

A Study of Endometrial Vascularity Following Implantation through Observation

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Abstract: *Background:* According to Ayurveda, Ambu is one of the four crucial components of the embryo's growth and development known as Garbhasambhav Samugri. The term "Ambu" refers to the nutrients that the mother provides to the developing embryo in order for it to build and grow. Modern science claims that the endometrium provides the embryo with nourishment during implantation. Some women are unable to become pregnant despite having normal endometrial thickness, endometrial pattern, and endometrial morphology. Endometrial vascularity plays a critical function in the implantation of fertilized eggs during the peri - implantation phase of the menstrual cycle as well as the continued growth of the fetus. *Objectives:* This study's goals are to assess the implantation rates in women with endometrial vascularity in the V1, V2, V3, and V4 zones. *Methods & Materials:* On the day that a menstrual follicle ruptured, a transvaginal colour doppler ultrasonography was performed on 160 women who were willing to become pregnant. The results of this examination were collected anonymously. Additionally, information about her status as an implanted or unimplanted woman was obtained from the gynecologist. Her pregnancy status up to 20 weeks was the subject of data collection. Results about endometrial vascularity were deduced from this data collection. *Results:* The implantation rates in instances with vascularity up to the V1 zone, up to the V2 zone, up to the V3 zone, and up to the V4 zone, respectively, were 0%, 8.33%, 25%, and 30.5%. *Conclusion:* In situations with stronger vascularity in the V3 and V4 zones than in the V1 and V2 zones, implants are more likely to be placed. For a fertilized egg to implant and for the embryo to continue growing, endometrial vascularity is crucial.

Keywords: Endometrium, Endometrial vascularity, Implantation, Miscarriage.

1. Introduction

Garbhasambhav Samugri is an Ayurvedic concept that defines elements that promote the birth of healthy offspring into the community. One of the four crucial elements for the embryo's formation and growth is the ambu. The term "Ambu" refers to the nutrients that the mother provides to the developing embryo in order for it to build and grow (1, 2). Sukshma garbha requires just a little liquid nutrition. More nutrients are required by the growing fetus. The mother regularly provides the foetus with these nutrients in the proper quantity and timing.

According to Acharya Sushruta, from the moment of conception until the foetus's body parts are visible, it is fed by upasneha through the rasavaha dhamani, which runs perpendicularly into every portion of the body. The foetus grows by obtaining food through upasneha after there are signs of obvious body parts in the fetus (1). The foetal umbilical cord is joined to the maternal rasavahanadi, which carries the essentials of the mother's diet.

Modern science asserts that the endometrium provides the embryo with nourishment during implantation (3, 4, 5). After fertilization, the foetus is fed in the following three stages, according to modern science (3, 4, 5).

- Absorption - During the initial stages of the post - fertilization period, the fertilized egg is fed nutrients found in the cytoplasm of the deutoplasm. It will also absorb a very limited amount of nutrients via tubal and uterine secretions.
- Histotrophic transfer — It receives nutrition from eroding decidua via diffusion after implantation but prior to the development of the utero - placental circulation. It then receives nutrition from maternal blood in the trophoblastic lacunae.

- Hematotropic - As the fetal circulation develops after the third week, nutrients is acquired through active and passive transfer.

According to earlier studies, some women who have normal endometrial thickness, endometrial pattern, and normal endometrial histology are still unable to become pregnant. (6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 18, 19). Endometrial vascularity has a significant role in both the implantation of fertilized eggs and the continued growth of the fetus during the peri - implantation phase of the menstrual cycle (20, 21, 22).

This study will provide important knowledge regarding how endometrial vascularity affects implantation and fetal growth. The outcomes of assisted reproductive technologies such intrauterine insemination, in - vitro fertilization, and intracytoplasmic sperm injection will be improved as a result.

2. Aim & Objective

Aim

The purpose of this study is to determine how endometrial vascularity affects implantation, as a fertilized egg implants in the uterine endometrium.

Objective

This study's goal is to assess implantation rates in women with endometrial vascularity in the V1, V2, V3, and V4 zones.

3. Materials & Methods

After receiving approval from the institutional ethics committee (SAMC/EC/ - 1302 dated: 19/11/2021), this work was completed.

On the day that a menstrual follicle ruptured, a transvaginal colour doppler ultrasonography was performed on 160 women who were willing to become pregnant. The results of this examination were collected anonymously. Additionally, the gynecologists were asked if she had been implanted or not. Her pregnancy status up to 20 weeks was the subject of data collection. Table 1 displays the format of the data that was gathered.

The steps listed below were applied to this data.

- a) All cases are divided into V1, V2, V3, and V4 zones in accordance with their vascularity.
- b) The percentage of implanted instances was computed for each group.
- c) The percentage of cases of miscarriage was calculated for each group.

The relationship between endometrial vascularity and implantation is deduced from this data.

