INTRODUCTION

Interventional Radiology is an innovative branch of medicine in which physicians treat diseases non-operatively by minimally invasive procedures, many of them have replaced traditional surgery. Interventional radiology treatments offer less risk, less pain and less recovery time compared to open surgery. Many Benefits for the patient and health care system have included low complication rates, avoi-dance of surgical risks, and shorter hospitalizations.

One of the most significant uterine disorder is Uterine fibroid which is the most common pelvic tumor in women. Uterine fibroids are found in approximately 20% to 40% of women over the age of 35 years, with an estimated incidence as high as 75% in certain high risk populations, while many such tumors are asymptomatic, some are associated with significant and disabling symptoms, ranging from prolonged menstrual periods to urinary frequency, lower back and pelvic pain. Uterine artery embolization (UAE) is a non-surgical treatment for uterine fibroids that preserves the uterus and offers women an alternative to surgical procedures such as hysterectomy and myomectomy ***(Topfer et al., 2002)***.

Another important uterine disorder is chronic pelvic pain .It is estimated that one-third of all women will experience chronic pelvic pain in their lifetime .The causes of chronic pelvic pain are varied, but are often associated with the presence of ovarian and pelvic varicose veins .Embolization offers a safe , effective , minimally invasive treatment option that restores patients to normal. The procedure is very commonly successful in blocking the abnormal blood flow ***(Ewa Kuligowska et al., 2005)***.

Obstruction of the uterine (proximal) end of the fallopian tube is noted on up to 20% of hystero-salpingograms and has a variety of underlying causes. Definitive diagnosis and treatment in the past have required laparoscopy or laparotomy with tubal resection. Selective salpingography and fallopian tube recanalization with fluoroscopically guided catheters has emerged as an improved method both for diagnosis and treatment in these patients and it is recommended as the first intervention in patients with obstruction of the proximal fallopian tube ***(AS Thurmond, 1998)***.

US-guided aspiration of cyst fluid and subsequent methotrexate injection appears to be an alternative treatment for both simple and endometriotic ovarian cysts in selected cases **(*Spyros Mesogitis et al., 2005)***.

Today, MR imaging-guided focused ultrasound (MRI-FUS) has become a safe and effective means of performing probe delivered thermal ablations and minimally invasive surgery in the treatment of uterine fibroids ***(Jolesz et al., 2005)***.

AIM OF THE WORK

To highlight the current role of image guided radiological interventions as a new method in the treatment of some gynecological disorders.

ANATOMY OF THE FEMALE GENITAL TRACT

The uterus is a pear shaped muscular organ, located inside the pelvis immediately dorsal to the urinary bladder and ventral to the rectum. The typical uterus is approximately 2.5 to 3.5 inches long and 1.5 inches at its widest point. During pregnancy, its weight increases from about 3 ounces to 2.2 pounds and its capacity increases more than 4000 times. Under normal circumstances the uterus is both antiverted, antiflexed ***(David and Nayna, 2001)***.

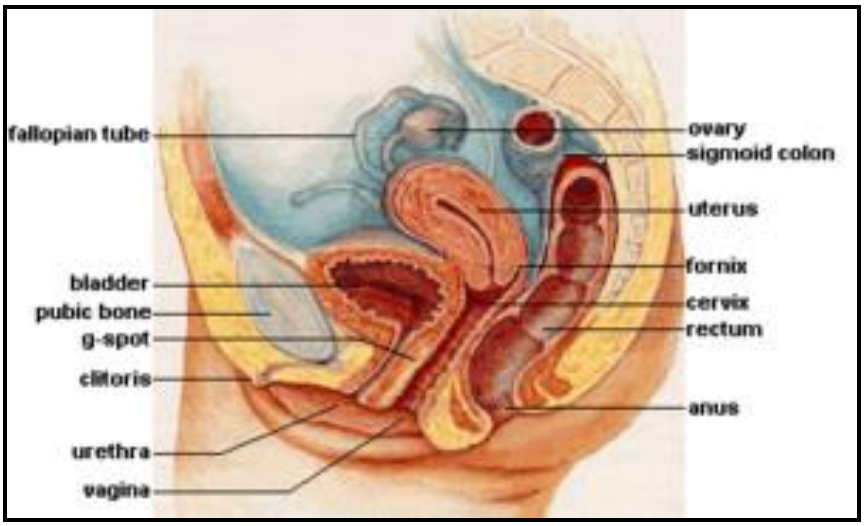

Fig. (1): Anatomy of the uterus and the surrounding organs ***(Quoted from Cunningham, 2001)***.

