

Fetal Renal Pelvis Dilatation: Prenatal and Postnatal Evaluation

Thesis

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بسم الله الرحمن الرحيم
قَالُوا سُبْحَانَكَ لَا عِلْمَ
لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ
أَنْتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

جامعة القاهرة / كلية الطب

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باللغة العربية: تمدد حوض الكلى في الجنين: التقييم قبل وبعد الولادة

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الكلمات الدالة: حوض الكلى - الجنين - تمدد - التقييم

إن عيوب الكلى الخلقية هي من أكثر عيوب الجنين الخلقية تشخيصا بالموجات فوق الصوتية. ويعتبر تمدد حوض الكلى من أكثر هذه العيوب شيوعا. تضمنت هذه الدراسة ٥٠ جنينا يعاني من تمدد حوض الكلى الذي تم تشخيصه في الثلاثة أشهر الأخيرة من الحمل ثم تمت متابعة هذه الحالات بعمل موجات فوق الصوتية ووظائف الكلى في صورة البولينا وفكرياتينين وذلك خلال الشهر الأول من العمر. يمثل الذكور ٧٠% من الحالات بينما تمثل الإناث ٣٠%. لقد كانت أغلب الحالات تعاني من التمدد على جانب واحد. لقد كان النتائج في معظم الحالات هو التحسن بدون تدخل في حين أن ٢٠% من الحالات كانت تحسن سلوكا غير متغيرا. للتدخل الجراحي كان العلاج في ١٠% من الحالات.

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To

My Parents..

My wife..

And

My Beloved Kids

<<Sara & Ahmad>>

Abstract

Renal disorders are among the most common sonographically detected fetal abnormalities. Pyelectasis is one of the most common diagnoses in the prenatal period. The present study was conducted on 50 fetuses who suffered from antenatal renal pelvis dilatation during the third trimester. 70% of the cases diagnosed as antenatal renal pelvis dilatation were males and 30% were females. Idiopathic cases represented 74%. Most of cases resolved spontaneously, as detected by ultrasound done in the first month of life. 20% of cases showed stationary course that required follow up. Only 10 % of cases needed surgery.

Key words: Fetal -Renal Pelvis- Dilatation- Evaluation

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List of Abbreviations

99mTc-DTPA	technetium 99m diethylenetriamine pentaacetic acid
ACE	angiotensin-converting enzyme
Ang	angiotensin II
APPD	Anteroposterior pelvic diameter
AP	Anteroposterior diameter
B2M	beta2-microglobulin
COPUM	congenital obstructing posterior urethral membrane
CRI	chronic renal insufficiency
DMSA	Tc-dimercaptosuccinic acid
ESRD	End stage renal disease
GFR	glomerular filtration rate
IGF-1	insulinlike growth factor 1
IL-5	interleukin-5
IVP	intravenous pyelography
MAG3	mercaptoacetyl triglycine
MM	metanephric mesenchyme
NAG	<i>N</i> -acetyl-B-glucosaminidase
PGE2	prostaglandin E ₂
PGP	protein gene product
PNH	prenatal hydronephrosis
PUVs	posterior urethral valves
RBF	renal blood flow
SF	Split function
SFU	Society for Fetal Urology
TGF b	transforming growth factor b
UB	uretic bud
UPJ	Ureteropelvic junction
UPJO	ureteropelvic junction obstruction
UTI	urinary tract infection
VCUG	voiding cystourethrogram
VUR	vesicoureteral reflux

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Introduction

Renal disorders are among the most common sonographically detected fetal abnormalities (*Crane et al. 1994; and Dicke et al., 2006*). Pyelectasis is one of the most common diagnoses in the prenatal period with a prevalence varying from 2%-5% (*Sairam et al., 2001*).

Hydronephrosis detected antenatally was first reported in the early 1980s, since when there have been many case reports and studies describing the postnatal diagnosis associated with these findings (*Jaswon et al., 1999*).

The structure of the fetal kidneys and measurement of renal pelves anteroposterior diameter are able to be reliably assessed by ultrasonography(*Moorthy et al., 2003*).

Commonly accepted thresholds for pathologic renal pelvis dilatation (RPD) requiring further prenatal or postnatal evaluation are an anteroposterior measurement of the renal pelvis of 4 mm or greater at less than 33 weeks gestation or 7 mm or greater at more than 33 weeks gestation (*Aviram et al., 2000; and Coplen et al., 2006*).

Aim of the Work

1- Antenatal diagnosis of fetal renal pelvis dilatation with ultrasound done in the second or third trimester.

2- Postnatal evaluation of these infants within the first month of life using ultrasound and renal function tests in the form of serum urea and creatinine levels.

Anatomy and Embryology of the Genitourinary System

Kidneys

The kidneys lie along the borders of the psoas muscles and are therefore obliquely placed. The position of the liver causes the right kidney to be lower than the left. The adult kidney weighs about 150 g. The kidneys are supported by the perirenal fat (which is enclosed in the perirenal fascia), the renal vascular pedicle, abdominal muscle tone, and the general bulk of the abdominal viscera. Variations in these factors permit variations in the degree of renal mobility. The average descent on inspiration or on assuming the upright position is 4–5 cm. Lack of mobility suggests abnormal fixation (eg, perinephritis), but extreme mobility is not necessarily pathologic (*Tanago and Nguyen, 2008*).

