THE HISTO-PATHOLOGY OF THE PLACENTA IN ABORTION

A THESIS

Submitted For Partial Fulfillment

Of The Master Degree

In

Pathology Subsidary Obst. & Gyn.

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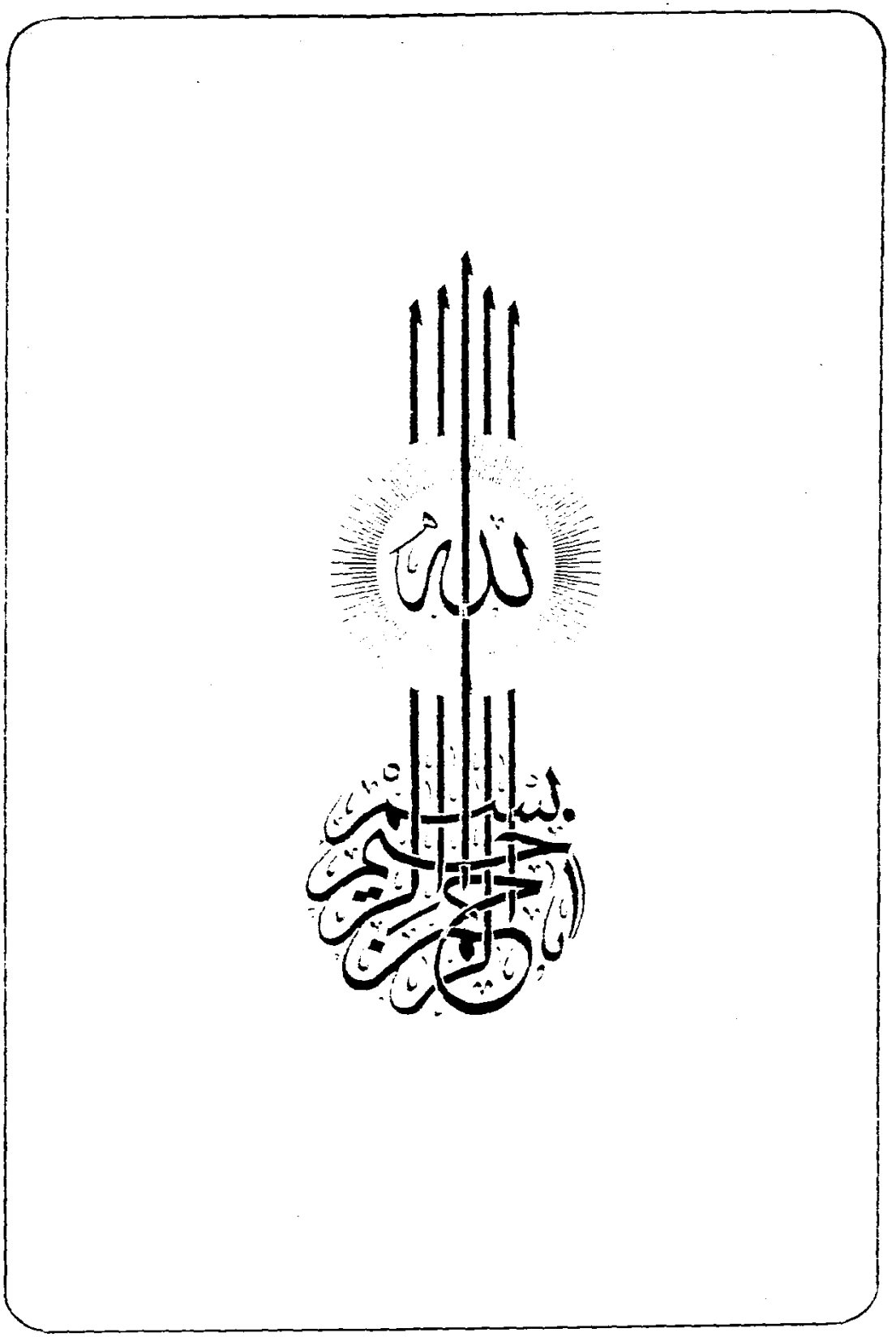
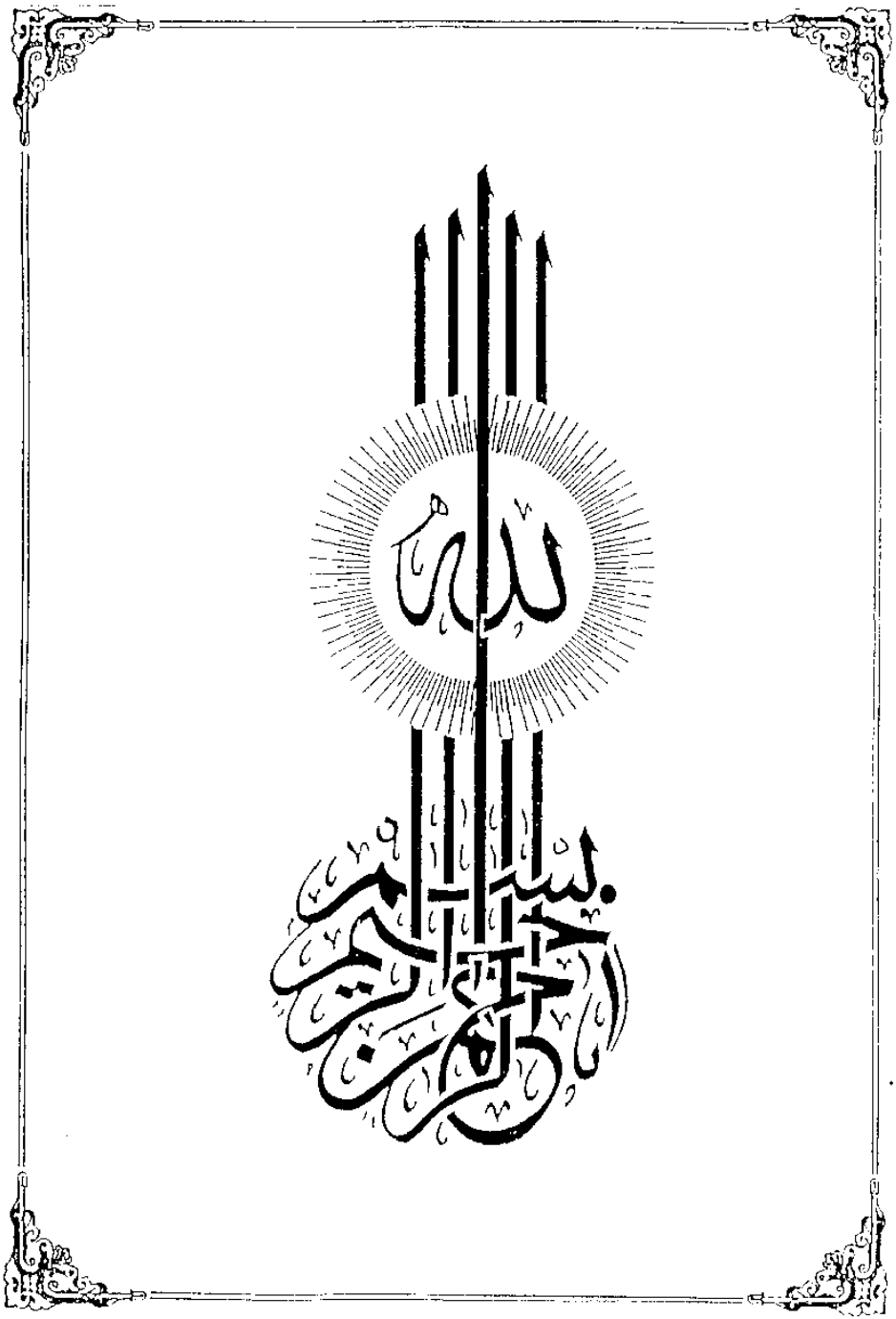
1986





