



ORIGINAL RESEARCH PAPER

Ophthalmology

A STUDY ON TEAR FILM PRODUCTION AND DRAINAGE IN WOMEN WITH DYSFUNCTIONAL UTERINE BLEEDING

KEY WORDS: Tear film, lacrimal gland , Meibomian gland, endometrium, uterus, menstrual cycles, epithelium lining, luteal phase, follicular phase

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ABSTRACT
AIM – To assess the tear film stability and the tear drainage in dysfunctional uterine bleeding women. **MATERIALS AND METHODS** : A randomised study of 50 women of fertile age and with irregular menstrual cycles for a period of 1 year were enrolled in this study. Tear production was evaluated with Schirmer I and II test, tear stability with tear breakup time, tear film meniscus, ocular surface stained with lissamine green and Meibomian gland count assessed. Tear drainage was assessed using Jones dye test. **RESULTS** : The data values of Schirmer's test 1 and 2 ,TBUT and Jones dye test were found to be normal in all the patients. As the patients were tested randomly in different phases of their disrupted cycles, the differences in their tear film stability and production could not be commented. **CONCLUSION**: The findings of our study show that Meibomian glands exhibit a cyclic change in normal menstrual cycle whereas in irregular menstrual cycles, no changes were found in tear film production and drainage as women were in their different phases of irregular menstrual cycle

INTRODUCTION

Tear components are produced by the 'lacrimal functional unit', consisting of ocular surface tissues (cornea and conjunctiva, including goblet cells and Meibomian glands), the lacrimal glands (main and accessory), and their interconnecting sensory (CN V) and autonomic (CN VII) innervation¹. The lacrimal gland is comprised of acini that are made up of basal stellate shaped myoepithelial cells are known to contract. Meibomian glands are large, modified sebaceous glands that synthesize and secrete a mixture of lipids, known as "meibum," which play an important role of stabilizing the tear film.

The endometrium is the innermost lining layer of the uterus, functions to prevent adhesions between the opposed walls of the myometrium, thereby maintaining the patency of the uterine cavity. During the menstrual cycle or estrous cycle, the endometrium grows to a thick, blood vessel-rich, glandular tissue layer. The endometrium experiences morphologic and functional changes that are closely associated with the cyclic release of sexual hormones.

In the sebaceous gland, androgens reportedly increase the secretion of sebum, whereas estrogens have an opposite effect. Tear production is affected in normal menstruating women during the luteal phase. The endometrial tissue of the uterus and nasolacrimal duct are lined by the same type of pseudostratified columnar epithelium so that any change in menstrual cycle could lead to dry eye. Hence, we theorized that the meibomian gland, as a modified sebaceous gland, also undergoes physiologic changes during the menstrual cycle. It is found that majority of patients with dry eye syndrome are women.

AIM–

1. To assess the tear film stability in dysfunctional uterine bleeding women
2. To assess the tear drainage in dysfunctional uterine bleeding women.

MATERIALS AND METHODS :

50 women of fertile age and with irregular menstrual cycles

for a period of 1 year were enrolled in this study. Tear production was evaluated with Schirmer I and II test, tear stability with tear breakup time, tear film meniscus, ocular surface stained with lissamine green and Meibomian gland count assessed. Tear drainage was assessed using Jones dye test. Women with history of pre-existing tear film instability, on medications, any systemic illness, prior ocular surgeries and computer professionals were excluded from the study.

RESULTS :

Out of 50 women with abnormal uterine bleeding, patients aged from 15-25 years were 8 , 26-35 years were 17 and 36-49 years were 25 .The data values of Schirmer's test 1 and 2 ,TBUT and Jones dye test were found to be normal in all the patients. As the patients were tested randomly in different phases of their disrupted cycles, the differences in their tear film stability and production could not be commented . In our previous study of normal menstruating women , there is a reduction in Schirmer's and TBUT in the luteal phase of menstrual cycle. Thereby, functionally due to the changes in the endometrial tissue during the luteal phase , a change was seen in the tear film stability in normal menstruating women.

