

## INFLUENCE OF MENSTRUATION ON GLAUCOMA\*†

BY

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PREMENSTRUAL migraine and closed-angle glaucoma have many points of similarity: thus both may be provoked by the water-drinking test; all are more severe in the early morning; contributory factors precipitating attacks include emotional stress and fatigue; and in both there may be other systemic disturbances such as nausea, lethargy, and vertigo. The excitable temperament of patients with closed-angle glaucoma has long been recognized and has been confirmed by recent studies (Berger and Zimet, 1959), and this same type of personality is found in patients with premenstrual syndrome (Kessel and Coppen, 1963).

### Present Investigations

57 women attending the Glaucoma Clinic and under 55 years of age were each given a menstrual chart on which to record the dates of menstruation and ocular symptoms (blurred vision, pain, or headaches). The types of glaucoma were closed-angle (19), chronic simple (20), congenital (4), secondary (6), and preglaucoma (8).

### Definitions

Premenstruum is limited to the 4 days immediately preceding menstruation.

Paramenstruum covers the premenstruum and the first 4 days of menstruation.

Intermenstruum covers all days of the menstrual cycle except the paramenstruum.

### Type of Menstruation

When first seen 34 women were menstruating regularly, eighteen had a natural menopause, and five an artificial menopause. Only two had suffered from dysmenorrhoea, but an unusually high proportion (70 per cent.) suffered from premenstrual syndrome. Among those with closed-angle glaucoma, the incidence of premenstrual syndrome rose to 89 per cent., compared with only 50 per cent. of those with chronic simple glaucoma. The premenstrual symptoms of these forty women included headache (28), depression (21), lethargy (13), irritability (12), backache (10), bloatedness (8), mastitis (8), and epilepsy (1). A high incidence of pre-eclamptic toxæmia (21 per cent.) was noted among the 43 parous women, about twice the national average.

### Results

Examination of menstrual charts revealed a definite time relationship of ocular symptoms to menstruation in closed-angle glaucoma (Fig. 1, opposite) which was absent among sufferers from chronic simple glaucoma. Even in menopausal patients with closed-angle glaucoma, the ocular symptoms tended to occur at monthly intervals although menstruation had ceased.

Analysis of the timing of 356 episodes of ocular symptoms in 106 menstrual cycles showed the highly significant figure of 49 per cent. of symptoms occurring during

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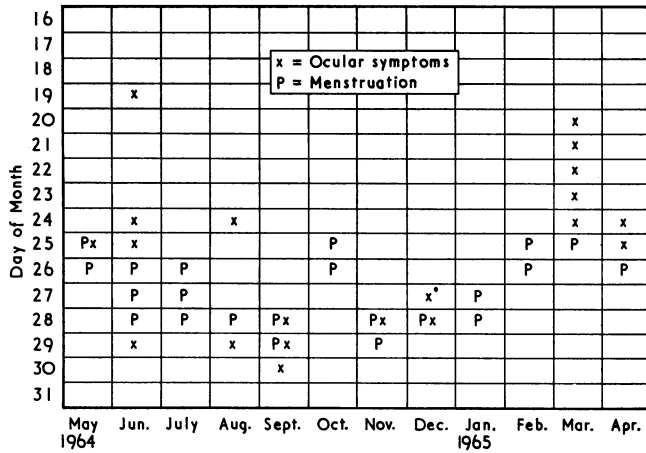


FIG. 1.—Menstrual chart of a woman aged 49 years with closed-angle glaucoma.

the paramenstruum ( $\chi^2 = 73.8$  at 1 d.f.). The influence of menstruation on the timing of ocular symptoms was almost entirely confined to those with closed-angle glaucoma, in whom 60 per cent. of symptoms occurred during the paramenstruum (Fig. 2) compared with 30 per cent. of those with chronic simple glaucoma (Fig. 3).

FIG. 2.—Ocular symptoms related to menstruation in women with closed-angle glaucoma.

