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Studies on identification of menstrual blood stain by fibrin-plate method. II. A study on the identification of menstrual blood stain

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Studies on identification of menstrual blood stain by fibrin-plate method. II. A study on the identification of menstrual blood stain*

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Abstract

The fibrinolytic activity of plasmin present in menstrual blood has been studied by means of the Fibrin-Plate Method, and utilizing the findings of such a study, the identification of menstrual blood stain in legal medicine has been conducted. As the result, it has become clear that the identification of a very small amount of menstrual blood is possible, for an example, only one thread from the menstrual blood stained cloth 1.0 cm². in size, and with the blood stain left in a room temperature for as long as two years, or with the blood stain left in water for one month, it is possible to identify menstrual blood. Aside from menstrual blood, no other toco-gynecological blood responds to this Fibrin-Plate Method.

STUDIES ON IDENTIFICATION OF MENSTRUAL BLOOD STAIN BY FIBRIN-PLATE METHOD

II. A STUDY ON THE IDENTIFICATION OF MENSTRUAL BLOOD STAIN

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In legal medicine it often becomes necessary to identify menstrual blood, and up to date there are such methods for this purpose as the histochemical identification of glycogen in the vaginal epithelial cells^{1,2}, the identification of vaginal bacillus^{3,4}, identifying by using serologically anti-menstrual^{5,6}, anti-delivered⁷, and anti-fibrinogen precipitin sera⁸, the estimation of fibrinolytic activity of menstrual blood⁹, assay of denatured fibrinogen in menstrual blood^{10,11}, and the demonstration of the extent of fibrinolytic activity in menstrual blood by paper electrophoresis^{12,13}, and the demonstration of the so-called menstrual toxin in menstrual blood¹⁴. All these methods are, however, not exactly reliable ones.

On the basis of the results obtained previously¹⁵, some excellent findings have been obtained in the identification of menstrual blood stain in legal medicine by means of the Fibrin-Plate Method for the examination of plasmin in menstrual blood.

MATERIALS AND METHODS

Blood stains are prepared by soaking the menstrual blood collected in the same manner as reported previously and soaking the pieces of cloth with blood and let them stand until they are dry. Pieces of blood-stained cloth 1 cm². —1/32 cm². and a piece of thread 1 cm. long, pieces left standing at room temperature for one month to two years, pieces of stained cloths heated at 70 to 100°C. for one hour, and the pieces kept ten days after staining with menstrual blood and left in running water for 7—30 days are used as the materials. As for controls toco-gynecological blood stains are made in a similar manner.

The Fibrin-Plate Method is the same as mentioned in the previous report. Namely, the menstrual blood stain is placed directly on the fibrin plate and dissolution of the plate around the stain is observed.

RESULTS

Pieces of cloth stained with menstrual blood in the size of 1.0 cm^2 , or $1/2$ to $1/32$ of it are placed directly on the fibrin plate and its fibrinolysis is observed. As the result the fibrinolytic activity can be recognized even with one thread from the stained cloth 1.0 cm^2 in size and it is therefore, possible to distinguish menstrual blood even in a very small quantity (Fig. 1).

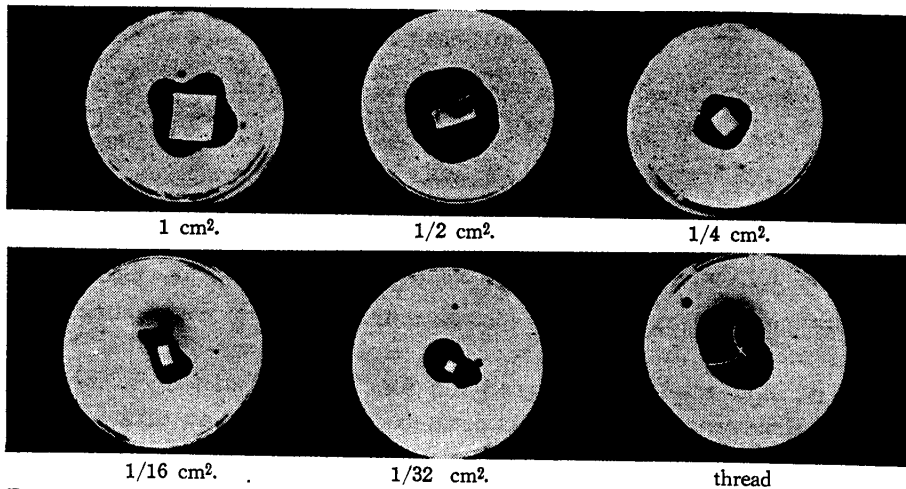


Fig. 1. Sensitivity of menstrual blood stain to fibrin plate test (without SK. identification 8 hrs. after the test) showing the fibrinolytic activity according to the size of blood stain

In the observations with old stained cloths left standing as long as two years, fibrinolysis does occur, proving that it is also possible to identify menstrual blood even with such an old blood stain (Fig. 2).

