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NON REFLUX MEGAURETER IN CHILDREN

ESSAY

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The Master Degree of General Surgery

By

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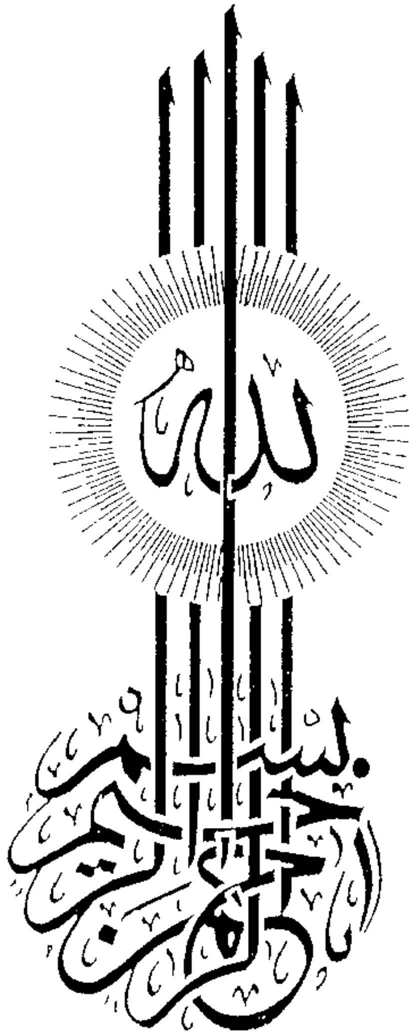
بسم الله الرحمن الرحيم

« سبحانك لا علم لنا إلا ما علمتنا إنك انت العليم الحكيم »

« صدق الله العظيم »


بسم الله الرحمن الرحيم

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INTRODUCTION

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Megaureter is one of the most difficult problems facing surgeons who care for infants and children. Those children and infants may be born with a sterile urinary tract and often seemingly quite healthy. They gradually acquire urinary infection and some may suffer from voiding troubles which bring to light their serious urological problem. Curiously, a few children do not develop attention for several years and escape during infancy, but this is rare. When this condition is neglected, great loss of renal parenchyma may occur rapidly or slowly depending upon the severity of the condition.

Actually megaureter is not a diagnosis but it is a term to describe the abnormally wide ureter which may occasionally be also tortuous .

Until relatively recently megaureter was considered to be a urologic condition that was not amenable to surgical correction. However, there is ample evidence that many cases should be repaired and that a relatively high degree of success can be achieved.

It should be underscored at the outset, however, that some of these cases present a technical surgical challenge as difficult as any problem in reconstructive urologic surgery

There are two principal types of megaureter, those with reflux at the vesicoureteric junction, and non reflux megaureter, which is the subject of our essay.

EMBRYOLOGY OF URETER

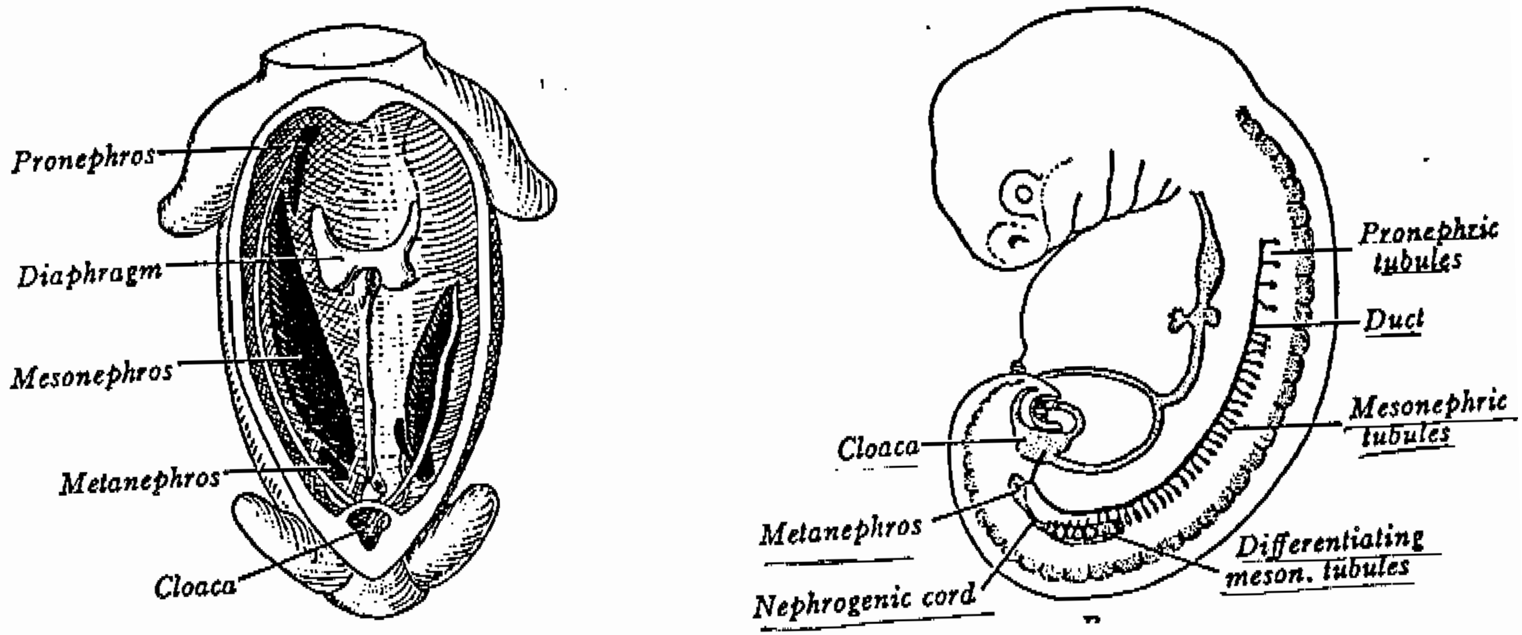
The ureter makes its appearance as a slight bulbous enlargement of the Wolffian duct in the 4 mm embryo at the point where the distal end of the Wolffian duct bends sharply from its craniocaudal course to enter the posterolateal wall of the cloaca . The short ureteral bud grows at first in a dorsal direction toward the vertebral column. Later in the 6 to 8 mm embryo, the ureter acquires a gentle curve as it advances in a cranial direction. At this time, the tipe of the ureter changes into a bulbous end and acquires the metanephric cap, still in the unorganized mesenchymal tissue of the sacral portion of the nephrogenic ridge. (Hodges 1964),

