Different Modalities In Management Of Ureteropelvic Junction Obstruction

An essay Submitted in partial Fulfillment for the
Master of Urology

Presented by

Mohamed Abdallah Mostafa Ahmed Selmy
M.B.B.Ch., Suez Canal University 2004

Supervised by

Prof. Dr. Mahmoud Ezzat Ibrahim
Professor of Urology
Faculty of Medicine
Ain Shams University

Dr. Mohamed Wael Safa
Lecturer of Urology
Faculty of Medicine
Ain Shams University

Ain Shams University
Faculty of Medicine
2012

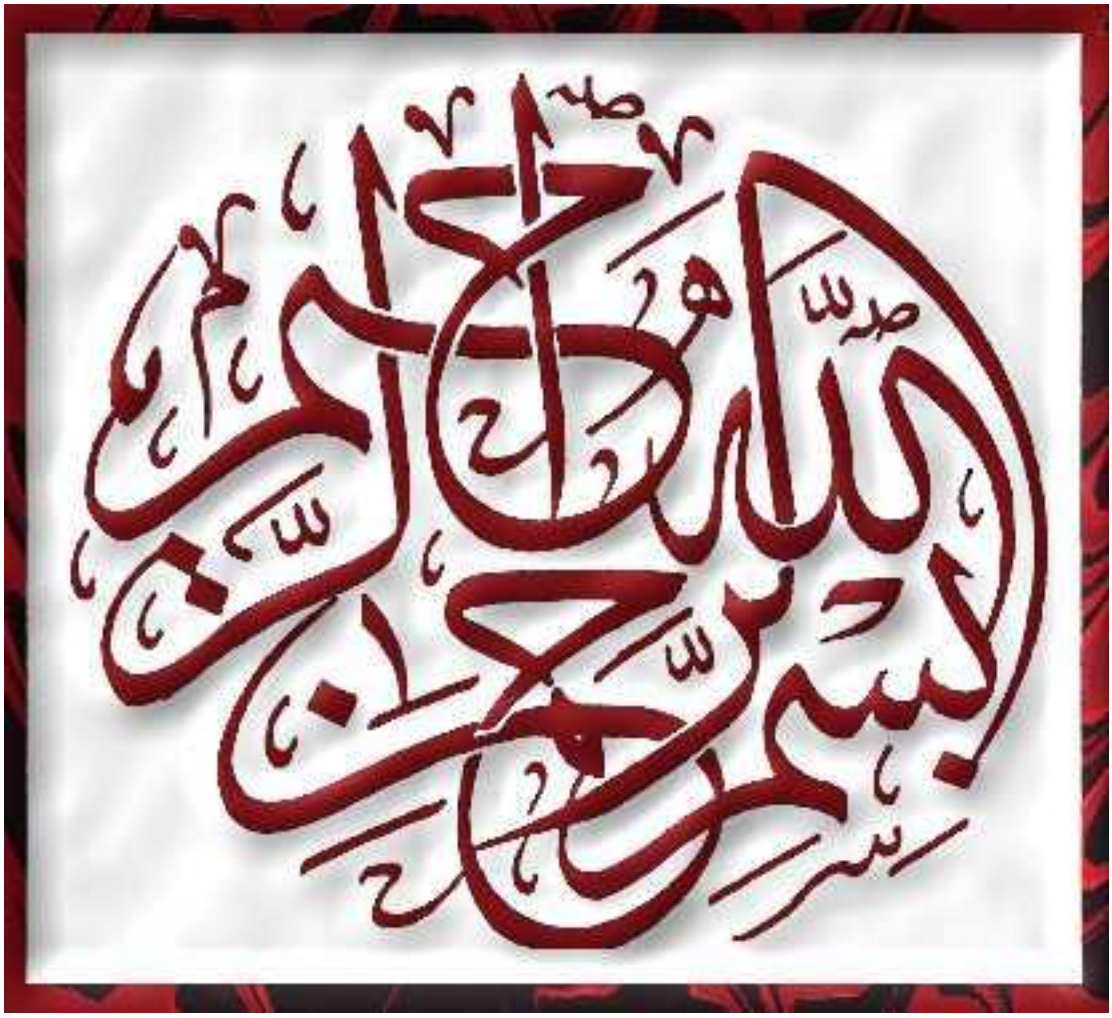
بسم الله الرحمن الرحيم

TABLE OF CONTENTS

Acknowledgement

FIRST and FOREMOST Thanks to ALLAH

I would like to express my deepest gratitude to **Prof. Dr. Mahmoud Ezzat**, Professor of Urology, Faculty of Medicine, Ain-Shams University- for his kind help together with his valuable assistance, directions with great generous cooperation in every step of this work.

