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Midtrimester transvaginal ultrasound cervical length screening for spontaneous preterm birth in diamniotic twin pregnancies according to chorionicity

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ABSTRACT

Objective: To compare the mean transvaginal ultrasound (TVU) cervical length (CL) at midtrimester screening for spontaneous preterm birth in asymptomatic monochorionic diamniotic versus dichorionic diamniotic twin pregnancies
Study design: This was a multicenter retrospective cohort study. Study subjects were identified at the time of a routine second trimester fetal ultrasound exam at 18 0/7–23 6/7 weeks gestation. We excluded women that received progesterone, pessary, or cerclage. Distribution of CL was determined and normality was examined. Mean of TVU CL were compared between monochorionic diamniotic and dichorionic diamniotic pregnancies. The relationship of TVU CL with gestational age (GA) at delivery and incidence of spontaneous preterm birth (SPTB) at different TVU CL cut offs were assessed. Incidence of short TVU CL, defined as TVU CL ≤30 mm, was also calculated in the two groups.
Results: 580 women with diamniotic twin pregnancies underwent TVU CL screening between 18 0/6 and 23 6/7 weeks. 175 (30.2%) were monochorionic diamniotic pregnancies, and 405 (69.8%) were dichorionic pregnancies. The demographic characteristics were similar on both groups. The mean GA at TVU CL was about 20 week in both groups. The mean TVU CL was significantly lower in the monochorionic diamniotic (32.8 ± 10.1) compared to the dichorionic (34.9 ± 8.6) group (MD −2.10 mm, 95% CI −3.91 to −0.29). TVU CL ≤30 mm was 16.6% (29/175) in the monochorionic group, and 11.9% (48/405) in the dichorionic group (aOR 1.48, 95% CI 1.03–2.43). Twins with a monochorionic diamniotic pregnancy had a significantly higher incidence of SPTB (53.1% vs 44.9%; aOR 1.22, 95% CI 1.22–1.79). For any given CL measured between 18 0–7 and 23 6/7 weeks, gestational age at delivery for monochorionic diamniotic pregnancies was about 2 weeks earlier compared to dichorionic pregnancies (MD -2.1 weeks; ANCOVA P < 0.001).
Conclusion: Monochorionic diamniotic twin pregnancies had a higher rate of spontaneous preterm birth than dichorionic diamniotic pregnancies. The higher rate of spontaneous preterm delivery in monochorionic pregnancies is associated with lower midtrimester TVU CL when compared to dichorionic pregnancies.

Introduction

Preterm birth (PTB) is a leading cause of perinatal morbidity and mortality [1]. Over the last few years, cervical assessment has moved from digital examination to ultrasound evaluation, and ultrasound of the cervix has been the focus of much research [2–6].

Transvaginal ultrasound (TVU) cervical length (CL) has been assessed in several populations (e.g. women with and without symptoms of preterm labor or premature rupture of membranes) to evaluate the risk of spontaneous PTB (SPTB) [7], in women before induction of labor to predict induction outcome [8], and at term to predict the onset of spontaneous labor with moderate degree of accuracy [9]. A short TVU CL has been shown to be a good predictor of SPTB in both singletons and twins [4]; and has been shown to be more accurate than digital examination and fetal fibronectin in the prediction of SPTB [4,10].

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Twin gestations are at increased risk of both SPTB and indicated PTB (either maternal or fetal indications) [1]. For example, the overall rate of PTB at < 37, <34 and <32 weeks in twin pregnancies has been shown to be 56%, 17% and 9%, compared with about 9.8%, 2% and 1% in singleton pregnancies, respectively [1].

