twin pregnancies with and without preterm labor and delivering before and after 36 weeks. *Am J Obstet Gynecol* 2007.

2365 (32.7%) delivered at ≥36 weeks. Patients experiencing PTL with or without PTD at <36 weeks had a higher percentage of monitored hours with UCF of >2, >4, and >6 per hour than women without PTL (Table). Maximum UCF at each gestational week was significantly higher for patients experiencing PTL with or without PTD compared to the control group (all *P* < .001; Figure). Within each study group there is a significant positive, but weak association be-

tween gestational age and mean maximum UC frequency (group 1: control: rho = 0.189; group 2: PTL/PTD < 36: rho = 0.171; group 3: PTL/GAD ≥ 36 weeks: rho = 0.172).

#### COMMENT

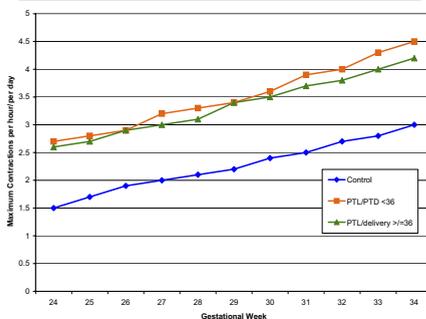
PTL is a common complication of twin pregnancies. Twin pregnancies complicated by PTL continue to have a higher baseline UCF than those pregnancies that do not experience PTL or PTD even when the information collected is acted upon as needed. The goal of outpatient PTL surveillance programs is early identification of PTL prior to advanced cervical dilatation. Although previous prospective, randomized trials evaluating the efficacy of outpatient UCF monitoring in multiple pregnancies have provided conflicting results,<sup>3-5</sup> our findings have an important clinical implication for the management of women with twin gestations at higher risk of delivering prematurely. This study shows that twin pregnancies experiencing PTL with or without later spontaneous PTD have significantly more uterine contractions throughout the third trimester than women who do not experience PTL or spontaneous PTD. We propose that as-

essment of UCF is of value in the management of twin pregnancies.

Strengths of the present study are the large number of twin pregnancies available for inclusion (n = 7891) and the over 267,000 hours of UCF assessed. Limitations of our study include those inherent in a retrospective study. We did not have information on cervical length and fetal fibronectin. This information would be helpful on deciding which women will benefit of outpatient UCF monitoring.

In summary, outpatient UCF surveillance may be a beneficial tool in the management of twin pregnancies complicated by PTL. Identification of preterm UCF is of clinical value when placed into context with maternal signs and symptoms of PTL and utilized to trigger further assessment and evaluation. Continuing studies should focus on identifying women at risk for preterm delivery and utilization of clinical interventions aimed at improving perinatal outcome. The role of outpatient surveillance should be revisited. ■

**FIGURE**  
Maximum uterine contraction frequency at each gestational week for patients experiencing PTL with or without PTD compared to the control group



Hernandez. Antepartum uterine contraction patterns in twin pregnancies with and without preterm labor and delivering before and after 36 weeks. *Am J Obstet Gynecol* 2007.

#### REFERENCES

- Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Kirmeyer S. Births: final data for 2004. National vital statistics reports. Vol 55, no 1. Hyattsville, MD: National Center for Health Statistics; 2006.
- Newman RB, Iams JD, Das A, et al. A prospective masked observational study of uterine contraction frequency in twins. *Am J Obstet Gynecol* 2006;195:1564-70.
- Knuppel RA, Lake MF, Watson DL, et al. Preventing preterm birth in twin gestation: home uterine activity monitoring and perinatal nursing support. *Obstet Gynecol* 1990;76(1 Suppl): 24S-7S.
- Dyson DC, Danbe KH, Bamber JA, et al. Monitoring women at risk for preterm labor. *N Engl J Med* 1998;338:15-9.
- Dyson DC, Crites YM, Ray DA, Armstrong MA. Prevention of preterm birth in high-risk patients: the role of education and provider contact versus home uterine monitoring. *Am J Obstet Gynecol* 1991;164:756-62.