Effect of endometrial thickness on fertility

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الخلاصة:
دراسة اجريت لقياس ثخن بطانة الرحم لدى النساء العقيمات و غير العقيمات باستخدام جهاز السونار المهبلي خلال الايام ٢-٥ من الدورة الشهرية . النتائج اظهرت ان ثخن بطانة الرحم لدى النساء العقيمات هو اقل من ثخنه عند النساء الغير عقيمات أي ان قلة ثخن بطانة الرحم مرتبط بالعقم.

Abstract:
The study involve measurement of endometrial thickness of infertile women using transvaginal ultrasound during day 2-5 of menstrual cycle and comparing it to that of fertile women . The results reveal that endometrial thickness is higher in fertile women than infertile women i.e low endometrial thickness is related to infertility.

Introduction:

The uterus:

It is the site of menstruation , implantation of the fertilized ovum , development of fetus during pregnancy and labour (1) . Is shaped like an inverted pear tapering inferiorly into the cervix . It is hollow and has thick muscular wall(2). Anatomical subdivisions of uterus include : fundus , body , isthmus and cervix . The fallopian tubes extend laterally from the uterus (3). The uterine wall consist of 3 layers : inner endometrium , middle myometrium and outer perimetrium . The endometrium is mucous membrane composed of two layers : stratum functionalis and stratum basalis (4). The myometrium form the bulk of uterine wall and consists of 3 layers of smooth muscle fibers and is thickest in the fundus and thinnest in the cervix . The perimetrium or serosa is part of visceral peritoneum (5). At the time of ovulation the endometrium is about 3- 4 mm thick . After ovulation the endometrium is highly vascularized and slightly edematous under the influence of estrogen and progesterone from the corpus luteum . At the peak of secretary phase (about 1 week after ovulation) the endometrium has thickness of about 5- 6mm. (6) . While the corpus luteum regress the hormonal support for the endometrium is withdrawn . The endometrium become thinner , foci of necrosis appear in the endometrium and then coalesce . There is an additional spasm and then necrosis of spiral arteries leading to spotting hemorrhage that becomes confluent and produce menstrual flow or menstruation (7) .

Infertility

Infertility affects about 14% of couples and is a medical concern for 2.7 million women of reproductive age in U.S.(8) .
Although there has been no change in the prevalence of fertility problems more couples seek help than did previously. The causes of fertility problems include female causes or male causes , although no identifiable cause is found in one third of couples trying for baby . In 39% of couples a problem will be found in both partners.
Infertility is defined as failure to conceive within one year of unprotected

regular sexual intercourse (9).
Conception requires juxtaposition of male and female gametes at optimal stage of maturation followed by transportation of coceptus to the uterine cavity where the endometrium support its continuous development and implantation. For these events to occur ,the male and female reproductive system must be both intact and coitus must occur with sufficient frequency . Even when fertilization occur , more than 70 per cent of the resulting embryos are abnormal and fail to develop or become non viable shortly after implantation . Therefore , it is not surprising that 10 to 15 per cent of couples experience infertility (10).

Materials and Method

Study Population

Thirty one infertile volunteers women were selected from fertility center in Al-Zahraa and Al-Sadder teaching hospitals and from private gynecologist clinics during the period between January and April 2008 . The age of these women ranges from 16-39 year , their BMI range from 20-29 kg/m^2 , complaining primary or secondary infertility . The duration of infertility ranges from 1-20 years .
Also thirty one fertile volunteers women are subjected to the same investigations .The age range of fertile women is 16-39 years.

Equipments

Transvaginal ultrasound is done by using SIEMENS versa pro machine using 5-9 MHZ tranvaginal probe .