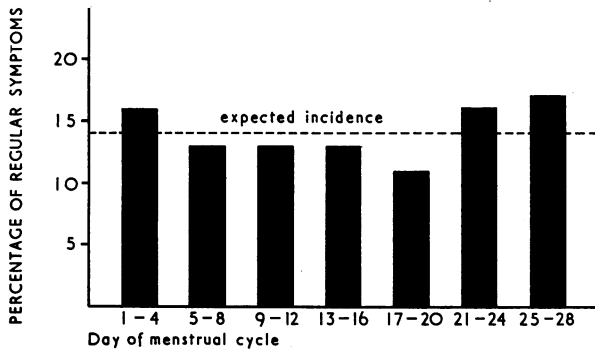
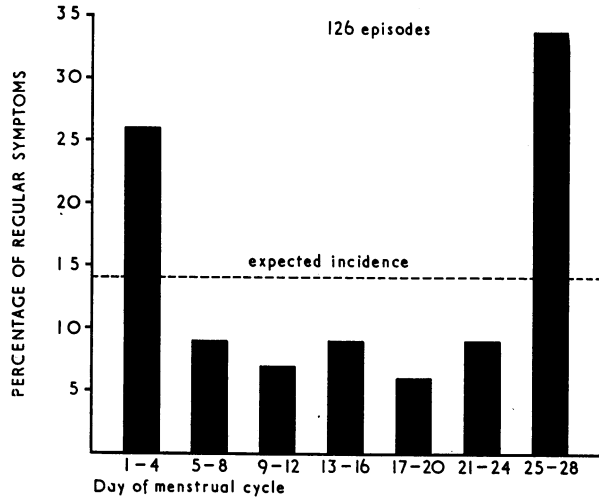


FIG. 3.—Ocular symptoms related to menstruation in women with chronic simple glaucoma.

To determine whether men also experienced cyclical ocular symptoms, 44 male

glaucoma patients under 55 years of age recorded the dates of their ocular symptoms, and the time-interval between attacks of symptoms was analysed for men and women. During the first 4 days the initial recurrence rate was high, and symptoms on one day were likely to be followed by another attack within 4 days in 36 per cent. of men and 30 per cent. of women. Thereafter the recurrence rate dropped rapidly to 4 per cent. in men and 5 per cent. in women by the 17th to 20th day. However, in women there was a secondary rise in the recurrence rate at the 25th to 28th day, which was absent in the men. This pattern was also found in an interval analysis of behaviour in prisoners and in school children (Dalton, 1964), and suggests that a hormonal cycle marked by recurrence of ocular symptoms is absent in men.

### **Variations in Intra-ocular Pressure, Blood Pressure, and Body Weight**

Fourteen women attended regularly for applanation tonometry, blood pressure reading, and weighing. One woman was aged 20 years, and the others were in the range 38 to 50 years (average 43.5). In all these women the intra-ocular pressure was controlled by miotics.

A rise in intra-ocular pressure occurred in every woman during the paramenstruum, and this was associated with a simultaneous rise in blood pressure and body weight (Figs 4 and 5, opposite). The average increase was 2.3 mm. Hg (maximum 8.6). In twelve eyes the rise occurred during the premenstruum and in fourteen during menstruation. The peak intra-ocular pressure during menstruation was accompanied by a drop during the premenstruum in seven eyes; a menstrual drop followed a premenstrual rise in five.

A paramenstrual rise in blood pressure occurred in all but one woman, averaging 14 mm. Hg systolic and 10.4 mm. Hg diastolic (maximum 30 and 20).

In ten women there was a paramenstrual weight gain, average 2 lb. 1 oz., maximum 4 lb. 4 oz.

The paramenstrual rise in intra-ocular pressure was similar in five women with closed-angle glaucoma and three with chronic simple glaucoma, all of whom were on miotics. However, there was a noticeable difference in average weight gain, 2 lb. 5 oz. in closed-angle glaucoma compared with 12 oz. in chronic simple glaucoma. The rise in blood pressure averaged 18 mm. Hg systolic and 10 mm. Hg diastolic in closed-angle glaucoma and 13 mm. Hg systolic and 7 mm. Hg diastolic in chronic simple glaucoma.

