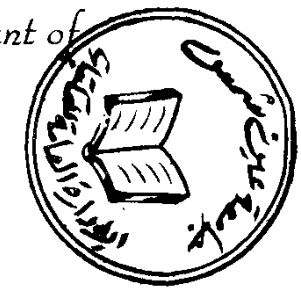
HISTOPATHOLOGICAL STUDY OF POST-TUBAL LIGATION UTERINE BLEEDING

A THESIS

Submitted for the Partial Fulfilment of
Master Degree in Pathology



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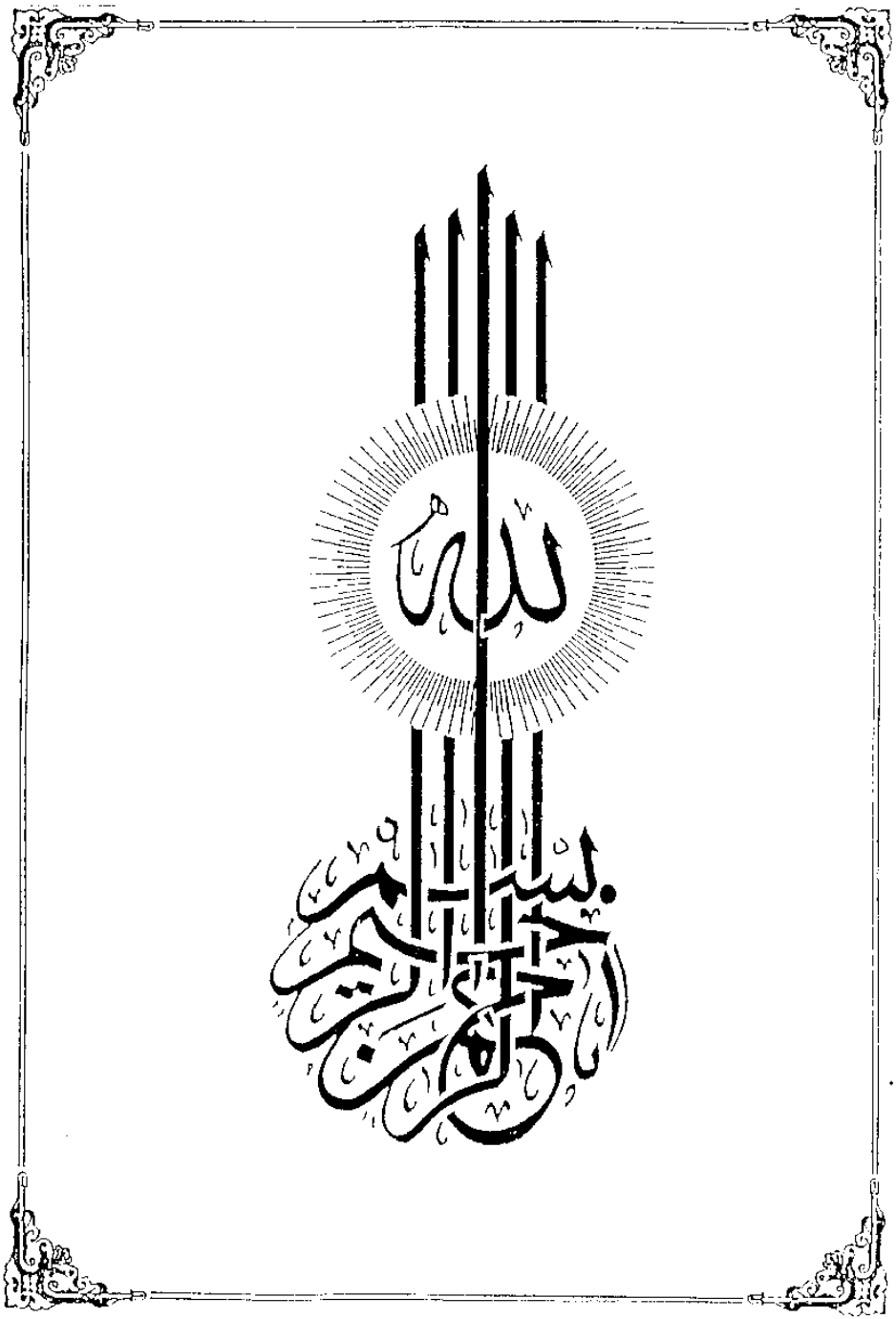
بسم الله الرحمن الرحيم

﴿قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ﴾

صَدَقَ اللَّهُ الْعَظِيمُ

سُورَةُ الْبَقَرَةِ (الآية ٣٢)



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Introduction And Aim Of The Work

INTRODUCTION
AND AIM OF THE WORK

Uterine bleeding have been reported following tubal ligation. ***Poma (1980)*** reported a 7% incidence of subsequent hysterectomy with tubal ligation during a seven years follow up. Some studies tried to find out an underlying etiology for this uterine bleeding; ***Grudesky et al., (1981)*** suggested ovarian cysts, ***Kendrick (1983)*** suggested tubo-ovarian mass and pelvic inflammation, ***Ronald (1984)*** suggested anovulation and hyperestrogenism, and ***Cattanach (1985)*** suggested estrogen deficiency.

