

**P-364 How to estimate the probability of a live birth after one or more complete IVF cycles? The development of a novel model in a single-center**

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**Study question:** What is the probability of a live birth for an infertile couple after one or more complete cycles of in vitro fertilization (IVF)

**Summary answer:** The Cox regression and Nomogram model could estimate the chance of a live birth after a complete IVF cycle effectively.

**What is known already:** At present, kinds of prediction models have been established for estimating the chance of having a live birth in different centers based on the characteristics of the population. But the predictive value and effectiveness of different models were different. These models were not applicable to every reproductive center.

**Study design, size, duration:** A retrospective cohort study was conducted in reproductive center of Shenzhen Zhongshan Urology Hospital from January 2012 to April 2015. 4413 patients who completed ovarian stimulation treatment and reached the trigger were involved. In order to verify the efficacy, we conducted stratified sampling for the whole sample according to live birth or not. 70% of the patients were divided into training set (N=3089) and 30% of the patients were divided into validation set (N=1324).

**Participants/materials, setting, methods:** Live birth rate (LBR) and cumulative LBR (CLBR) were calculated for up to five complete IVF cycles. PH test was used for establishing a prediction model. A Cox regression and nomogram model was built on the basis of training set, and ROC curve was used to test the specificity and sensitivity of the prediction model. And then, the validation set was applied to verify the validity of the model.

**Main results and the role of chance:** In the fresh embryo transfer cycle, the LBR were 38.7%. In the first to fifth frozen cycle, the optimal estimate and conservative estimate CLBR were 59.95%, 65.41%, 66.35%, 66.58%, 66.61% and 56.81%, 60.84%, 61.50%, 61.66%, 61.68%, respectively. There was no difference among the characteristics data of training and validation cohorts, which indicates that stratified sampling was reasonable. Based on the results of PH test, the predictive factors of live birth were fertilization technique, infertility factor, serum progesterone level (pg/mL) and luteinizing hormone level (pg/mL) on the day initiated with gonadotropin ( $R=0.043$ ,  $p=0.059$ ;  $R=0.015$ ,  $p=0.499$ ), basal follicle-stimulating hormone ( $R=-0.042$ ,  $p=0.069$ ) and BMI ( $R=-0.035$ ,  $p=0.123$ ). We used ROC curve to test the specificity and sensitivity of the prediction model. The AUC was 0.782 ( $p<0.01$ , 95%CI=76.4-80.1%). Then the model was verified in the validation data. And the AUC was 0.801 ( $p<0.01$ , 95%CI=77.4-82.8%). A Nomogram model was built on the basis of possible factors that might influence the live birth rate of training data. The concordance index (C-index) was 0.53. For the validation data, the C-index was 0.525.

**Limitations, reasons for caution:** This study was a retrospective analysis of a single-center, which was limited by sample size. Although its efficacy and specificity have been validated internally, further prospective clinical trials are needed to validate its efficacy. Wider implications of the findings: This prediction model can effectively predict the probability of infertile couples having a live birth. Further, this model can also help clinicians to make clinical decisions and provide guidance for patients.

**Trial registration number:** Non-clinical trials