Examining the WBC Count of Female Patients during Various Stages of Menstrual Cycle- A Hospital Based Study

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Abstract

Introduction

The goal of the current study was to determine how the leukocyte count varied on a monthly basis during the various stages of the menstrual cycle. Periodic vaginal bleeding is a cyclical phenomenon associated with the menstrual cycle, which impacts all bodily systems. It takes place in the course of a woman's reproductive life and is governed by a planned progression of structural, functional, and hormonal systems. A regular menstrual cycle typically lasts 28 days, with an average blood loss of 20 to 60 millilitres and a flow that lasts 2 to 6 days. The menstrual cycle is regulated by the pituitary-ovarian system.

Material and Methods:

38 healthy females in the 16–28 age range with regular cycles lasting 28–28 days were examined.The current study was conducted at the Obstetrics & Gynaecology Department of MKCG MCH, Berhampur, between August 2014 and October 2015. 38 healthy female subjects, ages 16 to 28, with average menstrual cycles lasting 28₱2 days participated in the study. Women with irregular periods, gastrointestinal disorders, anaemia, a

history of drug usage that interfered with their menstrual cycle, a history of chronic disease, or a fever at the time of sample collection were not included in the research. Each female participant informedly consented to the research after learning about its protocols. The tests were carried out in accordance with ethical standards.

Result:

During the secretory phase, the total leukocyte count significantly increased. When it came to the differential leukocyte count, the neutrophil count increased significantly during the secretory phase, the lymphocyte count increased during both the menstrual and secretory phases, the monocyte count increased during the proliferative phase but did not significantly change, and the eosinophil count did not significantly change throughout the three phases.

Conclusion:

In order to better understand a variety of illnesses, this study sought to ascertain the typical fluctuation in the leucocyte count during the various phases of the menstrual cycle.This study shows variations in the total leukocyte count and differential leukocyte count during the various stages of the menstrual cycle and offers information on a variety of disorders that affect women and are linked to monthly swings.

Keywords: Periodicity, secretory phase, leukocyte count, menstrual cycle.

Introduction

The menstrual cycle is a cyclical phenomena that affects every system in the body and is typified by periodic vaginal bleeding. It happens during a woman's reproductive life and is influenced by a structured sequence of hormonal, structural, and functional systems. The typical length of a normal menstrual cycle is 28 days, with a flow lasting 2 to 6 days and an average blood loss of 20 to 60 millilitres. Ovarian-pituitary regulation of the menstrual cycle occurs.

Follicle stimulating hormone (FSH) and luteinizing hormone (LH) are released by the integrated hypothalamus pituitary-ovarian axis, which in turn controls the production of ovarian steroid hormones such as progesterone and oestrogen, which stimulate and regulate the endometrium. Numerous research have demonstrated that the leukocyte count varies during distinct menstrual cycle phases, however the findings have been conflicting and unconvincing. Thus, the current investigation was conducted. up to investigate the changes in leucocyte count during the menstrual cycle's various stages.

MaterialsandMethods

The current study was carried out from August 2014 to October 2015 in the Obstetrics and Gynaecology Department of MKCG MCH, Berhampur. The study comprised 38 healthy female participants with typical menstrual cycles lasting 28₱2 days, aged between 16 and 28. The study excluded women who had irregular menstrual cycles, gastrointestinal illnesses, anaemia, a history of medication use that affected their menstrual cycle, a history of chronic illness, or a fever at the time of sample. Every female participant gave her informed permission after being educated about the study's procedures. The conduct of the experiments complied with ethical guidelines.

Two samples were taken: one during the secretory phase, 48 hours after the commencement of menstruation, and the other between the eighth and tenth days of the menstrual cycle. third sample was collected between the 22nd and 24th days of the menstrual cycle (during the secondary phase) and the cycle (during the proliferative phase). A single cycle was used to monitor every female. Samples were collected ideally between 9 and 10 in the morning. Under an enhanced Neubauer's chamber, Turk's fluid was used to count the total leukocytes, and Leishman's dye was used to count the differential leucocytes under a compound microscope.

Results

The secretory phase saw a rise in the total leukocyte count. When compared to the proliferative phase, the proportion of neutrophils increased throughout the secretory and menstrual phases. The number of lymphocytes rose throughout the secretory and menstrual cycles, but fell during the proliferative phase. The number of Eosinophils did not change. During the proliferative phase, the number of monocytes rose.