Over the past decades the incidence of twin pregnancies in the USA has increased, reaching a new high for the nation of 33.7 per 1000 total births in the 2015 [1]. Monochorionic pregnancies comprises 20–33% of all twin gestations they have inherently different complication rates when compared with dichorionic pregnancy, including higher risk of fetal demise, congenital anomalies, intrauterine growth restriction, twin anemia polycythemia sequence, twin-twin transfusion syndrome, and higher risk of spontaneous preterm birth [11,12]. However, data regarding TVU CL in twin pregnancies stratified by chorionicity, and specifically studies assessing whether the risk of spontaneous PTB in monochorionic compared to dichorionic twins can be predicted by a difference in TVU CL, are limited [13].

Objective

The aim of this study was to compare the TVU CL at midtrimester in screening for SPTB in asymptomatic twins in monochorionic diamniotic compared to dichorionic diamniotic pregnancy.

Methods

Study population

This was a multicenter retrospective cohort study. Data on all consecutive asymptomatic twin pregnancies who underwent TVU CL screening at University of Naples Federico II (Naples, Italy), at Division of Maternal Fetal Medicine Thomas Jefferson University Hospital (Philadelphia, PA), and at Division of Maternal Fetal Medicine University of Pennsylvania (Philadelphia, PA) at the time of routine second trimester fetal ultrasound exam at 18 0/7–23 6/7 weeks from January 2014 to January 2017 were included in a dedicated database

Monoamniotic twins, twin pregnancies with twin-twin transfusion syndrome, use of vaginal progesterone, pessary or cerclage in place, as well as major fetal malformations or genetic anomalies at the time of the TVU CL were excluded. Fetal demise or selective reduction of any of the twins before delivery were also excluded from the analysis. Therefore the analyzed cohort included all consecutive asymptomatic twin pregnancies with normal, viable twins at the time of delivery who underwent midtrimester TVU CL screening. Women were divided in two groups according to chorionicity: monochorionic and dichorionic. To avoid selection bias all consecutive twin pregnancies who received TVU CL screening were included and analyzed.

Potential study subjects were identified at the time of a routine second trimester fetal ultrasound exam at 18 0/7–23 6/7 weeks gestation. Only TVU screening was employed for cervical screening; and only one TVU CL measurement was performed. Physicians and sonographers who performed TVU CL screening were certified through the Fetal Medicine Foundation (FMF) or through CLEAR. Briefly, the measurement of CL was performed in the sagittal plane, visualizing the full length of the cervical canal from the internal os to the external cervical os. At least 3 measurements were obtained and the shortest was recorded [14,15]. Chorionicity was assessed using the lambda sign in the first trimester and confirmed with placental analysis at the time of delivery [11]. Women that received pessary, cerclage, or progesterone were excluded [16]. According to our protocol, delivery was planned at 37 0/7–38 6/7 weeks for dichorionic twins, and at 36 0/7–37 6/7 weeks for monochorionic twins [17,18]. Indication for delivery was recorded.

Outcomes

The primary outcome was the mean of TVU CL stratified by chorionicity. Distribution of CL, normality, and incidence of short cervix in several cutoffs (≤30, ≤25, ≤15, ≤10, and ≤5 mm) in both group were calculated. Receiver-operating characteristics (ROC) curve was used to assess the CL value predictive for SPTB < 32 weeks. Sensitivity, specificity, positive and negative likelihood ratio (LR + and LR-, respectively) were calculated for the each cutoff point (30, 25, 15, 10, and 5 mm). We also assessed the relationship of TVU CL with gestational age at delivery between monochorionic diamniotic and dichorionic pregnancy.

Secondary outcomes were gestational age at delivery, incidence of PTB and of SPTB < 37, <34, <32 and <28 weeks, and indication for delivery.

Data on pregnancy outcomes were obtained from hospital maternity records. In case of PTB, records were examined to determine whether the delivery was medically indicated or spontaneous PTB. SPTB included either spontaneous onset of preterm labor or PPROM.

Data analysis

Data are shown as means ± standard deviation (SD), or as number (percentage). Univariate comparisons of dichotomous data were performed with the use of the chi-square or Fisher exact test. Comparisons between groups were performed with the use of the Mann—Whitney *U* test, to test group medians; and with the use of the *T*-test to test group means with SD. Outcomes were estimated with multivariate analyses.

