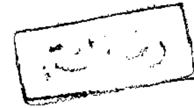
IMAGING OF FEMALE PELVIC LESIONS IN CHILDREN

Essay

Submitted in Partial Fulfillment for
Master Degree in **Radiodiagnosis**



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Azza El Findy

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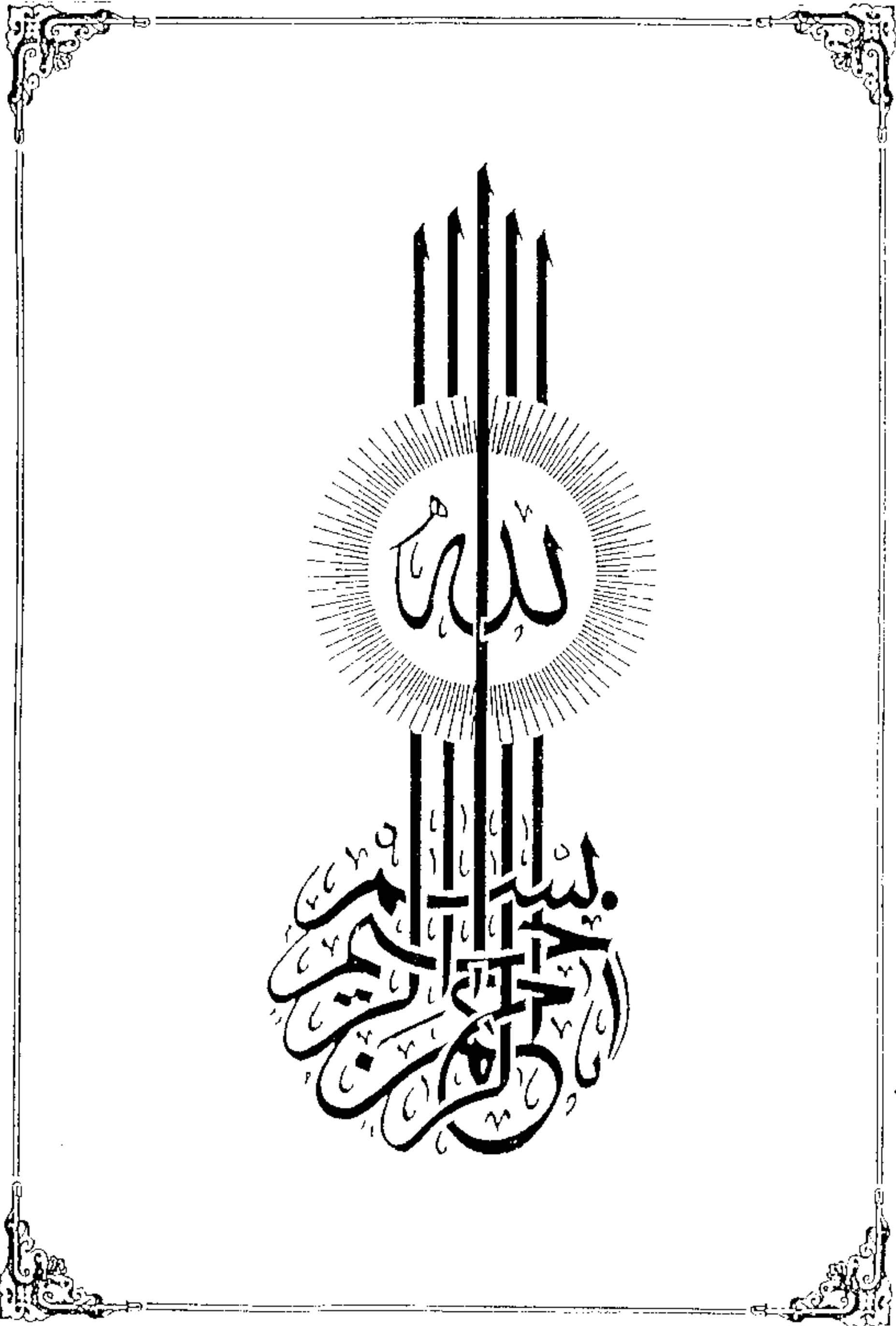

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INTRODUCTION AND AIM OF WORK

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INTRODUCTION
AND
AIM OF WORK

According to Dietrich and Kangarloo, 1987 the female pelvic lesions in children can be divided into Congenital, Cystic or Neoplastic:

1. Congenital anomalies: Approximately 10 percent of all indivaduals have some anomaly of the genitourinary system and these account for approximately 30 percent of all congenital malformations.

2. Cystic lesions and fluid collection: usually ovarian cysts and hydrometrocolpos.

3. Neoplasms: Cystic, solid, or teratomas and dermoid cysts.

The use of ultrasound for the evaluation of pelvic pathology in children is now well established, and in the past few years repeated studies have yielded a relatively clear cut set of clinical indications for such an examination, so sonography is an excellent imaging modality in the pediatric patients *(Shirkhoda and Madrazo, 1981)*.

