LOWER URINARY TRACT LITHIASIS

THESIS

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BY

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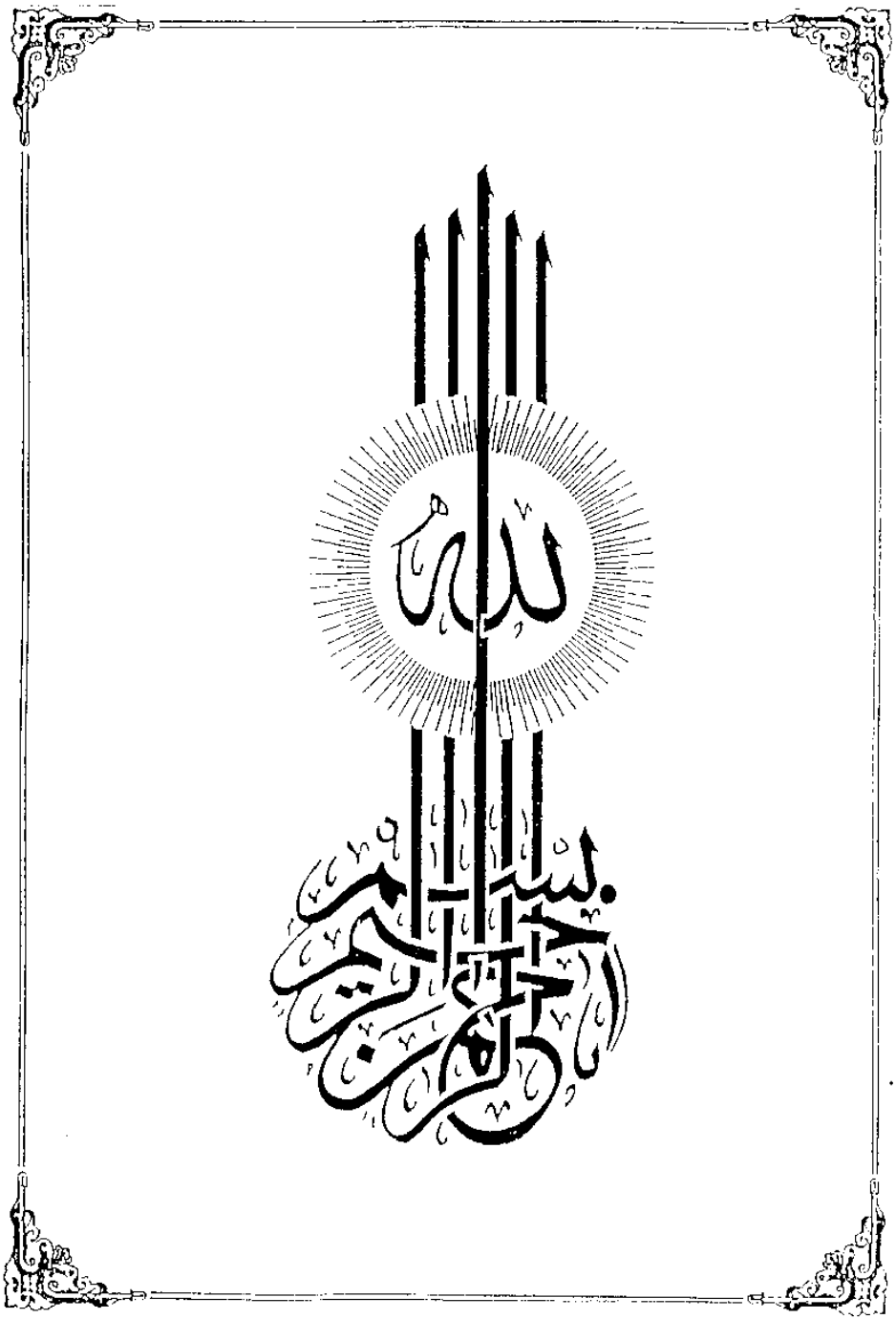

A C K N O W L E D G E M E N T S

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C O N T E N T S

HISTORICAL REVIEW

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Urologists have been defined (forever) as surgeons because of their methods of dealing with urinary lithiasis.

The historical panorama of Calculus disease reveals a fundamental change in the characteristics of the disease from the earliest records to the present day. The bladder stone is typically the Urinary stone of history whilst the renal and ureteric stones are the characteristic clinical manifestation of the disease in the affluent, technically - deneloped Communities of to day.

Vesical calculus represents one of the most symptomatizing stones of the urinary tract Owing to the Continuous irritation on the bladder wall specially during movement and Voiding, Retention of urine due to impaction at bladder neck, specially small stones is one of the emergency Conditions Occasionally met with Stones are like dogs, the little one makes the most noise.

Study of Egyptian Mummies and ancient documents has revealed that stone formation did exist several thousand years B.C. (Badr, 1963).

Vesical Calculus dates back to the begining of evolution of man The earliest vesical calculus was discovered in the skeleton of a young adult male from a grave in a pre-historic Cementry in upper Egypt which is reputed to be dated as back as 4, 800 B.C. (Badr, 1963).

This stone was described by Elliot Smith in 1910 and it was lying down in the bony pelvis. It was ovoid in shepe with a long axis of 4 - 5 Cm and was Composed of central nucleus of uric acid surrounded by laminations of Ca. Phosphate, Ca. Carbonate and Magnesium Ammonium phasphate.

