# IMPACT OF RENAL SCARRING ON THE CHOICE OF TREATMENT MODALITY IN PRIMARY VESICOURETERIC REFLUX

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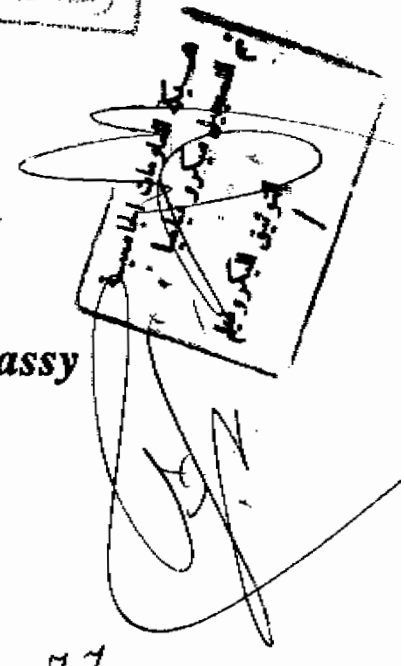



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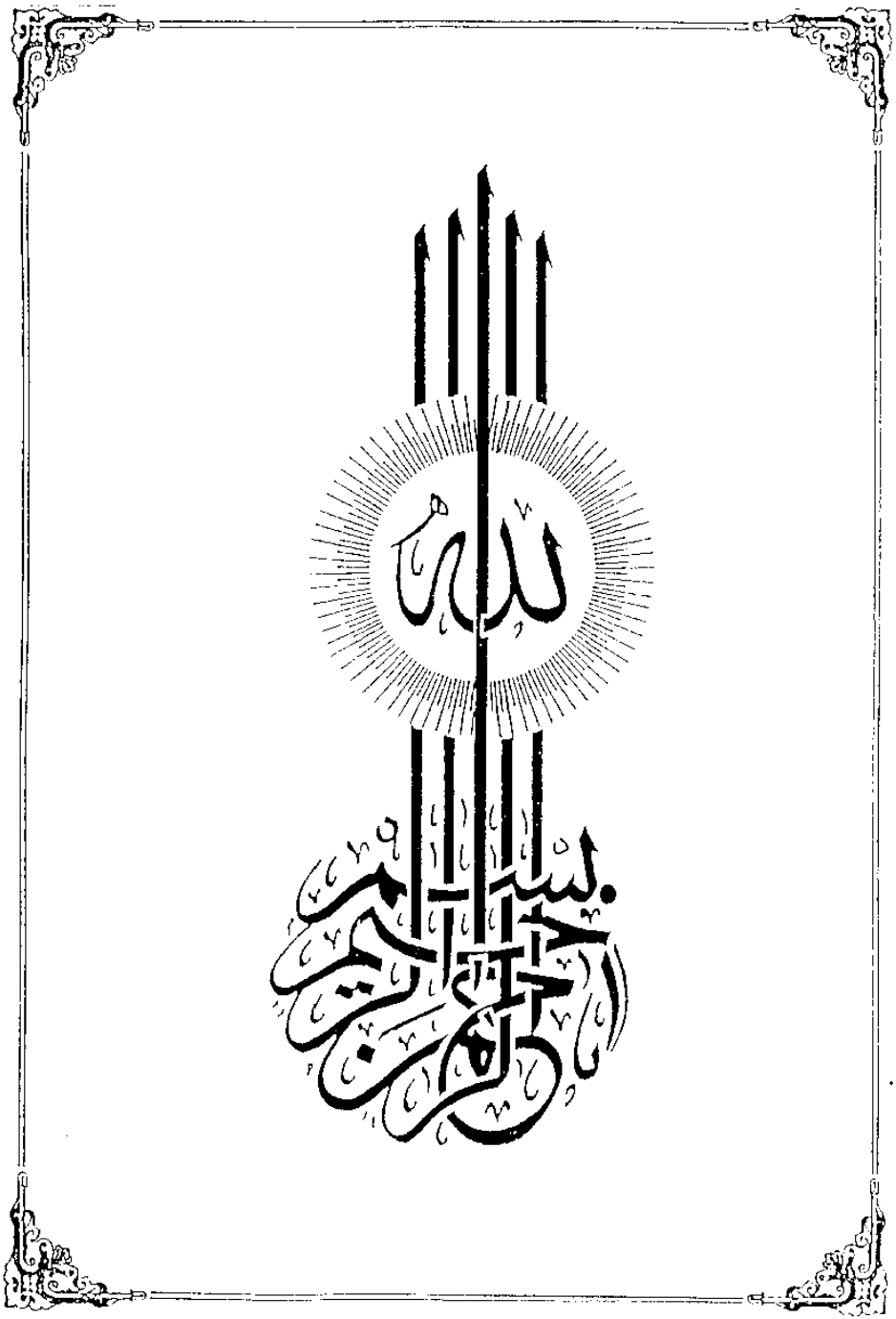
**Safwat H. Abo El-Maaty**



