

Characteristics of Women with Recurrent Spontaneous Abortions and Women with Favorable Reproductive Histories

BARBARA STROBINO, MPH, PhD, HAROLD E. FOX, MD, JENNIE KLINE, PhD, ZENA STEIN, MB, BCH, MERVYN SUSSER, MB, BCH AND DOROTHY WARBURTON, PhD

Abstract: Women with a history of recurrent spontaneous abortions (repeaters) are compared with women who have had live births and no spontaneous abortions (multiparae) and women who have had live births and only one spontaneous abortion (sporadics) to identify characteristics of the women and their abortuses that might predict subsequent fetal loss. A number of risk factors for recurrent spontaneous abortion have been identified: the loss of a

chromosomally normal conception, loss after the first trimester of pregnancy, a delay in conceiving prior to the study pregnancy, a diagnosis of cervical incompetence, and a history of very low birthweight deliveries. The odds ratios associated with being a repeater vary from 1.4 to 5.6 depending on the number of characteristics present. (*Am J Public Health* 1986; 76:986-991.)

Introduction

The woman who experiences recurrent spontaneous abortions has been the subject of numerous investigations and a variety of causal mechanisms have been implicated, including inherited chromosomal anomalies, hormonal imbalances, structural defects of the reproductive tract, and immunological abnormalities.¹⁻⁸ Some studies have been marred by unresolved problems of case definition, others by small numbers. An issue that faces all studies is the distinction between a woman having recurrent abortions from a single persisting cause and a woman having repeated abortions from different causes. Since spontaneous abortion is a frequent occurrence and heterogeneous with regard to etiology, a single persisting cause is likely to underlie successive episodes in only a proportion of women.⁹⁻¹¹ In this paper we aim to elicit a pattern of traits that are characteristic of women having repeated abortions due to a single etiology. We identify those items in the medical and reproductive histories of women experiencing repeated abortions that distinguish them from women who experience a single spontaneous abortion or no spontaneous abortions. We then examine the interrelations between the items associated with recurrent abortion.

Methods

All women seeking care for a spontaneous abortion at one of three New York City hospitals from April 1974 through July 1979 were invited to participate in our study by responding to a structured interview. The interview, which was administered by trained fieldworkers, covered medical history; contraceptive use; family history of adverse reproductive outcomes; and the use of medication, illicit drugs, cigarettes, and alcohol. Each previous obstetric event was asked about in detail; data were obtained on gestation, date of termination, where the event occurred (home or hospital), and the outcome of the pregnancy. In addition, the fieldworkers abstracted information on medical and gynecological conditions recorded in the patient's hospital chart. In all

cases an attempt was made to obtain the products of conception and to set up fetal tissue in culture for karyotyping.

From this population of all women experiencing a spontaneous abortion, two subgroups were selected for analysis: a case group ("repeaters") and a comparison group ("sporadics"). The criteria for selection are summarized in Table 1. Only women of gravidity three or more at the study pregnancy were considered. All reproductive outcomes were included in the enumeration of gravidity: spontaneous and induced abortions, live births, stillbirths, and ectopic pregnancies.

Any woman who reported three or more spontaneous abortions and fewer live births than spontaneous abortions was considered a repeater. Any woman of gravidity three or more who reported only one spontaneous abortion (the study pregnancy) and at least one previous live birth was considered a sporadic. It was hypothesized that the causes of abortion in the sporadic group were likely to be more diverse than those in the repeaters since their other pregnancies had resulted in outcomes other than spontaneous abortion. The criterion of at least one live birth was used to select further for women likely to have favorable reproductive outcomes.

The entire case series consisted of 3,755 women entering the study for the first time with a spontaneous abortion; 136 (3.6 per cent) of these women had an unknown or incomplete obstetric history. Of the remaining 3,619 women, 246 fulfilled the criteria for repeater and 190 (77.2 per cent) of these women were interviewed; 990 fulfilled the criteria for sporadic and 770 (77.8 per cent) of these women were interviewed. Cases were not interviewed primarily because of patient or doctor refusal or because our fieldworkers were unable to reach the woman.

