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Factor predicting total nucleated cells count (TNC) in cord blood units

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Background: Stem cells originating from neonatal cord blood are used worldwide in transplant medicine to treat various diseases. Stem cells efficacy in the Umbilical Cord Blood (UCB) can be predicted by the number of total nucleated cells (TNC). To optimize the clinical use of stem cell in our population, this study addresses several variables affecting TNC count.

Methods: This is an observational cross-sectional study conducted at King Abdulaziz Medical City in Riyadh, Saudi Arabia. From 2012-2014, 957 UCB units were collected from consented mothers by trained personnel using standard procedure. Data analysis of clinically accepted CBUs was correlated with maternal and infant factors.

Results: Based on the TNC accepted level of banking which is at least 90x107 cells, 188 CBUs (19.64 %) were rejected from a total of 957 units. Of the 17 maternal and neonatal variables evaluated, three factors demonstrated a statistically significant predictive value of accepted TNC level: Cord blood volume was the best predictive factor (p-value<0.0001), newborn birth weight (p-value=0.025) and vaginal delivery (p-value= 0.002)

Conclusion: Several maternal, neonatal and obstetric factors appear to play a major role in predicating accepted TNC count which can be used to improve the criteria of the donation of stem cells in cord blood unit.

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