I wish to express my deep gratitude to **Dr. Mohamed Wael Safa**, Lecturer of Urology, Faculty of Medicine, Ain-Shams University- for his valuable advice in supervising the present work.

The deepest gratitude ever goes to my dear family for their loving care, patience, and the blessings too numerous to count.

LIST OF ABBREVIATIONS

ANH	Antenatal Hydronephrosis
APDRP	Anteroposterior Diameter of the Renal Pelvis
CRVs	Crossing Renal Vessels
CT	Computed Tomography
dMRU	Dynamic MRU
DMSA	Dimercaptosuccinic Acid
DRF	Differential Renal Function
DSA	Digital Subtraction Angiography
DTPA	Diethylenetriamine
EC	Ethylenedicysteine
GFR	Glomerular Filteration Rate
ICCs	Interstitial cells of Cajal
IVP	Intravenous Pyelography
L	Length
Lap	Laparoscopic
LESS	Laparoendoscopic Single Site Surgery
LP	Lamina Propria
LP	Laparoscopic Pyeloplasty
MAG-3	Mercaptotriglycylglycine - 3
MCDK	Multicystic Dysplastic Kidney
MRA	Magnetic Resonance Angiography
mRNA	Messenger Ribonucleic Acid
MRU	Magnetic Resonance Urography
NOTES	Natural Orifice Translumenal Endoscopic Surgery

NR	Not Reported
OP	Open Pyeloplasty
OR	Operating Room
P	Pressure
PUV	Posterior Urethral Valves
r	Radius
RALP	Robotic-Assisted Laparoscopic Pyeloplasty
ROI	Regions Of Interest
RPD	Renal Pelvic Diameter
SFU	Society for Fetal Urology
SMA	Superior Mesenteric Artery
SMC	Smooth Muscle Cells
T	Tension
TC	Transitional Cells
TGF-β	Transforming Growth Factor β
UPJ	Ureteropelvic Junction
UPJO	Ureteropelvic Junction Obstruction
US	Ultrasonography
UTI	Urinary Tract Infection
UVJ	Ureterovesical Junction
VCUG	Voiding Cystourethrogram
VUR	Vesicoureteral Reflux
3D	Three-Dimensional

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

INTRODUCTION

Ureteropelvic junction obstruction (UPJO) is defined as an obstruction of the flow of urine from the renal pelvis to the proximal ureter. The condition is frequently encountered by both adult and pediatric urologists. Congenital abnormalities may be observed in both adults and children, but adults may also present with UPJO following previous surgery or other disorders that can cause inflammation of the upper urinary tract **(Park and Bloom, 1998)**.

UPJO is the most common cause of neonatal and antenatal hydronephrosis, occurring in 1 per 1500 live births **(Lee and Cendron, 2006).** Prior to the use of prenatal ultrasonography, most patients with UPJO presented with pain, hematuria, urosepsis, failure to thrive, or a palpable mass. With the enhanced ability and availability of prenatal ultrasonography, urologic abnormalities are being diagnosed earlier and more frequently **(Reddy and Mandell, 1998)**. Fifty percent of patients diagnosed with antenatal hydronephrosis are eventually diagnosed with UPJO upon further workup **(Lee and Cendron, 2006).** Initially, most children are treated conservatively and monitored closely. Intervention is indicated in the event of significantly impaired renal drainage or poor renal growth **(Heinlen et al., 2009)**.