A second comparison group ("multiparae") was selected from among a larger population designated as controls for the women who were cases. The control group was comprised of 1,633 women who delivered at 28 weeks gestation or later. They were recruited from among women who came for prenatal care before the 22nd week of gestation. To improve comparability at selection, the controls were matched to the cases on two variables: age (year of birth \pm two years) and the use of the private or public hospital facilities. Recruitment of controls began toward the end of 1975, when funding for the full study was obtained—hence the smaller number of controls than cases. Controls were interviewed using the same schedule as the cases and followed to delivery either by contact with the patient or her

From the New York State Psychiatric Institute; and the G. H. Sergievsky Center, the Department of Obstetrics and Gynecology, the Division of Epidemiology, and the Department of Human Genetics and Development and Pediatrics, at Columbia University. Address reprint requests to Barbara Strobino, MPH, PhD, Associate Research Scientist, G. H. Sergievsky Center, Columbia University, 630 West 168th Street, New York, NY 10032. This paper, submitted to the *Journal* March 29, 1985, was revised and accepted for publication December 19, 1985.

TABLE 1—Definition of Case (Repeater) and Comparison Groups (Sporadic and Multiparae)

	Repeaters (n = 190)	Sporadics (n = 770)	Multiparae (n = 264)
Index Pregnancy	Spontaneous Abortion	Spontaneous Abortion	Live Birth
Gravidity	≥3	≥3	≥3
Prior Spontaneous Abortions	≥2	0	0
Prior Live Births	≤Number of prior spontaneous abortions	≥1	≥2

TABLE 2—Selected Sociodemographic Characteristics of Repeaters, Sporadics, and Multiparae within Payment Status (public or private)

Characteristics	Public Patients			Private Patients		
	Repeaters	Sporadics	Multiparae	Repeaters	Sporadics	Multiparae
N	108	597	224	82	173	40
Mean Maternal Age	28.8	28.5	28.9	32.3	31.9	32.0
sd	6.8	6.4	5.3	5.7	5.2	3.8
Mean Gravidity Prior to Index Pregnancy	4.2	3.2	3.2	4.1	2.8	2.6
sd	2.0	1.5	1.4	1.9	1.1	0.8
Ethnicity (%)						
White	13.0	15.6	17.0	61.0	53.2	62.5
Black	50.9	40.9	39.7	22.0	24.3	20.0
Hispanic	29.6	37.5	34.8	12.2	10.4	10.0
Other	6.5	6.0	8.5	4.9	12.1	7.5
Cigarette Smoking (%)						
Never	39.3	45.8	53.4	57.5	54.1	55.0
Current and ex-smokers	60.7	54.2	46.6	42.5	45.9	45.0
Frequency of Alcohol Use (%)						
Never	26.2	18.8	29.2	11.4	12.4	12.8
< 2 times per week	43.9	55.1	55.3	53.2	56.5	51.3
≥ 2 times per week	29.9	26.2	15.5	35.4	31.2	35.9

doctor or review of her hospital chart in order to ascertain the outcome of pregnancy.

The multiparae were women who reported at least three live births and no spontaneous abortions. Among controls, 31 women (1.9 per cent) had an unknown or incomplete obstetric history. Of the remaining 1,602 women, 338 fulfilled the criteria for multiparae; 264 (78.1 per cent) of these women were interviewed. Controls were not interviewed primarily because of patient or doctor refusal.

The two comparison groups of sporadics and multiparae were defined to create groups as different as possible, in terms of reproductive history, from the repeaters. The multiparous group with three or more live births represents women with highly favorable reproductive histories. Sporadics as an additional comparison group permit the examination of characteristics of the study abortion, such as gestation at abortion, among a group at low risk for spontaneous abortion and a group at high risk for spontaneous abortion.

