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Research Article

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To Study Relationship of Umblical Cord Insertion with Fetal Outcome in PIH and Normotensive Pregnancies

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ABSTRACT

Pregnancy induced hypertension (PIH) is associated with placental morphological changes and adverse fetal outcome. A total of 100 placentae were collected from labour room and from gynecological operation theatre, Rajindra Hospital, Patiala, 75 placentae were from pregnancies associated with PIH (study group) and 25 cases were associated with normotensive pregnancies (control group) and were studied for site of umbilical cord insertion. Findings were correlated with fetal outcome. The study group had 25 (33.33%) cases of central and 23 (30.67%) cases of eccentric insertion of umbilical cord. Marginal insertion of umbilical cord was found in 16 (21.33%) cases of study group as compared to only 2 (8%) cases of control group. In PIH, marginal insertion of umbilical cord was assosciated with IUGR and IUDs . Fetal outcome was significantly poor in preeclampsia as compared to normotensive pregnancies (p<.0001). In PIH, impaired placental perfusion is directly related to poor fetal outcome. Hence ultrasonographic study of umbilical cord insertion site and placenta is useful for managing fetal outcome in PIH patients.

Key words: *Pregnancy induced hypertension (PIH), umbilical cord insertion, fetal outcome.*

INTRODUCTION

A well nourished newborn reflects the adequate placental function. In gross majority of Pregnancy induced hypertension (PIH) cases, placenta shows the effects of low uteroplacental flow and results in fetal growth retardation. Umbilical cord is an important lifeline between fetus and placenta. The site of cord insertion is variable, usually central or eccentric but occasionally (about 7%), it is marginal (Battledore) or into fetal membranes (Velamentous).The significance of marginal insertion is debated. Marginal insertion has been reported to occur with increased frequency in abortions, with malformed fetuses and in association with neonatal asphyxia and premature labour[1]. Association of marginal insertion with low birth weight and pregnancy induced hypertension was observed by Rath *et al*[2,3]. The aim of the present study was to access the effect of variation in site of umbilical cord insertion on fetal outcome in PIH and normotensive pregnancies.

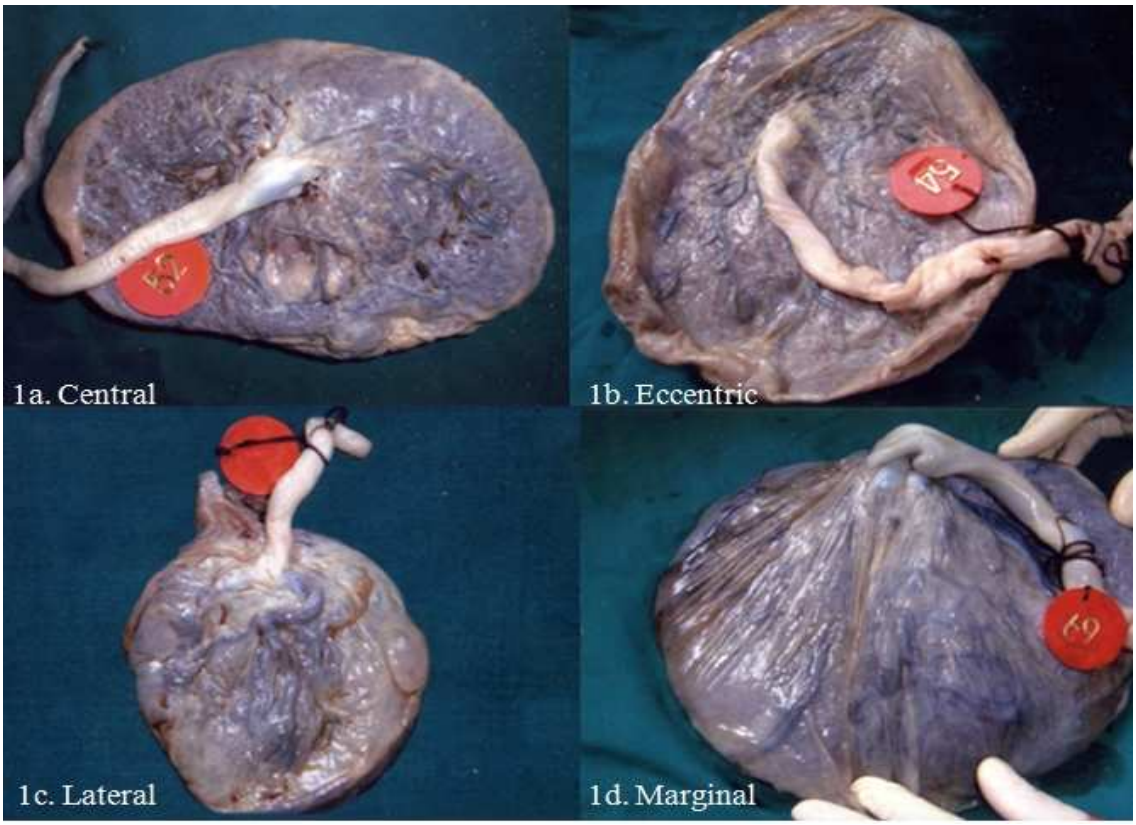
MATERIALS AND METHOD

The present case control study was conducted in the Department of Anatomy , Government Medical College, Patiala. A total of 100 placentae were collected from labour room and from gynecological operation theatre, Rajindra Hospital, Patiala. Out of which 75 cases were associated pregnancy induced hypertension (study group) and 25 cases were associated with normotensive pregnancies (control group). For both groups, patients of all ages and parity with period of gestation more than 35 weeks were taken. The patients having hypertension and diabetes before pregnancy had been excluded.The placentae were grouped depending on the degree of hypertension as described by Cunningham *et al* (2005)[4].