Elliot Smith examined 9000 Egyptian mummies and found only 3 urinary colculi 2 of them were vesical. He Explained the low incidence of Calculi among ancient Egyptian mummies by the fact although the incidence of calculi was higher in lower classes, yet embalming of the dead was restricted to higher classes where vesical Calculi were not Common.

Shattock (1905) described another stone in a grave dated about 4 700 B.C. the stone measured 1.5 Cm in diameter, Irregular in shape and was composed of Calcium Carbonate and phosphate with smoll amount of Calcium Oxalate.

Ruffer 1921 described 3 Stones given to him by professor Flinders Petrie who had discovered them in a pre-dynastic skeleton, they weighed 30 - 24 - 12 Grams respectively and their chemical composition proved to be of phosphate and uric acid .

Ancient records revealed that stone disease was also present in the Greek and Roman Civilizations.

Hippocrates could be credited as being the first to theorize about the aetiological factors of urinary lithiasis.
He observed that many patients having Calculi in the bladder

or kidneys had sandy sediment in their urine and suggested that the ingestion of muddy river water or water Containing lime caused stone formation in the urinary tract (Butt, 1956).

Galen the great Roman physician also wrote about stone formation and recognized such risk factors as heredity, race, climate, diet, drinking water, the ingestion of alcohol, incidence of gout and rheumatism and metabolic abnormlities. Galen believed that gouty deposits and some renal calculi were of the same origin

Ancient Indian physicians described four types of calculi which were formed by phlegm, Vapour, bile and semen (Murphy , 1972). They thought that when air and phlegm meet, asmall stone is formed which grows toward the bladder outlet and enters the outflow of urine. The tortured patient grinds his teeth, presses on his abdomen and rubs his penis, Urine, Flatus and faeces are passed with severs pain. In such a case the stone is black, rough, irregular and covered with spikes like the manelea cadanba flower, the wise physician diagnosed the stone as beeing caused by air.

Jean-Baptiste van Helmont (1571 - 1644) was the first to suggest that stone formation resulted from the excretion of abnormal material in the urine(Butt, 1956). He observed that stone formation was asscocieted with the presence of multiple factors and similarly the Composition of the stone reflected the presence of multiple substances found in the urine.

These necessary Urinary Factors were :-

1. The Spirit of Urine (uric acid).
2. The Coagulating spirit (Alcohol).
3. Aferment causing decomposition of the urine.

He proposed the presence of anucleus or core of the stone and progressive growth of the stone was dependent on the presence of a ferment causing decompasition of urine.

The first investigation demonstrating the structural Composition of urinary calculi were made by Anton Von Heyden in 1684 (Butt 1956). He removed the crystalline Components from stone without destroying the gross structure and termed the remaining substance the framework of urinary calculi. No attempts was made to identify the crystalline components themselves until 1776 when Carl Wilegim schele a Swedish apothecary isolated uric acid from acalculus.

French investigators, Vauquelin, Four Cray, Engle[illegible]'s W[illegible]ston and Marcet performed extensive chemical analysis and categorized stones as :-

1. Uric Acid
2. Oxelate of lime.
3. Cystine.
4. Calcuim Carbonate.
5. Phosphate of lime.
6. Ammonium magnesium phosphate and ,
7. Fusible Calculus Consisting of the latter two substances.

In 1923, Keyser reported the results of some experimental studies on the production of crustalluria and subesequent stone formation,

He proposed that hyperexcretion of crystals might cause stone formation as well he recognized the protective effects of urine in maintaining crystalloids in solution. He believed that the latter was due to due to hydrogen ion Concentration and the presence of protective colloids in urine .
Also the protective ;echanism existed in the anatomy of the urinary tract with its contractile and funnel shaped structures that allow for ready passage of crystalline material. So accordingly Keyser theorized that any disturbance of one or more of this protective mechnaisms would result in stone formation.

Trials of management and extraction of vesical stones were recorded since the Oath of Hippocrates 460 - 370 B.C. which includes the words "neither will I Cut them that have stone but leave those operation to those who are accustomed to perform it" This indicates that an accepted and successful method of treatment was then well estalished.

An Egypt Ammnius who lived two centuries after Hippocrates, practiced treatment of vesical stones in Alexandria by crushing using a hook inserted through a perineol incision.

Celsus the Roman (25 B.C. to A.D. 50) performed successful operations that were still followed up to the 15th Century. He chose his cases from boys between 9 - 14 years old, only in spring time. The patient was in lithotomy position, the stones were fixed by an able assistant with his 2 fingers in the rectum and a hand above the pelvis, pushing and fixing the

stone prominently into the perineum, he then cuts with a sharp knife on the bulge of the perineum and the stone was extracted.

After this travelling lithotromists were known with their skilled technique of removing stone bladder, they moved from one place to another in constant circles and were awaited by anxious miserable patients. The technique of their operation was kept secret among their families and passed from one generation to another.

From these famous families were preciani and Norsini in Italy in the 13th century.

Callots in France is a family that was renewed through eight generations up to the 18th Century Then there was Frere Jacques a famous French lithotromist during 17th - 18th Century .

In the early years of 18th century the combined work of Cheselden of St. Thomas's and Douglase Brothers one an anatomist and the other a surgeon of Westminster Hospital, established supra pubic approach to the bladder.

Crushing bladder stones was unsatisfactory until 1883 when Bigelow of Boston (U. S. A.) modified the evacuator that was designed by claver of London in 1866 .

From the famous surgeons of litholapaxy all over the world was keegan and Frayer who began their experience in India.

PHYSIOLOGY OF THE BLADDER