

Intervillous Fibrin Deposition Associated with Spontaneous Abortion

Analysis of 100 Cases*

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MANY interrelated factors appear to contribute to spontaneous abortion. These include endocrine imbalance, psychogenic factors, defective ova, impaired maternal health and etc.^{1,2,3}

Certain significant histologic changes have been observed in sections of placentas of spontaneous abortions that are not present in normal placentas. One of these changes is the finding of relatively avascular villi with intervillous fibrin deposits. The finding of deposits of fibrin between the chorionic villi has led to the speculation that this phenomenon bears a direct relationship to spontaneous abortion.^{4,5} Since this subject is not widely written about in the literature, the authors studied a series of cases to determine the relationship of intervillous fibrin deposition and spontaneous abortion.

MATERIALS AND METHODS

One hundred patients with spontaneous abortion were selected from the files of the Department of Pathology, Howard University. The tissue slides studied, represented uterine curettings which contained decidua and chorionic villi. These were stained with Hematoxylin and Eosin and in some instances with PAS. Each slide was analyzed for fibrin deposition, hyalinization of villi, calcium deposition, necrosis and inflammatory change. These changes were quantitated as follows: no change, slight change, moderate change, and diffuse change. The age, parity, gravidity and number of abortions were recorded on each patient.

RESULTS

The age distribution was from 15 to 44 years (Table 1). The gravida ranged from one to 14, parity from 0 to 10 and abortions from one to

seven (Table 2). The extent of the fibrin and calcium deposition and necrosis, inflammatory and hyaline changes are noted in Table 3.

DISCUSSION

A normal villus, before the age of 12 weeks of pregnancy, is composed of two layers of cells, an inner cytotrophoblast and an outer syncytial trophoblast which surrounds a rather fibrillary looking stromal network. Hofbauer cells are scattered throughout the villus and some fetal capillaries may be seen (Fig. 1).

Following an abortion, the villi begin to degen-

TABLE 1.—AGE RANGE OF PATIENTS

<i>Age Range</i>	<i>Number</i>
15-20	11
21-30	61
31-40	26
41-44	2
<i>Total</i>	100

TABLE 2.—NUMBERS OF ABORTIONS

<i>Number of Abortions</i>	<i>Number of Patients</i>
1	68
2	18
3	10
4	3
7	1
<i>Total</i>	100

erate, the stroma appears hyalinized and large amounts of fibrin deposits are usually seen be-

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TABLE 3—DEGREE OF HISTOLOGICAL CHANGES IN 100 SLIDES

<i>Degree of Change</i>	<i>Fibrin Deposition</i>	<i>Hyaline Change</i>	<i>Calcium Deposition</i>	<i>Necrosis</i>	<i>Inflammation</i>
No Change	10	7	50	11	—
Slight	44	53	7	87	100
Moderate	40	34	8	2	—
Diffuse	6	6	35	0	—
<i>Total</i>	100	100	100	100	100

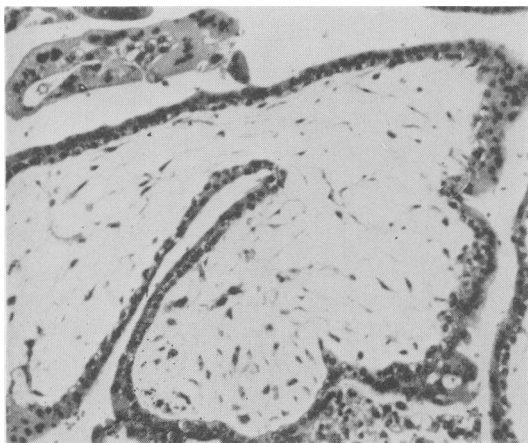


Fig. 1. Photomicrograph showing normal placenta. Note the cytotrophoblast and syncytial trophoblast layers, H & E 100 \times .

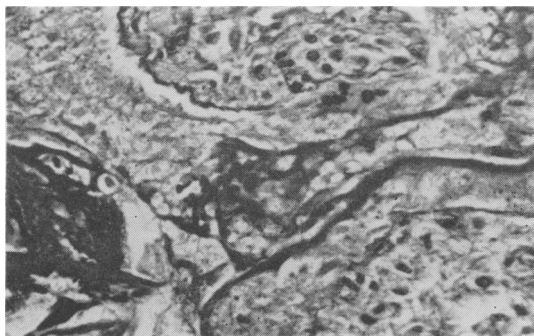


Fig. 2. Photomicrograph showing fibrin deposited between the villi, H & E 400 \times .

tween the villi. (Fig. 2).

