Rapid cervical phIGFBP-1 test in asymptomatic twin pregnancies: role in mid-pregnancy prediction of spontaneous preterm delivery

ORIGINAL ARTICLE

Rapid cervical phIGFBP-1 test in asymptomatic twin pregnancies: role in mid-pregnancy prediction of spontaneous preterm delivery

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ABSTRACT

Objective This study aimed to assess the accuracy of a second-trimester rapid cervical phosphorylated insulin-like growth factor binding protein-1 (phIGFBP-1) test to predict spontaneous preterm delivery in asymptomatic twin pregnancies.

Method During the second trimester, a rapid test to detect phIGFBP-1 in cervical secretions was performed on consecutive twin pregnancies between 2009 and 2011, to evaluate its predictive value for spontaneous preterm delivery at <28, <30, <32 and <34 weeks' gestation. Excluded were patients with cerclage, pessary or undergoing indicated preterm delivery.

Results A total of 197 pregnancies fulfilled the study criteria and were tested at a median gestational age of 20.3 weeks (interquartile range: 20–20.6). Median gestational age at delivery was 36.4 weeks. Spontaneous preterm delivery at <34 weeks occurred in 21 (10.7%) cases, at <32 weeks in 9 (4.5%), at <30 weeks in 6 (3%) and at <28 weeks in 4 (2%). Seventeen patients (8.7%) were test positive: In this group, three patients delivered before 34 weeks' gestation, whereas none delivered at <32 weeks. The sensitivity, specificity, positive and negative predictive value of the test for spontaneous preterm delivery <34 weeks were 14% (95% confidence interval, 3–37%), 92% (86–95%), 17% (4–44%) and 90% (84–93%), respectively, with a positive and negative likelihood ratio of 1.79 (0.56–5.74) and 0.93 (0.78–1.10).

Conclusions In the second trimester, rapid cervical phIGFBP-1 testing in asymptomatic twin pregnancies has a poor performance in predicting spontaneous preterm delivery. © 2014 John Wiley & Sons, Ltd.

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INTRODUCTION

Preterm delivery, defined as birth before 37 weeks of gestation, remains the major cause of neonatal mortality and morbidity in twin pregnancies. The increased prevalence of twin gestations observed in the last 30 years has been associated with an increased incidence of preterm delivery, causing high public health and social costs.[1]

Preterm delivery can be spontaneous or the result of intervention for maternal and/or fetal indications. The etiology of spontaneous preterm delivery is now considered multifactorial in singletons[2]; in twin pregnancies, although uterine overdistention is considered the main cause of preterm delivery, other mechanisms (inflammation/infection) may have an inducing role.[3] Given the high incidence of preterm delivery in twin pregnancies, the ability to predict this phenomenon is considered precious because it would help to identify patients at higher risk and requiring closer surveillance. Ultrasound cervical measurement at 18–24 weeks of gestation has been shown to be strongly predictive of preterm birth in twin pregnancies.[4] Several biomarkers have been studied to test their predictive value for preterm delivery in singleton gestations. In particular, the presence of phosphorylated insulin-like growth factor binding protein-1 (phIGFBP-1), a protein secreted by the human decidua, in cervicovaginal fluid has been demonstrated to be a biomarker of the risk to deliver preterm in singleton pregnancies.[5–9] This is probably the consequence of a tissue disruption followed by leakage of chorionic and decidual products into the cervix and vagina. A commercial bedside test for phIGFBP-1 is available in Europe and Canada, and compared with other tests, such as fetal fibronectin (fFN), it has the advantage of being unaffected by recent sexual intercourse or urine presence, and having a lower cost.[5,6,10]

The aim of our study was to assess the accuracy of a rapid test for cervical phIGFBP-1 performed in the second trimester to predict spontaneous preterm delivery in asymptomatic twin pregnancies.