Method

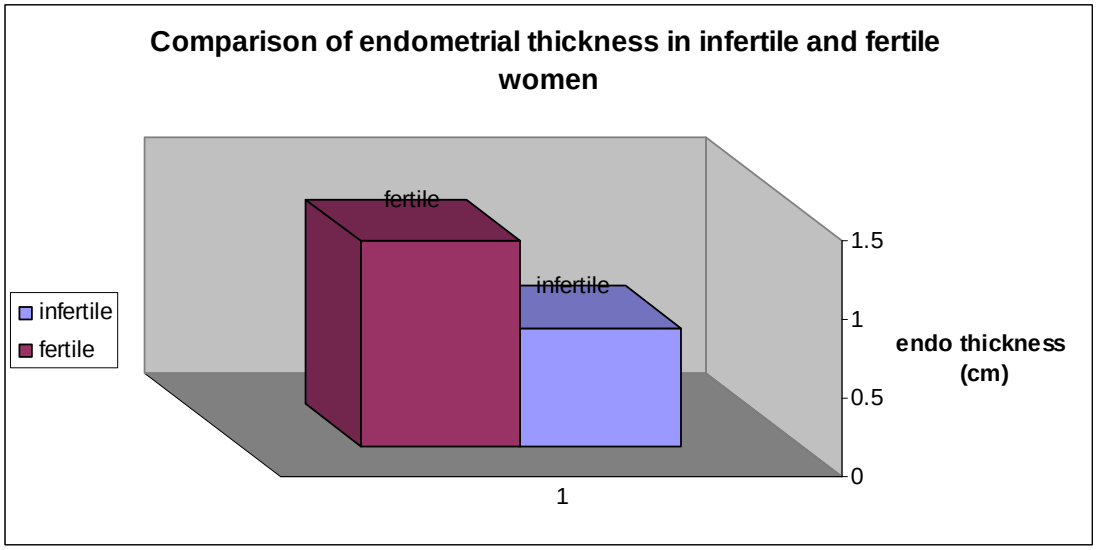
Full history is taken from the volunteers including their age , parity fertility state , duration of infertility , full medical and surgical history , menstrual history , any use of contraception and any male causes of infertility.
In day 2-5 of the menstrual cycle of the women transvaginal ultrasound is done , after the patient empty her bladder (11), and in lithotomy position , introduction of transvaginal probe , identification of uterus measurement of uterine dimension , endometrial thickness and detection of any abnormality is done.

Statistical analysis

The data was reported as mean ±standard deviation (SD) for each variable . Statistical study is done by using t – test , statistical significance was assumed $P < 0.05$ .All calculations were done by personal computer using Microsoft excel computerized program.

Results

The data include comparison of endometrial thickness in infertile and fertile women . The results reveal that endometrial thickness is lower in infertile than fertile women , as shown in the following figure:



The mean of endometrial thickness in infertile was 0.7cm , and the mean of endometrial thickness in fertile women was 1.3cm so there is significant decrement in endometrial thickness at $p < 0.05$.

Discussion:

In order to successful implantation to occur , an adequately prepared endometrium has to be built up during the menstrual cycle . Endometrial development is regulated by steroid hormones , various growth factors and cytokines . Sufficient uterine blood supply is required for these factors to reach the endometrium, especially to its functional layer(12). Several studies have tried to evaluate the association between the morphologic characteristics of the endometrium and pregnancy rates in assisted reproduction therapy. Although the results are sometimes conflicting, most studies agree that the endometrium has to reach a certain thickness for successful pregnancy to occur(13). We have found that endometrial thickness was significantly associated with in vitro fertilization (IVF) outcome(14). In addition, pregnancy rates were higher when the endometrium was thicker than 10 mm. Endometrial thickness is valid screening test for conception outcome in cycles stimulated with hMG. A periovulatory endometrial thickness more than 10mm defined 91% of conception cycles. No pregnancy occurred when the endometrium measured less than 7mm(15).
Vaginal Sonography has significantly influenced fertility management and greatly extended the role of ultrasound in gynaecology. The transvaginal transducer enables very detailed visualization of the uterine cavity.As several studies report that transvaginal ultrasound of endometrial thickness may help distinguish fertile from infertile cycles(16).
Uterine receptivity is an important factor that may affect embryo implantation. Two measures of uterine receptivity that are commonly used are the thickness and pattern of the endometrium,as measured by ultrasound during the periovulatory period. Endometrial thickness and pattern, as a predictor of outcome, have been investigated by numerous studies with variable results. While some study groups found a significant correlation between thickness and pattern of the endometrium and pregnancy rate, others reported no such relationship(17).Several studies have suggested a poor outcome when the endometrium exceeded a certain thickness. One study showed that there were no pregnancies with an endometrial thickness over 15 mm(18).Several studies demonstrated that a thin endometrium is associated with failure of implantation and that

pregnancy rarely occurs in the presence of an endometrial thickness of less than 6-7 mm(19) . In this study there was significant relation between endometrial thickness and fertility rate . We found that endometrial thickness is higher in fertile women .

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