Role of US and Multi-detector CT scan In Diagnosis of Acute Gynecological Pelvic Pain

An Essay

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بسم الله الرحمن الرحيم

(قالوا سبحانك لا علم لنا إلاّ ما علمتنا

إنك أنت العليم الحكيم)

صدق الله العظيم

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Hanaa Elsayed Abdel-Razik

Dedication

To the soul of my beloved Mum,

To my Dad & Sisters.

LIST OF ABBREVIATIONS

CT	Computed tomography
MDCT	Multidetector Computed tomography
HCG	Human Chorionic gonadotrophin
HOC	Haemorrhagic ovarian cyst
TOA	Tubo-ovarian abscess
OHSS	Ovarian hyperstimulation syndrome
PID	Pelvic inflammatory disease
TAS	Transabdominal sonography
TVS	Transvaginal sonography
US	Ultrasound
MR	Magnetic Resonance

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INTRODUCTION

Acute pelvic pain is generally considered to be pain that is of less than about 3 months duration. Patients with acute pelvic pain can be categorized into patients with a positive versus those with a negative pregnancy test (beta-human chorionic gonadotropin) ***(van*,et al;2006)**

The most common gynecological causes of acute abdominal pain are, hemorrhagic ovarian or corpus luteum cyst, ovarian and adnexal torsion, endometriosis, gynecologic neoplasm, degenerating leiomyoma, adenomyosis, pelvic congestion syndrome, pelvic inflammatory disease, pelvic abscess, pelvic arterio-venous malformation, premenstrual syndrome, appendicitis, renal stone with obstructive uropathy, and inguinal and other hernias **(Lamvu, et al;2006&** ***Siddall,et al;2005****)*

Trans-vaginal ultrasonography (TVUS) is the mainstay of imaging evaluation at initial presentation .Its strengths includes absence of radiation ,rapid availability of machines in hospitals ,and excellent visualization of the pelvic organs .Improvements made in image quality have facilitated the

rapid and accurate diagnosis of the majority of gynecological causes of acute pelvic pain **(*Salem*,et al;2005)**.

Although ultrasound (US) is the primary imaging modality of choice for the evaluation of acute pelvic pain in the female patient, the role of computed tomography (CT) in the evaluation of abdominal and pelvic pain continues to expand. CT may be performed if US findings are equivocal or if the abnormality extends beyond the field of view of the endo-vaginal probe and further characterization is required. Although clinical findings and correlation with ß-human chorionic gonadotrophin (HCG) levels frequently indicate a gynecological disorder, it may be unclear whether the cause of symptoms is primarily gynecologic or is related to the gastrointestinal or genitourinary tract. CT plays a particularly important role in the evaluation of patients with suspected pelvic abscess or hematoma, post partum complications, or complications related to pelvic inflammatory disease and the exclusion of bowel disease ***(Woodward, et al;2001).***

MDCT is a technologic advance that allows simultaneous acquisition of multiple images during a single rotation of the X-ray tube ***(Paulson, et al;2003).***

Female pelvic anatomy and abnormality may be difficult to characterize using axial images. In particular, it is difficult to delineate the adnexal structures from the uterus, pelvic side wall, and small and large bowels. As with pelvic MRI, the coronal plane on **MDCT** often clarifies confusing anatomy ***(Ahn, et al;2002)*.**

Aim of the work:

The aim of this work is to evaluate the role of US and MDCT in diagnosis of different gynecological causes of acute pelvic pain.

Anatomy of the female pelvic organs

The female genital organs consist of an internal and external group. The internal organs which are situated within the pelvis consist of the ovaries, the uterine tubes, the uterus and the vagina **(Lioyid; 2001).**

The Vagina

The vagina **(Fig 1)** is a fibro-muscular tube lined by non-keratinized stratified epithelium. It extends from the vestibule to the uterus. Its anterior wall is 7.5 cm in length and the posterior wall is 9 cm long on average. The bladder and urethra are anterior to the vagina. The rectum and anal canal are posterior and separated from the upper part by the recto-uterine pouch **(Healy, et al; 2005) .**

Vascular supply

Arterial supply

Arterial supply is derived from the vaginal, uterine, internal pudendal and middle rectal branches of the internal iliac arteries **(Healy ,et al;2005)** .

Venous drainage

The vaginal veins, one on each side, form from lateral plexuses that connect with uterine, vesical, and rectal plexuses and drain to the internal iliac veins **(Healy ,et al;2005)** .

