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Risk of acute feto-fetal transfusion in different clinical subtypes of monochorionic twins

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Objective

Demonstration of the potential risk of acute feto-fetal transfusion (aFFTR) in different clinical courses of monochorionic (MC) twins using in vitro simulation model.

Methods

The prospective study analyzed 157 fresh MC placentas without any intrauterine intervention history in the period 2017-2021. The analysis compared 108 placentas with a physiologic course (PC), 31 selective fetal growth restriction (sFGR), and 18 twin-to-twin transfusion syndrome (TTTS), respectively. A specially designed protocol was used for the storage, preparation, and aFFTR simulation analysis of the placentas. The number and types of anastomoses, types and umbilical cord insertion (UCI) distances, and the size of the placental areas were also statistically analyzed. The placental angioarchitecture with and without proven aFFTR was statistically compared, and odds ratios and multivariable logistic analysis were performed.

Results

A total of 76/157 (48.4%) cases of aFFTR were proven with the average transfusion time of 1ml in 50 seconds (8-240 sec). aFFTR was present in 76/116 (65.5%) of placentas with AA anastomosis. The median diameter of AA anastomoses with the present, and absent aFFTRF was 1.9 mm and 0.8 mm, respectively. The representation of AA anastomoses was significantly higher in the sFGR and FC groups compared to TTTS (84.4% and 80.6% vs. 11.8%; $p<0.001$). The corresponding presence of aFFTR in sFGR, FC, and TTTS was 62.5%, 50.9%, and 5.9%, respectively. UCI distances less than 10 and 5 cm show OR 4.5 and 8.6 for aFFTR, respectively, compared to an insignificant risk above 10cm. In the UCI distance of less than 10 cm, the risk of aFFTR increased by 8% with each closer centimeter.

Conclusion

The potential risk of acute aFFTR is significantly different in individual clinical subtypes of MC twins, depending on the presence and nature of AA anastomosis. Therefore UCI distance is a well-measurable clinical marker inversely related to the risk of aFFTR.