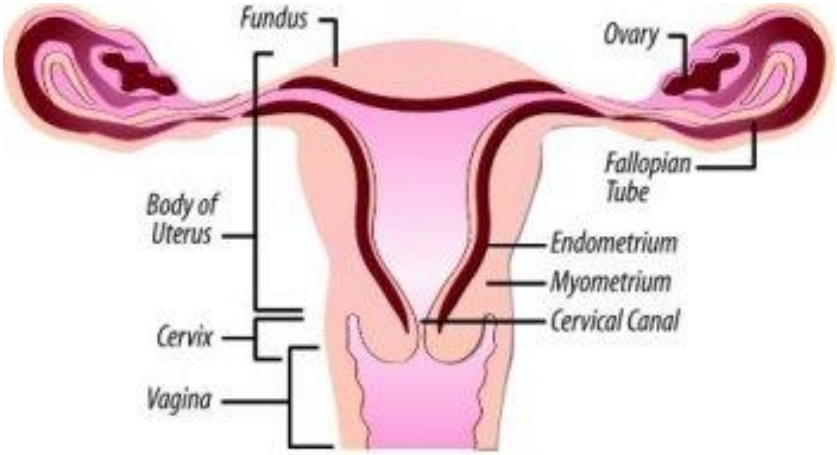

Fig. (2): The uterus is divided into a fundus, body, isthmus, and cervix ***(Quoted from Netter, 1991)*.**

The fundus is convex in all directions, and covered by peritoneum continuous with that on the vesical and intestinal surfaces. The lateral margins are slightly convex. The uterine tube pierces the uterine wall at the upper end of each wall. The round ligament of the uterus is fixed below and in front of this point, while behind it is the attachment of the ligament of the ovary. These three structures lie within a fold of peritoneum, which is reflected from the margin of the uterus to the wall of the pelvis, and is named the broad ligament.

The cavity of the Body is a mere slit, flattened antero-posteriorly. It is triangular in shape, the base being formed by the internal surface of the fundus between the orifices of the uterine tubes, the apex by the internal orifice of the uterus.

The isthmus is the short narrowed portion of the uterus located inferior to the body and superior to the cervix.

The Cervix (neck of the uterus): The cervix is the lowest constricted segment of the uterus. It is somewhat conical in shape, with its truncated apex directed downward and backward, but is slightly wider in the middle than either above or below. Owing to its relationships, it is less freely movable than the body, so that the latter may bend on it. The long axis of the cervix is therefore seldom in the same straight line as the long axis of the body. The long axis of the uterus as a whole presents the form of a curved line with its concavity forward, or in extreme cases may present an angular bend at the region of the isthmus ***(Williams et al., 1995)***.

The cervix projects through the anterior wall of the vagina, which divides it into an upper, supravaginal portion, and a lower, vaginal portion ***(Clare, 1995)***.

The supravaginal portion is separated in front from the bladder by fibrous tissue (parametrium), which extends also on to its sides and lateral ward between the layers of the broad ligaments, posteriorly, the supravaginal cervix is covered by peritoneum, which is prolonged below on to the posterior vaginal wall, when it is reflected on to

the rectum, forming the recto uterine excavation ***(Williams et al., 1995)***.

The vaginal portion of the cervix projects free into the anterior wall of the vagina between the anterior and posterior fornices. The cavity of the cervix communicates with that of the vagina through a small, depressed, somewhat circular aperture, the external orifice of the uterus ***(Williams et al., 1995)***.

The uterine tubes open into its upper part, one on either side, while below, its cavity communicates with that of the vagina ***(Williams et al., 1995)***.

