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Original Research Article

A study on pregnancy outcome following previous spontaneous abortion: a hospital-based prospective observational comparative study

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ABSTRACT

Background: Majority of spontaneous pregnancy loss occur in early gestation. Early pregnancy loss causes great physical and psychological distress to couples and creates apprehension in achieving future reproductive success. Previous abortions have a definite impact on the successful outcome of future pregnancies. Hence for such pregnancies careful antenatal care is mandatory. Careful surveillances required in pregnancies preceded by spontaneous abortions, for early detection of possible complications.
Methods: This was a prospective observational comparative study conducted on 184 antenatal women (92 patients with previous spontaneous abortion, no full-term delivery, selected as cases while 92 patients with previous full term normal vaginal delivery with no previous abortion selected as control) attending antenatal OPD at Holy Family Hospital, New Delhi, from October 2020 to May 2022. All women received regular antenatal care and were followed up till delivery for maternal and foetal outcome.
Results: For predicting pregnancy outcome following previous spontaneous abortion showed statistically significant in term of obesity, 56.52% patients were obese in cases while in controls only 48.91%. Duration of marriage, in cases is 2.22 years, where as in controls were 4.24 years with significant result. Interpregnancy interval (months) in cases was 10.58±4.19 whereas in controls it was 32.53±14.41 with significant result. Antenatal complications in term of GDM, hypothyroidism, IUGR more in cases than controls.
Conclusions: We found that prior spontaneous abortion miscarriage is definitely a risk factor for the next pregnancy, making present pregnancy a high-risk pregnancy.

Keywords: IUGR, Preterm labour, Previous spontaneous abortion

INTRODUCTION

Miscarriage (abortion) is defined as a pregnancy that fails to progress, result in death and expulsion of embryo or foetus. The generally accepted definition speculates that the foetus or embryo should be less than the period of viability and /or weigh 500 gm or less which usually corresponds to gestational age of up to 20 weeks. It has been observed that incidence of spontaneous abortion is higher in urban than in rural areas.[1]

Around 80% of spontaneous pregnancy loss occurs in early gestation. The incidence ranges from 11 to 22% in pregnancies of 5 to 20 weeks. Abortion rates decline with advancing gestational age.

Around 50% of spontaneous miscarriage can be attributed to chromosomal abnormality. According to study of Kajii and associates (1980), they found that majority (75%) of abortion occurred by 8 weeks of gestation and causes of spontaneous abortion was chromosomal abnormality. Of chromosomal abnormalities, 95% are caused by maternal gametogenesis error and 5% by paternal error. The most common abnormalities found are trisomy followed by monosomy X.

Pregnancy is a crucial period for maternal and foetal well-being. Spontaneous abortion is one of the common adverse pregnancy events complicating approximately 15% of all clinically recognized pregnancies. In many cases, it results in pregnancy failure. Spontaneous pregnancy loss is physically and emotionally traumatic for couples.[3]

Keeping all these facts in consideration, we have conducted a study in our department to determine whether a previous spontaneous miscarriage is associated with an increased rate of adverse pregnancy outcomes in subsequent pregnancies.[4]

A low ratio of prostacyclin to thromboxane was found to be associated with recurrent abortion and this can predispose to complications in pregnancy by provoking micro thrombosis in the uterus. Contradictory results were obtained by comparing the studies of Reginald et al and Hughes et al. Reginald et al found an increased rate of preterm delivery, small for date and perinatal mortality in women with previous miscarriages, while Hughes et al found no difference. Tulppala et al reported a higher risk of preterm deliveries, intrauterine growth retardation, and impaired glucose tolerance in infants born after previous miscarriages.[5-7]

In a more recent study, Jivraj et al compared the obstetrical and neonatal outcome of 162 pregnancies in women with previous recurrent miscarriages with a control population delivery during the same period, they found increased rate of preterm delivery, growth restriction, caesarean section and perinatal mortality, although no differences in incidence of hypertensive disorder of pregnancy or diabetes was found.[8]

Dilatation of cervix during abortion lead to cervical incompetence results in abortion and preterm deliveries. Also, curettage during abortion may result in poor placentation and placental insufficiency in next pregnancy which can increase the risk of placenta previa, abruption and pre-eclampsia. These further results in fetal and neonatal outcome like intrauterine growth retardation, intrauterine death, fetal demise and low birth weight.[9]