Possible etiologies for UPJO include the intrinsic obstruction which results from ureteral hypoplasia which may lead to abnormal peristalsis through the UPJ. Asymmetry of ureteral wall musculature may inhibit the natural peristaltic emptying of the renal pelvis into the ureter. These two etiologies mentioned above may manifest as a high-insertion of the ureter into the renal pelvis which may alter the configuration and impair drainage of urine **(Park and Bloom, 1998)**. On the other hand, Crossing lower-pole renal vessel(s) or entrapment of the ureter by a vessel can prohibit urinary flow down the ureter. Vessels that wrap around the UPJ may be associated with obstruction or may be a product of renal dilatation and hydronephrosis that distorts renal vascular architecture **(Richstone et al., 2009)**.

Secondary UPJO can be caused by prior surgical intervention to treat other disorders (eg, renal stone disease) or failed repair of a primary UPJO. This

obstructive lesion is usually secondary to ureteral-wall and periureteral scar formation **(Williams et al., 2007)**. All of the above abnormalities impair drainage of urine from the kidney into the ureter, resulting in elevated intrarenal back pressure, dilatation of the collecting system, and hydronephrosis **(Park and Bloom, 1998)**.

Currently, to reach the diagnosis, neonates who present with hydronephrosis should be fully evaluated with voiding cystourethrography (VCUG; to rule out vesicoureteral reflux) and renal ultrasonography soon after birth. These patients should also be placed on prophylactic antibiotics to prevent urinary tract infections (UTIs), especially while diagnostic imaging is being performed **(Yiee and Wilcox, 2008)**. If renal ultrasonography demonstrates hydronephrosis without reflux on VCUG, a diuretic renal scan (mercaptotriglycylglycine [MAG-3], diethylenetriamine [DTPA], or dimercaptosuccinic acid [DMSA]) should be performed to quantify relative renal function and to define the extent of obstruction **(Conway and Maizels, 1992)**.

Older children may present with UTI, a flank mass or intermittent flank pain secondary to a primary UPJO. Hematuria may also be a presenting sign if it is associated with infection. Adults with UPJO can present with various symptoms, including back and flank pain, UTI, and/or pyelonephritis. A detailed history may reveal that the pain correlates with periods of increased fluid intake or ingestion of a food with diuretic properties (ie, Dietl crisis) **(Hsu and Nakada, 2012)**.

The goals in treating patients with UPJO are to improve renal drainage and to maintain or improve renal function. Dilatation of the intrarenal collecting system or hydronephrosis does not necessarily imply obstruction. Specifically in children, renal pelvic dilatation should be monitored with serial imaging to assess for changes in dilatation, renal parenchymal thickness and/or the presence of scarring, and function. Surgical repair is indicated upon a significant difference on serial imaging or progressive deterioration of renal function. Using this algorithm, patients with hydronephrosis are monitored closely with renal ultrasonography and nuclear medicine renography every 3-6 months. Similarly, in adults, repair is recommended if nuclear medicine renal

scan or intravenous pyelography (IVP) reveals ureteral obstruction **(Van Cangh, 2007)**.

The treatment strategies for UPJO have seen a significant shift in the last several years. The options of surgical treatments for UPJO today include laparoscopic pyeloplasty, open pyeloplasty, endopyelotomy, endopyeloplasty, and robotic-assisted laparoscopic pyeloplasty. While open pyeloplasty is still considered the standard for UPJO in infants, laparoscopic pyeloplasty, with or without robotic assistance, is the treatment of choice in older children and in most adults **(Streem, 1998)**.

Endopyelotomy is a minimally invasive option in patients with mild-to-moderate hydronephrosis and reasonably good renal function and it may be the preferred option in patients in whom prior pyeloplasty has failed **(Gallo et al., 2009)**. According to success rates in terms of relieving obstruction, percutaneous endopyelotomy shows a success rate ranging from 60% to 100% (mean 70%) **(Dimarco et al., 2006).** Meanwhile, the ureteroscopic endopyelotomy shows a success rate of 80% **(Rassweileret al., 2008)**, while the cautery wire balloon endopyelotomy shows a success rate of 70% **(El-Nahas, 2007)**.

AIM OF THE ESSAY

AIM OF THE ESSAY

To compare the different modalities currently used in management of UPJO according to the technique, feasibility, results, complications and cost-effectiveness.

ESSAY OBJECTIVES

- To review the current guidelines for management of UPJO.
- To review the surgical and minimally invasive modalities used in management of UPJO.
- To compare the different surgical and minimally invasive modalities according to the technique, feasibility, results, complications and cost-effectiveness.