1.	Normotensive	< 140/90 mmHg
2.	Mild hypertension	≥ 140/90 - <160/110 mmHg
3.	Severe hypertension	≥ 160/110 mmHg

The placentae with umbilical cord and membranes were collected immediately after delivery. All the placentae were examined grossly for any abnormality of cord and membranes. The site of umbilical cord insertion of each placenta was noted and categorized into 4 groups (Figure 1a, 1b, 1c and 1d). Placentae along with umbilical cord were given code numbers and preserved in adequate amount of 10% formalin. Besides gross morphological examination of placenta, all the patients were evaluated clinically and routine hematological and biochemical tests were also considered. Data was compiled in a performa. Observations were interpreted and compared with the control.

Fig.1(a-d): Different sites of umbilical cord insertion



RESULTS

Table 1: Umbilical cord insertion in study and control groups

Umbilical Cord Insertion	Group I (Study)		Group II (Control)	
	No.	%age	No.	%age
Central	25	33.33	12	48
Eccentric/medial	23	30.67	7	28
Lateral	11	14.67	4	16
Marginal	16	21.33	2	8
Total	75	100	25	100

Statistical Analysis

χ^2	P value	Significance
3.01	>0.05	NS

Table 2: Fetal outcome in study and control groups

Fetal outcome	Group I (Study)		Group II (Control)	
	No.	%age	No.	%age
AGA	32	42.67	25	100
IUGR	33	44	0	0
IUD	10	13.33	0	0
Total	75	100	25	100

Statistical Analysis

χ^2	P value	Significance
25.1	<0.0001	HS

Table 3: Umbilical cord insertion and fetal outcome in study group

Umbilical cord insertion	AGA No. (%)	IUGR No. (%)	IUD No. (%)	Total No. (%)
Central	16(64)	8(32)	1(4)	25(100)
Eccentric/medial	11(47.83)	11(47.83)	1(4.34)	23(100)
Lateral	2(18.18)	6(54.55)	3(27.27)	11(100)
Marginal	3(18.75)	8(50)	5(31.25)	16(100)
Total	32(42.67)	33(44)	10(13.33)	75(100)

AGA-appropriate for gestational age, IUGR-intrauterine growth retardation, IUD- intrauterine death.

It was observed that out of 75 cases of study group 25 (33.33%) cases had central and 23 (30.67%) cases had eccentric insertion of umbilical cord. Marginal insertion of umblical cord was found in 16 (21.33%) cases of study group as compared to only 2 (8%) cases of control group. In control group central insertion of umbilical cord was found in 12 (48%) cases, eccentric in 7 (28%) cases and lateral in 4 (16%) cases. The statistical difference between two groups was not significant. In study group 10 (13.33%) had worst outcome in the form of intrauterine death (IUD) and 33 (44%) cases had babies with intrauterine growth retardation (IUGR). In control group all the 25 cases, had babies which were appropriate for gestational age (AGA). The statistical difference between study and control group for fetal outcome was highly significant (Table 2). Marginal umbilical cord insertions in PIH were maximally associated with IUDs followed by IUGR (Table 3). However in normotensive cases, all the newborns were appropriate for gestational age irrespective of different sites of umbilical cord insertion (Table 1 and 2).

DISCUSSION

The present study reveals that common sites of umbilical cord insertion are central or eccentric in both PIH and normotensive cases (Table 1). Udainia and Mehta found that the commonest type of umbilical cord insertion in PIH was eccentric (70.67%) whereas central and marginal insertion was12% and 14.67% respectively in PIH group.[5] Some of the authors have related the site of insertion of umbilical cord with fetal outcome and PIH and some do not. Shanklin (1970) observed a high degree of correlation between anomalous cord insertion and low birth weight.[6] Woods and Malan(1978) found no correlation between birth weight and site of cord insertion in normal term infants which is in concordance with the present study .[7] Rath et al (2000) found no significant differences for umbilical cord insertion between study and control groups and observed that marginal cord insertion results in low birth weight both in normotensive and hypertensive cases, most commonly in severe hypertensive subgroup.[3] Present study also observed that sites of insertion were almost same in both PIH and normotensive placentae (Table 1), but in PIH placentae, marginal cord insertion was related to poor fetal outcome (8 IUGR and 5 IUDs) (Table 3).

Mirchandani et al (1979), Masodkar et al (1985) and Avasthi et al (1991) observed 12%, 11.9% and 12.5% still births associated with PIH.[8,9,10] In our study, IUDs were13.33% in PIH cases(Table 2). Placental inadequacy and altered placental function may result from primary pathological alterations in the mother, fetus or the placenta ultimately leading to intrauterine growth retardation and IUDs.[11]

CONCLUSION

Central and eccentric insertions of umbilical cord are the common types. Marginal cord insertion, though rare, when associated with hypertension can leads to poor fetal outcome. The status of maternal vascular tree is important because it limits the fuel delivery to the growing foetus and hypertensive disorders of pregnancy restrict the blood supply to the foetus and the placenta. Altered distribution of fetal blood vessels and impaired functional capacity in the placenta to exchange gas and provide nutrients lead to IUGR and IUDs in these cases. This study should be pursued in large number of cases, the mother should undergo regular antenatal checkup and ultrasonography (USG). If USG reveals anomalous cord insertion then counseling can be done to get it confirmed by colour doppler imaging so that fetal outcome can be improved by other measures.

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