Umbilical artery PI is related to fetal abdominal circumference in gastroschisis

Hussain U [1]

Daemen A [4]

Missfelder-Lobos H [1]

De Moor B [4]

Timmerman D [3]

Bourne T [2,3]

Lees C[1]

1. Division of Fetal Medicine, Addenbrookes Hospital, Cambridge UK
2. Institute of Development and Reproductive Biology (IRDB), Imperial College London, Hammersmith Campus, Du Cane Road, London, UK.
3. Department of Obstetrics and Gynecology, University Hospitals, KU Leuven, Belgium
4. Department of Electrical Engineering (ESAT), Katholieke Universiteit Leuven, Belgium

Correspondence to:

Dr C C Lees

Division of Fetal Medicine, Addenbrookes Hospital, Cambridge UK

Fax 0044 1223 216185

Tel 0044 1223 217972

Email christoph.lees@addenbrookes.nhs.uk

Objectives To determine whether a relationship exists between umbilical artery PI (UAPI) and the fetal abdominal circumference (AC) measurement in isolated gastroschisis.

Methods Data from 58 pregnancies with prenatally diagnosed isolated gastroschisis were included; in 52, UAPI was recorded on 2 or more scans. The gestation range was 24-36 weeks. Z-scores were calculated with respect to expected UAPI values in normal pregnancies after log- or square-transformation. For AC, z-scores were calculated with respect to expected size in normal pregnancies according to a standard chart. Functional linear discriminant analysis (FLDA) was applied, resulting in spline curves fitted through all data points belonging to each subject. The median number of data points per subject was calculated, this number of points was randomly selected from each individual curve and the Spearman correlation coefficient was calculated. The random selection of data points from each curve was repeated 1000 times, and median correlation coefficients and p-values are reported.

Results There was a highly significant negative correlation between UAPI and AC, normalised for gestation using z-scores (median correlation coefficient = -0.2892 / median p-value = 2.272e-5).

Conclusions In gastroschisis, there is a clear relationship between the degree of smallness of the baby's abdominal circumference for gestation and the umbilical PI. This is not the case for normally grown babies, and implies that fetuses with gastroschisis may have small AC not simply because of the external displacement of the abdominal viscera. The explanation for the growth restriction and its relation to UAPI may in fact be more related to hypoxia.

Figure 1: The relationship between z-score UAPI and z-score AC. FLDA spline curve showing curves fitted through each subject's data points; the black line showing the aggregated FLDA curve.