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Doppler ultrasound is a non invasive technique for evaluating patency of pelvic blood vessels, aid in the characterization of specific tissues and evaluation of pelvic masses, as well as detection of functional activity in ovarian cysts *(Tayler and Strandness, l988).*

Usually children are affected by a different spectrum of disease in the pelvis and perineum than adults, with a higher prepondenance of congenital anomalies, and a different groups of neoplasm, the development of magnetic resonance image has expanded our ability to examine these lesions, but the planes and pulse sequences that are optimal for adult may not be for children *(Dietrich and Kangarloo, l987).*

Computerized tomography is ideally suited for evaluation of pelvic pathology, it has great value in the evaluation of pelvic mass detected by other modalities, also can be used in following the response of pelvic lesions to therapy *(Walsh, l985).*

The aim of this work is to emphasize the role of each imaging modalities in diagnosis of female pelvic lesions in child age.

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CROSS ANATOMY

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Anatomic boundries:

The pelvic cavity is posterior and inferior to the abdominal cavity. The "false" pelvis is delineated by the ileum, whereas the "true" pelvis is delineated by the bow-shaped area within the iliac wings.

Within the true pelvis are found the sacral promontary, the pubis, and the pelvic brim. The pelvis is tilted forward, so that the anterior iliac spine is more anterior than the pubic bone, this increase the lumbosacral curve in females and emphasizes the curvature of the buttocks.

The lower border of the pelvis has three bony structures; the ileum, ischium and pubis. These meet to form the symphysis pubis, which generally serves as the external land mark of the lower pelvis.

The iliac crest holds the greater and lesser sciatic notches on its posterior surface, blood vessels and nerves pass out of the sciatic region into the lower extremities.

The muscle groups are the psoas and iliacus, or iliopsoas muscles. The psoas can be traced form the mid pole of the kidney into the pelvic area where it becomes the iliacus, the

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generally marks the lateral landmark of the true pelvis. The muscular sling across the bottom of the pelvis is composed of the levator ani and the coccygeus. Together they form the pelvic diaphragm. Inferior to this diaphragm perineum.

The intraperitoneal structures within the pelvis are the cecum, small bowel, sigmoid colon, and sacrum. The other structures are within what is more generally referred to as the retroperitoneal cavity and include urinary structures, vessels, and the reproductive system.

The common iliac artery bifurcates at the pelvic rim into the internal and external iliac arteries. The ureter crosses anterior to these vessels to enter the bladder posteriorly. The uterus generally is found to lie at a 90° angle between the vagina and the bladder. The fallopian tubes extend to the lateral walls of the pelvis. The ureter comes very close to the cervix before it enters the bladder. The cervix is almost at a right angle to the vagina and into it *(Hagen and Ansert, 1978).*

Peritoneal relations:

From the anterior abdominal wall the parietal peritoneum passes over the superior surface of the uterus as the vesicouterine reflection the peritoneum then passes over the

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fundus of the uterus onto the posterior surface and extends inferiorly, covering the upper part of the vagina before reflecting on the rectum. Forming the rectouterine pouch of Doglas.

The broad ligament is the fold of peritoneum related to the ovary, the uterine tubes, and the uterus. It is triangular in shape, extending from the lateral wall of the pelvis. Its free upper border encases the uterine tubes and is directed anteriorly-medially, the two layers envelop the uterus and are continous with the layers of the opposite side. The anterior surface is directed inferiorly as pelvis. The anterior surface, superiorly and posteriorly, the outer fifth of the upper free border contains the ovarian vessels and is termed the infundibulopelvic ligament of the ovary. The ovary projects from the posterior surface of the ligament suspended by a small peritoneal fold called the mesovarium. The portion of the ligament above this is termed the mesosalpinx and is related to the uterine tube.

The portion of the broad ligament below the mesovarium is referred to as the mesometrium.

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The support of the pelvic genital organs is farther aided by several ligaments, the ovarian, round, lateral cervical, and uterosacral ligament *(Hagen and Ansert, 1978).*

Vagina:

At birth the vagina measures approximately 3 cm in length, and owing to the effects of maternal and placental estrogens, it is thickened and cornified. It therefore has a pale, gray-yellow appearance that gradually changes paralleling the drop in estrogens, to the typical pink color in the immature vagina of childhood.

The thickened vaginal introitus often protrudes during the first days of life. Presumably owing to the fetal position, the caudal portion of the protruding vaginal introitus may become pinched off and quite edematous, particularly following a breech presentation. Such infants are occasionally suspected of having a polypoid vaginal tumour.

As the estrogenic effects regress the vagina becomes slightly shorter and averages some 2.85 to 3.0 cm for the firest 4 years of life in the premenarchal period the vagina attains a length of about 4.75 cm., and following the onset of puberty it

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quickly reaches adult size of about 7.25 cm *(Jones and Heller, 1966).*

The typical rugose appearance of adult vagina is acquired during puberty, in whom it is flattened but dilatable canal, it pierces the pelvic floor and is directed down and forward, in the anteflexed position the cervix enters the wall of the vagina at a right angle.

Vessels and nerves of vagina:

The arteries on each side are the vaginal artery, the vaginal branch of the uterine artery, the vaginal branches of the middle rectal artery, and branches of the internal pudendal artery. The veins form a plexus around the vaginal wall and drain their blood into the tributaries of the internal iliac veins. The nerves of the vagina are derived from the uterovaginal plexus and from the vesical plexus *(Hagen and Ansert, 1978).*

Uterus:

Until the seventh month of gestation the fetal uterus exhibits a linear growth curve in relation to the increase in crown-rump length, during the remainder of pregnancy there is marked uterine growth. This sudden increase in uterine weight and length is due to accelerated growth in the cervix with only

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