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Albuminuria-induced violations in apoptosis controlling system in children with nephrotic syndrome

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Proteinuria not only is a sign of kidney damage, but is also involved in the progression of renal diseases as an independent pathologic factor. Clinically, glomerular proteinuria which is the most commonly observed, relates to structural and functional anomalies in the glomerular filtration barrier. The objective of this project was to study the markers of apoptosis in kidney tissue in children with chronic glomerular diseases. 32 patients aged 5-18 years with an active stage of nephrotic syndrome were included to the study. Immunohistochemical examination of proapoptotic factor Bax, antiapoptotic factor Bcl-xL levels, apoptosis evaluation in kidney biopsy specimens was done. Analysis of the level of proapoptotic factor Bax in kidney slices obtained from children with morphological form focal segmental glomerulosclerosis (FSGS) showed the presence of high levels of Bax in both glomerular and tubular-interstitial segments. However, higher immunosignal was recorded in glomeruli with FSGS I-II st. compared to tubular segment. When complete glomerular sclerosis was observed, high levels of Bax were observed in the surrounding tubuli and interstitial segment. In kidney tissue of nephrotic patients, presence of a certain level Bcl-xL in glomeruli, tubuli and interstitium was found. Higher immunosignal was recorded in tubuli, interstitial segment compared to glomeruli with FSGS I-II st. When complete glomerular sclerosis occurs, relatively high immunosignal of Bcl-xL is localized in the surrounding tubuli, interstitial segment with almost complete absence in glomeruli. Quantitative analysis of apoptosis levels in kidney sections of patients with nephrotic syndrome and FSGS I-II st. revealed apoptotic index (AI) in glomeruli at level 21.5±0.9%, in the tubuli and interstitial component – 9.12±0.34% ($p<0.01$). With FSGS III-IV st. high AI was found in tubuli, interstitial component – 31.22±1.14%, in the glomeruli – 4.15± 0.6% ($p<0.001$). Thus, progression of glomerulosclerosis as an irreversible kidney damage induced by chronic albuminuria is associated with increased activity of proapoptotic factor Bax and simultaneous reduction of anti-apoptotic factor Bcl-xL. The manner of Bax and Bcl-xL distribution in relation to the stages of FSGS is an indicator of step-dependent manner of glomerular and interstitial injuries development under the influence of proteinuria.

Biography

Ievgeniia Burlaka, MD, PhD has completed PhD in 2009 in National O.O. Bogomolets Medical University (Kyiv, Ukraine). In 2008-2014 worked as a researcher in Karolinska Institutet (Sweden, Stockholm) in Department of Children's and Women's Health in Molecular and Cellular Pediatric Laboratory.

Currently works as a Professor's Assistant in Department of Pediatrics №4 in National O.O. Bogomolets Medical University (Kyiv, Ukraine). Current research interest is studying of the initial molecular disorders leading to the irreversible kidney damage in patients with albuminuric kidney diseases. She has published more than 60 papers in international and local Ukrainian journals.

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