ACKNOWLEDGMENT

I would like to acknowledge with my sincere thanks to prof. DR. FAWZI NAGUIB GIRGIS Professor of Pathology, Faculty of Medicine, Ain Shams University for his helpful guidence, constant encouragement and supervision.

I wish to express my deepest gratitude and sincerity to DR. SHADIA HUSSEIN MABROUK , Lecturer of Pathology, Faculty of Medicine, Ain Shams University for her help and cooperation throughout the period of work.

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INTRODUCTION

REVIEW

H I S T O L O G Y

THE ENDOMETRIUM OF NORMAL PREGNANCY

Haines and Taylor [1975] stated that when pregnancy occures, the fertilized ovum becomes implanted on the compact layer and the entire endometrium reacts to its presence. The changes appear first around the ovum, the predecidual cells of the premenstural stage continue to grow and enlarge. The compact layer thus becomes much thicker and is renamed the decidua. The glands of the spongy layer show considerable enlargement with great increase in the accumulation of secretion. The deeper part of the glands may dip into the basal zone, their cytoplasm is clear and their nuclei are prominent. The spiral arterioles become larger and surrounded by sheets of decidual cells. Increased oedema and scattered irregular foci of leucocytes appear between the glands.

Novak[1981] mentioned that the hypertrophic and secretory changes of the pregravid phase become more marked in the event of pregnancy. The glands of the decidua present marked saw-tooth convolution, scalloping and the epithelium is low pale staining and actively secretory. Novak [1981] added that, later on the tortuosity of the glands becomes

much less and the epithelium becomes very flat, so that there may be difficulty in distinguishing the glands from lymphatic vessels or venules. Also, he described the stromal cells as being large and polygonal with a wide zone of cytoplasm surrounding the nucleus, constituting the characteristic decidual cells, arranged in mosaic pattern. These cells-the mentioned-occur in the superficial compact layer of endometrium where the glands are sparest, but in the middle or spongy zone, the hypertrophy and convolution of the glands are more pronounced with delicate interglandular septa. In the basal layer the glands are lined by a non secretory type of epithelium which is different from that in the upper parts of glands.

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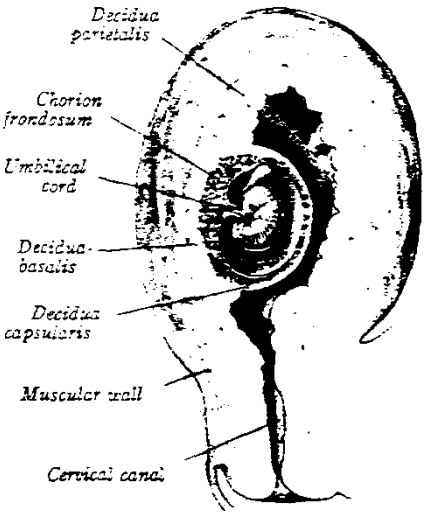

Gravid uterus of slightly over one month, in semi-diagrammatic section to indicate the relations of the embryo to the deciduae. About natural size. From L. B. Arey: Developmental Anatomy. Philadelphia, W. B. Saunders Co.

[Novak,1981]

occures which seems to be prerequisited for implantation. After hatching [release from zona pellucida], the blastocyst is ready for implantation.

Normal implantation as reported by Pauerstein [1981], occures near the fundus on either anterior or posterior walls of the uterus. The site of enternace is covered by fibrin, and then reepithelialized. The decidua does not regulate the depth of invasion. Implantation is interstitial and can be divided into three main stages:

1. Muscular, dealing with transport.
2. Adhesive, where by the blastocyst attachs to surface epithelium.
3. Invasive, where the trophoblast penetrates the endometrial wall.

Pauerstein [1981] mentioned that the human blastocyst probably implants on the sixth day after ovulation and the inner cell mass, from which the embryo will develop, can be distinguished on the inner surface of one pole of the blastocyst, this pole enters the endometrium first. The embryo is well anchored to the endometrium. Later stages demonstrate trophoblastic proliferation and differentiation into cytotrophoblast [langhan's cells] and syncitiotrophoblast. The later lies between the cytotrophoblast and the maternal tissue. It is a highly

differntiated tissue as regarding hormone production and enzymes. As development continues, sheets of trophoblast invades maternal tissues.