Lymphatic drainage

Vaginal lymphatic vessels link with those of the cervix uteri, rectum and vulva. They form three groups but the regions drained are not sharply demarcated. Upper vessels drain into the internal and external iliac nodes. Intermediate vessels drain into the internal iliac nodes. Vaginal vessels

below the hymen, and from the vulva and perineal skin, pass to the superficial inguinal nodes **(Healy, et al; 2005).**

Innervation

Innervation of the vagina is derived from the vaginal plexuses and pelvic splanchnic nerves. The lower vagina is supplied by the pudendal nerve **(Healy, et al; 2005).**

The Uterus

The uterus **(Fig 1)** is a hollow, thick-walled and muscular organ. It is normally situated in the lesser pelvis between the urinary bladder and the rectum. The uterus is divided into two main regions. The body of the uterus (corpus uteri) forms the upper two-thirds, and the cervix (cervix uteri) forms the lower third. The uterine tubes are attached to the upper part of the body of the uterus with their ostia opening into the lumen. The lower portion of the cervix continues into the vagina. The adult non-pregnant uterus is 7.5 cm long, 5.0 cm in breadth, 2.5 cm thick, and weights between 30 and 40 gm.

The anterior surface of the uterus is covered by peritoneum, which is reflected onto the bladder at the utero-

vesical fold. This normally occurs at the level of internal os. Between the bladder and uterus there is the vesico-uterine pouch, which is obliterated when the bladder is distended. When the bladder is empty, the vesico-uterine pouch is usually empty, but it may be occupied by part of the small intestine**.**

The posterior surface of the uterus is convex transversely. Its peritoneal coverings continues down to the cervix and upper vagina and is then reflected back to the rectum along the surface of the recto-uterine pouch (of Douglas), which lies posterior to the uterus. The sigmoid colon lies posterior to the uterus, although the terminal ileal coil usually separates the two**.**

The cavity of the uterine body measures 6 cm from the external os of the cervix to the wall of the fundus and is flat in its anteroposterior plane. In coronal section it is triangular, broad above where the two uterine tubes join the uterus, and narrow below at the internal os of the cervix **(Healy ,et al; 2005).**

Uterine ligaments

The uterus is continuous with a number of ligaments **(Fig 2&3)**. Some of these are true ligaments in that they have a fibrous composition and supply support to the uterus. Some ligaments provide no support to the uterus, and others only consist of folds of peritoneum **(Healy, et al; 2005).**

The uterus is supported in its midline position by the two broad ligaments, two round ligaments, and two utero-sacral ligaments **(Craggs; 1995).**

Between the two layers of each broad ligament, certain structures are contained; the Fallopian tubes, the round ligament, the ovary and its ligaments together with connective tissue, blood vessels and nerves **(McMinn ;1994).**

The round ligament lies in front of and below the fallopian tubes on either side of the superior angle of the uterus; it passes through the internal abdominal ring along the inguinal canal, to the labia majora **(Lumley, et al; 1995).**

The uterosacral ligaments originate laterally at the level of the internal os of the cervix and pass downwards

along the sides of the rectum extending to the third and fourth bones of the sacrum **(Skandalakis; 2004)**.

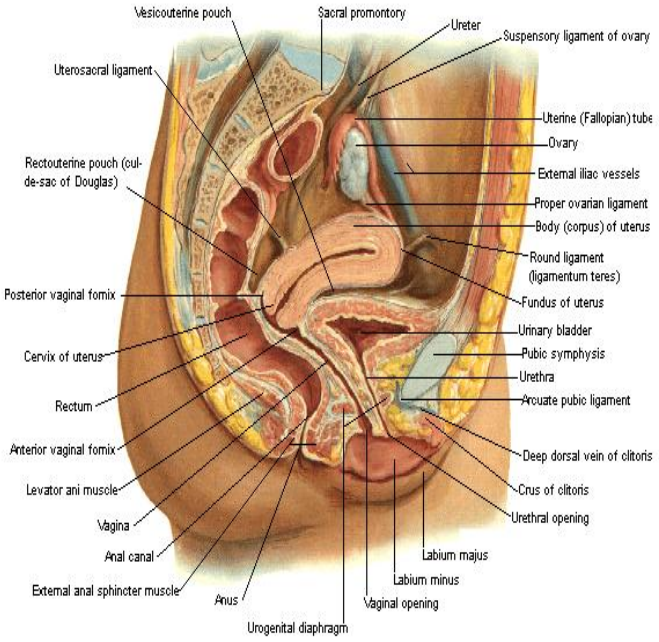

Figure (1): Pelvic viscera and perineum of female - Midsagittal section Quoted from**(Netter ;1995).**