Table-1 Shows Total Leukocyte Count During Different Phase Of Menstrual Cycle

No. of Female	Parameter	Menstrual Phase	Proliferative Phase	Secretory Phase
38	Total Leucocytes count(TLC)	6578	6352	8685

Table-2 Shows Differential Leucocytes Count During Different Phase Of Menstrual Cycle

Differential count%	Menstural Phase(2^{nd} day)	Proliferative Phase (6^{th}-9^{th}day)	Secretory Phase(22^{nd} to24^{th}day)
Neutrophil	63%	56%	65%
Lymphocyte	33%	22%	35%
Eosinophil	1.48%	1.31%	1.5%

Monocyte	1.4%	2.5%	1.4%
Basophil	0%	0%	0%

Discussion

The hypothalamopituitary ovarian axis regulates the menstrual cycle, which is a complicated and regular process. The current study's total leucocyte count increased throughout the secretory phase, which may have been caused by an increase in leucocyte subpopulations across the board. The research conducted by Mathur et al. and Tikare et al. is comparable to this study. A different investigation by Ranjee et al. showed that total leukocytes grew from the menstrual phase to the proliferative phase, reaching their peak level around the middle of the cycle. there is no variation in the quantity of leucocytes in circulation with respect to the menstrual cycle.

The current study's higher neutrophil percentage might be the result of ovaries' hormonal fluctuations. According to certain research, oestrogen may encourage the discharge of neutrophils from the bone marrow rather than the marginated pool and may also increase granulocyte proliferation. The ovaries release progesterone, which controls the neutrophil count. Compared to previous phases, the menstrual phase had a higher eosinophil level. However, in other research where there was a substantial drop in count throughout the middle of the cycle, followed by an increase in the secretory phase, which happened as a result of physiological stress and a spike in the blood's steroid hormone level, which led to eosinopenia.

Although some studies have shown a reduction in lymphocyte count in the secretory phase, the rise in T helper cells, cytotoxic T-cells, and NK cells that occur owing to the action of steroids may be the cause of the increased lymphocyte count in the secretory phase. The proliferative phase of the monocyte was increased. These might be brought on by an increase in monocyte and granulocyte counts as well as a rise in 17a estradiol concentration. In several studies, the menstrual and secretory stages of the cycle showed a drop in basophil count, perhaps as a result of the migration of thecells from the peripheral circulation into the ischemic endometrium and the rupturing ovarian follicle.

Conclusion

This study provides information on numerous illnesses that occur in females associated to monthly fluctuations and displays changes in total leukocyte count and differential leukocyte count during the different phases of the menstrual cycle.

References

1. Ranjee, Vinod KC, Raghuveer C et al. Haematological and electrocardiographic variations during menstrual cycle. Pak J Physiol 2010; 6 (1); 18-21.
2. Declaration of Heisinki (1964), 1966, Amended by World Medical Assembly, Venice, Italy, Br Med J 1983; 313:1448- 1449.
3. Sadiqua B, Ashwini S. Study of immune profile during different phases ofmenstrual cycle. Int Biol Med R 2012; 3(1); 1407-1409.
4. MathurS,MathurRS,GoustJetal.Cyclic variations in white cell subpopulations in thehumanmenstrualcycle;correlations with progesterone and estradiol Clin Immunopath. 1979; 13:246-253.
5. Tikare SN, Das KK, Sinha P et al. Blood leucocyte profile in different phase of menstrual cycle. Indian J Physiol Pharmacol 2008;52(2);201-204.
6. Makinoda S, Mikuni M, Sogame M et al. Erythropoietin, granulocyte-colony stimulating factor, interlukin-1 beta and interlukin-6duringthemenstrualcycle.Int J Gyanecol Obset 1996;55;265-71.
7. Bain BJ, England JM. Normal hematol- ogical values: sex difference in neutrophil count. Br Med J 1975; 1:306-309.
8. Bain BJ, England JM. Variations in leukocyte count during the menstrual cycle. Br Med J 1975; 2: 473-475.
9. Pepper H, Linsay S. Levels of platelets, eosinophils, total leucocytes and polymorphonuclear leucocytes during the normal menstrual cycle. J Am Coli Obstet Gyanecol 1959; 14:657.
10. Fass MM, Bouman A, Moes H, Heineman MJ et al. The immune response during the luteal phase of the ovarian cycle:a Th2 response.FertilSteril2000;74:1008-1013.