Introduction

- Congenital anomalies of kidney and urinary tract (CAKUT) might occur in 1 of 500 live newborns.
- An acronym/phenomenon CAKUT covers wide range of renal and urinary tract anomalies with various degree of severity and may be presented as a complete renal agenesis as the most severe, to renal hypo-/dysplasia, multicystic kidney dysplasia, duplex renal collecting system, ureteropelvic junction obstruction (UPJ), megareter, posterior urethral valves (PUV), and vesico-ureteral reflux (VUR).
- Small for gestational age (SGA) is a potential risk factor which may have an influence in increasing the prevalence of congenital and urinary tract anomalies in children and the progression of CKD.
- The aim of this study - our experiences with detected CAKUT in a relatively small cohort of SGA born children in Macedonia. We followed established criteria for diagnosis of CAKUT in children and their further follow up.

Methods

- A group of 100 SGA born children from Macedonia was evaluated for associated congenital anomalies of urinary tract.
- An anthropometric and clinical birth data were analyzed in children with diagnosed CAKUT and estimated a time of onset and stage of chronic kidney disease by biochemical and imaging techniques.
- Anthropometrical data were:
  - chronological age, gender, height (centimeters), weight (kilograms) and body mass index (BMI in kg/m²).
  - Clinical birth data was evaluated by:
    - birth length (BL), birth weight (BW), BL standard deviation score (SDS) and BW SDS.
- Diagnosis of CAKUT was established by biochemical and imaging techniques.

Results

- Seven (7.0 %) SGA born children were diagnosed with CAKUT, 4 girls and 3 boys;
- Very low birth parameters, mean birth weight (1855gr/3.93 SDS) and birth length (45.57cm/2.17 SDS);
- Growth failure (+2.36 SDS) with reduced weight (-3.01 SDS) and BMI (-1.72 SDS) at the time of diagnosis establishment;
- Time of diagnosed: 4/7 children - in the first few months of life, others 3/7 - later in early childhood;
- Stage of chronic kidney disease (CKD):
  - Normal glomerular filtration rate (GFR) - 3/7 children diagnosed with unilateral kidney agenesis;
  - Stage 2 CKD (GFR 60-90 ml/min/1.73m²) - 2 children with hypoplastic kidneys and 1 child with vesicoureteral reflux grade 2;
  - Stage 3 CKD at GFR 47.2 ml/min/1.73m² - 1 child with vesicoureteral reflux grade 3;
  - Stage 4 CKD - none;
  - Stage 5 CKD (GFR 9 ml/min/1.73 m²) - 1 patient and needed kidney transplantation;

Discussion

- Hypertension finishes around 36 week of gestation;
- If a child is born very premature or with intrauterine growth retardation (IUGR) is more likely to develop a renal disease due to reduced nephron number;
- Brenner’s hyperfiltration theory (1);
- Several studies implicate the influence of urinary tract anomalies on birth weight and length and growth spurt during childhood;
- 55% patients with CAKUT are born premature, and 28% with low birth parameters (2);
- More often episodes of hypertension and/or microalbuminuria and lower GFR in young boys older than 20 kg born IUGR/SGA with mainly normal renal function (3);
- Karlberg et al. found that all deceased patients with CKD were born with reduced BW and BL SDS by 1 SDS (4);
- Frankie et al. in their study showed significantly elevated rate of SGA and prematurity in children with congenital CKD (4);
- Lower birth weight correlates with greater growth failure and more significant kidney and urinary tract malformation (5);

Conclusions

SGA born children are at risk for developing obesity, hypertension, insulin resistance, diabetes, cardiovascular diseases and renal failure in adulthood.

Seven SGA born children with CAKUT born in Macedonia were presented in this study. Our hope is with an early diagnose and appropriate treatment of anomalies will improve their outcome.

References

87. [pii:6479131]