Within each payment category, the case group and the two comparison groups were similar with respect to maternal age (Table 2). Repeaters had more pregnancies prior to the study pregnancy than either comparison group. This excess in the number of pregnancies of repeaters may reflect several phenomena including a desire to achieve a particular number of live births.

There were some differences, although not large and not consistent between payment groups, in the ethnic distribution and cigarette and alcohol use among repeaters and the comparison groups. Among public patients, repeaters were slightly more likely to be Black than nonrepeaters; among private patients, repeaters were less likely to give Other as

their ethnic group. Among public patients, but not among private patients, both repeaters and sporadics were more likely to smoke and drink than multiparae. This difference is probably due to the excess risk associated with smoking and alcohol use that is observed when all cases are compared with controls.^{12,13}

We have assessed the reliability of patient reports of previous obstetric events as well as other information (Table 3) by comparing responses obtained upon interview with information abstracted from the patient's hospital chart. There were few differences between the groups with respect to the reporting of obstetric events. Slightly more repeaters than nonrepeaters report greater gravidity on interview compared to what was in the chart. This difference was not unexpected in view of the fact that sporadics and multiparae cannot, by definition, have reported any previous miscarriages. The frequencies and types of other discrepancies were also similar between the repeaters and nonrepeaters with the exception that the repeaters and sporadics were more likely to report previous illnesses than multiparae.

A preliminary analysis¹⁴ using a stepwise discriminant multivariate technique and cross tabulations screened several items in the questionnaire for possible associations with recurrent abortion. There were five items that were consistently associated with recurrent abortion:

- loss of a chromosomally normal conceptus,
- loss after the first trimester of pregnancy,
- delay in conception in the period immediately before the index pregnancy,
- a reported diagnosis of cervical incompetence, and
- a history of premature deliveries.

TABLE 3—Discrepancies between Information Obtained by Interview and from the Patient's Chart

Discrepancy	Repeaters (n = 190) %	Sporadics (n = 770) %	Multiparae (n = 264) %
None	66.8	73.2	60.7
Induced abortion on chart not reported by patient	2.6	1.3	1.9
Spontaneous abortion on chart not reported by patient	0.0	0.6	1.5
Chart gravidity > patient gravidity*	1.6	1.7	1.5
Patient gravidity > chart gravidity**	5.8	2.6	1.1
Date of birth	1.1	1.3	2.7
Illness in chart not reported by patient	4.2	4.3	12.1
Chart and patient LMP differ > 14 days	2.1	3.8	4.9
Other†	15.8	11.2	13.6

*Includes an additional abortion (type not specified on chart) or additional live birth.

**Includes spontaneous and induced abortions and any other obstetric events.

†Includes discrepancies in reports of vaginal bleeding, dates of previous obstetric events, contraceptive use, menstrual history, marital status, drug or medication use, and other discrepancies.

In this paper, we complete and elaborate on the analysis of these factors. Analyses involving characteristics of the abortion were necessarily limited to repeater-sporadic comparisons; all other analyses compared repeaters separately to sporadics and multiparae. All analyses were done separately for private and public payment groups. Since the magnitude of the associations were the same in both groups, the combined data are presented below.

Results

Karyotype of the Abortus

A fetal karyotype for the study pregnancy was obtained for 69 (36.3 per cent) of repeaters and 226 (29.4 per cent) of sporadics. The frequency of chromosomally normal abortions was greater among repeaters (82.6 per cent) than that among sporadics (66.8 per cent); odds ratio = 2.4, 95 per cent confidence interval = 1.2, 4.7. There were no translocations or other chromosome rearrangements among the abortuses of repeaters. There were three chromosome rearrangements among the abortuses of sporadics; one inherited, one de novo, and one of unknown origin.