### **Discussion**

The paramenstrual rise in intra-ocular pressure associated with simultaneous rises in blood pressure and body weight in women with glaucoma suggests that the ocular variation arises from a systemic and not a local influence. It is most marked in those with closed-angle glaucoma.

Each individual has a specific timing for the paramenstrual variation, some showing a premenstrual rise and others a menstrual rise, and these rises may be accompanied by a fall in the other phase of the paramenstruum. In a series of random intra-ocular pressure readings in relation to menstruation, it seems likely that the individual premenstrual rises and menstrual falls will be averaged out by the menstrual rises and premenstrual falls.

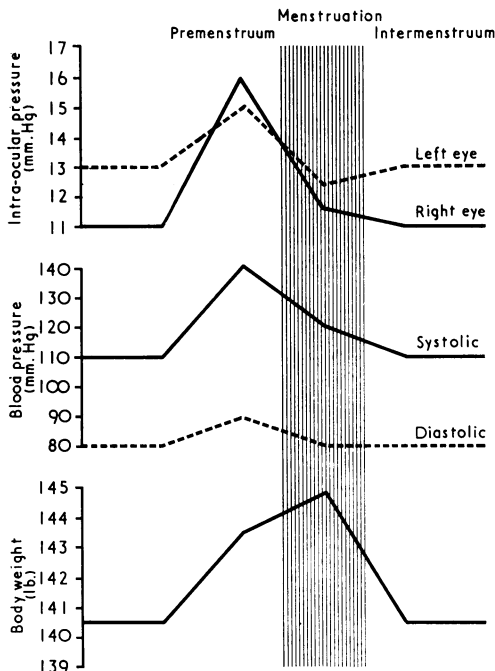


FIG. 4.—Rise in intra-ocular pressure, blood pressure, and body weight in a woman aged 39 years with closed-angle glaucoma related to menstruation.

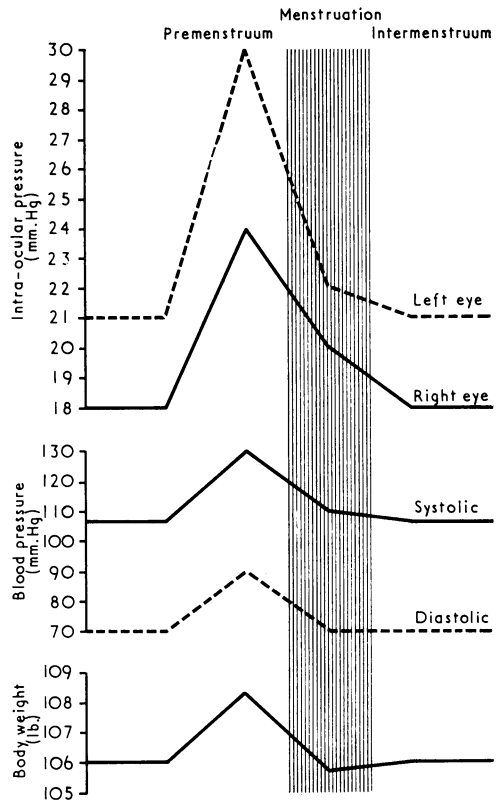


FIG. 5.—Rise in intra-ocular pressure, blood pressure, and body weight in a woman with secondary glaucoma.

**Summary**

The influence of menstruation was found to vary among women with closed-angle and chronic simple glaucoma. In closed-angle glaucoma, there was an incidence of 89 per cent. of premenstrual syndrome, and 60 per cent. of ocular symptoms occurred during the paramenstruum. In chronic simple glaucoma, only 50 per cent. suffered from premenstrual syndrome and there was no time relationship between ocular symptoms and menstruation.

In fourteen women with glaucoma, intra-ocular pressure, blood pressure, and body weight were found to rise simultaneously during the paramenstruum, but the average rises were greater in those with closed-angle glaucoma than in those with chronic simple glaucoma.

This study emphasizes the importance of noting the time in the menstrual cycle at which intra-ocular pressure readings are taken and the value of recording ocular symptoms on menstrual charts in cases of closed-angle glaucoma.

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