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بسم الله الرحمن الرحيم

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التوثيق الالكتروني والميكروفيلم

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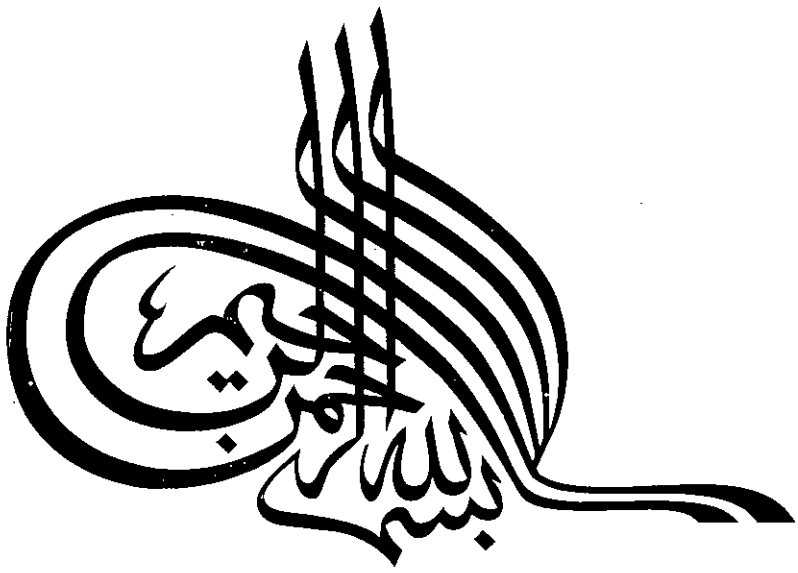
بسم الله الرحمن الرحيم

ROLE OF COMPUTED TOMOGRAPHY IN PATIENTS WITH RENAL TRAUMA

Thesis
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Univeristy Of Alexandria
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For his experience in computed tomography

Dedicated to

my family

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CONTENTS

INTRODUCTION

ANATOMY OF THE KIDNEY

General description:

The kidneys lie one on each side of the spinal column, usually beside the bodies of the 12th thoracic to the 3rd lumbar vertebrae. However, there is enough variation in position and shape to make it difficult to determine exactly what is normal.

Movement from the supine to the erect position and motions of breathing may shift the normal kidney as much as 5 cm (the length of one lumber vertebra). Because of the size and position of the liver. The right kidney usually is 1-2 cm lower than the left. (1)

The kidneys are not situated parallel and vertical , but the upper poles are tilted slightly towards one another, probably because of the kidney position in relation to the muscles of the posterior abdominal wall. As the kidneys are situated in a shallow trough (the renal niche) just lateral to the vertebral column and its enclosing muscles. Their medial borders are tilted forward on the edges of the psoas muscles, therefore, each kidney is rotated so that the medial border faces slightly anteriorly and lateral border slightly posteriorly.(2)

At autopsy, the average adult kidney is approximately 12-cm long, 6-cm wide and 3-cm thick. On excretory urography however, the kidneys appear to be much larger, having a mean length, in the adult man, of 12.9-cm on the right and 13.2- cm on the left. In part, this is a consequence of magnification of approximately 10% (more in obese persons) by the radiographic process. The diuresis accompanying urography can also lengthen the kidneys 1cm or more. The posterior renal surface is flatter than the rounded convex anterior surface. (2)

Anatomic relations of the kidney:

The posterior relation of the right and left kidneys are the same except that the right kidney, being lower, has less relation to the diaphragm and the pleura. The renal bed is bounded medially by the psoas major, posteriorly by the quadratus lumborum muscle, laterally by the aponeurosis of the transversus abdominis muscle, and superiorly by the diaphragm.(1) Posteriorly, the 12^{th} rib crosses the kidney at 45 angle, such that one third or more of the kidney lies beneath the last two ribs. This is more pronounced on the left side, however, this can be modified by the position and variable length of the 12^{th} rib.On the left side, the lower half of the kidney usually extends below the level of the pleural reflection , whereas, on the right side about two thirds of the kidney extends below. (3)

The diaphragm is attached to the 12^{th} rib and arcuate ligament, the reflection of the posterior costal pleura to the diaphragm is along a horizontal line starting at the lateral surface of the 12^{th} thoracic vertebra on the same level or a little below the origin of the 12^{th} rib and passes obliquely downwards and laterally. Within the reflection of the pleura are the pleural reserve sinuses, which are occupied by the lung margins only on deep inspiration. During expiration the pleural leaves of the recesses are approximated.(3)

The principle anterior relation of the kidney is the peritoneum. However, not all of the anterior surface is so covered because other retropertioneal structures lie in close opposition to the kidneys. (Fig. 1)

The anterior relations of the two kidneys are more symmetrical than appears at first sight and may be studied simultaneously with advantage. On each side, the peritoneum of the posterior abdominal wall lies in

contact with certain areas of the kidney, while intervening structures force it away from the kidney in other areas.[4] The hilum is separated from the peritoneum, on the right side by the second part of the duodenum and on the left side by the tail of the pancreas. The lateral part of the lower pole is separated from peritoneum by the hepatic and splenic flexures of the colon on the right and left sides respectively. The medial part of the lower pole, on each side, lies in contact with peritoneum which separates it from coils of jejunum; here between peritoneum and kidney, is an artery, the ascending branch of the right colic and of the upper left colic arteries respectively. The upper halves of each kidney, up to the superior pole, lie in contact with peritoneum. On the right kidney is the peritoneum of the hepato-renal pouch (part of the greater sac), in contact with the under surface of the liver. The upper part of the left kidney, over a triangular area between the suprarenal gland, spleen and pancreas, is covered by peritoneum of the lesser sac and so forms part of the stomach bed, with the lieno-renal ligament passing forward near the lateral margin of the kidney. [4]

Renal coverings:

The kidney has four coverings; the true capsule, the perirenal space and fat, Gerota's fascia and the pararenal fat (Fig. 2). The true capsule is a tough, fibrous membrane that is closely applied to the kidney surface, but can be easily stripped from it. Capillaries and lymphatics extend from the capsule into the renal substance. [5]

Outside the true capsule, the kidney is surrounded by peri-renal fat which is characteristically of pale yellow color. Multiple fibrous strands traverse this fat between Gerota's fascia and the capsule.[5]