METHODS

This was a prospective cohort study of consecutive twin pregnancies attending a dedicated twin clinic over a 2-year period (December 2009 to December 2011). The women were evaluated at our clinic during the first trimester (between 11 and 13 + 6 weeks' gestation) to establish chorionicity and pregnancy viability and assess gestational age. Subsequent examinations were performed differently on the basis of

chorionicity and/or the presence of complications. In monochorionic cases, ultrasound scans were performed fortnightly from 16 weeks of gestations till delivery. In uncomplicated dichorionic twin pregnancies, after the first-trimester evaluation, two further scans were performed at about 20 weeks to check for structural anomalies and at 34–36 weeks to plan mode and timing of delivery; in those patients, ultrasound scans were suggested between these two controls at their referring doctors or other centers, every 4–6 weeks, to assess fetal growth. According to our protocol, monochorionic twin pregnancies were delivered at about 36 weeks and dichorionic ones at 37–38 weeks of gestation, unless complicated.

At the time of the fetal anatomy survey, ultrasound cervical length was measured transvaginally in all pregnancies. During the study period, a commercially available immunochromatography-based rapid strip test (Actim Partus Test; Medix Biochemica, Kauniainen, Finland) was used at the same visit to detect phIGFBP-1 in cervical secretions, as previously described.[11] After sterile speculum introduction, the midwife or doctor attending the clinic collected secretions from the external cervical os with a dacron swab enclosed within the test package. The swab was then immediately transferred to a vial containing an extraction solution, and agitated in the vial for 10 s. The swab was then withdrawn, and a reagent strip was placed into the vial. The bottom end of the strip was kept in the solution until the liquid front entered the reaction area. After 20 s, the strip was removed and placed in a horizontal position. The test result was read after 5 min. Two blue lines on the strip (corresponding to a phIGFBP-1 concentration >10 μg/L) were considered a positive result; a single blue line a negative result; and the appearance of no line a test failure, which prompted repeat testing. Data on maternal demographic characteristics, ultrasound examinations, results of the phIGFBP-1 test and pregnancy outcome were collected in a dedicated database. A positive phIGFBP-1 result prompted re-evaluation of cervical length the following week. No other clinical interventions were performed on the basis of the test results. In case of intrauterine death of one fetus at enrolment, active vaginal bleeding or preterm premature rupture of the membranes, the test was not performed.

According to our policy, cervical ultrasound-indicated cerclage was offered in patients with a cervix measuring less than 20 mm before 24 weeks[12]; in selected cases, an Arabin cervical pessary was applied after 24 weeks. In order to avoid bias, cases with cervical cerclage or Arabin cervical pessary were excluded from data analysis. Pregnancies who were delivered before 34 weeks for maternal and/or fetal indications were also excluded.

The following variables were included in the analysis: maternal age, parity, chorionicity, mode of conception (spontaneous, *in vitro* fertilization), previous preterm delivery before 34 weeks, gestational age at testing, gestational age at birth and spontaneous preterm delivery before 28, 30, 32 and 34 weeks of gestation, birthweight and admission to neonatal intensive care unit. Data on pregnancy outcome were obtained from the women's hospital records. Neonatal data were obtained from the pediatric notes.

Variables are described as mean (±SD), median (interquartile range) or percentage. The Mann–Whitney test (for continuous variables), the chi-square and the Fischer's exact test (for percentages) were used for the statistical analysis. p-values <0.05 were considered significant. Sensitivity, specificity, positive predictive value, negative predictive value and positive and negative likelihood ratio with 95% confidence intervals were calculated to test the predictive value for preterm delivery (before 28, 30, 32 and 34 weeks of gestation) of the phIGFBP-1 test. Data were analyzed with IBM Statistical Package for Social Science (SPSS Inc., Chicago, IL, USA) for Mac v20.

RESULTS

Two hundred and twenty-five consecutive twin pregnancies followed up at our twin clinic were eligible for the phIGFBP-1 test. The test was performed in 219 (one woman declined consent for performing the test; in five cases, the test was temporarily unavailable). Twenty-two pregnancies were excluded from the analysis: 14 delivered preterm at <34 weeks for maternal and/or fetal indications; seven underwent cervical cerclage in the second trimester because of ultrasonographic short cervix; in one case, an Arabin cervical pessary was inserted because of cervical dilation identified after 24 weeks. Therefore, a total of 197 patients were included in the analysis. A chart of patient flow is shown in Figure 1. Demographic and clinical characteristics of the study population are reported in Table 1.

