

سامية محمد مصطفى



شبكة المعلومات الجامعية

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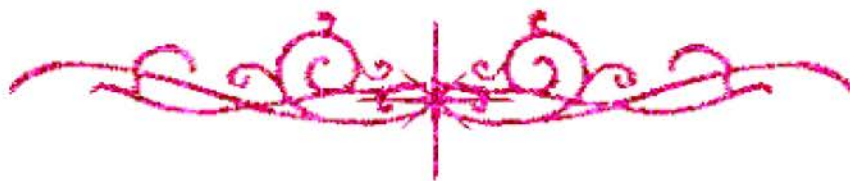
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شبكة المعلومات الجامعية



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



سامية محمد مصطفى



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

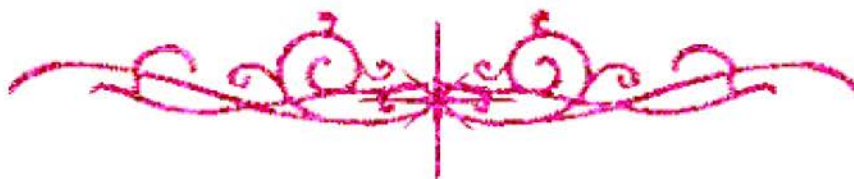
## قسم

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علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



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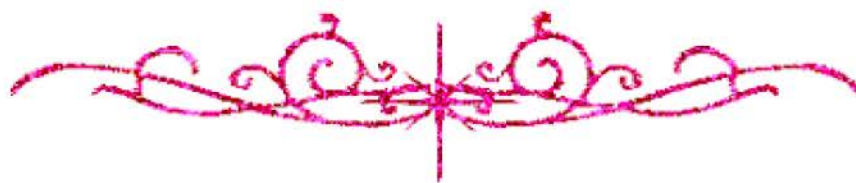
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# بعض الوثائق الأصلية تالفة



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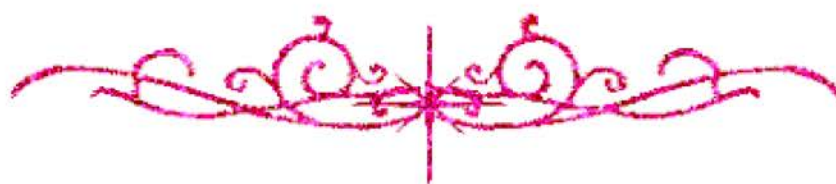


شبكة المعلومات الجامعية



بالرسالة صفحات

لم ترد بالأصل



# Anaesthesia in Renal Diseases

*Thesis*

المشرف  
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عزت

*Submitted in partial Fulfillment for  
The Master Degree  
In Anaesthesia*

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TO A FRIEND AND COLLEAGUE:  
WHOME THEY WERE VERY HELPFUL TO ME FOR  
FINISHING THIS WORK AND GIVING ME ALL  
THE SUPPORT AND ENCOURAGEMENT

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## ***Introduction***

Sometimes surgery is a must for a renal patient.

Anaesthesia for renal patient presents many problems to the anaesthetist mainly in anaesthetizing the patients with terminal renal failure.

Anaesthesia for renal patient needs special skill from the anaesthetist to ensure good perfusion and preservation of the kidney all through the operation.

This thesis has been suggested to review all effects of anaesthetic agents and techniques on patients with chronic renal failure and to choose the ideal agent and technique in patients subjected to anaesthesia.

## **Anatomy of the kidney**

### **Site and Microscopical Appearance**

The two kidneys lie retroperitoneally in the abdomen on either side of the vertebral column. The upper and lower poles are at the level of the twelfth thoracic and third lumbar vertebrae respectively. The right kidney may lie slightly lower than the left due to the mass of the liver.

During normal inspiration each kidney moves up and down over a distance of one vertebral body, the anterior surface of each kidney bears important relationships to many intra-abdominal structures, the upper pole is closely attached to the adrenal gland, and the renal vessels and ureter join the hilum at its medial border.