Early pregnancy losses cause great physical and psychological distress to couples and create apprehension in achieving future reproductive success. Clinical attention has mainly focused on the workup and management of recurrent pregnancy loss, which is proven to have an adverse effect on subsequent pregnancies. But a single miscarriage has not been correlated to future pregnancies. Its diagnosis and management is usually straightforward and any detrimental effect on future childbearing remains unproven.[10]

METHODS

The present study was a prospective observational comparative study conducted on 184 antenatal women attending antenatal OPD at Holy Family Hospital, New Delhi, from October 2020 to May 2022 selected randomly between gestational age of 24 to 28 weeks. Patients were recruited in the study after informed consent obtained from them, they participated in the study on a voluntary basis. All patients in the study were subjected to detailed history which includes history of present pregnancy, obstetric history, menstrual history, past history, family history. POG will be estimated by calculation from the first day of LMP and amp; by early ultrasound examination. Detailed history regarding previous abortion will be taken and examination was done focusing on information about previous abortion.

92 patients with previous spontaneous abortion (and no full-term delivery) were selected as cases and 92 patients with previous full term normal vaginal delivery (and no previous abortion) were taken as controls. All women received regular antenatal care and were followed up till delivery for maternal and fetal outcome.

Statistical analysis

Categorical variables were presented in number and percentage (%) and continuous variables will be presented as mean±SD and median. Normality of data was tested by Kolmogorov-Smirnov test. If the normality was rejected then non parametric test was used.

Statistical tests were applied as follows: quantitative variables were compared using unpaired-test/Mann-Whitney test, when the datasets were not normally distributed between the two groups. Qualitative variables were compared using Chi-Square test/Fisher's exact test. A p value of<0.05 was considered statistically significant. The data was entered in MS Excel spread sheet and analysis wase done using Statistical Package for Social Sciences (SPSS) version 21.0.

RESULTS

In the study distribution of age (years), body mass index (kg/m^2) and parity were comparable between cases and controls. Maximum numbers of patients were in the age group of 26-30 years in both cases and controls with no significant difference.

56.52% patients in cases were obese while in controls only 48.91% were obese (Table 1) with statistically significance. Mean weight of cases was 61±5.09 and control was 65.12±6.55 with p value <0.001.

When we were comparing the mean duration of marriage (years) in cases was 2.22 years, where as in controls were 4.24 years (Table 2) with significant result.

Mean duration of interpregnancy interval (months) in cases was 10.58±4.19 where as in controls it was 32.53±14.41 (Table 3) which was statistically significant.

Table 1: Comparison of demographic characteristics between cases and controls.

Demographic characteristics	Cases (n=92)	Controls (n=92)	P value
Age(years)			
Mean±SD	28.87±3.33	29.72±3.53	
Median (25th-75th percentile)	29 (26-31)	30 (27-32)	0.11§
Range	21-35	22-42	

Table 2: Comparison of duration of marriage (years) between cases and controls.

Duration of marriage (years)	Cases (n=92)	Controls (n=92)	P value
Mean±SD	2.22±1	4.24±1.26	
Median (25th-75th percentile)	2 (1.5-3)	4 (3-5)	<0.0001§
Range	6-1	8-2	

Table 3: Comparison of inter pregnancy interval (months) between cases and controls.

Inter pregnancy interval (months)	Cases (n=92)	Controls (n=92)	P value
Mean±SD	10.58±4.19	32.53±14.44	
Median (25th-75th percentile)	11 (8-12)	30 (24-36)	<0.0001§
Range	1.9-24	Dec-84	

Table 4: Comparison of birth weight (kg) between cases and controls.

Birth weight (kg)	Cases (n=92)	Controls (n=92)	P value
Mean±SD	2.83±0.43	2.87±0.42	
Median (25th-75th percentile)	2.88 (2.5-3.14)	2.9 (2.61-3.16)	0.535‡
Range	1.79-3.93	1.7-3.7	

Table 5: Comparison of antenatal complication between cases and controls.