The median gestational age at delivery was 36.4 weeks (interquartile range 35.1–37.4). Perinatal survival rate was 99.2% (391/394): One twin in a monochorionic pregnancy died unexpectedly in utero at 36 weeks, and one patient miscarried at 22 weeks. Mean birthweight was 2347 ±467 g, and 74/391 (19%) neonates alive at birth required admission to the neonatal intensive care unit. Delivery occurred <34 weeks in 21 (10.7%) cases, <32 weeks in 9 (4.5%), in <30 weeks 6 (3%) and <28 weeks in 4 (2%). The group of patients delivered <34 weeks was not different compared with those delivered later in terms of maternal age, chorionicity, parity, type of conception, previous preterm delivery and gestational age at testing (Table 1).

The phIGFBP-1 test was performed at a median gestational age of 20.3 weeks with an interquartile range between 20 and 20.6 weeks. Seventeen patients were test positive: in this group, three patients delivered <34 weeks of gestation, but none delivered at less than 28, 30 or 32 weeks. The performance of the phIGFBP-1 test in predicting preterm delivery is reported in Table 2.

DISCUSSION

In our study, we found that phIGFBP-1 test, performed during the second trimester in asymptomatic twin pregnancies as a screening test for spontaneous preterm delivery at <34 weeks, has a very low sensitivity. Moreover, the negative predictive value was identical to the prevalence of delivery at >34 weeks in the study population (90%), suggesting that it did not add to the prediction of preterm delivery.

A systematic review, published in 2011, on the results of nine studies focusing on cervicovaginal phIGFBP-1 as predictor of