Length of Gestation at Abortion

The information on the length of gestation (Table 4) was obtained during the interview and calculated from the patient's last menstrual period to the date of abortion. The mean gestation at abortion for repeaters was greater than that for sporadics. Of the repeaters, 45.1 per cent aborted at 14 weeks or later compared with 29.7 per cent of the sporadics.

Because the proportion of chromosomally normal abortions increases with length of gestation, a simple excess of normal fetal karyotypes among repeaters would be sufficient to raise the mean gestation at abortion. However, if one considered only chromosomally normal abortions, the mean gestation at abortion remained greater in repeaters than sporadics.

Length of Time to Conceive

Women were asked for how long before conception they had engaged in sexual intercourse without using any method of contraception. A greater proportion of repeaters than of

TABLE 4—Distribution of Length of Gestation at Abortion among Repeaters and Sporadics

Weeks of Gestation	Total		Chromosomally Normal	
	Repeaters (n = 184)†	Sporadics (n = 741)†	Repeaters (n = 55)†	Sporadics (n = 147)†
≤4	1	13	1	1
5		13		2
6	2	29	1	3
7	11	37		7
8	9	53		5
9	13	75		11
10	21	92	5	13
11	8	85	2	9
12	19	66	5	7
13	17	58	6	15
14	9	40	5	9
15	8	33	3	9
16	9	25	4	12
17	9	22	3	6
18	6	20	2	7
19	10	10	3	4
20	7	17	2	10
21	5	17	2	6
22	3	11		5
23	7	5	6	
24	4	4	3	
25		7		4
26	2	3	1	
27	4	6	1	2
Mean gestation (in days)	101.9	88.0	116.0	101.8
sd	36.4	32.6	36.1	35.3
Per cent ≥ 14 weeks	45.1	29.7	63.6	50.3
Difference in frequencies (95% confidence intervals)		15.4 (7.5,23.3)		13.3 (-1.8,28.4)

†Excludes Repeaters and Sporadics with unknown gestation.

TABLE 5—Length of Time to Conceive: Per Cent Distribution of Repeaters, Sporadics, and Multiparae by Number of Weeks of Engaging in Intercourse without Contraception Before Conception

Number of Weeks	Repeaters (n = 179)†	Sporadics (n = 705)†	Multiparae (n = 243)†
1-9	33.0	44.8	44.9
10-26	14.0	13.3	15.6
27-52	12.3	8.2	9.9
≥53	40.8	33.6	29.6
X ² (3df)		9.5*	8.1*

†Excludes women with unknown conception interval.

*p < .05 (Repeaters vs Sporadics) and p < .05 (Repeaters vs Multiparae).

sporadics or multiparae reported an interval to conception of more than one year, and a smaller proportion of repeaters reported an interval of two months or less (Table 5). This difference could not be attributed to differences in the frequency of intercourse since more repeaters (43.4 per cent) reported frequent intercourse (more than 12 times per month) than sporadics (36.3 per cent) or multiparae (35.3 per cent).

Prematurity and Low Birthweight Infants

Births occurring prior to the study pregnancy in the three groups were compared in terms of both gestational age at delivery and birthweight. Repeaters had a greater proportion of previous preterm births (deliveries under 36 weeks gestation) than did sporadics or multiparae (Table 6). Similarly, there was a higher proportion of previous low birthweight

TABLE 6—Previous Premature Deliveries and Neonatal Deaths for Repeaters, Sporadics, and Multiparae

