



A study on histomorphological patterns of endometrial biopsies in women with infertility

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Abstract

Background: Infertility is a global health problem. Cyclical histological changes in the endometrium reflect the fluctuating hormone levels and enables histological appearance of endometrium to be a reliable parameter to evaluate the cause of infertility. The aim was to study histomorphological patterns of endometrial tissue in cases of infertility.

Materials and methods: A cross sectional study on 250 endometrial samples of infertile women both primary and secondary was carried out to find the histomorphological patterns of endometrium in infertile women.

Results: 250 endometrial biopsies of patients presenting with infertility were studied. The age ranged from 20 to 45 years, with mean age of 31.47±3.15 years. Majority of the cases were of primary infertility 165 cases (66%) and secondary infertility 85 cases (34%). The various patterns include proliferative phase 76 cases (30.4%), early secretory phase 15 cases (6%), mid secretory phase 15 cases (6%) and late secretory phase 36 cases (14.4%), endometrial polyp 40 cases (16%), endometrial hyperplasia without atypia 52 cases (20.8%), atypical endometrial hyperplasia 2 cases (0.8%), nonspecific endometritis 12 cases (4.8%) and tuberculous endometritis 2 cases (0.8%)

Conclusion: Endometrial biopsies provide an insight into the hormonal response of endometrium as well as the local factors of endometrium. Hence the histological examination of endometrial biopsy is the most confirmatory tool for the diagnosis of infertility.

Keywords: endometrium; infertility; endometrial biopsy; tuberculous endometritis; primary infertility.

Introduction

The inability to achieve conception even after one year of unprotected coitus by a couple is considered as infertility [1]. It is a global health problem affecting about 80 million people worldwide [2]. As per national health portal of India the overall prevalence of infertility in India is between 3.9 to 16.8% [3]. Infertility has social, cultural and psychological implications and often creates problems for the couples, especially women as they are usually blamed for it [4]. Infertility can be primary, where in the couples have never conceived previously or secondary wherein they have had a pregnancy, although not necessarily a successful one [2]. Infertility is attributed to male factors in about 25% of cases, female factors in 58% of cases and unexplained in 17% of cases. Both male and female factors can also be present simultaneously [5].

Investigating an infertile couple aids in assessing their chance of achieving a pregnancy and identifying the factors amenable to treatment [6]. Disturbances in the female genital tract or parts of the central nervous

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system that control the release of hormones lead to female infertility [7]. Cyclical morphological changes in the endometrium reflect the fluctuating biorhythms of hormone levels thus making histological appearance of the endometrium a reliable parameter in the evaluation of infertility [6].

The aim was to study the histomorphological patterns of endometrial tissue in cases of infertility including primary and secondary.

Materials and methods

In the current study, 250 biopsies of endometrium, received with the clinical diagnosis of infertility, primary or secondary were included. This is a retrospective cross sectional study conducted using endometrial biopsies received at UdayaRavi diagnostic center, Tumkur during the period March 2020 to February 2022 and was approved by ethical committee. All endometrial biopsies were processed by paraffin tissue processing, sections of 5 micron thickness were stained with Hematoxylin and Eosin (H & E) and were studied under microscope. Ziehl-Neelsen stain was done wherever required.

Clinical details of the menstrual cycle, date of last menstrual period (LMP) and date of dilatation and curettage (D &C) were collected. Evaluation of morphological features such as proliferative phase, early secretory phase, mid secretory phase, late secretory phase, endometrial polyp, endometrial hyperplasia without atypia, atypical endometrial hyperplasia, nonspecific endometritis and tuberculous endometritis. In the statistical analysis, percentages (frequencies) of various parameters were calculated.

Reported results were tabulated and analysed using descriptive statistics.

Results

In a total of 250 endometrial biopsies, the age ranged from 20 to 45 years, with mean age of 31.47 ± 3 years. In primary infertility group youngest patient is 20 years-old and oldest being 45 years. In secondary infertility group, youngest being 32 years and oldest being 45 years.

As shown in table 1, amongst the morphological patterns observed, the percentage of cases in proliferative phase/ anovulation was found to be most common followed by late secretory phase. Out of 250 cases, 76 cases (30.4%) showed proliferative phase. Among secretory phase there were 15 cases (6%) of early, 15 cases (6%) of mid and 36 cases (14.4%) of late secretory phase. Other histomorphological patterns include endometrial polyp 40 cases (16%), endometrial hyperplasia without atypia

52 cases (20.8%), atypical endometrial hyperplasia 2 cases (0.8%), nonspecific endometritis 12 cases (4.8%) and tuberculous endometritis 2 cases (0.8%).

Table 1: Various histomorphological patterns in endometrium of infertile women.