Format of the Data Collected:

Table 1: Format of collected data

S. No.	Age (yr)	Height (cm)	Endometrial Vascularity on the Day of Rupture of Follicle	Implanted/ Non - Implanted (Y/N)	Is Pregnancy Continued upto 20 Weeks (Y/N)
1					
2					
3					

Endometrial Vascularity Zone (23, 24)

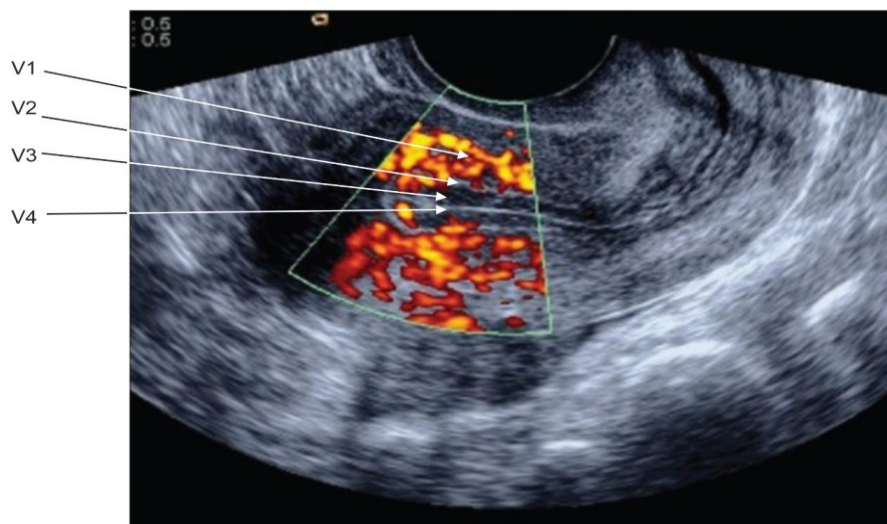


Figure 1: Measurement of Endometrial Vascularity Zone

From Fig.1 following endometrial vascularity zones were done.

- V1 – Myometrium surrounding the endometrium
- V2 – Hyperechoic endometrial edge.
- V3 – Internal endometrial hypoechoic zone.
- V4 – Endometrial cavity.

Study design – Observational study.

Inclusion criteria:

- Married Women
- Age between 20 and 30 years

- Women having normal and regular menses.

Exclusion criteria:

- Women having abnormal Uterine Cavity.
- Women having uterine disorders, cervix disorders, tubal disorders, ovarian disorders and vaginal disorders.
- Partner having semen abnormality.

4. Results & Discussion

Distribution of cases according to endometrial vascularity

Table 2: Distribution of cases according to endometrial vascularity

Vascularity Zone	Implanted cases	Non - Implanted cases	Total cases	% of implanted cases	Miscarriage (Upto 20 weeks)	% of Miscarriage cases
V1	0	22	22	0.00	-	-
V2	1	11	12	8.33	1	100
V3	2	6	8	25.00	0	0
V4	36	82	118	30.50	0	0

Table 2 shows that instances with more vascularity in the V3 and V4 zone than the V1 and V2 zone have a higher implantation rate.

Out of 160 cases, endometrial vascularity was found in 22 cases up to the myometrium that surrounds the endometrium, 12 cases up to the hyperechoic endometrial

edge, 8 cases up to the internal endometrial hypoechoic zone, and 118 cases up to the endometrial cavity.

Zero cases are implanted out of 22 cases with vascularity up to the myometrium surrounding the endometrium.

Only one case out of the 12 cases with hyperechoic endometrial edges and vascularity has been implanted.

Two patients out of eight with vascularity up to the internal endometrial hypoechoic zone have implants; the other six do not.

Out of 118 instances with endometrial cavity vascularity, 36 cases have implants and 82 cases do not.

There is no chance of implantation in situations where the endometrium is surrounded by vascularity up to the myometrium. 8.33 percent of patients with vascularity up to the hyperechoic endometrial edge will undergo implantation. 25% of instances with vascularity up to the internal endometrial hypoechoic zone will undergo implantation. The implantation rate is 30.5 percent in cases when there is vascularity up to the uterine cavity.

It has been found that cases with vascularity up to the internal endometrial hypoechoic zone and endometrial cavity had a higher implantation rate.

One case out of twelve cases with hyperechoic endometrial vascularity was implanted, but the pregnancy failed.

In our observational analysis, there were no problems in any of the implanted instances with vascularity reaching the internal endometrial hypoechoic zone and the endometrial cavity reaching 20 weeks.

In this study, the endometrial thickness of the patients varied from 6 to 13 mm. Additionally, no connection between endometrial thickness and vascularity was discovered throughout this study. No information pertaining to a hormonal study was gathered for this one.

For a fertilized egg to implant and for the embryo to continue growing, endometrial vascularity is crucial. The endometrium's poor blood supply hinders embryo implantation.

5. Conclusion

The rate of implantation is higher when the endometrial cavity (V4 zone) and internal endometrial hypoechoic zone (V3 zone) are both vascularized.

For a fertilized egg to implant and for the embryo to continue growing, endometrial vascularity is crucial. The endometrium's poor blood supply hinders embryo implantation.

Conflict of interest

There are no conceivable conflicts of interest for the authors. All authors have agreed to disclose any possible conflicts of interest in the format specified.

Ethical approval

The Shubadeep Ayurvedic Medical College and PG Institute in Indore, MP, institutional ethics committee accepted the study, and the work was carried out in compliance with its rules.

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