After implantation, the stromal cells in the endometrium enlarge and take polygonal shape with translucent membrane having a round vesicular nucleus and abundant slightly basophilic cytoplasm. Many factors play a role in successful implantation and early placentation which include: adequate preparation of endometrium, good nutrition,normal immunologic responses, abscence of anatomic defect or intrinsic disease.

Steive [1940] and Hertig & Rock [1945] mentioned that the early placenta consists of a mass of proliferating trophoblast, which expands rapidly in all directions. Maternal vascular channels are infilterated by the trophoblast and within hours of implantation, the syncitio trophoblast is bathed by maternal venous blood. This supplies the fertilized ovum with nutrition and permits exchange of gases.

Bourne [1962] and Massman [1973] added that at about 12 days gestational age, fetal mesenchyme invaginates the trophoblast with formation of chorionic villi. At this time the cells delaminate from the inner surface of the

trophoblast to form the amnion. Newton [1938] had previously. Stated that the ectoderm continuous with that of the embryonal disc grows out to line the amniotic cavity. The primary yolk sac is formed on the 12th day from endodermal cells of the embryonal disc. Massman [1973] said that over a period of 5 days [days 13 to 18] mesenchyme condenses and forms the body stalk which is the precursor of the umblical cord. At the same time the trophoblastic tissue has differentiated into cytotrophoblast and syncitiotrophoblast cells. Cytotrophoblast have a single round or oval well-defined nucleus and a pale cytoplasm. They are the progenitors of the syncitiotrophoblast, which is a syncitium having multiple nuclei and a darker staining cytoplasm. These cells produce chorionic gonadotrophins, chorionic ionic growth hormones, placental lactogen, oestrogen and progesterone. The production of these steroids is essential for the maintenance of pregnancy.

Douglas et al [1959] had mentioned that at day 20 the chorionic villi are in intimate contact with maternal decidua that is richly supplied with engorged capillaries and the rapid proliferation of cytotrophoblast serves to anchor the growing placenta to the maternal tissue. Further more, Attwood and Park [1961] stated that the trophoblast invades the decidua and uterine veins and can be isolated from the pelvic venous blood. Trophoblast, as well as

villi have been found as emboli in maternal lungs. Boe [1953] stated that at about days 18 to 21 cells delaminate from cytotrophoblast, migrated into the villous stroma and capillaries. As the capillaries differentiate, they communicate with the umblical vessels and fetoplacental circulation is thus established. At about 5 weeks, the chorionic villi acquire blood vessels. As the fetus grows, the placenta increases in size, the villi proliferate and their blood supply proliferates with them. Chorionic villi are anchored to the decidual plate, and from these anchoring villi proliferation of secondary and tertiary villi takes place. Initially the whole chorion is covered with villi but gradually, as the chorion expands, surface pressure and interferance with blood supply result in atrophy of the villi on the chorion leve, the surface lying exposed in uterine cavity. But, Reynolds [1966] stated that the chorion of the implantation site is called chorion frondosum and here the villi are well preserved.Fox [1978], described that the cytotrophoblast is prominent in the villi during the first trimester while in the second trimester the villi are smaller and increased in number,the stroma is more dense and the fetal vessels are more prominent. Later on, at the commencement of the third trimester cytotrophoblast is less conspicuous while the syncitial knotting becomes more prominent and the villi decrease in size but the fetal capillaries become more prominent, and

Hofbaur cells are scanty. Fetal capillaries are dilated, their walls are thin and become in close contact with maternal circulation in the intervillous space.

NORMAL PLACENTA

Wynn [1965] and Clayton et al [1980]described the mature term placenta is discoid in shape, measures 15 -20 cm. in diameter and about 2.5 cm. thickness, and weighs between 400 - 500 g. It has a fetal and a maternal surface, the fetal surface is covered by a smooth amnion underneath which is the chorion. The blood vessels are visible beneath it as they radiate from the insertion of the umblical cord. The maternal surface is rough and spongy due to the presence of 10 - 12 cotyledons which are polygonal areas with convex surface. Each cotyledon is formed of main villous stem and branched villi. Its colour is dull red with a thin greyish and shaggy layer on the surface which is the remnant of decidua basalis. Numerous greyish spots are seen on the maternal surface due to calcium in degenerated areas.