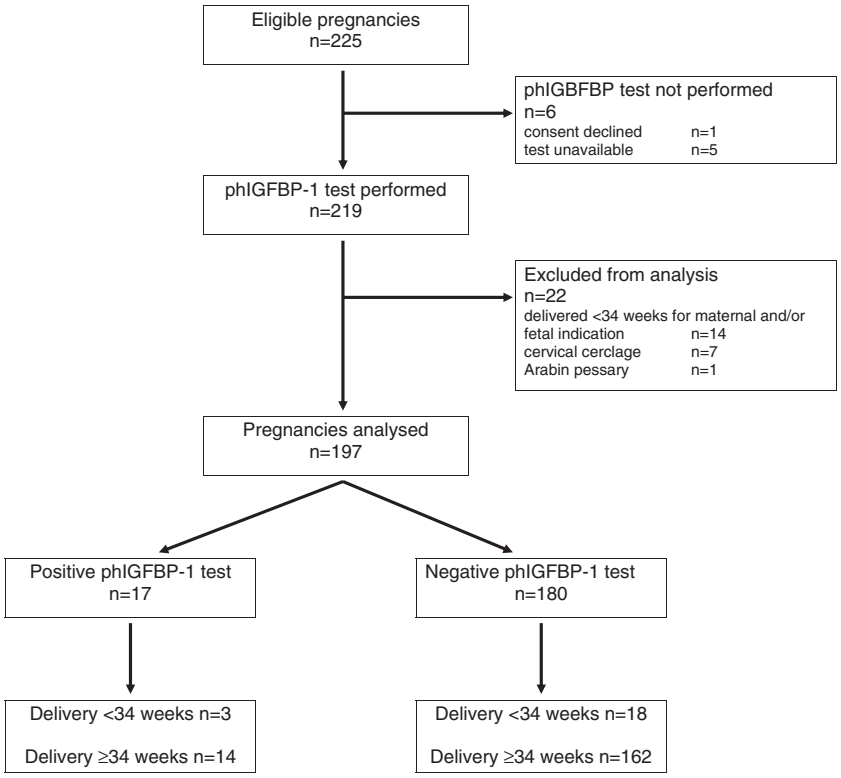

Figure 1 **Flow chart of the study population**

Table 1 **Demographic and clinical characteristics of the study population**

	All pregnancies ($n=197$)	Delivery <34 weeks ($n=21$)	Delivery ≥34 weeks ($n=176$)	p
Maternal age (years)	33 (29–36)	33 (30–36)	33 (29–36)	0.94
Nulliparity (%)	106 (53.8)	13 (61.9)	93 (52.8)	0.43
In vitro fertilization (%)	55 (27.9)	7 (33.3)	48 (27.3)	0.55
Previous history of preterm delivery (%)	8 (4.1)	1 (4.8)	7 (4)	0.86
Chorionicity				0.45
Monochorionic (%)	61 (31)	8 (38.1)	53 (30.1)	
Dichorionic (%)	136 (69)	13 (61.9)	123 (69.9)	
Gestational age at testing	20.3 (20–20.5)	20.3 (20–20.5)	20.3 (20–20.6)	0.50

Values are given as median (interquartile range) or number (%).

spontaneous preterm delivery, reported a pooled sensitivity between 33% and 83%, a pooled specificity between 76% and 87%, with positive and negative likelihood ratio ranging between 1.6 and 6.4 and between 0.2 and 0.8, respectively.[13] This study comprises data from different subset of pregnancies, including symptomatic and asymptomatic patients tested at different gestational ages, and high-risk and low-risk cases. In general, on the basis of published data, the phIGFBP-1 measurement in cervicovaginal fluids seems to have a moderate predictive accuracy for preterm delivery in singleton pregnancies with a high negative predictive value, especially in symptomatic cases (Table 3).

Specific data regarding the predictive role of phIGFBP-1 in twin gestations are lacking (Table 3). Rahkonen included twin gestations in his study on unselected asymptomatic pregnant women tested for cervical phIGFBP-1 in the first or second trimester, but separate and detailed results for this group were not provided.[14] A recent study reported on a group of 40 asymptomatic patients with a twin gestation: phIGFBP-1 test was performed at 26 weeks and, among those patients with a negative result, 92.1% delivered after 34 weeks, demonstrating a good negative predictive value of this test.[15] Our data are consistent with these results: in this study, negative predictive value ranged between 90% and 97% for preterm delivery preterm before 34 and 28 weeks of gestation, respectively; on the contrary, sensitivity was poorer compared with that of Adeyemi *et al.*, and positive and negative likelihood ratios are both inadequate for clinical use.

Other variables have been investigated to assess their accuracy in predicting preterm delivery in twin pregnancies.

Table 2 Test results, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+) and negative likelihood ratio (LR−) of phosphorylated insulin-like growth factor binding protein-1 for spontaneous preterm delivery

	<28 weeks	<30 weeks	<32 weeks	<34 weeks
True positives (*n*)	0	0	0	3
False positives (*n*)	17	17	17	14
False negatives (*n*)	4	6	9	18
True negatives (*n*)	176	174	171	162
Sensitivity (%)	0 (0–60)	0 (0–48)	0 (0–37)	14 (3–37)
Specificity (%)	91 (86–94)	91 (85–94)	90 (85–94)	92 (86–95)
PPV (%)	0 (0–22)	0 (0–22)	0 (0–22)	17 (4–44)
NPV (%)	97 (94–99)	96 (92–98)	95 (90–97)	90 (84–93)
LR+	0	0	0	1.79 (0.56–5.74)
LR−	1.09 (1.09–1.09)	1.09 (1.09–1.09)	1.09 (1.09–1.10)	0.93 (0.78–1.10)

Figures are given with 95% confidence interval.

