OBSTETRICS

Quantitative fetal fibronectin and cervical length to predict preterm birth in asymptomatic women with previous cervical surgery

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BACKGROUND: Quantitative fetal fibronectin testing has demonstrated accuracy for prediction of spontaneous preterm birth in asymptomatic women with a history of preterm birth. Predictive accuracy in women with previous cervical surgery (a potentially different risk mechanism) is not known.

OBJECTIVE: We sought to compare the predictive accuracy of cervicovaginal fluid quantitative fetal fibronectin and cervical length testing in asymptomatic women with previous cervical surgery to that in women with 1 previous preterm birth.

STUDY DESIGN: We conducted a prospective blinded secondary analysis of a larger observational study of cervicovaginal fluid quantitative fetal fibronectin concentration in asymptomatic women measured with a Hologic 10Q system (Hologic, Marlborough, MA). Prediction of spontaneous preterm birth (<30, <34, and <37 weeks) with cervicovaginal fluid quantitative fetal fibronectin concentration in primiparous women who had undergone at least 1 invasive cervical procedure (n = 473) was compared with prediction in women who had previous spontaneous preterm birth, preterm prelabor rupture of membranes, or late miscarriage (n = 821). Relationship with cervical length was explored.

RESULTS: The rate of spontaneous preterm birth <34 weeks in the cervical surgery group was 3% compared with 9% in previous spontaneous preterm birth group. Receiver operating characteristic curves comparing quantitative fetal fibronectin for prediction at all 3 gestational end points were comparable between the cervical surgery and previous spontaneous preterm birth groups (34 weeks: area under the curve, 0.78 [95% confidence interval 0.64-0.93] vs 0.71 [95% confidence interval 0.64-0.78]; $P = .39$). Prediction of spontaneous preterm birth using cervical length compared with quantitative fetal fibronectin for prediction of preterm birth <34 weeks of gestation offered similar prediction (area under the curve, 0.88 [95% confidence interval 0.79-0.96] vs 0.77 [95% confidence interval 0.62-0.92], $P = .12$ in the cervical surgery group; and 0.77 [95% confidence interval 0.70-0.84] vs 0.74 [95% confidence interval 0.67-0.81], $P = .32$ in the previous spontaneous preterm birth group).

CONCLUSION: Prediction of spontaneous preterm birth using cervicovaginal fluid quantitative fetal fibronectin in asymptomatic women with cervical surgery is valid, and has comparative accuracy to that in women with a history of spontaneous preterm birth.

Key words: cervical length, cervical surgery, fetal fibronectin, LLETZ, preterm birth

Introduction

Preterm birth (PTB) (birth <37 weeks' completed gestation) is responsible for >1 million neonatal deaths annually. Representing approximately 10% of all deliveries worldwide, rates are continuing to rise.[1] Although history of spontaneous PTB (sPTB) is known to be a limited predictor of subsequent sPTB,[2] currently the 2 best available predictors for sPTB <34 weeks of gestation are cervical length (CL) by transvaginal ultrasound scan (TVS) and cervicovaginal fluid (CVF) fetal fibronectin (FFN).[3]

