COMPARATIVE STUDY BETWEEN SELECTIVE AND NON-SELECTIVE ALPHA ADRENERGIC BLOCKERS IN THE TREATMENT OF DISTAL URETERIC STONES

THESIS
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For Partial Fulfillment Of
Master Degree In Urology

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2008

بسم الله الرحمن الرحيم

"نرفع درجات من نشاء
وفوق كل ذى علم عليم"

صدق الله العظيم

سورة يوسف أية (٧٦)

ACKNOWLEDGEMENT

I would like to express my sincere gratitude and appreciation to Prof. Dr. Abdel-Rehim Hegazy professor of Urology, Cairo University for his continuous guidance and support throughout the execution of this work.

My sincere gratitude to Prof. Dr. Amr Massoud Assistant Professor of Urology, and head of the department in Beni-Swaif University for his constant support.

I can not forget the continuous and valuable advice given by Dr Ahmed Abd El Barry which made this work to be finished in that way.

I owe Prof. Dr. Mostafa Abdel-Mohsen assistant professor of urology, Cairo University, my thanks for his valuable effort, continuous advice and constructive suggestions that made this work achievable.

My sincere thanks to all professors and staff members at urology Department, Faculty of Medicine Cairo University and Beni-Swaif University who were available when I needed their help.

I can never forget the continuous guide and continuous support given by my parents and my wife.

Ahmed Mohamed El-Batanouny
2008

Contents

Page

- Abstract 8
- Review of literature 9
  - Introduction. 9
  - Embryology &Development of the ureter and the trigone. 11
  - Anatomy of the ureter and trigone 14
    - Anatomy of the ureter. 14
    - Anatomy of the ureterovesical junction 19
    - Blood supply and lymphatic drainage. 26
    - Innervation of the lower ureter and trigone. 28
  - Histology of the ureter and the trigone. 30
  - Physiology and Pharmacology of the ureter. 33
  - Pathology. 46
    - Pathology of Stone Formation 46
    - Pathologic processes affecting ureteral function 53
  - Diagnosis of the urinary tract stones 59
  - Treatment of the distal ureteric stones. 66
- Aim of work. 92
- Materials and methods. 93
- Results. 98
- Discussion. 112
- Summary & conclusion 118
- References. 121
- Arabic Summary. 135

List of Figures

Page

Fig (1) shows incorporation of the mesonephric ducts and ureteric buds into the bladder wall. 12

Fig. (2) Shows transverse section of an embryo at the beginning of the folding (ca. 28 days). 12

Fig (3), fig (4) shows the intermediate mesoderm moves ventrally and loses its connection (black arrow) to the somites and the lateral mesoderm. 13

Fig (5) the ureter demonstrating sites of normal functional or anatomic narrowing 18

Fig (6) normal ureterovesical junction and trigone. 25

Fig (7) sources of arterial blood supply to the ureter 27

Fig(8) Slide 1Ureter, with typically stellate lumen. Slide 2Ureter stained with H&E. 32

Fig. (9) Smooth muscles, representation of calcium movements during contraction and relaxation, SR and sarcoplasmic reticulum during contraction and relaxation 39

Fig.(10) sex distribution in the three groups 99

Fig.(11) shows the minimum and maximum duration of pain in the three groups 99

Fig.(12) shows the history of previous stone disease and surgery in the urinary tract 100

Fig.(13) shows the history of previous spontaneous stone passage 101

Fig.(14) shows the percentage of presenting side of the stone by imaging. 102

Fig. (15) shows the results of the stone passage. 105

Fig.(16) shows the Duration to stone passage 106

Fig.(17) shows the analgesic requirements between the three groups. 107

Fig (18) case 1 109

Fig (19) case 2 110

Fig (20) case 3 111

List of Tables

	Page
Table (1) shows variations in the caliber of the ureter	15
Table (2) shows treatment adverse events	87
Table(3) showing the summary of trials of medical expulsive therapy for ureteral stones	91
Table(4) shows the mean age of the three groups of the study	98
Table (5) shows the sex distribution in the three groups	98
Table (6) shows the duration of pain in the three groups	99
Table(7) shows the history of previous stone disease and surgery in the urinary tract	100
Table(8) shows the history of previous spontaneous stone passage	101
Table (9) shows the level of serum creatinine.	102
Table(10)shows the percentage of presenting side of the stone by imaging.	102
Table(11) shows the presence and degree of hydronephrosis.	103
Table(12) shows white blood cells in the urine analysis	104
Table (13) shows the results of the stone passage.	105
Table (14) shows the Duration to stone passage	106
Table(15)showsthe analgesic requirements between the three groups.	107
Table(16)shows the presence of side effects of the treatment between the three groups.	108

ABSTRACT

Purpose: To compare the efficacy of the addition of Tamsulosin or Terazosin to the standard expulsive pharmacologic therapy for the treatment of distal ureteral stones.