A sonographically short cervical length measured at 20–24 weeks in asymptomatic twin pregnancies seems to be a strong predictor of preterm delivery.[4] A recent systematic review has also analyzed the predictive value for spontaneous preterm delivery of fFN in twin pregnancies and has found limited accuracy in both asymptomatic and symptomatic patients: This test seems to perform better to predict preterm delivery before 32 weeks in asymptomatic twin pregnancies and delivery within 7 days in those with threatened preterm labor. Conversely, the study of Fox on the combined use of fFN and ultrasound cervical length measurement in asymptomatic twin pregnancies between 22 and 32 weeks reported better results to predict preterm delivery before 28, 30 and 32 weeks of gestation. Despite these results, most clinical guidelines do not recommend to screen twin pregnancies routinely for preterm delivery because it is still unclear, at this time, what is the best intervention to reduce the risk of preterm delivery in twin pregnancies. Different therapeutic options have been investigated to assess their value without significant results. Hospitalization for bed rest has not been demonstrated to be beneficial in uncomplicated multiple pregnancies or in those patients with a twin pregnancy and cervical effacement and dilatation prior labor.[16] Progesterone, administered vaginally, has been shown to be effective in singleton at higher risk of preterm delivery,[17–19] but the same results have not been obtained in twin gestations.[20–23] In the same way, from a meta-analysis by Berghella published in 2005, cervical cerclage seems to prevent preterm delivery in a specific subgroup of singletons with a cervical length less than 25 mm at ultrasound before 24 weeks and a previous history of preterm birth between 16 and 36 weeks.[24] This meta-analysis has also shown an increased risk of preterm delivery in twin pregnancies who underwent cervical cerclage for a sonographically short cervix, even if the number of cases included in the study is limited to draw definitive conclusions. Indeed, in our experience, twin pregnancies who underwent cervical cerclage during the second trimester for cervix length ≤20 mm or cervical dilatation at digital examination had a high overall perinatal survival.[12] Finally, there has been a recent interest in the use of the Arabin pessary for the prevention of preterm delivery both in singleton and twin pregnancies: A recent randomized trial in unselected twin pregnancies has failed to show any significant overall effect, but observed a reduced risk of poor perinatal outcome and preterm birth in twin pregnancies with cervical length of less than 38 mm receiving the pessary.[25]

The strengths of our study are as follows: the inclusion of a well-characterized cohort of twin pregnancies attending a dedicated clinic with defined management protocols and the use of a commercially available rapid bedside phIGFBP-1 test, which is more representative of clinical practice standards than the delayed quantitative assessment of absolute concentrations of phIGFBP-1. Our study has a number of limitations. First, the managing clinician was not blinded to the phIGFBP-1 result. However, according to the clinical protocol in use, a positive phIGFBP-1 test prompted re-evaluation of cervical length the following week, but no other clinical intervention. We think therefore that it is unlikely that knowledge of test results may have influenced subsequent management. Second, we excluded from the study those patients with an ultrasound cervical length of less than 20 mm, who underwent cervical cerclage before 24 weeks of gestation according to the policy of our Department. An Arabin pessary was inserted in one patient who was found with a short cervix after 24 weeks applied to perform cervical cerclage, and this case was also excluded. We preferred not to include these pregnancies to avoid a potential bias to the study, and therefore, patients with a short cervix on ultrasound were not part of our study population, even if we should report that none of these cases had a positive phIGFBP-1 test and all cases delivered after 34 weeks of gestation. We could postulate that the mechanism responsible of cervical shortening in twin pregnancies may be not linked to the presence of phIGFBP-1 in cervical secretions. Third, we have only tested phIGFBP-1 in cervical and not in vaginal secretions: In a recently published study, testing on vaginal secretions performed slightly better than cervical secretions in predicting preterm delivery, at least in

Table 3 **Main details of the published studies on the predictive accuracy of the detection of phIGFBP-1 in cervicovaginal secretions for preterm delivery, retrieved from a search on PubMed using as keywords 'phIGFBP-1' or 'phosphorylated insulin-like growth factor binding protein-1' and 'preterm delivery' or 'preterm delivery'**