In slightly older embryos (8 to 11 mm.) , this metanephric mesenchyme is organized into a compact bean-shaped (reniform) mass of cells, quite distinct from the more cranially located mesonephros. In the centre of this reniform mass of metanephric blastema the bulbous ureteral tip produces four knob like projections- the first divisions of the ureteral pelvis. These structures elongate [illegible] before dividing further. The craniocaudal branches, which [illegible] the upper and lower poles of the kidney, divide more rapidly than the interpolar branches, for in the 15 mm embryo four to five generations of branches are present at the poles with only three generations between the poles. It is in embryos of about 18-to 20 mm. size that the metanephric blastema first begins to become organized into nephrons; until then the kidney consists of about five generations of ureteral bud branches with each distal branch ampula being surrounded by a double layer of metanephric cells. Part of each of these bilaminar masses separates to form a hollow vesicle, the renal vesicle ,while the remainder of each mass becomes the cap of the next subdivision of the collecting tubule. The first vesicles are formed in stage 19 mm embryos and become S-shaped in stage 20 mm embryos, with glomeruli making their appearance in stage 21 mm embryos (25 nd post-ovulatory day). Concurrent with the appearance of functioning glomeruli, the early tubular generations (the first three to five ureteral bud divisions), become dilated and coalesce to form the renal pelvis and major calyces. The reshaping of these early ampullar divisions most likely is due to the hydrostatic pressure of primitive urine produced by the developing glomeruli. As further duct subdivisions now occur rapidly throughout the kidney, an increasing peripheral consolidation of metanephric elements profoundly affects the dilating ability of the newest generations of collecting tubules, the next three to five ampular divisions (after the formation of the renal pelvis and major calyces) result in short, closely spaced tubules that will dilate, consolidate, and transform themselves into the minor calyces and cribriform plates. Their initial saccular shapes are soon flattened as they are compressed by the centrally expanding renal pelvis against the dense cortical mantle; each calyceal chamber will embrace an area of closely spaced terminal ends of peripherally advancing collecting tubules, there by assuming its definitive cup shape. (Chwalla; 1972 b).

Branches immediately distal to those that dilated to form the cavity of a calyx and its cribriform plate become papillary ducts. They are the first true generation of collecting tubules, because the first three to five ampular divisions were necessary to form the renal pelvis (and major calyces) and an additional three to five divisions were necessary to form the minor calyces, papillary ducts and the more peripherally located collecting tubules can arise only from additional divisions (seven or more) of the ureteral ampulae. (Chwalla; 1972 b).

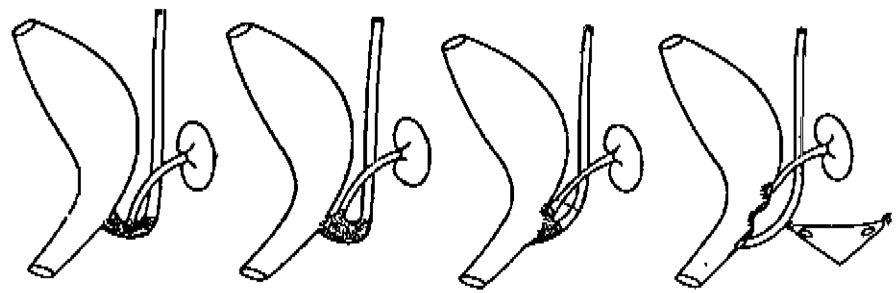
Branches of the newest generation of periphral collecting tubules become elongated and slender, whereas those near each calyx remain short and wide. These younger generations of tubules will carry attached nephrons with them peripherally, thus creating a central zone withen the kidney of only collecting tubules, called the medulla. (Chwalla; 1972 b).

As the common duct segment distal to the point of origin of the ureter is assimilated in the formation of the trigone, the distal end of the ureter achieves an independant opening into the cloaca (bladder angle) . In the stage 18 embryo, only to be sealed by an epithelial membrane for the next 16 days ; this membrane eventually ruptures owing to increased pressure of the accumulated urine within the primitive pelvis and calyces. This hydrostatic pressure having " Modeled" the renal pelvis and calyces, as already described, the slanting course of terminal ureters along the bladder wall is present almost from the beginning , the ureters being anchored in this " adult" position by concentrically arranged embryonal connective tissue (Chwalla, 1972 b). The mesenchyme forms delicated concentric rings, about twenty in number, around the ureters, inside these rings, fine strands of circular muscles appear in embryos older than 70 mm. crown-rump length. The musculature appears first in the lower end of the ureters and gradually extends toward the kidney , in embryos of 150 mm. length it is developed throughout the entire length of each ureter. (Chwalla, 1972 b).



Embryology of the urinary tract (D. Stephens 1984 P. 190).

Developmental steps of the ureter and the formation of Trigone . (D. Stephens 1984 P. 191) .



Formation of Trigone
(D. Stephens 1984 P. 191).

ANATOMY OF THE URETER