Other studies found out an associated lesions: Uterine myoma and endometrial cancer ***(Uchida, 1968)*** and hydrosalpinx ***(Lefebvre et al., 1979).***

The aim of this work was to study the histopathological endometrial changes in cases complaining of post-tubal ligation uterine bleeding.

Review Of Literature

REVIEW OF LITERATURE

ANATOMY AND HISTOLOGY

UTERUS : ***(Nathan et al., 1990).***

The uterus is a thick walled, muscular hollow organ of pyriform shape measuring in the nullipara 9 cm in length, 6.5 cm in width and 3.5 cm in thickness. Its tapering end, the cervix, projects into the vagina. The length of the normal uterine cavity, as measured from the external os of the cervix, is not less than 7 cm. The shape of the cavity of the uterus is triangular. It communicates with the vagina through the cervical canal and with each Fallopian tube at the cornua.

The supracervical portion of the uterus consists of three layers: The peritoneal covering, the muscle layer or myometrium, and the mucous membrane or endometrium. The part of the corpus situated above the level of the Fallopian tubes is designed as the fundus. The externally visible constriction between the uterine cavity and the cervical canal is the anatomic internal os, and the isthmus is located below this. The junction between the isthmus and the endocervical canal can be recognized only microscopically and is termed the histologic internal os.

The myometrium is the thickest of the three layers of the wall of the uterus. Within the myometrium, three layers can be distinguished that are best seen in the pregnant uterus. The external layer is longitudinal, with the fibers passing from the cervix anteriorly over the fundus to reach the

posterior cervix. The middle layer is the thickest and consists of bundles of muscles separated by connective tissues perforate the interlacing muscle bundles, which serve a hemostatic function. The inner muscle layer consists of circular fibers and is most visible at the internal os and at the cornua.

The endometrium is a different structure from that of the endocervix. It measures between 3-4 mm in thickness and consists of stroma, glands and a surface epithelium.

Its histologic structure and dimensions vary during the menstrual cycle, achieving maximal dimensions during the premenstrual phase and showing superficial necrosis during menstruation.

The stroma is a characteristic immature type of connective tissue consisting of small cells with slightly oval nuclei. The vascular supply is derived from basal layer arterioles and spiral or coiled arterioles that play an important part in the mechanism of menstrual bleeding. The glands of the endometrium are simple tubules lined by cuboidal or low columnar epithelium.

As menstruation approaches, the glands become complex, evolving into corkscrew-shaped configurations. The surface epithelium is ciliated, with movement directed downward toward the internal os.

The endometrium is divided into three layers: The superficial compact layer, the middle spongy layer, and the deep basal layer. Cyclic changes

affect the upper two layers, whereas regeneration is from the deepest layer. The immediate postmenstrual endometrium is 1-2 mm thick.

Low cuboidal cells cover the surface epithelium, and the glands are small and straight. Under estrogenic stimulation, the endometrium thickens, and the glands become wider and more sinus in appearance.

After ovulation, vacuoles are seen in subnuclear position, displacing the cell nuclei toward the gland lumina. The stroma becomes more cellular and vascular. A thickening of the endometrium continues to a height of 7 mm. The stroma becomes edematous. The glands are hypertrophied and present a saw-toothed and elongated appearance. The luminal surfaces of some glands are absent, and the secretory material contained within the vacuoles has migrated through the cells into the free gland spaces. Immediately before menses, a decidual-like reaction is noted in the stroma. At menstruation, vasoconstriction of the coiled arterioles produces ischemia and loss of tissue integrity. Red blood cells and leukocytic infiltration of the endometrium is seen.

The stroma and glands are fragmented with hemorrhage both inside and outside the glands. While upper level desquamation proceeds, regeneration is simultaneously taking place at the basal level.

FALLOPIAN TUBES :

Each Fallopian tube is attached to the uterine cornua and passes outward and backward in the free upper border of the broad ligament.

These musculo-membranous canals, which transport the ova from the ovaries to the uterus, are between 10-12 cm in length and approximately 8 mm in diameter. The Fallopian tube is divided anatomically into :

(1) **Interstitial portion** : The innermost part of the tube that traverses the myometrium to open into the endometrial cavity. It is the shortest and narrowest part of the tube, its length being the thickness of the uterine muscle and its internal diameter being 1 mm or less. The tube is different here from its remainder in that it is without a peritoneal coat, and the outer longitudinal muscle layer is absent.