DISCUSSION:

The normal tear formation necessary to keep the eye moist is provided by a continuous secretion from the accessory lacrimal glands. Under normal conditions, tear production just exceeds that lost by evaporation; the remainder passes down the nasolacrimal duct. As a draining and secretory system, the nasolacrimal ducts play a decisive role in tear transport. The normal tear film is a 1.0-mm convex band with a regular upper margin. It is made of three components. The outer layer is a thin lipid layer produced by the meibomian glands, which open along the upper and lower lid margins. The middle layer, the thickest, is composed of aqueous produced from the main and accessory lacrimal glands. The innermost layer is a mucin layer produced by conjunctival goblet cells¹. Women are more likely to develop dry eye than men, probably in relation to changes in hormone levels. Histologically, the nasolacrimal duct and the upper and lower canaliculi are lined by pseudostratified columnar epithelium³ (Fig-1). Similarly , the endometrium during the proliferative

phase/ follicular phase have pseudostratified columnar cells in glands (Fig-2). Therefore, in a previous study conducted by us in 100 fertile women with regular menstrual cycles showed a reduction in Schirmer's and TBUT in the luteal phase of menstrual cycle whereas normal tear film status in the follicular phase. This could be due to the increased estrogen and progesterone in the luteal phase, especially in the latter half of the phase where the meibomian gland orifice become smaller, and the volume of meibum decreased. In our current study, as women were in their different phases of irregular cycles, the role of luteal and follicular phase could not be assessed and the tear film stability and drainage was found to be within normal limits.

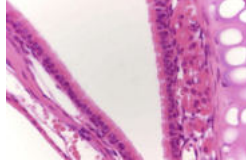


Fig 1 Pseudostratified columnar epithelium of NLD

Table - 1 : Average Data Of Tear Film Tests From 100 Fertile Women In Pre And Post Menstrual Phase Of Regular Cycles

Age group (years)	number of women	follicular phase cycle		luteal phase cycle	
		Schirmer's test (mm)	TBUT (secs)	Schirmer's test (mm)	TBUT (secs)
15-25	26	32	12	30	9
26-35	32	30	11	26	8
36-49	42	26	10	22	8

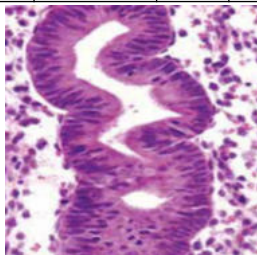
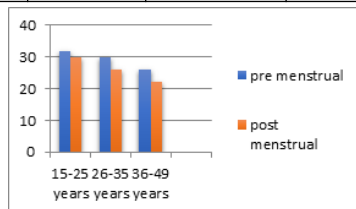


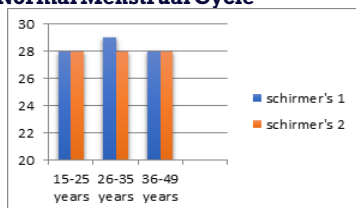
Fig 2 - Pseudostratified columnar epithelium of endometrium in proliferative phase

Table - 2 - Various Tear Film Parameters With Age Distribution In 50 Dub Females

Age group (years)	number of women	schirmer's 1 & 2 (mm)	TBUT (secs)	Jones Dye test
15-25	8	28	12	patent
26-35	17	29	11	patent
36-49	25	28	12	patent



Graph - 1 : Average Data Of Schirmer's Test Of 100 Fertile Women In Normal Menstrual Cycle



Graph - 2: Average Data Of Schirmer's Test Of 50 Fertile Women Abnormal Menstrual Cycles

CONCLUSION :

The findings of our study show that Meibomian glands exhibit a cyclic change in normal menstrual cycle. The physiology of Meibomian gland during luteal phase may influence on tear film stability resulting in evaporative type of dry eye. Whereas in irregular menstrual cycles, no changes were found in tear film production and drainage as women were in their different phases of irregular menstrual cycle. Females with long term continuous use of computer systems and devices with screen display during this phase may further decrease the number of eye blinks leading to incomplete blinking, evaporation of tears and then subsequently dry eye disease. However, a detailed analytical study in a larger population and with the comparison of NLD and endometrial tissue biopsy histopathologically during various phases of irregular cycles could be demonstrated in the future.

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