



Transvaginal 3D ultrasonography and quantitative elastography of the cervix as a predictor of preterm delivery

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Objective

To examine the relationship between transvaginal ultrasound cervical changes and pregnancy outcomes and ultrasound elastography strain measurements of cervical stiffness in women at risk of cervical incompetence and preterm delivery.

Methods

In 200 pregnancies with clinical and ultrasonic signs of cervical incompetence and preterm delivery the length of the cervix, the thickness of the anterior wall of a lower uterine segment and the width of the endocervical canal were evaluated ultrasonically (3D) and strain stiffness was calculated in five regions of interest in the anterior cervical lip and correlated to the outcomes of cervical cerclage and spontaneous preterm delivery. We evaluated these same parameters in 200 healthy pregnancies. An analysis of neonatal outcomes, adjusted for obstetric intervention, was performed using multivariate analysis.

Results

In patients at 10 weeks to 14 weeks of gestation the cervix is significantly longer than at 25 to 36 weeks. The anterior wall of the lower uterine segment at 10-14 weeks is significantly thicker than at 20 to 36 weeks. In pregnancies at risk of cervical incompetence, cervical lengths and wall thickness, were significantly different from those in comparable controls. Strain measurements values higher than 0, 80 were associated with cervical incompetence and strain values higher than 0, 98 were associated with preterm delivery. Forty-five percent of patients in the at-risk group, with cervical cerclage, delivered at 37, 5 weeks and 10, 5% of pregnancies ended in abortion when the amniotic membrane herniated into the cervical canal. The rate of preterm delivery was 55%, 39% and 17% for cervical lengths of < 10mm, 10-20mm, and 20-30mm and strain values of 1, 10, 0, 99, 085 respectively.

Conclusion

A shortened cervix with decreased thickness of the anterior wall of lower uterine segment and dilated endocervical canal compared with ultrasound elastography strain measurements of cervical stiffness shows a strong association with cervical incompetence and preterm birth.