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ROTEM parameters during pregnancy: a meta-analysis

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Introduction

Integral tests such as TEG and ROTEM have become increasingly popular for urgent assessment of the hemostasis system during postpartum hemorrhage (PPH) [1]. The manufacturer of ROTEM (TEM Innovations GmbH, Munich, Germany) in the accompanying documentation for the device, informs that the manufacturer has not established strict reference values for INTEM, EXTEM, FIBTEM, APTEM and NATEM for pregnant women or for the non-pregnant population. In this regard, we began a systematic review and meta-analysis of published ROTEM data in pregnant women and parturients.

Methods

We searched databases PubMed, MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL) in English and Google Academy (Google Scholar) in Russian from 1 January 2000 to 31 December 2020 using text words «ROTEM obstetric», «Thromboelastometry obstetric», «ROTEM pregnancy» and «Thromboelastometry pregnancy», and same words in Russian. The criteria for inclusion in the review were: studies containing indicators of ROTEM tests in pregnant women and parturients in the third trimester of pregnancy and with full term. Primary outcome were the reference values (95% confidence intervals) for the any ROTEM tests. The secondary outcome was the weighted mean of these tests.

Results

The final analysis included data from 13 studies (9 in English and 4 in Russian), 1328 pregnant women and 121 parturients who underwent various ROTEM tests. Parameters of ROTEM tests show physiological chronometric and structural hypercoagulation during pregnancy. There is an increase in the weighted mean maximum clot lysis (ML) compared to the non-pregnant population in the INTEM ML 0.0 - 16.2% and EXTEM ML 0.0 - 18.3%, with absence of obvious changes in the FIBTEM ML 0 - 3.6%. Analysis of FIBTEM A5 test, showed that its lower limit was 12 mm. This level was adopted as the lower limit in almost studies of PPH for decision to give fibrinogen concentrate or cryoprecipitate [2].

	INTEM	EXTEM	FIBTEM	APTEM	NATEM
CT, c	102,1 – 204,2	31,6 – 66,7	30,0 – 66,9	26,1 – 74,8	623,0 – 915,1
CFT, c	31,4 – 87,2	38,7 – 97,1		35,3 – 102,1	85,4 – 248,7
α angle, °	72,7 – 83,7	68,5 – 82,9	67,4 – 86,1	71,8 – 82,2	24,4 – 62,6
A5, мм	41,3 – 62,5	42,6 – 64,4	12,0 – 28,0	39,3 – 63,4	
A10, мм	51,8 – 76,0	53,3 – 73,8	14,3 – 29,7	53,5 – 71,7	24,6 – 54,8
A15, мм	56,6 – 74,9	58,3 – 76,4	13,4 – 32,1	52,9 – 73,7	27,3 – 62,9
A20, мм	60,1 – 76,7	61,2 – 77,3	14,8 – 33,6	62,0 – 76,5	
A30, мм	60,1 – 77,3	62,2 – 78,1	15,4 – 34,4		
MCF, мм	61,0 – 79,2	62,2 – 83,8	14,7 – 33,1	61,9 – 77,9	38,8 – 71,3
ML, %	0,0 – 16,2	0,0 – 18,3	0,0 – 3,6	0,0 – 13,3	

Discussion

A systematic review and meta-analysis made it possible to determine the reference intervals for ROTEM indicators during pregnancy and parturients. These data can be used in everyday practice and can be included in various clinical recommendations for the correction of the hemostasis system, including the treatment or prevention of massive PPH. However, for a more accurate diagnosis of local changes in ROTEM indicators of pregnant women and women in labor, depending on their ethnic origin and geographical location of the region of residence, we recommend the independent determination of the reference intervals for ROTEM in your region.

References

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