

THE RELATION OF PREMENSTRUAL FEVER
TO PULMONARY TUBERCULOSIS:

A STUDY OF ONE HUNDRED CASES *

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In 1861 Fiedler¹ drew attention to definite rises in temperature occurring with anomalies in menstruation, particularly dysmenorrhea. He noticed that fever occurred one or more days preceding the menstrual period and disappeared rapidly with the onset of the menses. He called this "menstrual fever" and thought that it was due to an anomaly in menstruation, but not to an inflammatory process. At times since, physiologists have studied the changes occurring in the circulation, temperature and metabolism associated with menstruation; gynecologists have seen an increase in inflammatory pelvic conditions, or a lighting up of those which had been seemingly latent at this time, and finally, internists have noted the influence of menstruation on pulmonary tuberculosis, particularly the aggravation of subjective symptoms and an increase in the physical signs and temperature changes (F. Neuman²). Macht³ has recently published a review and a careful study of the history of the subject and has indicated the relation between menstruation and tuberculosis, from the point of view of physiology and internal medicine. He states that the heat-regulating apparatus in woman seems to be peculiarly unstable at the time of menstruation; that those who have studied the temperature charts of tuberculous patients at this time have been impressed by the constancy and regularity of these periodic menstrual exacerbations in temperature which seem to differ only as to the frequency of occurrence. The difference in figures, he believes, is due to carelessness in temperature observations, and to disregard of relative rises in temperature; he quotes Mantoux,⁴ to the effect that fever may exist without hyperthermia. Macht studied forty cases and states that 50 per cent. showed periodic monthly exacerbations. The cases are not given in any detail whatever and some of the patients were, furthermore, being treated with tuberculin at the time of observation. He finds that rises in temperature may occur in early, as well as in advanced cases, and in the former, are of diagnostic importance. In an extended experience with tuberculosis patients, I was quite unable to substantiate the observations made by Macht, or indeed those of any of the other observers, including Riebold. I consider it of interest, therefore, to add the facts gathered from our patients to indicate the variant findings. Before turning to the cases to be reported a review of the literature directly related to this phase of the subject may be of interest.

In 1899 Turban⁵ described a temperature curve with a rise preceding the menstrual period by three to five days and a depression following it. Nine years later he (Turban⁶) presented curves showing premenstrual, intermenstrual, menstrual and postmenstrual temperature rises. The first mentioned he considered diag-

nostically the most important. Without giving the criteria for his observations he mentions that seventy-three of 100 tuberculous women showed this premenstrual fever on several occasions. Following Turban, Saugman,⁷ Sabourin,⁸ Kraus,⁹ and Jessen¹⁰ laid stress on the fact that premenstrual fever lent evidence to the existence of pulmonary tuberculosis.

Riebold¹¹ made careful studies of the periodicity of menstruation, the relation¹² between menstruation and ovulation and their influence^{13 14} on disease. He believes that menstruation is dependent on ovulation, and usually follows this by one, two, or three days; that ovulation, not menstruation, is the process which is strongly periodical and that the periodicity in woman's life processes is dependent on it. The question whether this characteristic periodicity is inherent in the actively functioning ovary, or whether external, special cosmic influences play a rôle, he thinks must remain for the present unanswered. He advances the theory that during ovulation certain secretions reach the circulation and that these cause an increase in nervous and psychic irritability, increase in blood-pressure and vital energies, general heightening of metabolic processes, and an accompanying vigorous hyperemia of internal organs and activity of lymph-flow. During such a period of increased physiologic activity, the opportunity is offered for resorption from old infectious foci, for the lighting up of latent processes, or for an increase in activity of acute infections already present, which thus become the cause of premenstrual fever. He has later shown from a study of a large series of cases, that premenstrual rises in temperature occur in a great variety of diseases, such as acute infectious diseases, anginas, gynecologic and neurologic conditions.

I have for some time been impressed by the absence of this so-called premenstrual fever in cases of definite pulmonary tuberculosis. The mention in the literature of its frequent occurrence and the emphasis placed on its diagnostic significance led to the study of the following 100 cases. These cases were observed at Bedford, N. Y., in a sanitarium, in which the hygienic conditions were especially favorable. The sanitarium is devoted to the treatment of tuberculous patients only. The patients were under constant observation; a few were confined to bed, but the majority were up and about. Of these 100 cases forty-seven were incipient, thirty-nine moderately advanced, fourteen far advanced, classified according to National Association classification.¹⁵

7. Saugman: In von Schröter und Blumenfeld's Handbuch der Therapie der chronischen Lungenschwindsucht, 1904.

8. Sabourin: La fièvre menstruelle des phthisiques, Revue de méd., March, 1905.

9. Kraus, H.: Ueber praemenstruale Temperatur-Steigerung bei Lungentuberkulose, Wien. med. Wchnschr., 1905, No. 13.

10. Jessen: Lungenschwindsucht und Nervensystem, Monographie Jena, Fischer, 1905.

11. Riebold, G.: Der Nachweis des Vorhandenseins somatischer Perioden in weiblichen Organismus und ihrer Abhängigkeit von kosmischen Perioden, Arch. f. Gynäk., 1907-1908, lxxxiv, 182.

