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# **Patterns of Urolithiasis in Pediatric Patients**

**Thesis**

**Submitted for fulfillment for  
the master degree in urology**

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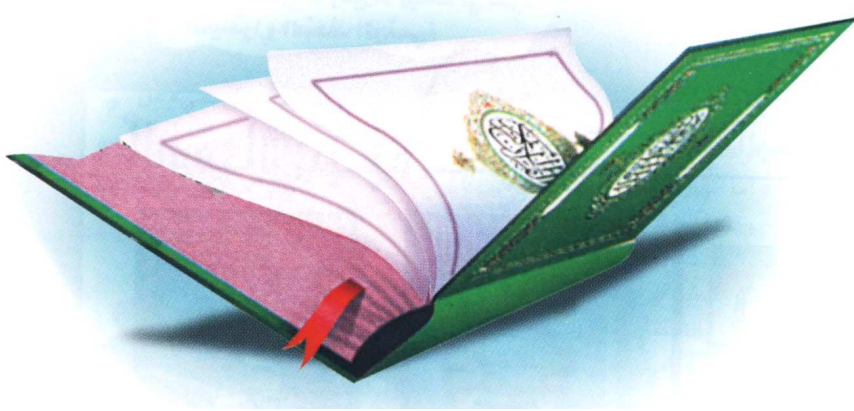
**Faculty of Medicine**

**Cairo University**

**2012**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"وَمَا أُوتِيتُمْ مِّنَ الْعِلْمِ إِلَّا قَلِيلًا"



صدق الله العظيم

(سورة الإسراء: 85)

# Acknowledgement

*Thanks to **ALLAH** the greatest of all for helping me to complete this work.*

*I would like to express my sincere and deep gratitude to **Prof. Dr. Mohammed Onsi**, Professor of urology, Faculty of Medicine, Cairo University, for giving me the privilege of supervising this thesis and for his constructive encouragement, illuminating guidance as well as his support throughout this work.*

*I am really grateful to **Prof. Dr. Amr Fayad**, assistant professor of urology, Faculty of Medicine, Cairo University, for his assistance.*

*I really wish to express my deep gratitude to **Dr. Mohammed El Sheemy**, Lecturer of urology, Faculty of Medicine, Cairo University, for his kind assistance, precious and effective effort.*

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## List of Abbreviations

AH	:	Absorptive hypercalciuria
AUA	:	American urologic association
BMI	:	Body Mass Index
CaOx	:	Calcium Oxalate
CT	:	Computed Tomography
DMSA	:	Dimercaptosuccinic Acid
ESWL	:	Extracorporeal Shock Wave Lithotripsy
HASTE	:	Half Fourier Acquisition Single Shot Turbo Spin Echo
HM-1	:	Human Model 1
HPF	:	High Power Field
HU	:	Hounsfield Unit
IVP	:	Intravenous Pyelogram
IVU	:	Intravenous Urography
KUB	:	Kidneys, Ureters and Bladder X-ray
MAP	:	Magnesium Ammonium Phosphate
MET	:	Medical Expulsive Therapy
MIP	:	Maximum Intensity Projection

MRI	:	Magnetic Resonance Imaging
NCCT	:	Non-Contrast-Enhanced Computed Tomography
PCNL	:	Percutaneous Nephrolithotomy
RARE	:	Rapid Acquisition With Relaxation Enhancement
SD	:	Standard Deviation
UPJ	:	Ureteropelvic Junction
URS	:	Ureteroscopy
US	:	Ultrasound
UTI	:	Urinary Tract Infection

## **Abstract**

**Introduction and objectives:** The aim of our study was to evaluate the clinical features and to assess possible underlying aetiologic factors of pediatric urolithiasis whether metabolic, infection or structural abnormalities, with detection of any role of family history on the cause of stone development.

**Material and methods:** The study design is a prospective study that was carried out on a total number of 66 consecutive Egyptian children diagnosed with urinary stone disease. The study was done at the department of urology at Aboul-Riche Children's Hospital, Kasr Al-Ainy, Cairo University during the period of the study from March 2011 to April 2012. □

**Results:** The children were between 18 months to 14 years (mean,  $5.864 \pm 3.441$  years, median 5.0 years). In 85% of the cases, the calculus was located in the upper urinary tract and in 15% it was only in the bladder. The most common presentations were dysurea, abdominal pain, and anuria. A positive family history of urinary calculi was detected in 42.4%; urinary tract infection, in 50%; and anatomic abnormality, in 9% of the patients. Metabolic evaluation revealed that 52.6% of them had a metabolic risk factor including hypercalciuria (7.5%), hyperuricosuria (4.5%) and hypomagnesuria (1.5%).

**Conclusions:** We think that urolithiasis remains a serious problem in children in our country. Family history of urolithiasis, urologic abnormalities, metabolic disorders and urinary tract infections tend to be associated with childhood urolithiasis.

**(Key Words):** Urolithiasis, Pediatric, Renal stone

# Introduction and Aim of the Work

## **Introduction**

The prevalence of pediatric urolithiasis appears to be increasing. Unlike adult patients, rigorous epidemiologic studies do not exist in pediatric populations. Thus, in the setting of an increasing prevalence of childhood stone disease, improved research is critical to the development of uniform strategies for pediatric urolithiasis management. (*Clayton et al., 2011*) .

The patients and their family histories, as well as physical examination, are important initial steps for diagnostic evaluation. Since metabolic causes are frequent in children, diagnostic evaluation should be meticulous so that metabolic disorders that cause recurrent urolithiasis or even renal failure, such as the primary hyperoxalurias and others, can be ruled out. The stone is not the disease itself; it is only one serious sign! Therefore, thorough and early diagnostic examination is mandatory for every infant and child with the first stone event, or with nephrocalcinosis. (*Hoppe et al., 2010*) .

Most children with urinary lithiasis have underlying metabolic abnormalities, with hypercalciuria being the most prevalent. Other metabolic risk factors vary in frequency according to the different series. Some other metabolic alterations that have been described are hypocitraturia, hyperuricosuria, hyperoxaluria, renal tubular acidosis and cystinuria (*Peres et al., 2011*) .

The goals of the metabolic evaluation for urolithiasis are to identify children at increased risk for recurrent stone disease and to diagnose specific treatable metabolic derangements. If stones have been surgically removed or isolated from strained urine during spontaneous passage,