Logistic regression, presented as unadjusted odds ratio (crude OR) or adjusted odds ratio (aOR) or as mean difference (MD) with the 95% of confidence interval (CI), was performed. Adjusted analysis was performed to correct data for relevant baseline characteristics. All potentially relevant baseline characteristics were added to the model as covariates. Relevant baseline characteristics included: age, body mass index (BMI), parity, history of SPTB, and smoking. This analysis was performed to show robustness of our results [19].

Distribution of cervical length was determined and normality was examined by the Kolmogorov-Smirnov test. We also planned to assess the incidence of TVU CL ≤30 mm in subgroup analysis in women with and without prior SPTB.

ROC curve to assess the CL value predictive for SPTB < 32 weeks was plotted for both monochorionic diamniotic and dichorionic pregnancies. The area under the curve (AUC) was computed to evaluate the overall performance of the diagnostic test accuracy in prediction of SPTB < 32 weeks [9,20]. The AUC of a ROC curve is a measure of the overall performance of a diagnostic test in accurately differentiating those cases with and those without the condition of interest [9,20]. Difference between the AUC of the ROC curve for the monochorionic diamniotic twins and the AUC of the ROC curve for the dichorionic twins were calculated by using the DeLong nonparametric test [20]. The DeLong test assessed the standard error of the AUC and the difference between the two AUCs [20].

The correlation between CL and gestational age at delivery in monochorionic diamniotic pregnancies and dichorionic pregnancies was assessed with the use of the Spearman's correlation coefficient. Comparison of coefficients was done by using the Fisher's Z-transformation. ANCOVA analysis of covariance was used to plot the general linear model for the relationship between CL and gestational age at delivery and the MD in weeks between

monochorionic and dichorionic was calculated. We calculated two sided p-values. A p-value <0.05 was considered to indicated statistical significance. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) v. 19.0 (IBM Inc., Armonk, NY, USA).

Results

Characteristics of the study population

Overall, 580 women with twin pregnancies, who met the inclusion criteria and underwent TVU CL screening at our institutions were analyzed. 175 (30.2%) were monochorionic diamniotic pregnancies, and 405 (69.8%) were dichorionic pregnancies. The maternal demographics were not significantly different between monochorionic vs. dichorionic (Table 1). Fifteen women in the monochorionic diamniotic group (8.6%) and 33 women in the dichorionic group (8.1%) had history of SPTB. None of the included women received progesterone, pessary, or cerclage.

Cervical length measurement

The mean gestational age at TVU CL was performed at about 20 week in both groups. The mean TVU CL was significantly lower in the monochorionic diamniotic (32.8 ± 10.1) compared to the dichorionic (34.9 ± 8.6) group (MD −2.10 mm, 95% CI −3.91 to -0.29). Fig. 1 shows the distribution of CL in both groups. In monochorionic diamniotic and in dichorionic pregnancies, the 5th percentile were 10.5 mm and 20.7 mm, respectively; and the 95th percentile were 45.0 mm and 50.0 mm, respectively (Fig. 2).

The incidence of short cervix, defined as TVU CL ≤30 mm, was 16.6% (29/175) in the monochorionic group, and 11.9% (48/405) in the dichorionic group (aOR 1.48, 95% CI 1.03–2.43) (Table 2).

In women without prior SPTB, the incidence of TVU CL ≤30 mm was 14.4% (26/160) in the monochorionic group, and 10.8% (40/372) in the dichorionic group (aOR 1.39, 95% CI 0.80–2.42). In women with prior SPTB, the incidence of TVU CL ≤30 mm was 40.0% (6/15) in the monochorionic group, and 24.2% (8/33) in the dichorionic group (aOR 2.08, 95% CI 0.57–7.68).