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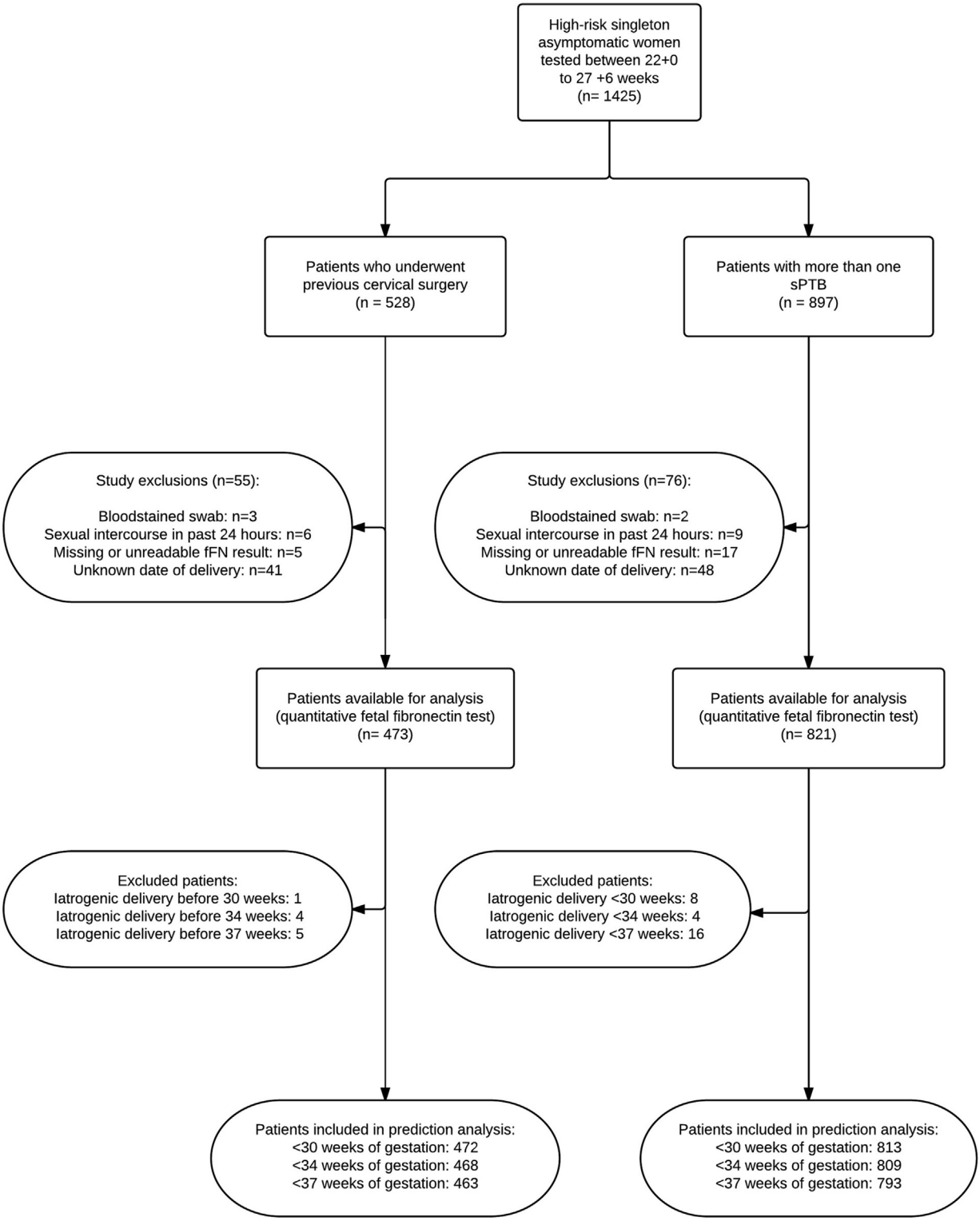
FFN is an adhesive glycoprotein normally found in the fetal membranes and decidua. As the gestational sac implants and attaches to the interior of the uterus in early pregnancy, presence of FFN in the CVF is regarded as "physiological."[4] A high concentration of CVF FFN after 18 weeks of gestation may indicate mechanical or inflammatory medicated disruption of the attachment of the membranes to the decidua.[5] Detection of CVF FFN has demonstrated accuracy at predicting sPTB in asymptomatic high-risk women (women who have had a previous sPTB or late miscarriage),[6] and there is increasing evidence that the actual concentration of FFN (quantitative FFN [qFFN]) measured in CVF allows more accurate discrimination of risk of sPTB, although its role in clinical practice is not yet established.[7-9]

It is well established that women who have undergone invasive cervical surgery (eg, laser loop excision or cone biopsy for premalignant changes) are at more than double the risk of sPTB than the background population, although this may differ with procedure and depth of biopsy.[10] Although used increasingly in clinical practice, the ability of qFFN to predict premature birth in women with previous cervical surgery, compared with women at high risk by virtue of their obstetric history, has never been described and routine FFN testing in asymptomatic women with prior cervical surgery is not recommended by the National Institute for Health and Care Excellence (NICE).[11] It is possible that the etiology underlying sPTB may be different in women with previous cervical surgery who have mechanically shortened cervices, compared with women with a previous sPTB, in whom decidual disruption results in activation of inflammatory pathways.[12] The predictive power of qFFN may be different in these 2 groups.

FIGURE 1
Flow diagram of participants through the study



Standards for reporting of diagnostic accuracy studies flow diagram illustrates number of participants who were involved in study and those who were excluded according to defined exclusion criteria.

fFN, fetal fibronectin; *sPTB*, spontaneous preterm birth.

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