(2) **Isthmus** : The straight and narrow portion adjacent to the uterus, measuring 2-3 cm. It has thick walls, but the lumen is so narrow that it will admit only the finest probe (1-2 mm in diameter). Its muscle wall contains both longitudinal and circular fibers.

(3) **Ampulla** : The lateral, wider and longest part of the tube, measuring 6-7 cm. The mucosa in this section of the tube is complex, with arborization of its folds.

(4) **Infundibulum** : The fimbriated extremity is a trumpet-shaped outer end of the tube with an opening into the peritoneal cavity. This opening is surrounded by fronds or fimbriae, one of which is longer than the others, directed toward the ovary. The infundibulum is free of the broad ligament, with motile fimbriae enjoying a considerable range of movement that enables them to embrace the ovary, similar to the tentacles of an octopus.

The Fallopian tubes have three layers : Serous, muscular and mucous. Except for a narrow strip opposite its attachment to the broad ligament, the extrauterine portion of the Fallopian tube is covered with peritoneum. The muscle zone is thick at the isthmus and thin at the ampulla. It consists of an outer longitudinal and inner circular fibers. The mucous membrane is thrown into fold or plicae that are most apparent in the ampulla. Each plicae consists of stroma covered by epithelium. The primary tubal epithelial cells are of the ciliated columnar type with a functional objective of propelling a fluid current toward the uterus to assist in the transport of the inert ovum. Goblet-shaped cells which are nonciliated occur frequently and may provide lubricant and possible nutritive support for the ovum. The third type of cell having a small rod-shaped configuration, the so-called peg cell, is also seen. Its function is unknown. Like the uterine epithelium, the mucosa of the tube undergoes cyclic changes, although these are much less conspicuous than in the uterus.

OVARIES :

The ovaries are solid ovoid structures approximately 3-5 cm in length, 2.5 cm in width, and 2 cm in thickness. Each weighs 4-8 grams, but there is variation in both their shape and size at different stages of the menstrual cycle. The colour of the ovary is pearly gray attributable to a compact tunica albuginea that has a slightly corrugated surface. The ovaries are placed at the side of the pelvis just below the tubes, the outer ends of which are curved over them in an arch-like fashion.

They are attached to the posterior surface of the broad ligament at the

hilum through which blood vessels and nerves enter the ovary. The ovaries are attached to the uterus by a well developed ovarian ligament, whereas the upper outer pole is suspended to the side of the pelvis by the segment of the broad ligament lateral to the tube, the infundibulo-pelvic ligament. The ovary is the only structure in the abdomen that is not covered by peritoneum. Its surface consists of an incomplete imperfect layer of cuboidal cells that becomes continuous with the mesothelial cell of the peritoneum at the hilum.

On section, the ovaries seem to be divisible into an outer cortex and a central portion or medulla. Beneath the cuboidal cell or the germinal epithelium, the cortical stroma shows a slightly condensed layer, called the tunica albuginea. The stroma of the cortex is firm and fibrous and contains primordial follicles, Graafian follicles, corpora lutea, and corpora albicania. The remaining stroma of the cortex consists of interlacing spindle cells that are closely packed. The medulla contains a large number of small arterioles, veins, and lymphatics. Generally, structures derived from the follicular system do not develop in the medulla, although the fully developed corpus luteum may extend inward to invade the medulla. In the hilum and adjacent to the mesovarium are small collections of hilar cells, they are ovoid or polyhydral in configuration and are usually arranged in rather mosaic fashion (Fig. 1).

BLOOD SUPPLY :

Ovary :

The blood supply of the ovary is from the ovarian artery which arises from the abdominal aorta, a little below the renal arteries. The right artery is

in front of the inferior vena cava. The left artery passes behind the inferior mesenteric vein. Each passes in front of the genito-femoral nerve, the ureter, and crosses the external iliac artery and vein at the pelvic brim and enters the pelvic cavity.

It then runs medially in the suspensory ligament of the ovary and gains the broad ligament of the uterus, below the uterine tube. At the level of the ovary, it passes backwards in the mesovarium and breaks up into branches to the ovary. Small branches are given to the ureter and uterine tube and one passes to the side of the uterus to unite with the uterine artery. Others run on the round ligament of the uterus through the inguinal canal to the skin of the labium majus and the inguinal region ***(Warwick and Williams, 1973; and Smout et al., 1977).*** It was found that the blood supply of the lateral part of the ovary comes via the ovarian artery while the medial aspect comes from the ovarian branch of the uterine artery, which reaches the ovary by way of the utero-ovarian ligament. Both arteries anastomose in the mesovarium and send out small branches into the ovary from this anastomosis ***(McVay, 1984).***

Fallopian tube :

The arterial and venous vessels of the uterine tube are basically derived from the ovarian and uterine stems. The uterine artery usually supplies about the medial two-thirds of the tube, while the ovarian artery supplies the remainder ***(McVay, 1984; and Colborn, 1986).***