On ROC curve analysis, TVU CL for the prediction of PTB < 32 weeks showed an area under the curve of 0.71 (95% CI 0.59–0.85) in the monochorionic diamniotic pregnancy, and of 0.67 (95% 0.55 to 0.79) in the dichorionic diamniotic pregnancy (Fig. 3). TVU CL in monochorionic diamniotic twin pregnancies had a better value compared to TVU CL in dichorionic pregnancies in prediction of PTB < 32 weeks (DeLong test: difference between areas 0.049, standard error 0.0577, 95% CI 0.031 to 0.063, p = 0.003). Sensitivity, specificity, LR + and LR-, for each TVU CL cutoffs are shown in Table 3 for monochorionic diamniotic twins, and in Table 4 for dichorionic twins.

Table 1
Characteristics of the included women.

	Monochorionic N = 175 (30.2%)	Dichorionic N = 405 (69.8%)	*p value*
Maternal age Mean ± SD	31.2 ± 4.79	32.0 ± 5.1	0.10
>35 y n (%)	46 (26.3%)	111 (27.4%)	0.78
BMI Mean ± SD	26.5 ± 5.5	26.1 ± 7.0	0.46
Nulliparity n (%)	111 (63.4%)	254 (62.7%)	0.87
Prior SPTB n (%)	15 (8.6%)	33 (8.1%)	0.87
Smoking n (%)	22 (12.6%)	51 (12.6%)	0.98

SD, standard deviation; SPTB, spontaneous preterm birth; BMI, Body mass index.

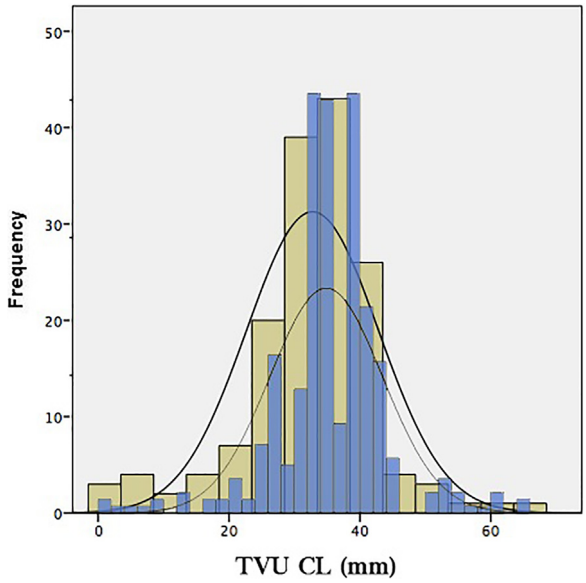

Fig. 1. Distribution of transvaginal cervical length between 18 0–7 and 23 6/7 weeks in diamniotic twins pregnancies. Yellow boxes show monochorionic diamniotic pregnancies and blue boxes show dichorionic pregnancies. TVU CL, transvaginal ultrasound cervical.

Relationship between cervical length and gestational age at delivery

Fig. 3 shows the relationship between TVU CL and gestational age at delivery. For any given CL measured between 18 0–7 and 23 6/7 weeks, gestational age at delivery for monochorionic was earlier by about 2 weeks on average compared with dichorionic pregnancies (MD -2.1 weeks; ANCOVA P < 0.001). For TVU CL measurement assessed between 18 0/7 and 23 6/7 weeks, the correlation with gestational age at delivery in monochorionic twin gestations was relatively constant [Spearman's correlation coefficient 0.57 (0.42–0.66)] and was statistically stronger (Fisher's Z-transformation P = 0.02) than in dichorionic pregnancies [Spearman's correlation coefficient 0.33 (0.27–0.52)].