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# *Abreviation*

| | |
|---|---|
| VUR | Vesicoureteric reflux |
| UVJ | Uretero vesical junction |
| VCUG | voiding cysto urethrography |
| PUJ | Pyelo ureteric junction |
| U/ S | Ultra sound |
| IVU | intra venous urogram |
| RES | Reticulo - endothelial system |
| RN | Reflux nephropathy |
| STING | Sub ureteric teflon injection |
| UTI | Urinary tract infection |

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# INTRODUCTION

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Vesico-ureteric reflux (VUR) is now recognized as the most common urologic abnormality associated with pediatric urinary tract infection, and renal scarring.

VUR is reported in 85-100% of scarred kidneys. Renal scarring affect both glomerular, and tubular functions of the kidney, it is responsible for about 40% of cases of end stage renal failure in children. It also induces arterial hypertension which is estimated to be found in 12.8 % of patients with refluxing scarred kidneys.

The pathogenesis of renal scarring associated with VUR is not yet clearly understood. It is explained either as secondary to reflux of infected urine, or to intrarenal reflux associated with peculiar pattern of renal papillae.

Other factors are significantly related to renal scarring e.g. age of the patient at time of presentation, and duration of symptoms of urinary tract infection.

Limited controlled studies, reported that progression of renal scars after surgical correction of VUR occurred in more than 10% of cases, and in more significant percentage of patients maintained on intermittent, than longterm chemoprophylaxis.

## Aim of the work :

The initial lines of managing VUR depend on the graded severity of reflux, frequency of urinary tract infection, and the age of the patient. The most delerious effect of VUR which is renal scarring was not considered in the choice of treatment modality up till recently. In this work we will evaluate the initial presence, and subsequent appearance, or progression of renal scars under the conventional lines of treatment; in order to pick up the high risk group of patients susceptible to deterioration of renal scars. This may impact on decision making in the management of VUR.

50 patients in infancy and childhood, with proven VUR will be submitted initially and periodicaly to the following regime :

1- Full clinical history and examination.

2- Urine analysis, C & S, serum urea and creatinine.

3- Abdominal U/S.

4- VCU.

5- I.V.U.

6- DMSA $T_{99}$ renal scan.

7- Nuclear cysto urethrography for follow up.

# EMBRYOLOGY

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We will present in this chapter some embryological notes explaining the occurence of primary reflux.

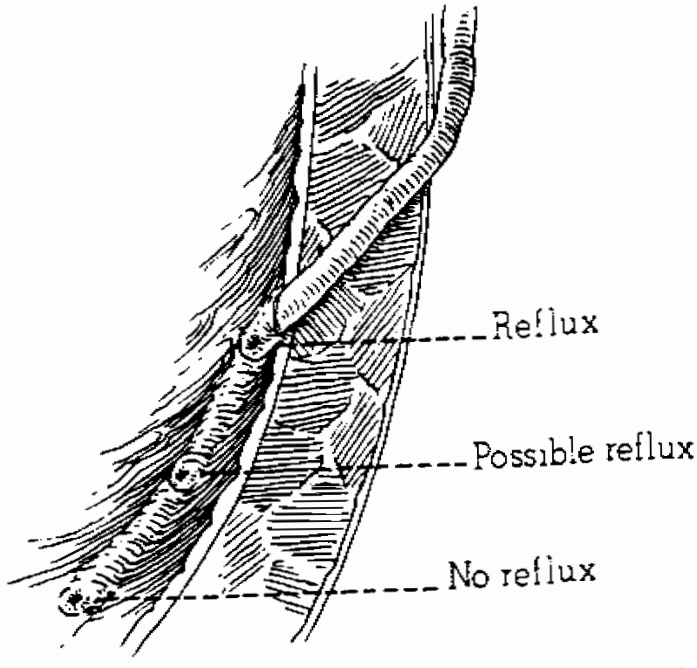
The ureteral bud normally develops from the mesonephric duct at its elbow, where the duct swings ventrally, and medially to join the cloaca. The segment of the meso - nephric duct between the ureteral bud and the future urogenital sinus is termed the common excretory duct, it is also called the trigone precursor by Tanagho, as it will become progressively absorbed into the developing vesico urethral canal, and it contributes mesenchyme, and muscularization to the trigone and the underlying detrusor of this area *(Tanagho et al., 1968).*