On longitudinal section (Figure 1), the kidney is seen to be made up of an outer cortex, a central medulla, and the internal calices and pelvis. The cortex is homogeneous in appearance. Portions of it project toward the pelvis between the papillae and fornices and are called the columns of Bertin. The medulla consists of numerous pyramids formed by the converging collecting renal tubules, which drain into the minor calices at the tip of the papillae (*Aizenstein et al., 1997*).

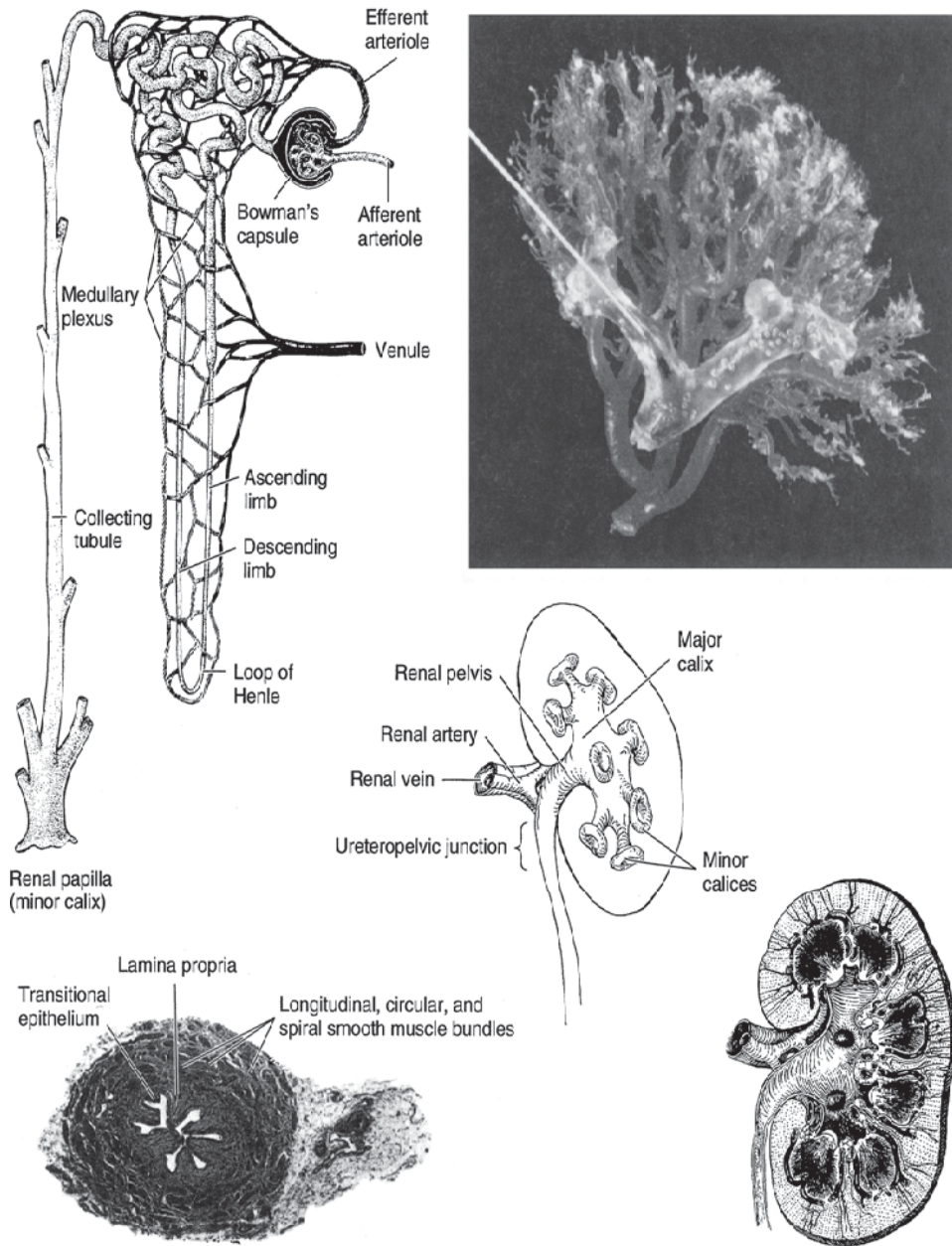


Figure (1): Anatomy and histology of the kidney and ureter. Upper left: Diagram of the nephron and its blood supply .Upper right: Cast of the pelvicaliceal system and the arterial supply of the kidney. Middle: Renal calices, pelvis, and ureter (posterior aspect). Lower left: Histology of the ureter. The smooth-muscle bundles are arranged in both a spiral and a longitudinal manner. Lower right: Longitudinal section of kidney showing calices, pelvis, ureter, and renal blood supply (posterior aspect) (*Tanago and Nguyen, 2008*).