The kidney is covered by a fibrous capsule which may be easily removed exposing a layer of smooth muscle fiber beneath. A cross section of the kidney reveals the outer cortical and inner medullary substance.

### **Vascular system**

The main renal arteries pass directly from the abdominal aorta to the kidneys. After giving off small branches to the capsule and the pelvis, each main artery then enters the hilum and divides into five segmental arteries which in turn divides

into interlobular arteries as they run through the renal medulla towards the cortex. Each of the segmental arteries is an end artery i.e., it does not anastomose with its neighboring artery. On reaching the point of junction between medulla and cortex at the base of the pyramids each interlobular artery divides into two, and in a T-shaped fashion each branch runs at right angles to the parent stem between cortex and medulla.

These vessels give off the interlobular arteries. These run through the cortex giving off a large number of branches which pass directly to the glomeruli (the afferent glomerular arterioles) and finally terminate as perforating arteries which supply the kidney surface. The renal veins follow the same course as the arteries (*Wylie and Churchill-Davidson, 1994*).

### **Nerve Supply**

The kidney has a sympathetic supply which is derived from the 12<sup>th</sup> thoracic to 2<sup>nd</sup> lumbar segments of the spinal cord. The adrenergic fibers enter the renal substance along the renal arteries and are predominantly vasoconstrictor in action being distributed to the afferent and efferent glomerular arteries.

Nerve fibers have also been shown to terminate close to the cells of the juxtaglomerular apparatus. Cholinergic fibers have also been found in the kidney but their exact function is not known (*Wylie, 1994*).

### **Collecting System :**

The functional unit of the kidney is the nephron, each kidney has approximately 1 ¼ million of these structures, and each nephron is capable of forming urine by itself. Each nephron consists of a glomerulus and renal tubule.

The glomerulus consist of a mass or tuft of parallel capillaries which is fed by an afferent arteriole and drained by efferent arteriole which breaks up again forming two separate capillary beds; peritubular capillaries and vasa recta which descend into the medulla along with the loops of Henle (*Marsh and Segal, 1991*). The glomerulus are surrounded by the blind end of an expanded renal tubule called Bowman's capsule. This apparatus is concerned with filtering of substances from the blood stream. Bowman's capsule leads to the proximal convoluted tubule, down the descending limb of the loop of Henle and bends sharply back as the ascending limb to become the distal convoluted tubule which finally drains into the collecting tubule, which collects fluid from several nephrons.

The collecting tubule passes from the cortex back downwards through the medulla, paralleling the loops of Henle, then it empties into the pelvis of the kidney.

The loops of Henle and the collecting tubules lie in the renal medulla, the remaining parts of the nephrons lie in the

cortex. The function of the tubular system is both selective reabsorption and excretion so that the material that finally reaches the ureter is urine.

At the point where the distal tubule begins, it lies close to the arterioles which enter and leave its own glomerulus and is modified histologically being known as a the macula densa. The area formed by these cells, the arterioles and the few cells lying between these structures is called the juxtaglomerular apparatus from which renin is secreted (*Guyton, 1990*).

## Physiological Considerations

### Renal Blood Flow

Under normal resting conditions the human kidneys receive a total blood flow of about 1100-1300 ml/min. Which is equal to about 20-25 % of total cardiac output. Approximately half of this total consists of plasma and the rest is made up of cells.

Not all the blood which enters the interlobular arteries in the cortex passes to the glomeruli. In the glomerular capillaries the arterial pressure which is probably some 10-20 mm Hg below the systemic pressure, tends to drive the fluid across the glomerular membrane, being opposed by the osmotic pull of the proteins in the blood and the hydrostatic pressure in Bowman's capsule. The glomerular membrane is permeable to both fluid and electrolytes but not to proteins or cells.

The driving force across the glomerular membrane is called the effective filtration pressure (EFP) and is equal to the glomerular capillary pressure (which is higher than in other capillary beds) minus the sum of the osmotic pressure of the plasma proteins and the hydrostatic pressure in Bowman's capsule. It is estimated to be about 20 mm Hg.