Previous Pregnancy Outcomes	Repeaters	Sporadics	Multiparae	Differences in frequencies and means (95% confidence intervals)	
				Repeaters vs Sporadics	Repeaters vs Multiparae
Number of women with ≥ 1 previous live birth†	115	770	264		
Per cent with ≥ 1 live birth < 36 weeks	32.2	11.9	14.1	20.2 (11.4, 29.1)	18.1 (8.6, 27.6)
Per cent with ≥ 1 live birth ≤ 2500 grams	31.9	17.6	23.4	14.3 (5.3, 23.3)	8.5 (-1.5, 18.5)
Number of previous live births†	175	1708	703		
Per cent gestation < 36 weeks	24.0	6.7	7.3	17.3 (10.9, 23.8)	16.7 (10.1, 23.3)
Per cent birthweight ≤ 2500 grams	25.1	10.6	12.0	14.6 (7.9, 21.2)	13.2 (6.2, 20.1)
Mean birthweight of first offspring ≤ 2500 grams	1611.9	2096.6	2049.1	-484.7	-437.2
sd	662.9	468.1	466.1	(-287.5, -681.9)	(-204.7, -669.7)
Per cent ≤ 2500 grams among term deliveries (≥ 36 weeks)	12.9	6.9	7.1	6.0 (0.1, 11.8)	5.8 (-0.2, 11.8)
Early neonatal mortality (≤ 7 days) per 1,000 live births					
Among infants ≤ 2500 grams	186.0	61.8	96.4	124.2 (2.7, 245.8)	89.7 (-42.9, 222.2)
Among infants > 2500 grams	7.8	6.6	13.1	1.2 (-14.6, 17.0)	-5.3 (-23.0, 12.4)

†Includes two repeaters, seven sporadics, and three multiparae with unknown number of previous low birthweight infants; seven sporadics, and one multipara with unknown number of previous births of gestation < 36 weeks; these women are excluded from calculations where appropriate.

deliveries (2500 grams or less) among repeaters compared to sporadics or multiparae. Not only did repeaters report more low birthweight offspring, but their low birthweight offspring weighed less (Mean = 1611.9 g for all first births under 2500 g) than did the low birthweight offspring of sporadics and multiparae (Means = 2096.6 g and 2049.1 g, respectively).

Among term births only (36 weeks or later), the frequency of previous low birthweight offspring remained higher in repeaters (12.9 per cent) than in the other two groups (6.9 per cent in sporadics and 7.1 per cent in multiparae). This finding leaves open the possibility that some of the excess in low birthweight offspring among repeaters may be due to intrauterine growth retardation, as well as to curtailed gestation.

The rate of early neonatal death among the previous offspring of repeaters was greater than that among the other two groups. The excess mortality was confined to infants ≤ 2500 g and was probably the result of an excess of extremely low birthweight infants born to repeaters; among repeaters, 16 per cent of those infants weighing ≤ 2500 g actually weighed under 700 g in contrast to only 2 per cent of the ≤ 2500 g offspring of nonrepeaters.

Cervical Incompetence

Cervical incompetence is a diagnosis that is much more likely to be made if a woman has a history of repeated spontaneous abortions and preterm births than if she has had a more favorable history. Indeed, the reproductive history is usually the primary criterion for diagnosis. In our study, the diagnosis of cervical incompetence had been made 14 to 27 times more often in repeaters than in sporadics or multiparae. Among repeaters, 10.5 per cent reported having this condition in contrast to 0.4 per cent of sporadics and 0.8 per cent of multiparae. The exclusion of women with this condition from the analysis did not affect the results. Among repeaters without a diagnosis of incompetent cervix, 82 per cent had chromosomally normal abortions, 42 per cent aborted after 14 weeks gestation, 42 per cent took more than one year to

conceive, and 30 per cent of those women with previous live births had at least one low birthweight offspring.

The differences between repeaters and nonrepeaters with respect to the identified risk factors did not vary by smoking status, gravidity, or race. Additionally, if one considered only those repeaters (59 women) with consecutive spontaneous abortions and no live births, the frequencies of the risk factors were similar to those observed in repeaters (131 women) who had spontaneous abortions as well as live births and other reproductive outcomes in their histories. Among repeaters with only spontaneous abortions in their histories, 75 per cent had a chromosomally normal abortion, 48 per cent aborted after 14 weeks gestation, 38 per cent took longer than one year to conceive, and 17 per cent reported a diagnosis of incompetent cervix. Among repeaters with spontaneous abortions and other reproductive outcomes, the respective frequencies were 86 per cent, 44 per cent, 42 per cent, and 8 per cent.

