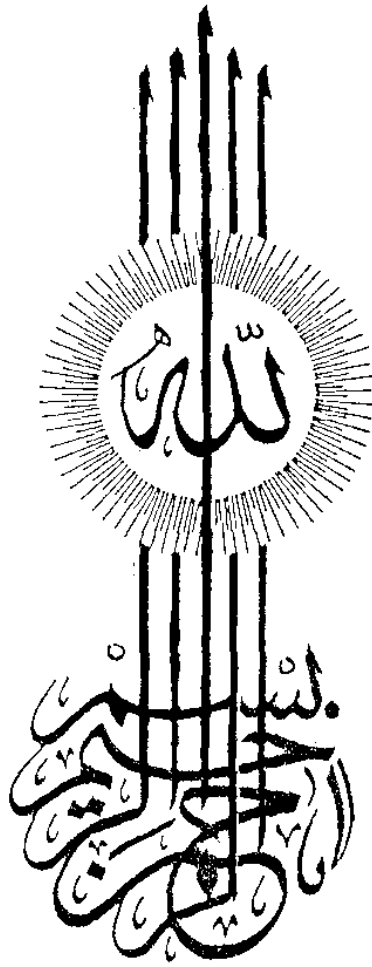
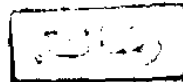




VESTICOURTERAL REFLUX

AN ESSAY

Submitted in Partial Fulfillment for
The Master Degree in General Surgery



BY

Ahmed Aayed Elam Zayed

M. B., B. Ch.

617.462
A.2

53680

Supervised By

Assistant Professor Dr. Abdo Bakr El-Seedik Mostafa

Assistant Prof. of General Surgery

Ain Shams University

Cairo

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TABLE OF CONTENTS

	page
- Introduction	1
- Historical Review	2
- Embryological Note	4
- Review of literature	
Chapter I : Anatomy of ureterovesical junction	7
Chapter II: Physiology of ureterovesical junction ..	23
Chapter III: Aetiology and Pathology of reflux	29
Chapter IV: Incidence of reflux	43
Grading of reflux	46
Complication of reflux	48
Clinical picture of reflux	52
Chapter V : Investigations of reflux	56
Chapter VI: Treatment of vesicoureteral reflux	70
Chapter VII: Complications of antireflux surgery ...	91
- Summary of vesicoureteral reflux	93
- References	96
- Arabic summary	106

INTRODUCTION
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VESTICOURTERAL REFLEX

INTRODUCTION

Under normal circumstances the ureterovesical junction functions as a unidirectional valve . It protects the kidney from exposure to the bad effects of a high pressure in the urinary bladder especially when full and at the time of voiding . the ureterovesical valve also protects the kidney from ascending infection by a relatively contaminated vesical urine leading to acute or chronic pyelonephritis if the valve is incompetent .

In 1961 Landbutter defined the condition of vesicoureteral reflux as a physiologic state characterized by varying degrees of incompetency of the ureterovesical valve mechanism , resulting in the retrograde passage of urine or fluid introduced into the bladder back to the ureter and up to the renal pelvis as a result of sustained straining, increase in the bladder tone incident to its filling, or as a result of voluntary effort for voiding .

The recognition of vesicoureteral reflux in human as an abnormal phenomenon since 1893 when Pozzi reported his first case, has realized the attention and encourage many investigators to find out the relationship between that abnormal phenomenon and the ascending renal infection, and also to suggest the possible ways of management .(Cook, J.A., and King, L.N., 1979)

In this work a brief discussion of the subject of vesicoureteral reflux is given . It will be dealt with from its all aspects , with more stress on the views of the different investigators of the subject , and the possible lines of treatment .

HISTORICAL REVIEW

The region of the ureterovesical junction was a subject of discussion and investigation by many physicians and surgeons long time ago . In the second century A.D. Galen noticed that no fluid passed up the ureters when he filled a human bladder obtained at autopsy , tied off the ureters , and applied pressure to its wall . (Cook, W.A., and King, L.R., 1979)

Al-Magonsy, Aly Ibn Abbas in the tenth century A.D. (944) , wrote the Royal Book , which is a medical text book , in two volumes . In his book Al-Magonsy described the anatomy of the ureterovesical junction . He mentioned that the two ureters enter the bladder wall, and they go so through an oblique course . After that, they enter the cavity of the bladder after acquiring a covering that seemed to be a membrane . On entering the chamber, urine pushed this membrane open . As long as the urine is not running to the bladder, this membrane adheres on the mouth of the ureter so tight that air cannot go through, and so no urine would escape back to the tubes . It is surprising that Vannier, an anatomist and urologist, working on reflux came to a similar conclusion more than one thousand years

later . (Hanafy, et.al. , 1976)

In 1812 Sir Charles Bell first called attention to the existence of muscle bundles flowing downward from the ureters to the vesical orifice . These bundles have since been known by his name . In 1856 Ellis confirmed the works of Sir Charles Bell . He also described a submucous layer of muscle fibers joining the ureteral orifices with the longitudinal muscle coat of the urethra . (Wesson, M.B., 1920)