Pregnancy outcome

The gestational age at delivery was significantly earlier in the monochorionic diamniotic group compared to the dichorionic group by about 2 week (MD −2.20 weeks, 95% CI −2.75 to −1.65). Monochorionic pregnancies had a significantly higher incidence of PTB < 37, <34 and <32 weeks. The results did not change when medically indicated births were excluded. Indeed, the incidence of SPTB < 37 and <34 weeks were significantly higher in the monochorionic group compared to the dichorionic group, while the rate of SPTB < 32 weeks was not statistically significant different after adjusting for confounders. Notably, the monochorionic group had a higher incidence of delivery due to spontaneous onset of labor (61.7% vs 48.1%; aOR 1.74, 95% CI 1.21–2.49) (Table 5).

Discussion

Main findings

This study showed that monochorionic diamniotic pregnancies had a higher rate of SPTB compared to dichorionic diamniotic pregnancies. This higher rate of SPTB was reflected by a lower mean midtrimester TVU CL, by higher incidence of short TVU CL, and by earlier gestational age at birth per any given CL in monochorionic diamniotic compared to dichorionic pregnancies.

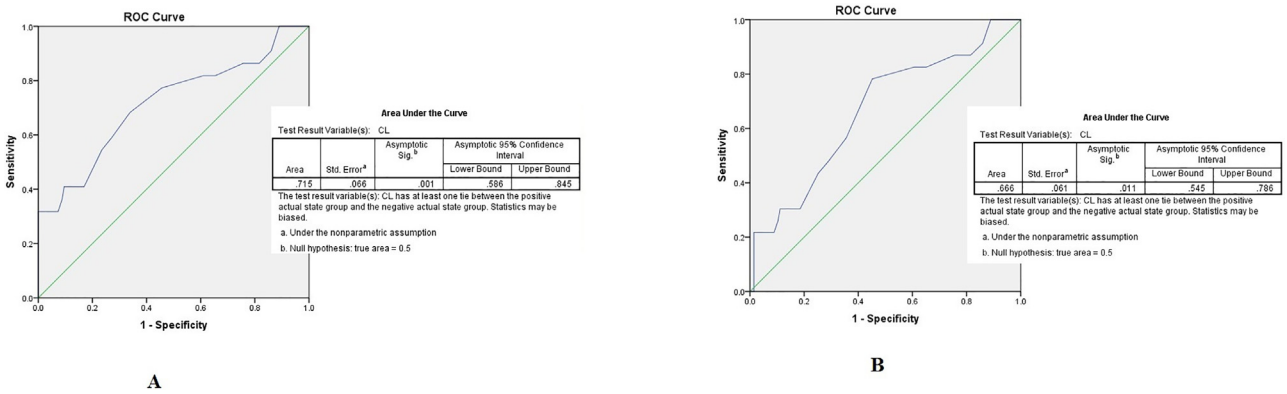

Fig. 2. Receiver-operating characteristics curve showing predictive ability of cervical length for spontaneous preterm birth <32 weeks in monochorionic diamniotic pregnancy (A), and in dichorionic diamniotic pregnancy (B).

Table 2
Cervical length measurement of the monochorionic diamniotic and dichorionic twin groups.

	Monochorionic N = 175 (30.2%)	Dichorionic N = 405 (69.8%)	aOR or MD (95% CI)[a]
GA at TVU CL assessment (weeks) Mean ± SD	20.9 ± 7.4	20.6 ± 8.8	0.30 week (−1.09 to 1.69)
TVU CL (mm) Mean ± SD	32.5 ± 10.1	34.9 ± 7.7	**−2.40 mm (−4.07 to −0.73)**
>30 mm	146 (83.4%)	357 (88.1%)	0.68 (0.41–1.12)
≤30 mm	29 (16.6%)	48 (11.9%)	**1.48 (1.03–2.43)**
≤25 mm	26 (14.9%)	35 (8.6%)	**1.84 (1.07–3.17)**
≤20 mm	18 (10.3%)	19 (4.7%)	**2.33 (1.19–4.56)**
≤15 mm	11 (6.3%)	12 (3.0%)	**2.31 (1.03–5.67)**
≤10 mm	8 (4.6%)	8 (2.0%)	2.38 (0.88–6.44)
≤5 mm	7 (4.0%)	4 (1.0%)	**4.18 (1.21–14.46)**

G9 A: Gestational age; TVU CL: Transvaginal ultrasound cervical length; SD, standard deviation; CI, confidence interval; MD, mean difference; aOR, adjusted odds ratio. Boldface data, statistically significant.
[a] Adjusted for all variables reported in Table 1.