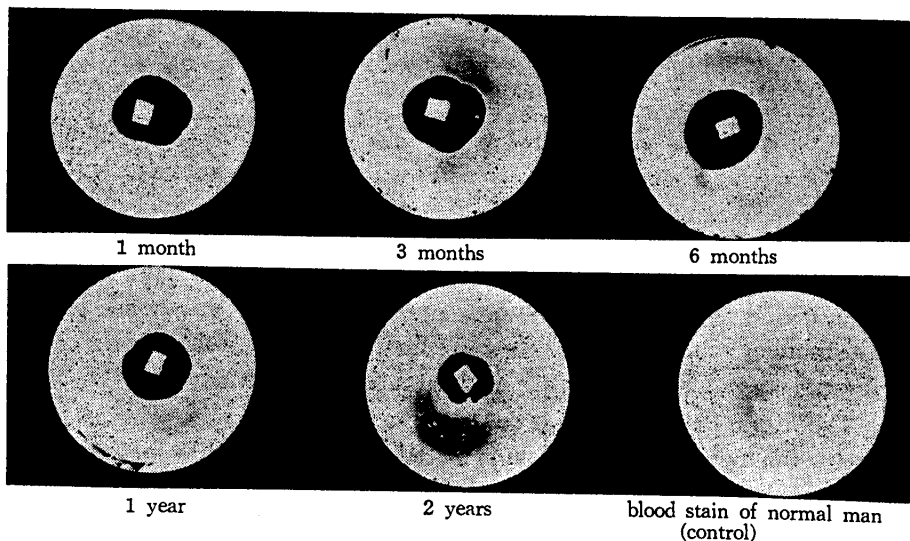


Fig. 2. Fibrinolytic activity of old blood stains (without SK. 8 hrs. after the test)

In the case where the blood stained cloths are heated at 70—100°C. for one hour and placed directly on the fibrin plate, the fibrinolytic activity can be recognized around the stained cloths, thus proving that even with the cloths stained menstrual blood and heated to 100°C. it is possible to distinguish menstrual blood (Fig. 3). With the blood stained cloths left standing in running water for 7—30 days, when they are put directly on the fibrin plate, fibrinolytic activity can be observed even with the cloths left in water for 20 days.

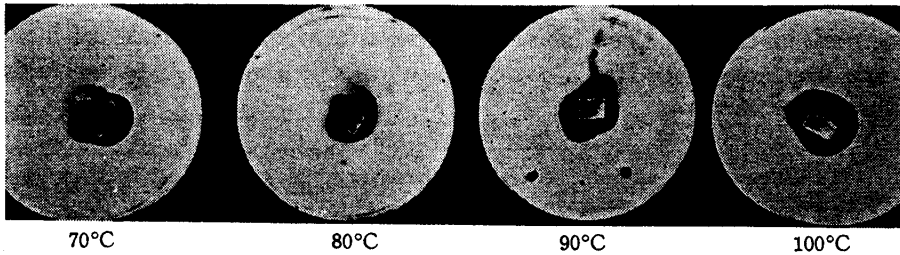


Fig. 3. Fibrinolytic activity of the blood stain exposed to heat (without SK. 8 hrs. after the test).

In the cases where blood stains are prepared with blood after normal delivery, hemorrhage due to incomplete abortion, functional hemorrhage, hemorrhage due to uterine myoma and hemorrhage of cervical carcinoma, when the stains are placed directly on the fibrin plate, no fibrinolysis occurs with anyone of them.

DISCUSSION

In the previous study it has been elucidated that a considerable amount of plasmin is contained in menstrual blood. Now, it has been proven that identification of menstrual blood is possible by means of the Fibrin-Plate Method for the determination of plasmin in menstrual blood. As already mentioned, there are many methods of identifying menstrual blood but none of them proves to be so very reliable. Likewise there are reported many methods for determining fibrinolysis, but with respect to their sensitivity and specificity there is none that supersedes the Fibrin-Plate Method. An attempt has been made to identify menstrual blood stains in legal medicine by utilizing this Fibrin-Plate Method taking advantage of fibrinolytic activity of plasmin contained in menstrual blood. As the result it has been demonstrated that even a minimal quantity of menstrual blood stain, fresh or old stain, blood stain exposed to heat and even the stain left in running water can be identified. This method amply proves that it is an excellent one for identifying menstrual blood stain in legal medicine.

On the other hand, no reaction is observed by this method with any other kind of uterine blood stains.

CONCLUSION

The fibrinolytic activity of plasmin present in menstrual blood has been studied by means of the Fibrin-Plate Method, and utilizing the findings of such a study, the identification of menstrual blood stain in legal medicine has been conducted. As the result, it has become clear that the identification of a very small amount of menstrual blood is possible, for an example, only one thread from the menstrual blood stained cloth 1.0 cm². in size, and with the blood stain left in a room temperature for as long as two years, or with the blood stain left in water for one month, it is possible to identify menstrual blood. Aside from menstrual blood, no other toco-gynecological blood responds to this Fibrin-Plate Method.

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