In 1875 Krause was the first to mention the presence of vesical muscle bundles along the lower end of the ureter . Waldeyer in 1892 introduced the concept of the ureteral sheath around the lower 3-4 cm. of the ureter . (El-Badawi , 1972)

In spite of the extensive studies of the anatomy of the ureterovesical junction in the past eight decades, there is still uncertainty about the origin, anatomical relationship . and the functional significance of the ureteral sheath . Detailed discussion and full examination of the ureters and the urinary bladder have been done by great number of anatomists and surgeons . Sampson (1903) , Satani (1919) , Wesson (1920), Hutch (1961) , Blokhens (1963), Tamm (1963), Woodburn (1964), and El-Badawi (1972) have all contributed to a better understanding of the functional anatomy of the ureterovesical junction . (Cook, W.A., and King, L.R., 1979)

EMBRYOLOGICAL NOTE :

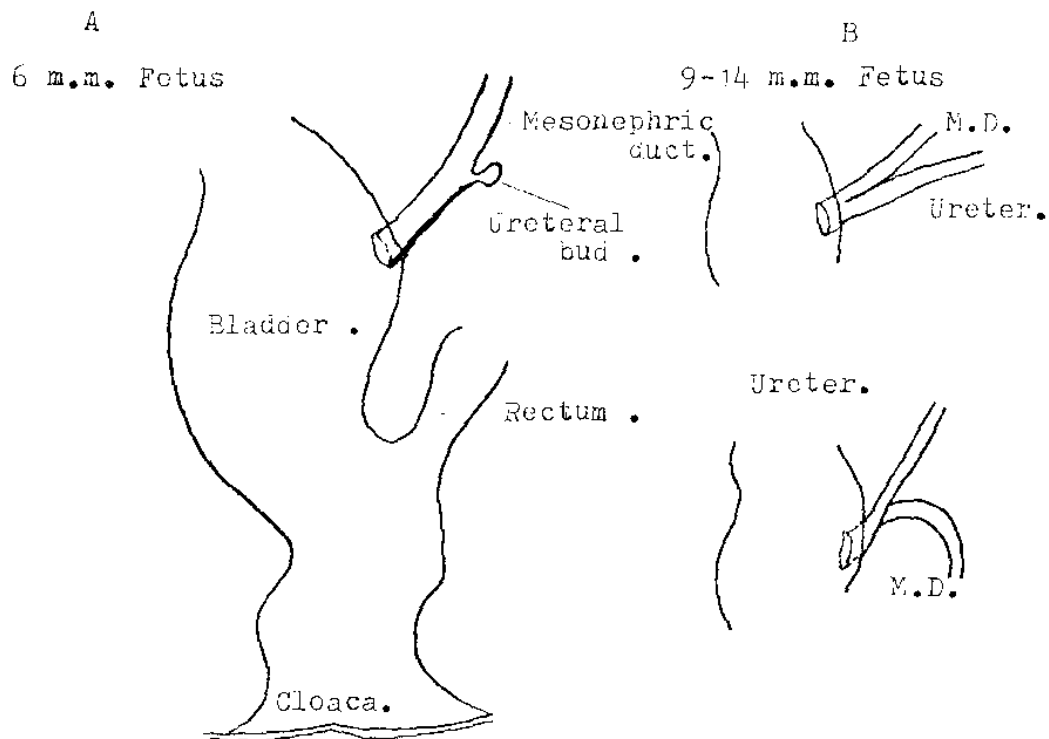


Figure 1 . Showing the development of the ureter as a bud from the distal portion of the mesonephric duct .

A : In 6 m.m. foetus . B : In 9-14 m.m. foetus .

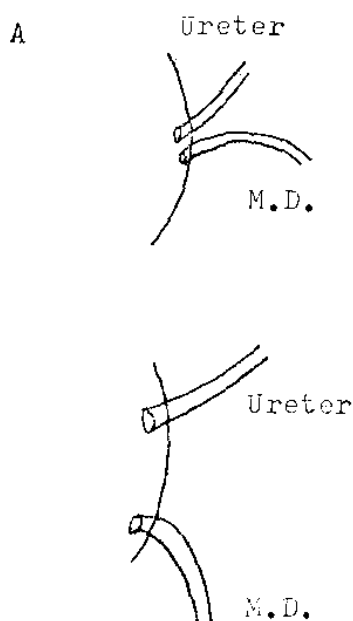
(Tanagho & Hutch , 1965)

When the human embryo has achieved the 5 m.m. stage, and the caudal end of the Wolffian duct has opened into the cloaca, as shown in Fig1,A. A small pouch (THE URETERAL BUD) appears on the dorsal aspect of the Wolffian duct , a short distance above its junction with the cloaca .

By 9-15 m.m. stage, the ureteral bud has pushed cranially into the primordial kidney, as shown in Fig 1,B. And the caudal end has achieved an independent opening into the cloaca just dorsolateral to the opening Of the Wolffian duct .