Patients and methods: A series of patients referred to our department for the management of symptomatic distal ureteral calculi were randomly divided into group 1 (N=15) who received standard medical treatment, group 2 (N=15) who received the same standard medical treatment plus Terazosin (5mg) and group 3 (N=15) who received the same standard medical treatment plus Tamsulosin (0.4mg) for maximum 1 month. There were no differences between the groups with respect to age, sex, or stone size. The primary end point was the expulsion of the stone. Expulsion time, need for analgesics, need for hospitalization, and drug side effects were the secondary endpoints.

Results: the expulsion rate is significantly higher in group3 and group 2 (67%, 80% respectively) than in group 1(53%). Lower analgesic use was found in groups 2 and group 3 as well as significantly fewer hospitalizations for recurrent renal colic.

KEY WORDS

Alpha Adrenergic blocker.
Distal ureteric stones.
Medical treatment of distal ureteric stones.

Review of literature

Introduction

Urinary stones have afflicted humankind since antiquity, with the earliest recorded example being bladder and kidney stones detected in Egyptian mummies dated 4800 BC. The specialty of urologic surgery was recognized even by Hippocrates, who wrote, in his famous oath for the physician, "I will not cut, even for the stones but leave such procedures to the practitioners of the craft". ***(*Clendening L et al**, **1942*)***

It has been well documented that calcular disease affects 12% of the world population. The disease frequency tends to increase in western countries. Among all ureteral stones, 70 % are found in the lower third of the ureter **(Pak C.Y et al, 1998, Menon et al, 1998).**

Until the 1980s, urinary stones were major health problem, with a significant proportion of patients requiring extensive surgical procedures and a sizable minority losing a kidney. One study showed that about 20% of patients with recurrent stone disease who underwent surgery for obstruction and infection went on to develop mild renal insufficiency (**Menon M et al, 1992*).***

The advent of extracorporeal techniques for stone destruction and the refinements in endoscopic surgery have greatly decreased the morbidity associated with stone surgery. One unfortunate result of this technologic success is that advances in medical management of stone disease and research in prevention have languished. ***(*Uribarry J et al, 1989*)***

Embryology &Development of the lower ureter and trigone

The ureteral bud appears as an out pouching from the caudal end of the mesonephric duct at the seventh week of gestation. Between days 37 and 40, the ureter goes through a stage of canalization throughout most of its length, with sparing of the proximal and distal ends **(Alcaraz et al, 1991).** It then progressively recanalizes, beginning with the mid section. Rapid elongation of the ureter may be the cause of loss of patency. When patency is established as a result of recanalization, it is the distal and proximal ureteral ends that are last to recanalize. It is thought that hydrostatic pressure from the mesonephric secretion of urine may contribute to the recanalization process **(Baker and Gomez, 1998)**.

The ureteral bud originates from the mesonephric duct at a relatively fixed site. The portion of the mesonephric duct between the ureteral bud and urogenital sinus is termed the common excretory duct **(Escala et al, 1989)**. This segment, a precursor of the trigone and bladder neck, contributes to its muscularization as it becomes absorbed into the urogenital sinus. The orifice of the mesonephric duct migrates caudally and the ureteral bud cranially **(Escala et al, 1989)**. See figures1- 4.