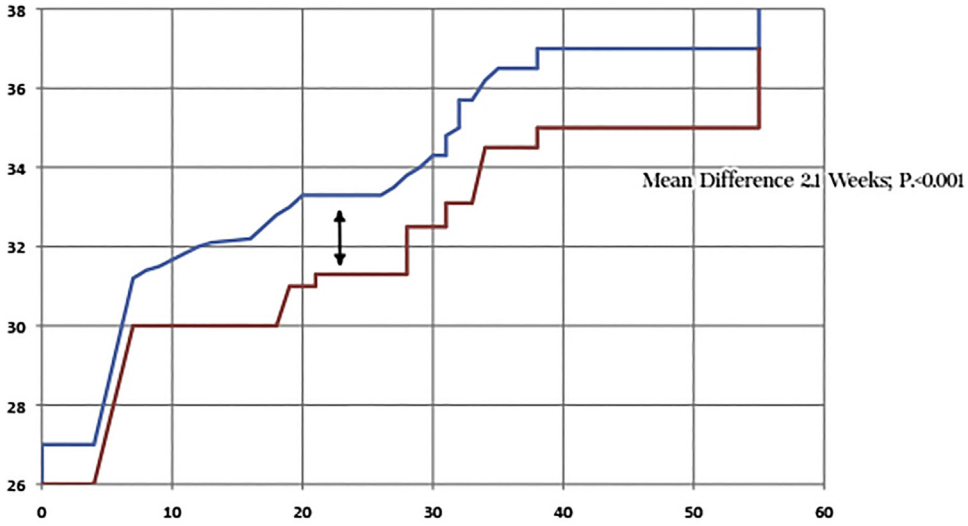

Fig. 3. Relationship between cervical length between 18 0–7 and 23 6/7 weeks and gestational age at delivery in monochorionic and dichorionic twin groups. The relationship is presented for asymptomatic twins with monochorionic pregnancies (red line) and dichorionic pregnancies (blue line). X-axis, cervical length (in mm); Y-axis, gestational age at delivery (in weeks).*Mean difference -2.1 weeks; ANCOVA analysis of covariance P < 0.001.*

For any given CL measured between 18 0–7 and 23 6/7 weeks, gestational age at delivery for monochorionic diamniotic was earlier by about 2 weeks compared with dichorionic pregnancies. Twins with a monochorionic diamniotic pregnancy had a higher rate of delivery at any GA due to spontaneous onset of labor compared to dichorionic pregnancies.

Strengths and limitations

This study has several strengths. CL measurements were performed transvaginally by certified operators. This is a retrospective study of a prospectively collected data in a dedicated database. To our knowledge, there are no similar studies in the

Table 3
Sensitivity and specificity for each cervical length measurement with 95% confidence interval in prediction of spontaneous preterm birth <32 weeks in monochorionic diamniotic twin pregnancies.

CL	Sensitivity (95% CI)	Specificity (95% CI)	LR+	LR-
≤30 mm	70% (56–79)	79% (71–80)	3.2 (2.4–3.7)	0.4 (0.3–0.6)
≤25 mm	59% (48–66)	89% (87–91)	6.0 (4.7–7.7)	0.5 (0.4–0.6)
≤15 mm	42% (39–61)	97% (95–97)	7.0 (1.8–8.7)	0.5 (0.3–0.7)
≤10 mm	29% (19–39)	98% (97–99)	8.1 (3.2–9.5)	0.6 (0.5–0.8)
≤5 mm	13% (7–29)	99% (98–100)	12.0 (10.5–17.4)	0.9 (0.6–0.9)

CL, cervical length; CI, confidence interval; LR+, positive likelihood ratio; LR-, negative likelihood ratio.