Odds Ratios for Repeaters According to the Presence of Risk Factors

At least three of the five items associated with repeater status are generally known at the time a woman presents with a first spontaneous abortion and might be used to predict subsequent pregnancy outcome. We have estimated the increased odds of a woman being a repeater, depending on the presence of one, two, or all three of these items. The three risk factors are:

- gestation at abortion of 14 weeks or later,
- delay in conceiving (intercourse without contraception for more than one year before the last menstrual period), and
- previous birth of an infant of 2500 g or less.

Birthweight was preferred to length of gestation at delivery as a risk factor since birthweight is likely to be more accurately reported than gestation. We have not included in our estimates the remaining two items associated with repeater status: karyotype of the abortus (the information is generally not available for prediction and, in addition, numbers avail-

TABLE 7—Odds Ratios (95% confidence intervals) Comparing the Frequency of Selected Risk Factors among Repeaters with that among Sporadics

Number of Risk Factors	Odds Ratio	95% Confidence Intervals	% With Risk Factor(s) Repeaters	% With Risk Factor(s) Sporadics
One Risk Factor				
Gestation ≥ 14 weeks	1.9	(1.4, 2.7)	45.1	29.7
Previous low birthweight offspring*	2.2	(1.4, 3.4)	31.9	17.6
One year or more delay in conceiving	1.4	(1.0, 1.9)	40.8	33.6
Two Risk Factors				
Gestation ≥ 14 weeks + delay in conceiving	2.3	(1.5, 3.7)	20.1	9.7
Gestation ≥ 14 weeks + low birthweight offspring*	4.5	(2.4, 8.3)	16.4	4.2
Low birthweight offspring + delay in conceiving*	1.9	(1.0, 3.6)	12.0	6.9
Three Risk Factors				
Gestation ≥ 14 weeks + delay in conceiving + low birthweight offspring*	5.6	(2.3, 13.9)	8.5	1.6

*Excludes 75 Repeaters with no previous live births.

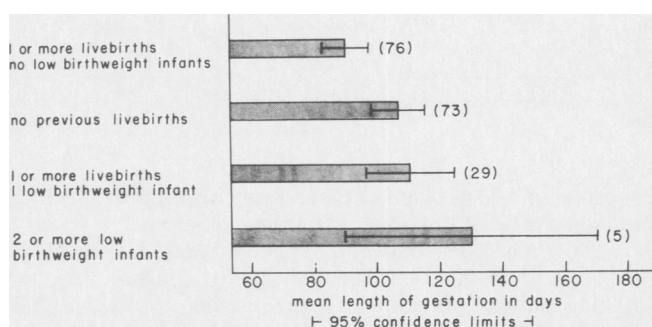


FIGURE 1—Low Birthweight in Previous Live Births and Mean Gestation at Abortion (95 per cent confidence limits)* among Women with Recurrent Spontaneous Abortions†

*The 95 per cent confidence limits are around each group mean.

†Excludes six women with unknown number of previous low birthweight infants and/or unknown gestation at abortion.

able for analysis were insufficient), and cervical incompetence (usually diagnosed only after a woman has experienced several spontaneous abortions).

The proportion of repeaters or sporadics who had one, two, or three of the risk factors and the odds ratios relating these factors to repeater status are set out in Table 7. In order to include length of gestation at the time of abortion as one of the factors, we have excluded multiparae from Table 7. There is a tendency for the odds ratio to increase with the number of factors present; the odds ratios associated with having one risk factor varied from 1.4 to 2.2; for two risk factors they varied from 1.9 to 4.5; and for all three factors the ratio was 5.6.

Interrelationships among Items Associated with Recurrent Abortion

Among repeaters, we examined the interrelations of the three items discussed above: gestation at abortion of 14 weeks or more, delay in conceiving, and previous low birthweight delivery. If a syndrome of recurrent abortion with a common underlying cause can be characterized by these three attributes, then one would expect these attributes to occur together in the same woman more often than expected by chance.