<i>Pattern of endometrium</i>	<i>No. of cases</i>	<i>Percentages (%)</i>
Proliferative phase	76	30.4
Early secretory phase	15	6
Mid secretory phase	15	6
Late secretory phase	36	14.4
Endometrial polyp	40	16
Endometrial hyperplasia without atypia	52	20.8
Atypical endometrial hyperplasia	2	0.8
Non- specific endometritis	12	4.8
Tuberculous endometritis	2	0.8
Total	250	100

As shown in table 2, 165 cases (66%) were of primary infertility and 85 cases (34%) of secondary infertility.

Table 2: Various histomorphological patterns in endometrium in different types of infertility.

<i>Pattern of endometrium</i>	<i>Primary infertility</i>		<i>Secondary infertility</i>	
	<i>No. of cases</i>	<i>Percentages (%)</i>	<i>No. of cases</i>	<i>Percentages (%)</i>
Proliferative phase	56	33.9	20	23.5
Early Secretory phase	12	7.3	3	3.5
Mid Secretory phase	7	4.2	8	9.4
Late Secretory phase	26	15.8	10	11.8
Endometrial polyp	32	19.4	8	9.4
Endometrial hyperplasia without atypia	27	16.4	25	29.4
Atypical endometrial hyperplasia	1	0.6	1	1.2
Non- specific endometritis	3	1.8	9	10.6
Tuberculous endometritis	1	0.6	1	1.2
Total	165	100	85	100

Primary infertility constituted majority of the cases. Proliferative phase was the predominant finding in primary infertility 56 cases (33.9%) followed by endometrial polyp 32 cases (19.4%). Whereas in secondary infertility, endometrial hyperplasia without atypia 25 cases (29.4%) was most common followed by proliferative phase 20 cases (23.5%).

Discussion

In a developing country like India, infertility is a major social taboo as well as a gynecological health concern. Infertility has been stigmatized since ages and thus evaluation of the cause plays a major role in the treatment.

Female infertility may occur due to hormonal imbalance, organic causes, inflammatory or neoplastic lesions of endometrium [8]. Histomorphological examination of

endometrial biopsy is the most dependable parameter for evaluating the cause of infertility [9].

In this study we aim to categorize and evaluate the histomorphological features of endometrium in both primary and secondary infertility. In the present study, mean age of the patient was 31.47 years and age ranged from 20 -45 years, which is similar to the study done by Ahmed et al [10] who found mean age to be 29.91 years and age ranged from 20-40 years.

In the present study as shown in table 3, we found proliferative phase/ anovulation (30.4%) (Figure 1) as the most common cause of infertility followed by secretory phase (26.4%) including its different stages. Similarly the studies done by Ahmed et al (41.3%) [10] and Ikeme et al (56.7%) [11] also showed proliferative phase as the most common finding.

Table 3: Comparison of percentage of histomorphological patterns of endometrium.

Pattern of endometrium	Present study (%)	Ahmed et al [10] (%)	Ikeme et al [11] (%)	Preethi et al [12] (%)	Kumari et al [13] (%)	Kafeel et al [14] (%)
Proliferative phase	30.4	41.3	56.7	30.8	33	25
Early Secretory phase	6	7.65	-	-	-	37.5
Mid Secretory phase	6	7.65	-	-	-	14.1
Late Secretory phase	14.4	25	16.6	35.86	35	5
Endometrial polyp	16	-	-	2.1	2.1	-
Endometrial hyperplasia without atypia	20.8	10.72	20	10.12	5	14.1
Atypical Endometrial hyperplasia	0.8	-	-	-	-	-
Non- specific endometritis	4.8	1.02	1.7	-	-	3.33
Tuberculous endometritis	0.8	0.51	-	2.1	3	0.83

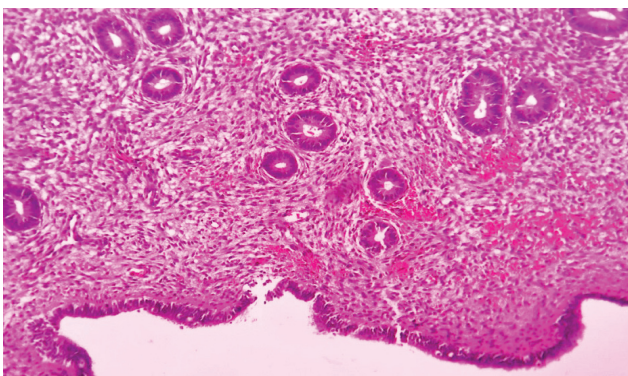


Figure 1: Proliferative phase endometrium (H&E; 100x).