Study (year)	Type of pregnancy (singleton/twin)	Range of gestational age at sampling (weeks + days)	Number of patients included with or without symptoms of preterm labor	Outcome: spontaneous birth	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Kekki[5] (2001)	Singleton and twin (number of twin pregnancies not specified)	22 to 36+6	63 symptomatic	<37 weeks	70%	81%	41%	93%
			58 asymptomatic	<37 weeks	0	95%	0	98%
Kurkinen–Räty[27] (2001)	Singleton	22–32	77 symptomatic	<37 weeks	46%	68%	19%	88%
Lembet[6] (2002)	Singleton	20–36	36 symptomatic	<37 weeks	89.5%	94.1%	94.4%	88.9%
				<7 days	93.8%	85%	83.3%	94.1%
				<48 h	93.3%	81%	77.8%	94.4%
			18 asymptomatic	<37 weeks	0	100%	0	100%
				<7 days	0	100%	0	100%
				<48 h	0	100%	0	100%
Vogel[7] (2004)	Singleton	7+4 to 24+2	473 asymptomatic	<37 weeks	13%	95%	33%	87%
Akercan[28] (2004)	Singleton	24–36	57 symptomatic	<37 weeks	78%	87%	73%	90%
			20 asymptomatic	<37 weeks	0	100%	0	100%
Kwek[29] (2004)	Not specified	23–33	47 symptomatic	<36 weeks	73.7%	82.6%	77.8%	79.2%
Elizur[30] (2005)	Singleton and twin	24–35	64 symptomatic (43 singletons + 21 twins)	<35 weeks	72.7%	83%	47%	93.6%
				<37 weeks	52.2%	87.8%	70.6%	76.6%
Eroglu[31] (2007)	Singleton	24–35	51 symptomatic	<35 weeks	70%	87%	58.3%	92.3%
				<7 days	83.3%	84.4%	41.7%	97.4%
			90 asymptomatic	<35 weeks	0	94.4%	0	100%
				<7 days	0	94.4%	0	100%
Paternoster[9] (2007)	Singleton	22–34	108 symptomatic	<37 weeks	69.2%	90.5%	50%	95.6%
			193 asymptomatic	<37 weeks	22.2%	91.8%	11.8%	96%

Bittar[32] (2007)	Singleton	24–34	105 asymptomatic	≤34 weeks	8%[a]	92%[a]	12%[a]	88%[a]
				≤34 weeks	41%[b]	86%[b]	27%[b]	91%[b]
				≤34 weeks	83%[c]	86%[c]	45%[c]	97%[c]
				≤34 weeks	83%[d]	91%[d]	55%[d]	97%[d]
				<37 weeks	4%[a]	91%[a]	12%[a]	75%[a]
				<37 weeks	32%[b]	87%[b]	44%[b]	80%[b]
				<37 weeks	52%[c]	88%[c]	59%[c]	85%[c]
				<37 weeks	48%[d]	92%[d]	66%[d]	84%[d]
Ting[33] (2007)	Singleton	24–34	94 symptomatic	<48 h	100%	74%	18%	100%
				<7 days	69%	78%	39%	92%
				<14 days	72%	80%	46%	92%
Balic[34] (2008)	Singleton	24–34	80 asymptomatic	<37 weeks	80%	93.3%	44.4%	98.6%
Sunagawa[35] (2008)	Singleton	22–34	76 symptomatic	<72 h	33.3%	68.8%	16.7%	84.6%
				<7 days	30.0%	67.9%	25.0%	73.1%
				<28 days	35.7%	70.8%	41.7%	65.4%
Altinkaya[36] (2009)	Singleton	24–34	105 symptomatic	<37 weeks	70%	87%	56%	92.5%
			73 asymptomatic	<37 weeks	40%	82.5%	14.3%	94.9%
Tanir[37] (2009)	Singleton	24–34	68 symptomatic	<7 days	93.3%	79.2%	56%	97.6%
				<14 days	60.7%	80%	68%	74.4%
				<34 weeks	70.5%	74.5%	48%	88.8%
Rahkonen[38] (2009)	Singleton	22–34	246 symptomatic	≤34 weeks	50%	86.9%	13.9%	97.6%
				<14 days	71.4%	87%	13.9%	99%
Paternoster[39] (2009)	Singleton	24–34	210 symptomatic	<37 weeks	52.9%	89.2%	48.7%	90.8%
Brik[40] (2010)	Singleton	24–34	276 symptomatic	<34 weeks	59%	66%	23.4%	88.6%
				<32 weeks	76.2%	65.5%	18.4%	96.4%
				<7 days	73.1%	66.2%	21.8%	95%
				<48 h	73.7%	64.9%	16.1%	96.4%
Rahkonen[14] (2010)	Singleton and twin (number of twin pregnancies not specified)	12 to 13+6	4984 asymptomatic	<32 weeks	53.8%	75.7%	1.1%	99.6%

(*Continues*)