Of the cases studied, 10 per cent of the villi showed an absence of fibrin and seven per cent showed no hyalinization of villi. Forty-four per cent of the villi displayed a small amount of fibrin, 40 per cent showed a moderate amount and 6 per cent showed rather large deposits. Fifty-three per cent had a small degree of hyalin-

ization while 34 per cent showed a moderate amount and 6 per cent displayed diffuse hyalinization.

The fibrin deposits are pink, amorphous and smudgy and when hyalinization was seen, the villi were often embedded in the fibrinoid material. An occasional hyalinized villus was seen without fibrin deposits.

In older abortions, the villi were small, completely hyalinized and surrounded by fibrin. They looked more shadowy and ghost-like. The age of the placenta was determined by the size of the villi. Judging from the average size of the villi, it was estimated that the abortions took place during the first trimester of pregnancy. Ninety-nine per cent of the villi were medium to small with only one per cent showing medium to large size. The smaller the villi, the older the pregnancy.

Calcium deposits were noted in 50 per cent of the cases, of which, 7 per cent showed heavy deposits. Calcium deposits were absent in the other 50 per cent. This is another factor which is used in determining the approximate time the abortion may have occurred. It is believed that more calcium is deposited in the placentas of older pregnancies.

Inflammation was seen in all but 3 per cent of the cases, but it was thought to be secondary to the abortion instead of being the primary cause of the inflammation.

Eighty-six per cent of the cases showed some degree of necrosis.

In this series it does not appear that the gravidity or parity of a patient has any association with the cause of spontaneous abortion.

Fibrinoid changes observed between the villi may occur shortly after implantation and after

the embryo has established contact with maternal vessels. The amount of fibrin may increase towards term. It is not known whether this reflects a defense mechanism on the part of the mother, that is, a circulatory sluggishness under the chorionic plate, or a local and diverse phenomena.⁴

Some authors believe that fibrin may possibly serve as a matrix for the organization of fetal connective tissue or as a basis for the villus growth. However, Novak states that any factor that may interfere with the maternal blood supply of villi, like diffuse deposition of fibrin enclosing it, would cause death of the affected villi, thus leading to spontaneous abortion.² Ischemic necrosis of villi may result from deposition of fibrin over their surfaces from sudden coagulation of intervillous blood which lead to thrombosis. Fibrin deposition is the earliest and most frequently noted change in the villi.

The authors believe that there were sufficient changes in most of the cases in this series to suggest that there is definite relationship between intervillous fibrin deposition and spontaneous abortion.

SUMMARY

One hundred cases of spontaneous abortions associated with intervillous fibrin deposition and their relationships are presented. It is believed that if the intervillous fibrin deposits are diffuse, they may cause embarrassment to the chorionic villi and thus lead to spontaneous abortion.

LITERATURE CITED

1. HERTIG, A. T. and W. H. SHELDON. Analysis of 1000 Spontaneous Abortions. *Ann. Surg.* 117:596, 1943.
2. NOVAK, E. R. and J. D. WOODRUFF. *Novak's Gynecologic and Obstetric Pathology*, 6th edition. Williams and Wilkins, Baltimore, 1967.
3. JAVERT, C. T. *Spontaneous and Habitual Abortion*. McGraw-Hill Book Co., The Blakiston Division, New York. 1957.
4. BENIRSCHKE, K. A Review of the Pathologic Anatomy of the Human Placenta. *Am. J. Obstet. Gynec.* 84:1612-13, 1962.
5. ECKMAN, T. R. and L. A. CARROW. Placental Lesions in Spontaneous Abortion. *Am. J. Obstet. Gynec.* 84:222-228, 1962.

POPULATION TRENDS IN THE UNITED STATES

The population of the United States at ages 18-24 increased from 16.1 million in July, 1960, to almost 22.3 million in mid-1967, according to statisticians of Metropolitan Life Insurance Company.

This gain of 38 per cent was $3\frac{3}{4}$ times the growth rate for the population at all ages combined. Moreover, the number of young people is expected to continue increasing rapidly, and may reach 29.6 million by 1980. Persons at ages 18-19 are expected to increase by 22 per cent, and those aged 20-21 by 29 per cent. There will be approximately 8.5 million men and women in each of these age groups by 1980.

Even more marked growth is expected of the 22-24 age group—some 45 per cent to over 12.5 million in 1980.

Metropolitan statisticians point out that these growth trends will have an important impact on our social and economic life. The rise in college enrollments, family formations and entrants into the labor force, events that have already occurred, are likely to continue for at least another decade.

Metropolitan Life Ins. Co.—1968