Abstract

Introduction:

Thanks to shared circulation in monochorionic twins, single intrauterine fetal death (IUD) may lead to acute feto-fetal transfusion (FFTR). The objective of the study was to describe our model of FFTR simulation after IUD in monochorionic (MC) twins.

Methods: Prospective study analyzed 99 fresh MC placentas with the physiological course. A specially designed protocol was used for the preparation and analysis of the placentas. A pair of infusion sets fixed together using a mechanical mercury sphygmomanometer cuff was connected to the cannulated umbilical arteries. The tonometer was pressurized up to 30 and 40 mmHg. A positive finding of FFTR was determined as the amount exceeding 1 ml of dye flowed out of the umbilical cord simulating a dead fetus. The number and types of anastomoses, types, and distances between cords insertions, and the size of the placental areas for each fetus were also statistically analyzed. The placental angioarchitecture with and without proven FFTR was statistically compared, odds ratio (OR) and multivariable logistic analysis were performed.

Results: A total of 49/99 (49.5%) cases of FFTR was proven, and the average transfusion time of 1 ml was 30 s (19-46 s). FFTR was present in 49/78 (62.8%) of placentas with arterio-arterial (A-A) anastomosis. The median diameter of A-A anastomoses with the present, and absent FFTR was 2.0 mm and 1.0 mm, respectively. The proven interfetal transfusion was 8%, 31%, and 61% in A-A anastomoses with a diameter below 0,5 mm, 0,5-1,5 mm, and above 1,5 mm, respectively ($p < 0{,}001$). A-A anastomoses diameter >1.5 mm had OR of 44.2 (95% CI 5.54-352.39). In the case of coexistence of A-A anastomosis and umbilical cord distance ≤5th percentile, the FFTR occurred in 90.9%.

Discussion: The potential risk of FFTR in monochorionic twins is mainly due to the presence and nature of A-A anastomoses. The diameter and length of the vessels play a crucial role, which is clinically related to the distance of the umbilical cords insertions.