Antenatal complication	Cases (n=92)	Controls (n=92)	P value
No complications	42 (45.65%)	31 (33.70%)	
Beta thalassemia	4 (4.35%)	3 (3.26%)	
GDM	12 (13.04%)	22 23.91%)	
Hypothyroidism	22 (23.91%)	12 (13.04%)	
IUGR	2 (2.17%)	2 (2.17%)	0.033*
Obstetric cholestasis	2 (2.17%)	10 (10.87%)	
PIH	3 (3.26%)	7 (7.61%)	
Rh negative pregnancy	5 (5.43%)	5 (5.43%)	
Total	92 (100%)	92 (100%)	

In our study 23.91% had GDM, 21.74% with hypothyroidism and 7.61% had IUGR in cases while in controls it was respectively 13.04%, 18.48% and 2.17%. In this prospective observational study, we observed that 30.44% in cases while 18.48% in controls underwent preterm delivery with insignificant result, and 29.35% in cases while 25% in controls underwent emergency LSCS with p value <0.011.

DISCUSSION

Spontaneous abortion may indicate a high risk of adverse outcomes in subsequent pregnancies. Spontaneous abortion and adverse outcomes like low birth weight, small for gestational age, growth retardation and preterm labour. Hence pregnancies with prior history of spontaneous abortion should be considered a high-risk pregnancy and extra precautions should be given during antenatal period anticipating these outcomes. The purpose of the present study was to determine the effect of a spontaneous miscarriage on the outcome of the next pregnancy, including preterm labour, placenta previa, PROM, placental abruption, pre-eclampsia and eclampsia, LBW, malpresentation, IUGR, foetal death.

My study was conducted on 184 patients among which 92 cases had previous spontaneous abortion whereas 92 controls had previous full-term delivery with no history of

previous abortion. Similar study conducted by Rama et al, 2015 at government maternity hospital, SV Medical College, Andhra Pradesh who conducted a prospective study, and their study was "an obstetric outcome after previous spontaneous abortion" on 200 pregnant patients with history of previous spontaneous abortion and 200 pregnant women with history of previous full-term delivery. Similar to present study conducted by Muzaffar et al, they studied 140 patients with history of spontaneous abortion preceding present pregnancy. In their study majority of the patients (39.2%) were in the age group of 25-30 years and there was no statistical difference.[1]

Study conducted by Muzaffar et al and their study was "outcome of pregnancy following previous spontaneous abortion" found study that spontaneous abortion increases the risk of congenital abnormalities, low APGAR score at 1 minute, low birth weight.[1]

Study conducted by Bishnoi et al, study was "to find out the incidence of adverse outcomes in pregnancy preceded by spontaneous abortion compared to those preceded by full term live birth: a hospital-based cohort study" and found that there was no statistically significant difference between the two groups (cases and controls) with regards to diabetes mellitus, placenta previa, preeclampsia, abruption and instrumental delivery, but pregnancy complication like threatened miscarriage, PROM, preterm labour, IUGR, induction labour and caesarean section were significantly higher in the group who had history of one spontaneous abortion preceding the current pregnancy which was statistically significant.[2]

Study conducted by Chandna et al, they studied a prospective study on 756 patients and their study was, "a study on pregnancy outcome following previous spontaneous abortion". They divided patients in three group, group A (pregnant female with history of previous one spontaneous abortion-case), there were 2 control groups group B (primigravida) and group C (second gravida with history of previous successful pregnancy outcome) and concluded that no statistically significant difference in BMI of female of all the groups in both cases and controls.[4]

A study conducted by Bakshi et al and their study was "risk of adverse pregnancy outcomes after prior spontaneous abortion". A prospective cohort study was done on 800 gravidae-2 patients: 300 patients (study cohort- whose previous pregnancies were spontaneously aborted), and 500 patients (control cohort-,whose previous pregnancy went to term and live fetus was delivered) concluded that rate of preterm delivery in control, A1 (history of one spontaneous abortion) and A2 group (history of previous 2 abortion) respectively was 21%, 23.4% and 32.3% with no significant difference between them while rate of term delivery respectively 60%, 53% and 33.8% with significant difference between them.[5]

Study conducted by Bakshi et al, and their study was "risk of adverse pregnancy outcomes after prior spontaneous abortion" that incidence of IUGR and IUFD was similar in all group, also found that incidence of LBW (low birth weight) was significantly increased in patients with a history of 2 or more abortion while in one abortion group it was not increased.[5]

In another comparable study conducted by Rama et al, they studied 200 pregnant women with history of spontaneous abortion and 200 pregnant women with history of previous full term normal deliveries (with no abortion).[6]

A study conducted by Rama et al mode of termination of pregnancies between two groups, 94% (control cohort) of patients with a history of the previous full term normal deliveries had normal deliveries and only 87.5% of study cohort had normal deliveries statistically significant difference between them. The number of patients who delivered preterm among control cohort was 3% among study cohort was 6% with no significant differences between them.[6]