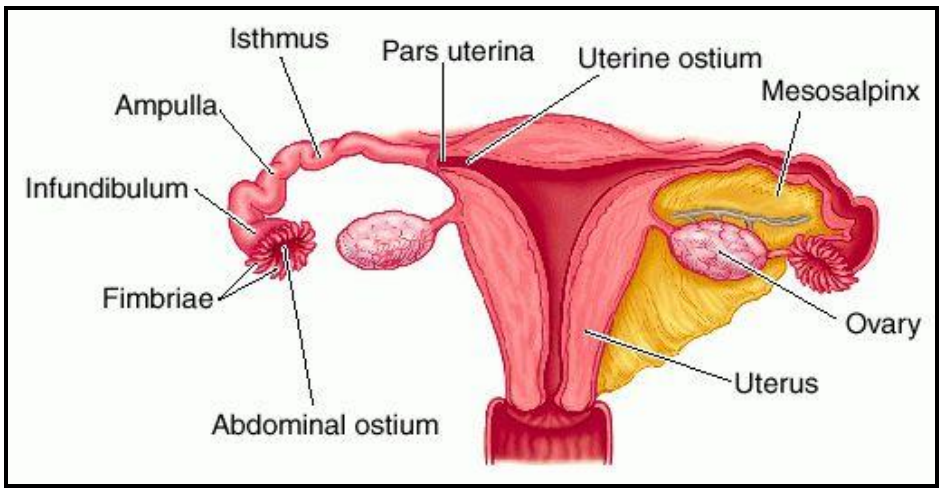

Fig. (3): Uterus and uterine tubes ***(Quoted fromWilliams et al., 1995)***.

The (Uterine) fallopian tubes: The fallopian tubes are positioned between the ovaries and the uterus each is divided into 4 parts: fimbrae, infundibulum, ampulla, tube or duct proper and isthmus which merge with uterus.

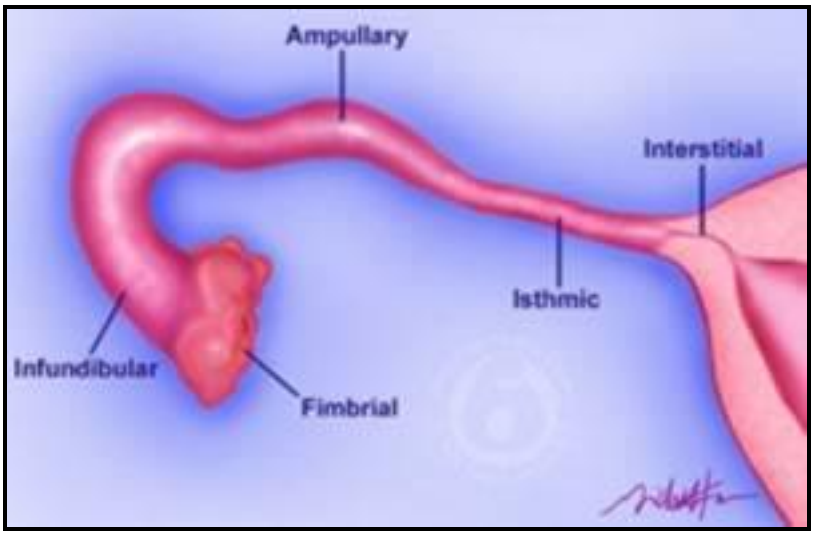

Fig. (4): Parts of fallopian tube ***(Quoted from Berger, 2008)***.

- Infundibulum:the expanded funnel shaped distal end of the uterine tube.
- Fimbrae: the fringe of finger like projections of tissue at the distal ends of the uterine tubes.
- Ampulla: the goblet shaped dilatation near the distal end of the uterine tube which merges with the infundibulum to which the fimbriae are attached.

(Moore, 1998)

The vagina is the muscular canal lined with mucus membranes that extend from outside of the body to the cervix of the uterus. It also is known as the birth canal ***(Moore, 1998)***.