Endometrial polyp was 16% in the present study, where it was only 2.1% in Preethi et al [12] and Kumari et al [13]. This discordance might be due to increase in secondary infertility cases in our study compared to other study. Endometrial hyperplasia without atypia constituted 20.8% (Figure 3) similar to Kafeel et al [14].

Atypical endometrial hyperplasia was seen in 0.8% of cases.

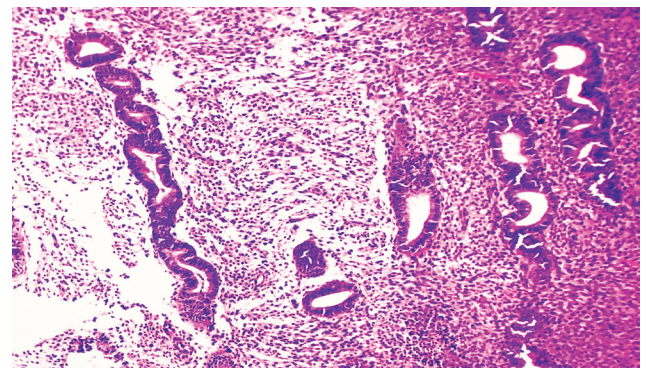


Figure 2: Secretory phase endometrium (H&E; 100x).

Tuberculous endometritis remains a major cause of infertility in India and should be investigated for tuberculosis [10]. Endometrial involvement suggests wide spread disease probably involving the fallopian

tubes leading to infertility [12]. Thus adequate evaluation is necessary.

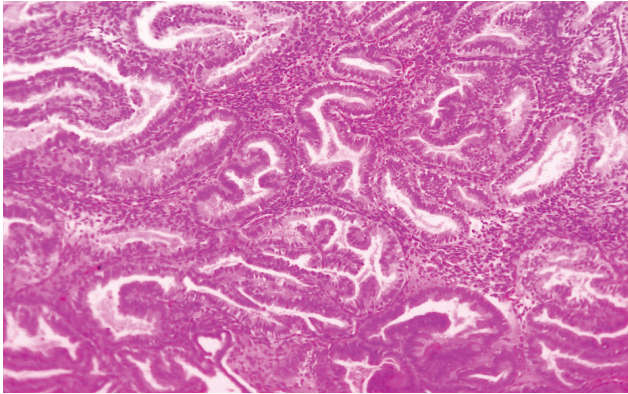


Figure 3: Endometrial hyperplasia without atypia (H&E; 100x).

Among inflammatory endometritis, nonspecific endometritis was seen in 4.8% and Tuberculous endometritis in 0.8% (figure 4). These findings were in concordance with Kafeel et al [14] (nonspecific endometritis 3.33% and tuberculous endometritis 0.83%) and Ahmed et al [10] (nonspecific endometritis 1.02% and Tuberculous endometritis 0.51%).

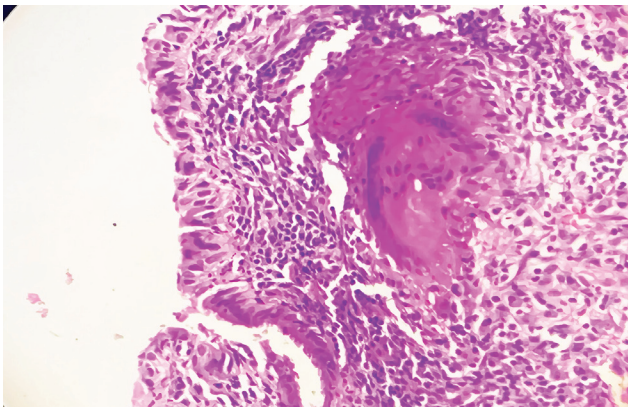


Figure 4: Granulomatous endometritis (H&E; 100x).

An array of hormonal assays and diagnostic tests are available to clinicians to clarify the cause of infertility. Yet in developing countries like India premenstrual endometrial biopsies are useful for the identification of anovulatory cycles, hyperplasia and endometritis, where hormone assays are either unavailable or not affordable [15].

Endometrium remains the sensitive indicator of ovarian function and thus histomorphological examination plays major role in the investigation of infertility as it forms a safe and cheaper diagnostic aid [15, 16].

Limitation of the study

The present study is based on a limited number of cases and is inadequate to provide a conclusive data.

Conclusion

The purpose of endometrial biopsies in infertile couple is to identify the factors amenable to treatment and to clarify the causes of infertility. Endometrial biopsies provide an insight into the hormonal response of endometrium as well as the local factors of endometrium concerning infections like tuberculous endometritis, hyperplasia, and anovulatory cycle. Hence the histological examination of endometrial biopsy is the most confirmatory tool for the diagnosis of infertility.

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Conflicts of interest

Authors declare no conflicts of interest.

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