As development progresses , the opening of the wolffian duct (which will become the ejaculatory duct) migrates downward and medially , and the opening of the ureteral bud (which will become the ureteral orifice) migrates upward and laterally , as shown in Fig 2 .A

15 m.m. foetal stage .



Full term.

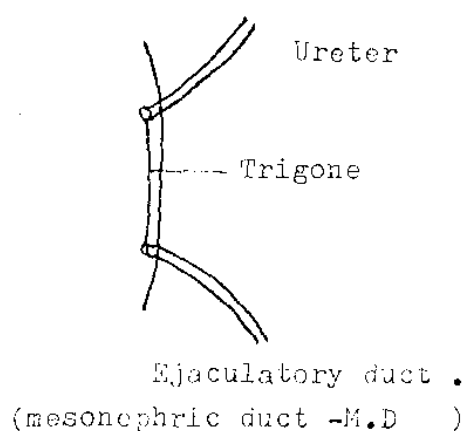


Figure 2 . Showing the mesonephric duct which gives origin also to the ejaculatory duct, and the trigonal tissue, as shown in the 15 m.m. foetal stage, and at full term .(Tanagho & Hutch , 1965)

As these two openings migrate farther and farther from each other, the mesodermal tissue between them becomes the vesical trigone (Fig 2. B) .

Thus , the structures which eventually make up the collecting tubules of the kidney , the calyces , the renal pelvis , extravascular ureter , intravascular ureter , Bell's muscle and the crista urethralis and collectively form the combined ureter , all arise from the Wolffian duct and are mesodermal in origin, as opposed to the bladder which arises from the endoderm .
(Tanagho and Hutch , 1965)

REVIEW OF LITERATURE

THE ANATOMY OF THE URETEROVESICAL JUNCTION

For proper anatomical discussion of the region of the ureterovesical junction , it is essential to consider the anatomy of the lower ureter, the trigone, and the nearby detrusor muscle of the bladder .

THE ANATOMY OF THE LOWER URETER:

Anatomically, two parts can be recognised in the lower ureter, which are the juxtavesical and the intravesical parts, as shown in Fig 3 .

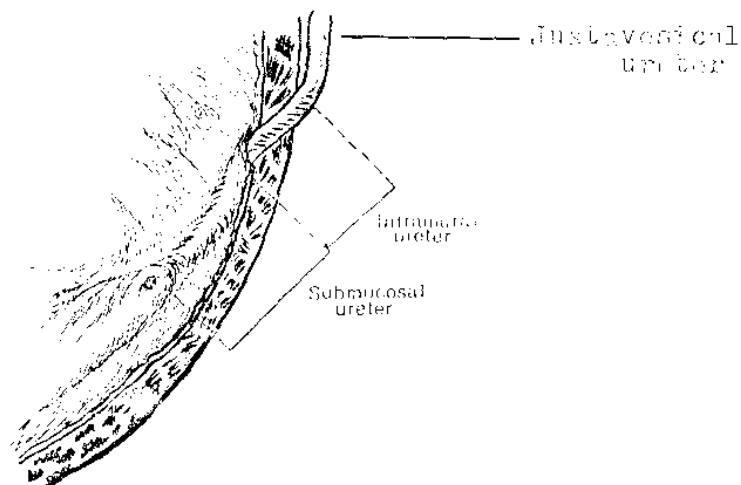


Figure 3 , Showing the normal anatomy of ureterovesical junction . (Cook, W.A., and King, L.R. , 1979)

1 - THE JUXTAVESICAL URETER :

This part comprises the distal 3-4 cm. of the ureter

till its near proximity to the posterolateral wall of the urinary bladder .

2 - THE INTRAVESICAL URETER :

This part is about 1.5 - 2 cm. in length and runs an oblique course within the bladder under its mucosa after traversing its wall . Two parts can also be recognised in this segment .

a - The intramural part :

It traverses the bladder wall and is totally surrounded by detrusor muscle . It is about $\frac{1}{2}$ cm. in length .

b - The submucosal part :

In this part, the ureter runs an oblique course downward forward and medially from the hiatus till its orifice passing under the mucosa of the urinary bladder for an average length of about one cm. before it loses its tubular character and its muscle fibers fan out to meet equivalent amount of muscle fibers from the other ureter, thus forming the superficial trigone . (Stephens, F.D. and Lenaghan, D. 1962)

The arrangement of the muscle fibers in the ureter and in the trigone of the bladder was subjected to a great controversy in views by different investigators .

In 1919 Salani stated that the ureter is formed of three coats, an inner mucosal coat, an intermediate muscle coat, and an outer fibrous coat . He added that at the lower end of the ureter a group of longitudinal muscle fibers are located on one side which is known as Waldeyer's sheath after the man who first described it . He found also that at the intraparietal portion of the ureter these fibers join the muscle of the bladder wall i.e. a group of muscle