The layers of the uterus are from inner most to outermost are as follows ***(Gray et al., 1995)***:

- ***Endometrium***: the inner glandular mucus membrane that lines the uterine cavity.
- ***Myometrium***: it is the middle layer which consists of smooth muscles, its inner most layer is known as the juntional zone. The main branches of blood vessels and nerves of uterus are located in the myometrium.
- ***Perimetrium***: is the outer serous lining of the uterus, a portion of the visceral peritoneum.
- ***Peritonium***: which surrounds the uterus.

Ligaments:

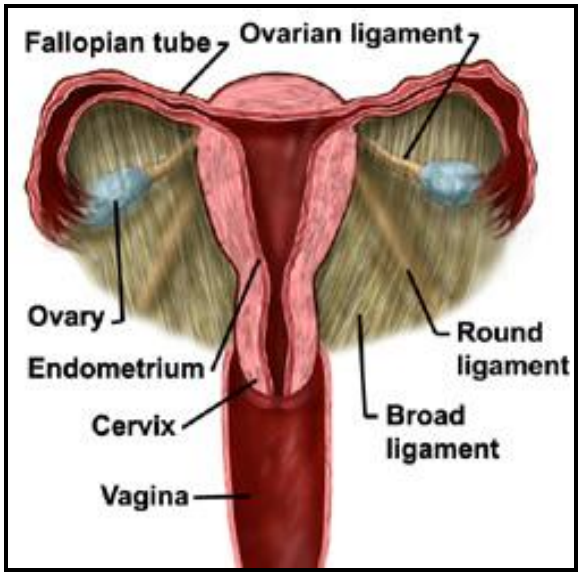

Fig. (5): Uterus and uterine ligments as seen from infront ***(Quoted from Netter, 1991)*.**

The uterus is held in place by the following ligaments:

The ligaments of the uterus are eight in number: one anterior; one posterior; two lateral or broad; two uterosacral; and two round ligaments ***(Holt et al., 1994)***:

1. The anterior ligament consists of the vesicouterine fold of peritoneum, which is reflected on to the bladder from the front of the uterus, at the junction of the cervix and body.
2. The posterior ligament consists of the recto-vaginal fold of peritoneum, which is reflected from the back of the posterior fornix of the vagina on to the front of the rectum. These folds are named the sacrogenital or

recto uterine folds. They contain a considerable amount of fibrous tissue and non-striped muscular fibers which are attached to the front of the sacrum and constitute the uterosacral ligaments.

3. The two lateral or broad ligaments pass from the sides of the uterus to the lateral walls of the pelvis. Together with the uterus they form a septum across the female pelvis, dividing that cavity into: anterior part containing the bladder, posterior part containing the rectum, and in certain conditions some coils of the small intestine and a part of the sigmoid colon. Between the two layers of each broad ligament are contained: (1) the uterine tube superiorly; (2) the round ligament of the uterus; (3) the ovary and its ligament; (4) the epoophoron and paroophoron; (5) connective tissue; (6) unstriped muscular fibers; (7) blood vessels and nerves.

4. The round ligaments are two flattened bands between 10 and 12 cm in length, situated between the layers of the broad ligament in front of and below the uterine tubes. The round ligaments consist principally of muscular tissue, some fibrous and areolar tissue, besides blood vessels, lymphatics; and nerves, enclosed in a duplicature of peritoneum.

In addition to the ligaments just described, there is a band named the ligamentum transversalis colli (Mackenrodt) on either side of the cervix uteri. It is attached to the sides of the cervix and to the vault and lateral fornix of the vagina, and is continuous externally with the fibrous tissue, which surrounds the pelvic blood vessels ***(Moore, 1998)***.