12. Riebold, G.: Ueber die Wechselbeziehungen zwischen dem Ovulationsvorgang inkl. der Menstruation und inneren Krankheiten, München. med. Wchnschr., 1907, No. 38, p. 1868; No. 39, p. 1935.

13. Riebold, G.: Ueber periodische Fieberbewegungen mit rheumatischen Erscheinungen bei jungen Mädchen, Deutsch. Arch. f. klin. Med., April 24, 1908, p. 15.

14. Riebold, G.: Ueber praemenstruale Temperatur-Steigerungen, Deutsch. med. Wchnschr., 1907, Nos. 11 and 12.

15. Classification adopted by National Association for Prevention and Study of Tuberculosis: *Incipient*: Slight initial lesion in the form of infiltration limited to apices or a small part of one lobe. No tuberculous complications. Slight or no constitutional symptoms. Slight or no elevation of temperature or acceleration of pulse at any time during the twenty-four hours, especially after rest. Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent. *Moderately advanced*: No marked impairment of function either local or constitutional. Localized consolidation moderate in extent, with little or no evidence of destruction of tissue or disseminated fibroid deposits. No serious complications. *Far-advanced*: Marked impairment of function, local and constitutional. Localized consolidation intense; or disseminated areas of softening; or serious complications.

* From the Montefiore Home Country Sanitarium, Bedford Station, Westchester County, N. Y.

1. Fiedler: Die Verhältnisse der Körperwärme in verschiedenen fieberhaften Krankheiten; Manuskript, 1861-2; quoted by Riebold, Deutsch. Arch. f. klin. Med., 1908, No. 93, p. 15.

2. Neuman, F.: Beziehung zwischen Menstruation und Lungentuberkulose, Berl. klin. Wchnschr., 1899, No. 21.

3. Macht, D. I.: Tuberculosis and Menstruation, Am. Jour. Med. Sc., December, 1910, p. 835.

4. Mantoux: Revue de la Tuberculose, October, 1905.

5. Turban, K.: Beiträge z. Kenntnis d. Lungentuberkulose, 1899.

6. Turban, K.: Menstruation und Lungentuberkulose, Verhandl. d. 25 Kong. f. inn. Med., 1908.

The average period of observation was nine months. Rectal temperatures were taken in all but one case. The sputum in ninety-two of these 100 cases contained tubercle bacilli; of the 8 remaining patients, the evidence for pulmonary tuberculosis was:

CASE 1.—Patient aged 13. Six members of immediate family and one cousin had tuberculosis. Physical examination showed bilateral apical dullness and diminished breathing, more marked on left side. Intracutaneous and von Pirquet reactions were positive. No expectoration; laryngeal smear negative.

CASE 2.—Patient aged 38. Non-tuberculous family history. A history of five years of weakness and cough; five months before admission, blood tinged sputum; slight dullness and shrinkage at right apex; diminished expansion at right base; ophthalmic, von Pirquet and intracutaneous reactions positive.

CASE 3.—Patient aged 18. Non-tuberculous family history; gradually increasing weakness for one and one-half years; cough; thoracic pain; lowering of right shoulder; dullness, increased voice and increased muscular resistance at right apex. Reaction to 7 mg. of Koch's old tuberculin to 102 F.

CASE 4.—Patient aged 16. Non-tuberculous history; hemoptysis on two occasions; dullness, diminished expansion and crackling râles at right base; intracutaneous, von Pirquet and ophthalmic reactions positive; 0.5 mg. tuberculin produced a rise of temperature to 101.4 F.

CASE 5.—No history of exposure to tuberculosis; history of two years' cough; expectoration and pain in chest; dullness at right apex, with a few scattered râles to second space; dullness, diminished tactile fremitus, diminished expansion and a few moist râles at right base; intracutaneous reaction positive.

CASE 6.—No history of exposure to tuberculosis; bilateral apical dullness; few fine râles at right first space; von Pirquet and intracutaneous reaction positive; reaction to 5 mg. tuberculin to 102.2 F.

