Cervical length in late second and third trimester: a mixture model for predicting delivery

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Objective

To examine the distribution of cervical length (Cx) in the late second and third trimester of pregnancy and construct survival models for spontaneous delivery (SpD).

Methods

Cross sectional study on 647 singleton pregnancies between 24 to 40 weeks. Cx was measured by transvaginal ultrasonography.

Results

Cervical length was best described by a mixture model of two subgroups with Gaussian distributions, one with long cervix (73. 85% of the population, mean =28. 2mm, SD = 4. 45mm) and one with short cervix (26. 15% of the population, mean = 12. 3 mm, SD = 5. 14 mm). Cx was gestational age (GA) dependent therefore conversion to z-scores (z-Cx) was employed in the analysis. Women with short Cx had higher probability for SpD (Hazard ratio: 1. 807, $p<0.001$) after adjustment for GA at measurement (Hazard ratio: 1. 115, $p<0.001$). In both subgroups the probability of SpD was predicted by the z-Cx and the GA. Survival models for prediction of SpD were constructed separately for the short Cx group (Hazard ratio: 1. 085, $p<0.001$) and z-Cx Hazard ratio: 0. 819, $p=0.003$) and the long Cx group (z-Cx Hazard ratio: 0. 864, $p=0.005$ and GA Hazard ratio: 1. 130, $p<0.001$).

Conclusion

Cx follows a mixture of 2 Gaussians distributions, one with short and one with long cervix. Cx is useful in the estimation of the probability of spontaneous delivery.