Table 4
Sensitivity and specificity for each cervical length measurement with 95% confidence interval in prediction of spontaneous preterm birth <32 weeks in dichorionic twin pregnancies.

CL	Sensitivity (95% CI)	Specificity (95% CI)	LR+	LR-
≤30 mm	67% (62–76)	77% (73–80)	3.1 (2.5–3.5)	0.4 (0.3–0.5)
≤25 mm	57% (51–65)	88% (87–90)	5.7 (0.49–7.1)	0.5 (0.4–0.6)
≤15 mm	40% (39–47)	97% (95–97)	3.0 (2.3–4.7)	0.6 (0.3–0.7)
≤10 mm	29% (23–33)	98% (97–99)	7.5 (4.2–8.3)	0.6 (0.5–0.8)
≤5 mm	12% (10–24)	99% (98–100)	12.0 (10.5–	0.9 (0.6–0.9)

CL, cervical length; CI, confidence interval; LR+, positive likelihood ratio; LR-, negative likelihood ratio.

Table 5
Pregnancy outcomes of the monochorionic and dichorionic twin groups.

	Monochorionic N = 175 (30.2%)	Dichorionic N = 405 (69.8%)	Crude OR (95% CI)	aOR or MD (95% CI)[a]
GA at delivery (weeks) Mean ± SD	34.0 ± 3.2	36.2 ± 2.9	–	**−2.20 weeks (−2.75 to −1.65)**
PTB < 37 weeks n (%)	100 (57.1%)	202 (49.9%)	**1.34 (1.20–1.88)**	**1.21 (1.05–1.97)**
PTB <34 weeks n (%)	61 (34.9%)	93 (23.0%)	**1.85 (1.20–2.77)**	**1.80 (1.22–2.65)**
PTB < 32 weeks n (%)	23 (13.1%)	40 (9.9%)	**1.37 (1.19–2.03)**	**1.38 (1.08–2.93)**
PTB <28 weeks n (%)	9 (5.1%)	16 (4.0%)	1.32 (0.57–3.04)	1.55 (0.91–4.12)
SPTB < 37 weeks n (%)	93 (53.1%)	182 (44.9%)	**1.22 (1.22–1.79)**	**1.39 (1.13–1.90)**
SPTB <34 weeks n (%)	52 (29.7%)	81 (20.0%)	**1.90 (1.12–2.99)**	**1.69 (1.13–2.54)**
SPTB < 32 weeks n (%)	20 (11.4%)	32 (7.9%)	**1.40 (1.03–3.11)**	1.50 (0.83–2.71)
SPTB <28 weeks n (%)	8 (4.6%)	12 (3.0%)	1.57 (0.63–3.91	1.67 (0.70–5.03)
Indication for delivery n (%)				
-Maternal indication	30 (17.1%)	65 (16.1%)	1.08 (0.67–1.74)	1.05 (0.55–1.70)
-Fetal indication	22 (12.6%)	20 (4.9%)	**2.77 (1.47–5.22)**	**2.49 (1.34–5.63)**
-Combined maternal and fetal	4 (2.3%)	4 (1.0%)	3.24 (0.66–8.41)	2.35 (0.58–9.49)
-Planned at term	11 (6.3%)	121 (29.9%)	**0.16 (0.08–0.30)**	**0.30 (0.11–0.73)**
-Spontaneous onset of labor	108 (61.7%)	195 (48.1%)	**1.35 (1.21–1.98)**	**1.74 (1.21–2.49)**

GA: Gestational age; SD, standard deviation; PTB, preterm birth; SPTB, spontaneous preterm birth; OR, odds ratio; aOR, adjusted odds ratio; CI, confidence interval; MD, mean difference. Boldface data, statistically significant.
[a] Adjusted for all variables reported in Table 1.

literature comparing TVU CL in monochorionic versus dichorionic twins. We excluded women who received cervical cerclage, pessary or vaginal progesterone to avoid further confounders in the incidence of SPTB.