CASE 7.—Patient, aged 19. No history of exposure to tuberculosis; cough persisting after influenza; dullness and fine râles at left apex anteriorly and posteriorly; injection of 0.5 mg. tuberculin caused rise in temperature to 101 F.; locally moist râles at left supraspinous fossa; injection repeated with similar results.

CASE 8.—Patient aged 21. No exposure to tuberculosis; hemoptysis two years ago; weakness, cough, slight expectoration, anorexia; dullness and dry râles after cough at right apex; impaired resonance, prolonged expiration and shower of fine râles at end of inspiration at left base; von Pirquet and intracutaneous reactions positive.

There are, then, ninety-two cases with demonstrated and eight with very probable pulmonary tuberculosis.

In ninety-six of these 100 cases, there was no evidence of premenstrual fever; i. e., no rise in temperature occurring within five days preceding the onset of a menstrual period. Neither did the patients show any elevation of the minimal temperature described by Saugman;⁷ that is, an elevation of the lowest point in the diurnal temperature while still remaining below normal. The intermenstrual fever, described by von Voornveldt,¹⁶ that is, a rise in temperature occurring thirteen to fourteen days after the onset of the preceding menstrual period, thus falling in the interval between two normal menses, was never present in my series. The four remaining cases, however, did show a rise in temperature; in detail they were as follows:

CASE 9.—R. G., aged 16, single; case moderately advanced; observed twelve months, sixteen days; menstruated twelve times while under observation, and presented two premenstrual rises: (a) four days before menses, a rise from usual temperature of 99.5 F. to 101.6 F. for twenty-four hours; (b) three days before menses, rise to 103.2 F. for twenty-four hours.

CASE 10.—L. K., aged 17, single; case moderately advanced; observed eleven months, twenty-three days; eleven periods;

two premenstrual rises: (a) rise to 101 F. on third and fourth days before menses; usual temperature 99.2 F. to 99.8 F.; nine days preceding this same period, a rise to 100.8 F. had occurred; (b) rise to 101 F. twenty-four hours before menses; eight days preceding this a rise to 101.6 F. had occurred.

CASE 11.—L. F., single; case incipient; tubercle bacilli in sputum; observed twelve months, twenty days. During this period the patient menstruated fourteen times; seven times preceding the onset of menstruation by twenty-four hours to forty-eight hours, and once, on first day of menstruation, her temperature reached 100 F. On eleven other occasions her temperature reached 100 F. and bore no relation to her menstrual period. A mitral and aortic endocarditis was a complication in this case. It is doubtful, therefore, whether an interdependence between the menstruation and tuberculosis can be maintained.

CASE 12.—S. P., aged 20, married; case moderately advanced; observed nine months. A rise in temperature to 101.6 F. forty-eight hours preceding her menstrual period occurred on one occasion. It is interesting to note that just at this period the patient had a breast abscess.

It appears, therefore, that in the 100 cases of pulmonary tuberculosis, in all stages of the disease, here reported, only two uncomplicated cases of premenstrual fever occurred. It has been shown in a large series of cases (2,000)¹⁴ that similar rises may occur in a large number of unrelated conditions. The proportion in which the rises occurred in my cases is out of all proportion to that assigned to it in literature; so I am forced to conclude that far too great stress has been laid on the incidence of premenstrual fever in tuberculosis. The theory of Riebold, which refers to the relation of ovulation to premenstrual fever, in dormant disease, is one which commends itself, but for which sufficient evidence is not yet present.

I wish to express my thanks to Dr. Kramer for aiding in the compilation of the statistics.

LEAD-POISONING IN ILLINOIS

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INTRODUCTION

Lead-poisoning in the United States is almost an unknown subject. Go through the literature and you will find here and there the report of an unusual case, an occasional compilation in a text-book, the material for which has had to be drawn from foreign sources; no experimental work, little study of the newer methods of diagnosis and no effort to gather statistical material or to bring the disease under the control of sanitarians.

When we began the study of the lead trades of Illinois we were assured that conditions here were very different from conditions in Europe; that lead-poisoning was a rarity, owing to our superior methods in industry. We found the reverse to be true. There is far more lead-poisoning in Illinois than in the same trades in England and Germany; at least in all those trades in which it has been possible to obtain anything like accurate figures. Far from being safer, American methods are often more dangerous than European, and while the German and English workman is not only better protected, but is under the supervision of an experienced physician, the American workman is, as a usual thing, under no medical supervision at all.

We found, in addition to the greater dangers arising from our methods of work, a very general ignorance of the hygiene of the lead trades on the part of the employ-

16. Von Voornveldt: *Ztschr. f. Tuberk.*, 1905, p. 543.