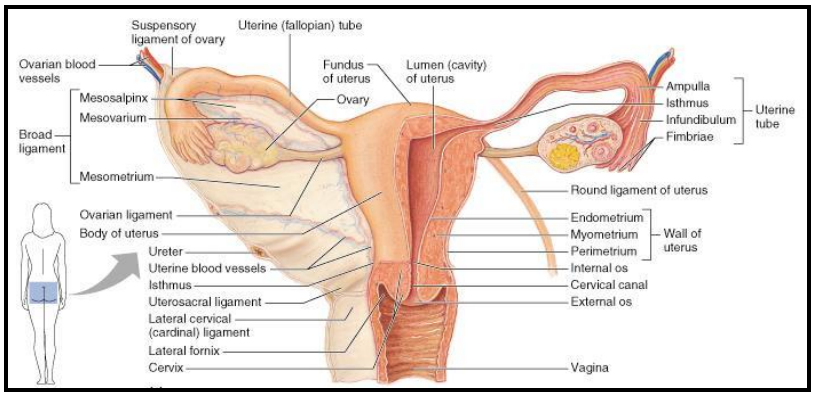

Fig. (6): Normal uterine anatomy-cut section ***(Quoted from Cunningham, 2001)***.

Anatomy of the ovary:

Ovaries are shaped, measuring approximately 3x1.5x1.5cm. The ovary is located in the lateral wall of the pelvis in a region called the ovarian fossa. The fossa usually lies beneath the external iliac artery and in front of the ureter and the internal iliac artery ***(Williams et al., 1995)***.

The ovary is attached to the posterior layer of the broad ligament by a short fold of peritoneum called mesovarium. This mesovarium is attached to the ovary at its mesovarian border and through this mesentery the

ovarian vessels and nerves pass to the ovary ***(Williams et al., 1995)***.

The ovary has an upper end and a lower end. The upper end gives attachment to the ovarian fimbria and the suspensory ligaments of the ovary, while the lower and end gives attachment to the ligament of the ovary ***(Williams et al., 1995)***.

Vessels and nerves of the uterus:

A- Arterial supply

The arteries of the uterus are the uterine, from the internal iliac artery, and the ovarian, from the abdominal aorta. They are remarkable for their tortuous course in the substance of the organ, and for their frequent anastomoses. The uterine arteries pass medially from the pelvic sidewalls and run to the lateral borders of the cervix. Here, each divides into a descending vaginal branch and a larger uterine branch that ascend along the lateral margin of the uterus supplying it by curving branches known as arcuate artery. The terminal portion of the main trunks continues along the fallopian tubes each ending in small ovarian branches. The termination of the ovarian artery meets that of the uterine artery ***(David and Nayna, 2001)***.

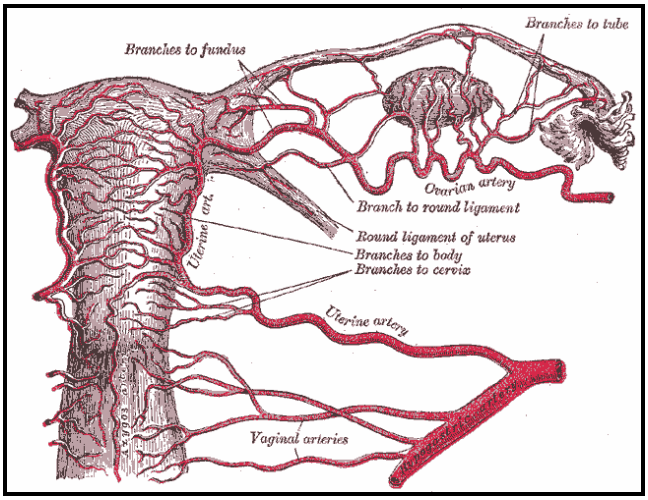

Fig. (7): The arteries of the internal genital organs of the female, seen from behind ***(Quoted from Williams et al., 1995)***.

Internal Iliac Artery (Hypogastric Artery):

The internal iliac artery (the Hypogastric artery) supplies the pelvic walls and the pelvic viscera. The internal iliac artery terminates in two main stems (bifurcation), one anterior and one posterior. The anterior branches (visceral and parietal) of the internal iliac artery include the inferior gluteal., obturator, internal pudendal., vesical., middle hemorrhoidal., and genital (uterine and vaginal) arteries. The posterior branches (parietal only) include the superior gluteal., iliolumbar, and lateral sacral arteries. Absence of the internal iliac artery is rarely observed. The contralateral anterior oblique (25-40 angle) projection is best for identification of the uterine artery ***(Pelage et al., 2005)***.

Table (1): Branches of the hypogastric artery are: