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Comparative study between Extracorporeal Shock Wave Lithotripsy and Percutaneous Nephrosto-Lithotomy in the management of lower pole renal calculi

Thesis

Submitted in partial fulfillment for the master degree

In Urology

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بسم الله الرحمن الرحيم

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ

خَلَقَ الْإِنسَانَ مِنْ عَلَقٍ

اقْرَأْ وَرَبُّكَ الْأَكْرَمُ الَّذِي عَلَّمَ بِالْقَلَمِ

عَلَّمَ الْإِنسَانَ مَا لَمْ يَعْلَمْ

العلق ١ - ٥

TO MY FAMILY:

My Father … the guide

My Mother … the light

My Sister … the warmth

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INTRODUCTION

Introduction

The treatment of renal calculi has undergone dramatic changes compared with other aspects of urologic surgery.

Small, non-obstructing caliceal calculi is a common urologic presentation. In the past, most urologists were reluctant to offer an active treatment approach and watchful waiting was the rule for these patients, since the only active treatment option available was open surgery.

Even when these patients complain of pain, these small non obstructing calculi were not considered to be the source of pain.

Thanks to the recent advances in the fibro-optics and in the shock wave technology, urologists now have multiple active and less invasive options to choose from and the standred open surgical procedures had become a remote option .

The available options for approaching caliceal stones are extra-corporeal shock wave lithotripsy, percutaneous nephrosto-lithotomy and finally retrograde uretero-renoscopy.

The choice among any of these options depends on the patient collecting system and stone anatomy, the urologist experience and the avaliablity of the facilities for this treatment option.

REVIEW OF LITERATURE

Surgical anatomy of the kidney

Sound recognition and three dimensional imaging of both intra-renal anatomy and its relationship to the neighboring structures as well is essential before selecting patients with renal calculi to be managed either by Extracorporeal Shock Wave Lithotripsy [ESWL] or by Percutaneous Nephrosto-Lithotomy(PCNL).

The kidney

A pair of excretory organs lying retro-peritoneally on the posterior abdomenal wall. Each kidney is bean shaped and has a superior, and an inferior pole, convex lateral border and a concave medial border carrying the hilum which in turn contains the renal vessels, nerves and the renal pelvis .[1]

Dimensions of the kidney are subject to considerable variations . The average measurements of the right kidney are 10 . 97 cm , 6.48 cm 3.21 cm. in the longitudinal, transverse, and antero-posterior diameter, respectively. The left kidney is usually 0.5-1 cm larger than the right kidney. [1]

Radiologic measurements are misleading, because there is usually 1-2 cm magnification in all dimensions than the actual measurements. [2]

Position of the kidney:

Each kidney lie at the upper part of the para-vertebral gutter, opposite to the last thoracic and upper three lumbar vertebrae. The position of the kidney is greatly influenced by the shape of the psoas muscle. The psoas muscle is cone shape and it influences the position of the kidney as the longitudinal axis of the kidney runs parallel to the oblique course of this muscle with dorsal inclination.

The net result of this arrangement is that the superior poles are more medial and more posterior than the lower poles. Furthermore, the hilar region is rotated anteriorly 30- 50^0 behind the frontal plane so that the lateral convex border of the kidney will be directed posteriorly, the anterior aspect of the kidney is facing forward and lateral and the posterior aspect of the kidney is facing backwards and medially.[1] (Fig. 1,2)

The kidney is held in position by[2]:

1)The enveloping renal fascia

2) The short vascular connections

3) The intra-abdomenal pressure generated by the muscle tone of the abdomenal wall. The kidney movement becomes more extensive when the patient is anaesthetized.

4) Support by the surrounding organs.