Table 3 **(Continued)**

Study (year)	Type of pregnancy (singleton/twin)	Range of gestational age at sampling (weeks + days)	Number of patients included with or without symptoms of preterm labor	Outcome: spontaneous birth	Sensitivity	Specificity	Positive predictive value	Negative predictive value
				<37 weeks	37%	76%	5.7%	96.8%
		18 to 20 + 6	4630 asymptomatic	<32 weeks	38%	79.8%	0.8%	99.6%
				<37 weeks	28.7%	80%	5%	96.7%
Audibert[41] (2010)	Singleton and twin	24 to 34	62 symptomatic (55 singletons + 7 twins)	<14 days	17%	93%	20%	91%
				<34 weeks	14%	94%	40%	79%
				<37 weeks	13%	95%	60%	65%
Adeyemi[15] (2010)	Twin	26	40 asymptomatic	≤34 weeks	25%	97.2%	50%	92.1%
Bogavac[42] (2010)	Singleton	20–35	16 symptomatic	<37 weeks	93.7%	0	100%	0
			38 asymptomatic		0	97.3%	0	100%
Danti[11] (2011)	Singleton	24 to 32 + 6	60 symptomatic and with ultrasound cervical length ≤30 mm	<34 weeks	63%	73%	26%	93%
				<7 days	50%	70%	11%	95%
Riboni[43] (2011)	Singleton	24–34	210 symptomatic	<7 days	50%	83.7%	10.8%	97.7%
				<34 weeks	64.3%	85.7%	24.3%	97.1%
				<37 weeks	52.9%	89.2%	48.7%	90.8%
Riboni[44] (2012)	Singleton	24	491 asymptomatic	<37 weeks	54.1%	72.1%	17.4%	93.5%
Cooper[45] (2012)	Singleton and twin	24 to 34 + 6	347 symptomatic (327 singleton + 20 twin)	<37 weeks	39%	76%	24%	86%
				<7 days	33%	74%	2%	98%
				<14 days	44%	74%	4%	98%
Khambay[46] (2012)	Not specified	23 to 24 + 6	45 high-risk asymptomatic	≤30 weeks	0	82%	0	97%
				≤34 weeks	0	80%	0	89%
				≤37 weeks	0	76%	0	70%

Kallionemi[26] (2013)	Singleton and twin (number of twin pregnancies not specified)	12 to 13 + 6	4981 asymptomatic	<32 weeks	26.9% (V)	95.9% (V)	3% (V)	99.6% (V)
				<37 weeks	11.1% (V)	96% (V)	10% (V)	96.5% (V)
				<32 weeks	53.8% (C)	75.7% (C)	1.1% (C)	99.7% (C)
				<37 weeks	37% (C)	76% (C)	5.7% (C)	96.8% (C)
Our study	Twin	16 + 5 to 25 + 1	197 asymptomatic	<28 weeks	0	91%	0	97%
				<30 weeks	0	91%	0	96%
				<32 weeks	0	90%	0	95%
				<34 weeks	14%	92%	17%	90%

Only those studies in English language and with data to calculate the predictive value of phIGFBP-1 for preterm delivery were included.
V, vaginal secretion test; C, cervical secretion test.
[a]Test performed at 24–26 weeks.
[b]Test performed at 27–29 weeks.
[c]Test performed at 30–31 weeks.
[d]Test performed at 32–24 weeks.

a cohort of singleton pregnancies tested at a mean gestation of 13 weeks.[26]

CONCLUSION

In our study, we have found a lack of predictive value of the phIGFBP-1 in cervical secretion in asymptomatic twin pregnancies during the second trimester. It could be interesting to investigate whether the test has value in patients with a twin gestation and preterm labor to identify those at the highest risk for preterm delivery.

WHAT'S ALREADY KNOWN ABOUT THIS TOPIC?

- The presence of phIGFBP-1 in cervicovaginal fluid has been demonstrated to be a biomarker of the risk to deliver preterm in singleton pregnancies, but data on twin pregnancies are lacking.

WHAT THIS STUDY ADD?

- Rapid cervical phIGFBP-1 testing in asymptomatic twin pregnancies in the second trimester has a poor performance in predicting spontaneous preterm delivery <34 weeks.

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