



Identification of Risk Factors and Development of a First Trimester Prediction Model for Preterm Prelabour Rupture of Membranes

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Background

Preterm prelabour rupture of membranes (PPRoM) is a common cause of preterm delivery affecting up to 3% of pregnancies. It is associated with high rates of mortality and morbidity due to the impact on pulmonary development and concurrent infection. Identification of risk factors and development of a model for first trimester predicting of risk of PPRoM would potentially allow therapeutic prophylaxis against this condition.

Purpose

To identify risk factors for PPRoM and develop a model for predicting the risk of PPRoM in the first trimester.

Methods

A retrospective analysis of a series of women who had first trimester (11-13⁺⁶ week) screening for aneuploidy and pre-eclampsia and delivered in the same institution. Women who had a diagnosis of PPRoM were identified from the maternity database. Univariate and multivariate logistic regression analyses were used to identify associated maternal / pregnancy characteristics and develop a model predicting PPRoM.

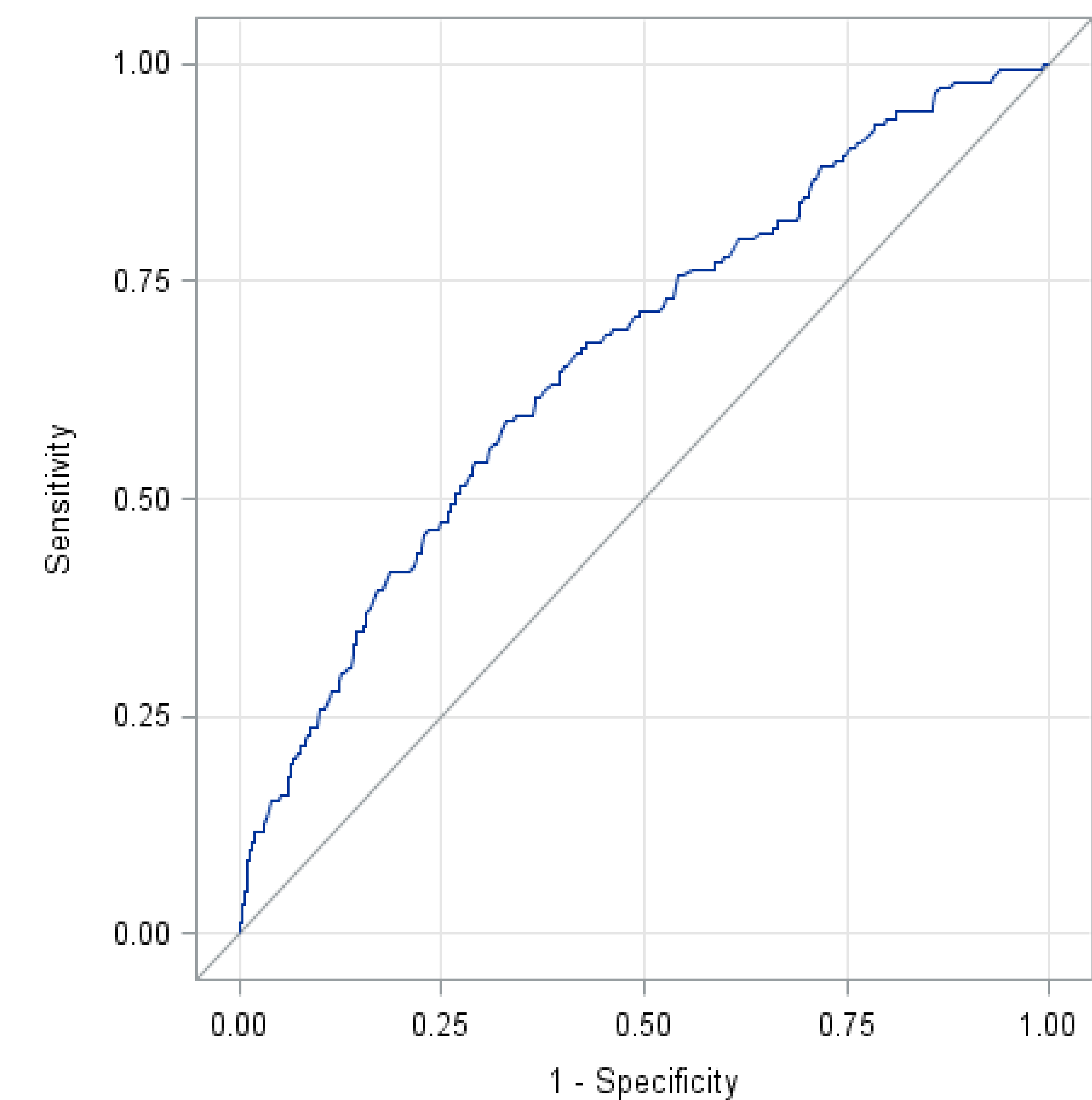
Results

- 10,280 women were screened between April 2010 and October 2016.
- **144 (1.4%) had PPRoM.**
- Maternal factors identified as predictive of PPRoM included:
 - **nulliparity** (parous women OR 0.53: 95%CI 0.4-0.8, p value 0.0006),
 - **pre-existing diabetes mellitus (DM)** (Type 1 DM OR 6.7: 95%CI 2.3-19.4, Type 2 DM OR 5.3: 95%CI 1.6 – 18.3, p value <0.0001),
 - **increasing maternal age** (p value 0.004)
 - **increasing body mass index** (p value 0.01).
- Ultrasound features (nuchal translucency, uterine artery doppler) and biochemical parameters (PaPP-A) did not reach statistical significance
- **PaPP-A >2** approached statistical significance (OR 0.38, 95%CI 0.2-0.8, p value 0.08)
- **Height** was also close to statistical significance (p value 0.06)
- The predictive model had moderate efficacy, with an AUROC 0.67.

Multivariate Logistic Regression

		OR (95% CI)	P value
Parity	Nulliparous	1.0*	0.0006
	Parous	0.53 (0.4- 0.8)	
Pre-existing DM	No DM	1.0*	<0.0001
	Type 1 DM	6.7 (2.3- 19.4)	
	Type 2 DM	5.3 (1.6- 18.3)	
Maternal age (years)	<25	1.0*	0.004
	25<-30	0.6 (0.3-1.3)	
	30<- 35	0.7 (0.3- 1.6)	
	>= 35	1.3 (0.6- 2.7)	
BMI (kg/m ²)	<20	1.0*	0.01
	20 <25	0.8 (0.4- 1.4)	
	25 <30	0.9 (0.5- 1.6)	
	>=30	1.6 (0.8- 3.1)	
Height (cm)	<155	1.0*	0.06
	155 < 160	1.0 (0.6- 1.8)	
	160 <165	0.6 (0.3- 1.1)	
	165<170	0.7 (0.4- 1.2)	
	>=170	0.7 (0.3- 1.0)	
PAPP-A (MoM)	<0.5	1.0*	0.08
	0.5< 1	0.8 (0.5- 1.4)	
	1<1.5	0.6 (0.3- 1.1)	
	1.5 <2	0.6 (0.3- 1.2)	
	>=2	0.4 (0.2- 0.8)	

ROC Curve for Model – AUC = 0.67



Summary and Conclusions

Several maternal characteristics are associated and can be used with moderate efficacy to predict PPRoM. Other parameters currently measured in first trimester screening are not predictive of PPRoM and future studies should focus on addition of other biomarkers that may improve screening efficacy.