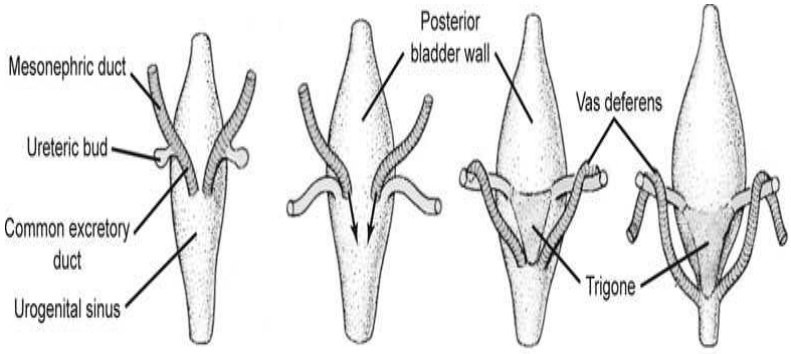
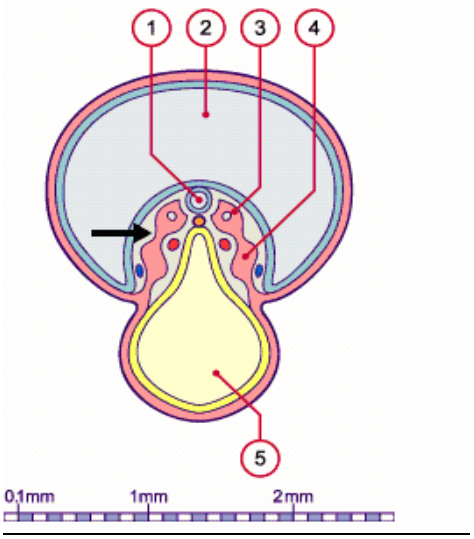
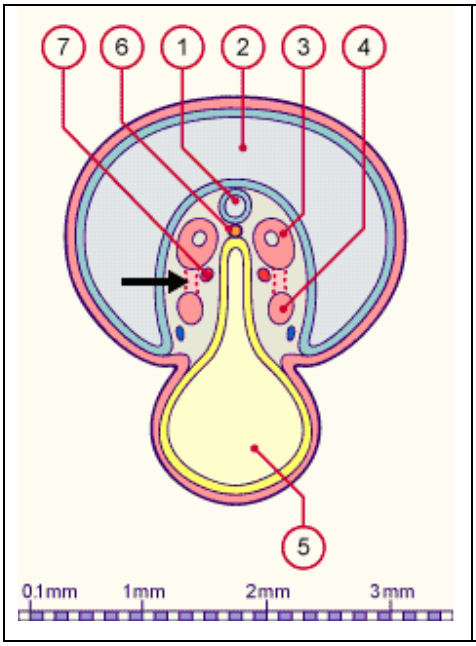


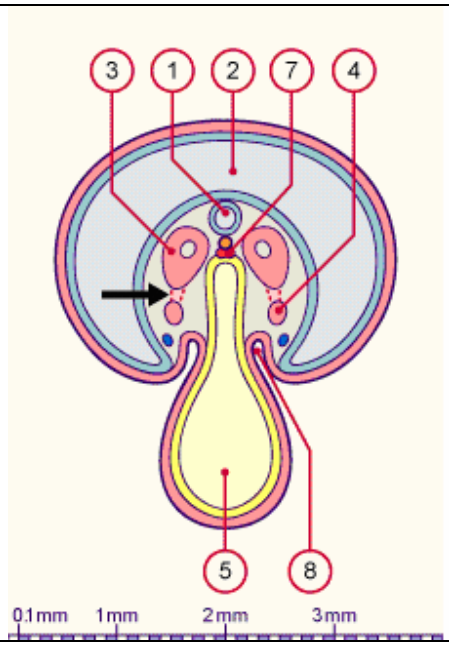
Fig (1) shows incorporation of the mesonephric ducts and ureteric buds into the bladder wall. **(Modified from Sadler TW; Langmans Medical Embryology. Baltimore, Williams & Wilkins, 1985)**



1 Neural tube
2 Amniotic cavity
3 Paraxial mesoderm
4 Intermediate mesoderm
5 Yolk sac (umbilical vesicle)

Fig. (2) Shows transverse section of an embryo at the beginning of the folding (ca. 28 days). In this diagram the nephrogenic cord is clearly distinguished in the intermediate mesoderm. The black arrow indicates the border between the paraxial and intermediate mesoderm. **Davies JA, Fisher CE. Exp Nephrol. 2002; 10(2):102-13. Review**





