Cairo University
Faculty of Medicine
Urology Department

Patterns of Urolithiasis in Pediatric Patients

Thesis
Submitted for fulfillment for
the master degree in urology
By

Ayman Maher Abdel Samie Abdel Wahed
(M.B. B.Ch.)

Under Supervision of

Prof. Dr. Mohammed Onsi
Professor of Urology
Faculty of Medicine
Cairo University

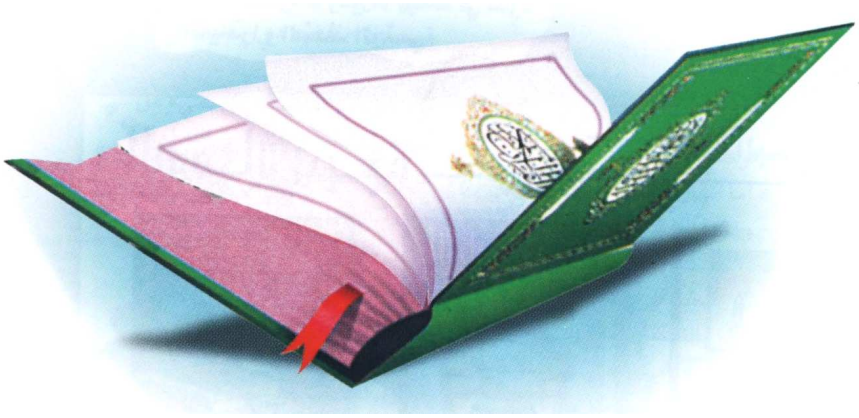
Prof. Dr. Amr Fayad
Assistant Professor of Urology
Faculty of Medicine
Cairo University

Dr. Mohammed El Sheemy
Lecturer of Urology
Faculty of Medicine
Cairo University

2012

بسم الله الرحمن الرحيم

"وَمَا أُوتِيتُم مِّن الْعِلْمِ إِلاَّ قَلِيلاً"



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.*

Contents

List of Figures

List of Tables

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 ± 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,