

# **Ultrasound Screening for Early Detection of Congenital Kidney and Urinary Tract Abnormalities in Neonates**

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## List of Abbreviations

|         |                                                  |
|---------|--------------------------------------------------|
| ADPKD   | Autosomal dominant polycystic kidney disease     |
| APD     | Anteroposterior diameter                         |
| ARPKD   | Autosomal recessive polycystic kidney disease    |
| BRA     | Bilateral renal agenesis                         |
| BW      | Birth weight                                     |
| CBD     | Congenital bladder diverticula                   |
| CFU     | Colony-forming units                             |
| CT      | Computed tomography                              |
| DIC     | Direct isotope cystogram                         |
| DM      | Diabetes mellitus                                |
| DMSA    | Dimercaptosuccinic acid                          |
| DRNC    | Direct radionuclide cystography                  |
| DTPA    | <sup>99m</sup> Tc-diethylenetriaminepentaacetate |
| GA      | Gestational age                                  |
| HPF     | High-power field                                 |
| IRC     | Indirect radioisotope cystogram                  |
| IVP     | Intravenous pyelogram                            |
| IVU     | Intravenous urogram                              |
| IVUS    | Indirect voiding urosonography                   |
| MAG-3   | <sup>99m</sup> Tc-mercaptoacetyltriglycine       |
| MCDK    | Multicystic dysplastic kidney                    |
| MOD     | Mode of delivery                                 |
| PKHD1   | Polycystic Kidney and Hepatic Disease 1          |
| PUV     | Posterior urethral valve                         |
| RE      | Renal ectopia                                    |
| RPD     | Renal pelvis dilatation                          |
| SD      | Standard deviation                               |
| SFU     | The Society of fetal urology                     |
| TMP-SMZ | Trimethoprim sulfamethoxazole                    |
| UPJO    | Ureteropelvic junction obstruction               |
| URA     | Unilateral renal agenesis                        |
| US      | Ultrasound                                       |
| UTIs    | Urinary tract infections                         |
| VCUG    | Voiding cystourethrogram                         |
| VUR     | Vesicoureteral reflux                            |
| VUS     | Voiding urosonography                            |
| WBCs    | White blood cells                                |

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## Introduction

Congenital urinary tract anomalies are relatively frequent and may be found in about 3% to 4% of the population (*Kim et al., 2009*). Also they account for 20 to 30 percent of all anomalies identified in the prenatal period (*Dugoff, 2002*).

Many cases of renal insufficiency in childhood are attributed to congenital anomalies of the kidneys and urinary tract (*Kim et al., 2009*). Nearly 30% of childhood cases of chronic renal failure in Japan are attributed to congenital anomalies of the kidney and urinary tract (*Tsuchiya et al., 2003*).

Congenital anomalies of the urinary tract are well known causes of urinary tract infections (UTIs) in children, as about 40% of infants and children with symptomatic UTI are reported to have vesicoureteric reflux (VUR) and 20% have other associated abnormalities in urinary tract (*Ahmadzadeh and Askarpour, 2007*).

UTIs have been considered an important risk factor for the development of renal insufficiency or end-stage renal disease in children (*Elder, 2007a*). About 10%–30% of children with febrile UTIs develop renal scarring, which is thought to be a risk factor for hypertension and renal insufficiency in the longer term (*Smellie, et al., 2001*).

Therefore, early diagnosis of congenital anomalies of the urinary tract is crucial, as potential targeted therapy (either surgical or conservative) might prevent irreversible damage of the renal parenchyma (*Halek et al., 2010*).

Ultrasound study has a fundamental role in the investigation for detecting renal anomalies, since it is an accessible method of real-time diagnosis without the use of ionizing radiation,

## **Introduction**

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which is an important factor, especially in this pediatric age bracket (*Kim et al., 2009*).

Prenatal ultrasound for detecting urinary abnormalities has been used, but the sensitivity of the prenatal ultrasonography in detecting urinary abnormalities is low (36%) (*Stolz et al., 2002*). So the postnatal ultrasound examination completes early diagnosis of renal defects by uncovering the malformations which have been missed prenatally (*Stolz et al., 2002*).

The postnatal ultrasound screening of the urinary system is a reliable, cheap and non-invasive method. It can be performed in many local hospitals as a primary screening tool for the newborn. Through its help, many subclinical renal abnormalities will be diagnosed early (*Chein et al., 1999*).

### **Aim of the Work**

- (1) Determination of the incidence of congenital abnormalities of the kidney and urinary tract in apparently healthy newborn infants detected by postnatal renal ultrasound screening.
- (2) Detection of the accuracy of prenatal ultrasound screening in excluding abnormalities of the kidney and urinary tract in the studied group.
- (3) Detection of the presence of UTI in those with congenital kidney and urinary tract anomalies detected by our postnatal ultrasound screening.

## **Aim of the Work**

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