The most important shortcoming of this study was the retrospective nonrandomized approach. The CL was assessed only once between 18 0–7 and 23 6/7 weeks. Therefore, comparing the rate of cervical shortening during gestation was not feasible.

Discussion

Different strategies have been evaluated for prediction and prevention of SPTB [21–40], Mid-trimester TVU CL has been shown to be a good predictor of SPTB in asymptomatic women with twin pregnancies [21,22]. A meta-analysis of 21 studies, including 3523 women, showed that among asymptomatic women with twin pregnancies a CL ≤20 mm at 20–24 weeks was the most accurate in predicting SPTB < 32 and <34 weeks with a pooled sensitivities, specificities, and positive and negative likelihood ratios of 39% and 29%, 96% and 97%, 10.1 and 9.0, and 0.64 and 0.74, respectively [22]. Sperling et al. in a prospective multicenter study of 383 twin pregnancies showed that CL measurement at 23 weeks was a good screening test for predicting twins at low risk of preterm and very preterm delivery [23]. They also found that the incidence of SPTB was higher in the monochorionic compared to the dichorionic twins. Our study showed that the higher rate of SPTB among

monochorionic twins could be reflected and predicted by the higher rate of short cervix. Notably, several treatments for SPTB have been shown to have different effects in monochorionic compared to dichorionic pregnancies [24]. These findings could support the theory that the pathogenesis for SPTB was different in monochorionic and in dichorionic twins. Cervical pessary, for example, in one large trial have been shown to be effective in monochorionic but not in dichorionic twins [24]. Our study also showed that women with twin pregnancies can have different baseline risk of SPTB based on the midtrimester TVU CL. A prior large retrospective study, showed that IVF-conceived twin pregnancies had an increased risk of SPTB compared to those who conceived spontaneously and that this risk was predicted by lower midtrimester TVU CL.

Our study also showed that the correlation between short TVU CL and earlier gestational age at delivery was stronger in monochorionic compared to the dichorionic twins, and that any given TVU CL was associated with lower gestational age of about 2 week in the monochorionic diamniotic compared to the dichorionic twins. Future studies should differentiate TVU CL and perinatal outcomes between monochorionic and dichorionic pregnancies. This information would be useful in counseling women regarding their risk of SPTB as well as improving the design of future studies evaluating therapies in the prevention of preterm delivery in twin pregnancies. The biological plausibility to explain our findings is not completely clear. However, some unknown factors may be more likely to trigger subclinical or overt uterine contractions in monochorionic compared to dichorionic twins, which would increase the risk of PTB in the presence of a given CL. In a prior study, our group also showed that IVF-conceived twin pregnancies had a significantly lower mean TVU CL compared to spontaneously-conceived twin pregnancies [25]. These findings may lead to the hypothesis that different subset of women have different baseline risk of SPTB according to the mean midtrimester TVU CL.

In our cohort, we excluded women who received progesterone, pessary, or cerclage. Indeed, prevention of SPTB in women with twin pregnancies is still a subject of debate. Progesterone is routinely used to prevent SPTB in singletons [32,41,42], but is not currently recommended for twins [43]. A recent meta-analysis of randomized trials showed that use of Arabin pessary in twin pregnancies with short TVU CL at 16–24 weeks does not prevent SPTB or improve perinatal outcome [31]. Finally, data on cervical cerclage are controversial. While it seems to be beneficial based on small retrospective studies [44,45], level-1 data showed an increased risk of perinatal complications in women with twin gestations receiving cerclage [16].

Conclusion

In summary, our study showed that the higher rate of SPTB in monochorionic diamniotic compared with dichorionic pregnancies is predicted by a lower midtrimester TVU CL, as well as by the earlier gestational age at birth per any given cervical length.

Disclosure

The authors report no conflict of interest

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