Figure 1 shows the mean gestation at abortion of the study pregnancy among repeaters with different reproductive histories. Dunn's multiple comparison procedure¹⁵ was used to evaluate differences between the groups. Repeaters with

one or two or more low birthweight infants aborted later in gestation than repeaters with previous live births but no low birthweight infants (difference = 31.4, 95 per cent CI = 5.5, 57.2). Additionally, repeaters who had no previous live births aborted later than repeaters who had had previous live births but no low birthweight infants (difference = 17.3, 95 per cent CI = 1.5, 33.1).

The mean gestation at abortion for repeaters who took longer than a year to conceive (102.1 days) did not differ from the mean in those who conceived within nine weeks of having unprotected intercourse (102.2 days). The rate of previous low birthweight deliveries was lower among repeaters who took more than a year to conceive than that among repeaters who conceived within nine weeks (23.2 per cent versus 29.6 per cent, respectively). This was not what was expected if delayed conception and prematurity were manifestations of a single condition. Thus interval to conception appeared not to be related to either of the other two characteristics (gestation at abortion and low birthweight) that were associated with recurrent spontaneous abortion.

Discussion

Five characteristics have been shown to be associated with recurrent spontaneous abortion: 1) chromosomally normal karyotype of the abortus, 2) abortions that occur after the 14th week of pregnancy, 3) delay in conceiving, 4) a diagnosis of cervical incompetence, and 5) previous premature deliveries. The characteristics were present in women who had only three or more spontaneous abortions as well as in women who had three or more spontaneous abortions in addition to other reproductive outcomes.

In theory, either fetal or maternal pathology could lead to recurrent spontaneous abortions. We have demonstrated that repeaters were more likely to have chromosomally normal rather than chromosomally abnormal losses, a finding consistent with other reports.¹⁶⁻¹⁸ These data suggest that inherited chromosome rearrangements are likely to be a rare cause of multiple abortion since none were observed in the conceptuses of repeaters. However, it is difficult to estimate the risk associated with inherited anomalies since they are so rare (less than 1 per cent of the abortuses of sporadics had an inherited rearrangement) and there were only 69 karyotyped abortuses of repeaters.

On the maternal side, physiological dysfunction or structural anomaly of the uterus could be responsible for

repeated premature initiation of labor, with the result being either the loss of a normal fetus or the delivery of a low birthweight infant with an increased mortality risk.

Cervical incompetence, a premature dilatation of the cervix during pregnancy, might be one such disorder. Although there was a strong association between a diagnosis of cervical incompetence and recurrent abortion in our data, there is an unavoidable circularity in assigning cervical incompetence a causal role. Confounding occurs because this condition is rarely diagnosed in the non-pregnant state and a major criterion for its diagnosis is a history of repeated second trimester loss.¹⁹

The observation that repeaters take longer to conceive than nonrepeaters was not associated with either of the other characteristics that were more common in repeaters than nonrepeaters. Perhaps there is a distinct mechanism responsible for conception delay that could also increase the risk of recurrent abortion. Thus maternal or paternal germ cell abnormalities or hormonal insufficiency might lead both to conception difficulties and to abnormalities in the developing zygote.

In summary, we have observed five characteristics associated with recurrent spontaneous abortion. Although the evidence for the existence of a constellation of characteristics indicative of a recurrent spontaneous abortion syndrome is modest, women who are classified as repeaters can be distinguished to some extent from women who are classified as sporadics by the following characteristics: abortion after the first trimester of pregnancy, previous premature deliveries, and a chromosomally normal conception. A diagnosis of cervical incompetence does not add to the evidence about the existence of a syndrome because the diagnosis is confounded with a history of previous abortion. Delayed conception stands apart from factors that might define a syndrome since it is independently related to recurrent spontaneous abortion.

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