Study conducted by Rama et al and theirstudy was "an obstetric outcome after previous spontaneous abortion" 32% of study cohort and 11% of control cohort had LSCS with statistically significant difference between them. The incidence of LSCS was high in study cohort.[6]

Similar to above, study conducted by Kashanian et al and their study was "risk of adverse pregnancy outcomes after prior spontaneous abortion" also found increase incidence of LSCS, 28.14% in cases and 13.48% in controls had caesarean delivery with statistically significant difference between them.[6]

Study conducted by Bhattacharya et al, their study was "does miscarriage in an initial pregnancy lead to adverse obstetric and perinatal outcomes in the next continuing pregnancy?" concluded that increasing the interpregnancy interval following a miscarriage appears to improve perinatal outcome in next pregnancy. A report of WHO technical consultation on birth spacing recommends delaying the next pregnancy for a minimum 6 months following a miscarriage or abortion in order to optimize outcomes.[7]

Similar to present study, Basso et al study the "risk of preterm delivery, low birth weight and growth retardation following spontaneous abortion: a registry-based study in Denmark" and concluded that women who have previous spontaneous abortion had a shorter average interpregnancy interval which supports my study.[10]

Study conducted by Basso et al showed an increased risk of preterm labour after abortion in previous pregnancies. In another comparable study conducted by Taylor et al reported, and their study was placenta previa in relation to induced and spontaneous abortion: a population-based study, and concluded that an increased evidence of

placenta previa in patients with previous abortion, in contrast to present study.[10]

In another comparable study conducted by Muzaffar et al found that pregnancy outcome following spontaneous miscarriage increased risk of threatened abortion and preterm delivery.[1] study conducted by Agarwal et al and their study was "pregnancy outcome following spontaneous abortion" they studied on 70 patients with history of previous spontaneous abortion and found that mode of delivery was vaginal in 70%, caesarean section was done in 23.3%, whereas 6.7% underwent instrumental delivery. Incidence of operative and instrumental delivery was high so as to avoid maternal exhaustion, prolonged second stage of labour and foetal distress which was significant.[11]

The mean age of patients in study cohort and control cohort were 23.81 year and 23.3 years respectively, indicating that both the groups were distributed predominantly in the age group 18-25 years and this was not statistically significant. Study conducted by Kashanian et al, they studied 300 gravida 2 patients. They divided study group in 2 groups- 200 women of the case group had previous 1 previous spontaneous abortion and 100 women of the control group had a previous term pregnancy and delivered a live foetus. Mean age of the case and control group were 25.0±12.89 and 23.69±13.78 respectively, with no statistically significant difference in between the 2 group with regard to maternal age.[1]

Study conducted by Knudsen et al and the study was "prognosis of a new pregnancy following previous spontaneous abortions" the association between the age of the mother and the spontaneous abortion rate has been discussed, results show that the spontaneous abortion rate is steady up to the age of 35 years.[17]

According to Latin American study, which found that abortion-pregnancy intervals of less than 6 months were associated with increased risk of preterm birth and growth restriction.

Similar to my study, study conducted by Rama et al and their study was "an obstetric outcome after previous spontaneous abortion" percentage of patients having IUGR in study cohort were 3% and which was more than 1% among the control cohort, but there was no statistical difference between these two cohorts (p=0.28).[6] Study conducted by Thom et al, and their study was "spontaneous abortion and subsequent adverse birth outcome" concluded that risk of IUGR and LBW increases as number of abortion increases.[18]

Limitation of our study was in the present study, there was a small cohort of patients and larger sampling is needed for better statistical interpretation. Our study did not take into account socio demographic parameters like race, ethnicity, socioeconomic status, education, nutritional status, prenatal care etc.

Patients were followed up only till the time they stayed in the hospital, hence long-term outcome could not be accessed. Very limited data and research studies are available, creating hindrance to find any association.

CONCLUSION

Prior spontaneous abortion miscarriage is definitely a risk factor for the next pregnancy, making present pregnancy a high-risk pregnancy. To evaluate pregnancy outcome following a previous abortion, the finding of the present and previous studies show that further researches is required with large enough sample sizes and control of intervening factor, such as previous spontaneous abortion, immunological factors, body mass index and consanguinity.

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