As the common excretory duct is absorbed into the vesico - urethral canal, the ureteric bud, and the mesonephric duct aquire separate opening with the ureteral bud initially located medial and caudal to the mesonephric duct ; the two openings migrate in opposite directions, rotating as they do so, the ureteric orifice migrates cephalad and laterally with developing vesico - urethral canal, and the mesonephric duct crosses over the ureter as it moves medially and caudally. The bladder muscularinization begins after the orifices are well separated, resulting in a separate hiatus for each duct *(Perlmutter et al., 1979)* .

In primary reflux, the ureteric bud arises more caudally than normal from the meso - nephric duct. Absorption of this short duct is completed early giving the now separated ureteral duct a longer time to migrate cranially, and laterally before completing its movement . As a result, there is a wide separation of the ureter, and the mesonephric duct, and there is a large trigone with superior and lateral ureteric orifices. The mesenchymal

contribution of the short common excretory is little, thus the trigone is not only large but poorly muscularized. The intra-mural ureter will also be deficient in musculature as there is little time for the common mesenchyme to accumulate around the developing urteric bud. The ultimate result is a large, poorly muscularized trigone with poorly fixated, laterally positioned ureteric orifice and poor muscularization of terminal ureter. Owing to the deficient attachments of the ureter, its orifice is patulous or gaping and has a deficient submucosal tunnel. (figure 1)

The variations encountered clinically in severe VUR and altered uretero-trigonal anatomy can be related directly to the degree of dislocation of the ureteric bud towards the urogenital sinus *(Perlmutter et al., 1979).*




**Figure, -1-** Refluxing ureterovesical junction. Same anatomic features as nonrefluxing orifice, except for inadequate length of intravesical submucosal ureter, are shown. Some orifices reflux intermittently with borderline submucosal tunnels. (From Glenn, J. (Ed.): Urologic Surgery, 2nd ed. New York, Harper & Row, 1975.)

# PHYSIOLOGICAL ANATOMY

**Physiological anatomy of the uretero-vesical junction (UVJ) :**

The ureter is a muscular conduit that contracts in response to stretch reflex to transport a bolus of urine to the bladder. When the bolus of urine passes down the ureter, several factors operate to facilitate its passage through the intravesical segment into the bladder. The longitudinal muscle fibres of the intravesical ureter contracts as the bolus appears at the hiatus, shifts the orifice cranially and laterally towards the hiatus, causing shortening and widening of the intra-vesical ureter and reducing the resistance to the passage of the bolus to the lumen of the bladder. After the passage of the bolus, the intrinsic ureteral musculature relaxes permitting the intra-vesical ureter to resume its resting configuration beneath the bladder mucosa.

The spiral muscle fibres of the ureter which transmit peristaltic waves become oriented more longitudinally, running parallel to the ureteric lumen in the intra-vesical segment without loss in size or number. Thus, only longitudinal muscle fibres continue in the intra-vesical ureter, covered by bladder mucosa and buttressed by the underlying detruser muscle. The longitudinal muscle fibres of the ureter are propably the most significant firm attachment of the ureter to the bladder, a point of utmost surgical importance, other attachments between the ureter and bladder in forms of slings or fascia have been suggested *(Hutch, 1958)*.

As the intravesical ureter passes from the hiatus to its orifice, these longitudinal muscle fibres fan out and decussate with the corresponding fibres of the other side, passing medially forming Mercier's bar, and downwards to form Bell's muscle which are the borders of the superficial trigone. Thus the longitudinal muscle fibres of the ureter forms the