

Effects of chorioamnionitis in fetal renal glomeruli

Dear Editor,

Chorioamnionitis (CAM) is a type of intra-amniotic infection caused by an inflammation of the chorion and amnion due to ascending bacterial infection¹. It is histologically characterized by mononuclear cell infiltration into fetal membranes². CAM is considered responsible for at least 40 % of the preterm labor¹ while several fetal systems such as the heart, lungs, and brain are also implicated in the disease manifestation. In the case of fetal kidney, few experimental data propose that chorioamnionitis also affects renal development^{2,3}.

This study explores a potential association between chorioamnionitis and the number of renal glomeruli in the human fetal kidney. Thirty-six tissue specimens were categorized into two groups. Group A (n =18) was derived from embryos in which chorioamnionitis had not been diagnosed (control group), and Group B (n =18) consisted of samples with chorioamnionitis (study group). From all the collected placenta samples, full-thickness cross-sections were analyzed to establish the diagnosis of chorioamnionitis. Fetal tissues were obtained from spontaneous abortions during the second trimester. All samples were obtained from the Laboratory of Histology-Embryology archive.

Three- micrometer sections of formalin-fixed, paraffin-embedded tissues from fetal kidneys and placentas were studied. Hematoxylin-eosin staining was performed, aiming to identify the presence of inflammation in the chorioamniotic membranes and fetal kidneys. All kidney samples were examined to assess the number of renal glomeruli and their association with the presence or absence of chorioamnionitis. Renal glomeruli were measured in 50 low-power optical fields (10x) of renal cortex in each sample, and their average was expressed as a number of glomeruli per optical field. Differences between groups were explored through analysis of descriptive statistics (t-test, two-tailed paired t-test). All statistical analyses were performed using GraphPad Prism 5 software.

Total glomeruli were found to be reduced in cases where chorioamnionitis was diagnosed (study group). Specifically, the mean (\pm standard deviation) of the renal glomeruli in chorioamnionitis samples was 546.35 ± 63.4 whereas in the control group was 892.42 ± 97.64 . Statistical analysis of the data showed a significant reduction (approximately 40 %) in the number of renal glomeruli between the samples with chorioamnionitis compared to the control group ($p = 0.0065$).

Our data seem to be in accordance with other experimental studies performed on fetal sheep models. Galinsky et al found a 20 % reduction of nephrons in fetal sheep with chorioamnionitis induced by endotoxin lipopolysaccharide (LPS)³. In contrast, Ryan et al, showed that there was no harmful impact on nephrogenesis when an ovine model was exposed to a lower dose of LPS in a different stage of fetal life⁴. These findings suggest that the extent and timing may define the effect of CAM on renal growth. More recently, Muk et al suggested that induced CAM in preterm pigs triggered renal inflammation¹. Most fetal kidney studies associated with CAM are experimental and are based on LPS administration.

The present study confirms for the first time a correlation between chorioamnionitis and the number of renal glomeruli in the human fetus. Our data may contribute substantially towards bridging the existing gap in the literature. However, larger samples are required to firmly associate chorioamnionitis with reduced renal glomeruli during fetal development.

Keywords: Chorioamnionitis, renal glomeruli, fetus

Conflict of interest

None

References

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