1	Neural tube
2	Amniotic cavity
3	Dermatomyome
4	Nephrogenic cord that has moved away from the paraxial mesoderm (somite) (black arrow)
5	Yolk sac (umbilical
6	vesicle)
7	Notochord
8	Aorta
	Intraembryonic coelom

Fig (3), fig (4) shows the intermediate mesoderm moves ventrally and loses its connection (black arrow) to the somites and the lateral mesoderm. Also observe its approach towards the intraembryonic coelom. **Davies JA, Fisher CE. Exp Nephrol. 2002; 10(2):102-13. Review**

Anatomy of the ureter and trigone

Anatomy of the ureter

The ureter is an entirely retroperitoneal structure extending from the renal pelvis to the bladder. It varies in length from 25-30 cm with the right being 1 cm shorter than the left. The surface anatomy of the ureter can be presented by a vertical line from a point on the transpyloric plane, 5 cm from the midline, drown downward and medially to the pubic tubercle **(Dyson, 1995).**

Radiologically, the ureter is divided into upper, middle, and lower segments. The upper ureter extends from the renal pelvis to the upper border of the sacrum, the middle ureter extends to the lower border of the sacrum, and the lower (pelvic or distal) ureter extends from the sacrum to the bladder. Surgically, the ureter is divided into abdominal and pelvic portions by the common iliac artery, at ureteroscopy the pulsations of the artery can be seen in the posterior wall **(Kabalin, 1998)**

From the pelviureteric region each ureter descends through the retroperitoneal tissues of the posterior abdominal wall as far as the pelvic rim. Here it crosses in front of the external iliac vessels and continues down

the lateral wall of the pelvis. Within the abdomen the ureter lies on the psoas major, behind which are the lumber transverse processes **(Kabalin, 1998)**.

Endoscopically, a normal ureter is relatively uniform in caliber and easily distensible; however there are three naturally occurring relatively narrow sites within the lumen that are recognizable endoscopically: the pelviureteric junction, the pelvic brim region, and the ureterovesical junction **(Huffman et al, 1985)**

Variations in the caliber of the ureter, according to its course, were reported by **Olsson et al in 1986** as shown in the table (1):

1	At the PUJ	2mm (6 F.)
2	At the lumber region (widest)	10mm (30 F.)
3	At the crossing with iliac vessels	4 mm (12 F.)
4	At the parietal pelvic part	4-6 mm (12-18 F.)
5	At the intramural part	1-5 mm (3-15 F.)
6	At the ureteric orifice	3-4 mm (9-12 F.)

Table (1) shows variations in the caliber of the ureter

However, **Gosling et al in 1983** stated that the external diameter of the ureter post mortem is relatively uniform throughout its whole length about 5 mm (15 F.) and that living ureter is of similar uniform dimensions except when peristaltic contraction waves occur, and that, the ureter at its vesical end is less distensible.

Each ureter enters the pelvis by passing downwards along the anterior border of the greater sciatic notch, just in front of and parallel to the internal iliac artery as far as the ischial spine. In this course where the ureter lies on the side of the pelvis, it is related in the male posteriorly to internal iliac artery and vein, and the lumbosacral trunk. And it is related laterally to the obturator internus muscle and its fascia, obturator nerve, umbilical, obturator, inferior vesical and middle rectal arteries. And is related medially only to the peritoneum. The relations of the ureter in this part differ in the female anteriorly, it is related to the ovary, and here the ureter forms the posterior boundary of the ovarian fossa **(Kabalin, 1998)**.

The ureter at the ischial spine, changes its direction to run forwards and medially on the floor of the pelvis to reach the postero-superior angle of the urinary bladder, then the ureter passes obliquely in the wall of the bladder for 1 inch before it opens into its cavity at the lateral angle of the trigone, this part of the ureter is the narrowest and is called the intramural part. In male, this part of the ureter lies in front of the upper end of the seminal vesicle, and behind the vas deferens, and is surrounded by tributarities of the vesical veins. In the female, the ureter runs in the medial part of the root of the broad ligament to come in relation with 3 important structures

-uterine artery crosses above the ureter from lateral to medial, and then ascends on the side of the uterus.

– supra vaginal part of the cervix where the ureter lies about 1 inch lateral to the cervix, and here the ureter runs forwards just above the lateral fornix of the vagina.