



ORIGINAL RESEARCH PAPER

Medical Science

THE ROLE OF COLOUR DOPPLER ULTRASOUND AND MAGNETIC RESONANCE IMAGING IN PLACENTA PREVIA

KEY WORDS: Placenta previa, Placenta accreta, Colour Doppler Ultrasound, Magnetic Resonance Imaging

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ABSTRACT

This study basically focuses on the role of Colour Doppler Ultrasound and Magnetic Resonance Imaging in the study of placental localization and its penetration into the myometrium in suspected cases of placenta accreta in addition to evaluating the relationship between various factors and incidence of placenta previa. According to the study, Colour Doppler Ultrasound is accurate enough in diagnosing placenta accreta and also in detecting the amount of myometrial invasion. Magnetic Resonance Imaging can be reserved for ambiguous cases with equivocal Ultrasound findings and in suspected cases of posterior placenta.

INTRODUCTION:

In large majority of the cases, the placenta is situated in the upper uterine segment usually near the fundus on the posterior wall of the uterus and less frequently on the anterior wall. It may in other cases be situated wholly or partially in the lower uterine segment, resulting in placenta previa and a likelihood of hemorrhage, preterm delivery, low birth weight of the baby, maternal and fetal mortality and morbidity.

Literature reveals that antepartum hemorrhage complicates 2-5% of pregnancies of which approximately one third are due to placenta previa.

Although the cause of placenta previa is poorly understood a number of studies have established its association with such factors as advancing maternal age, multi-parity, previous caesarian section, previous spontaneous or induced abortion and multiple gestation.

With the increasing number of caesarean sections and advancing maternal age at delivery, the risk of placenta previa accreta has increased 10 fold in the past 50 years. It is important to diagnose this condition prenatally to avoid morbidity and mortality later.

This study basically focuses on the role of colour Doppler ultrasound and MRI in the study of placental localization and its penetration into the myometrium in addition to evaluating the relationship between various factors and placenta previa.

AIM OF THE STUDY:

- To study the incidence of placenta previa in general obstetric population.
- To evaluate and to find out the occurrence of placenta previa under the influence of the following factors like maternal age, gravidity, parity, previous history of abortion, previous history of uterine scars.
- To study the course of pregnancy and labour in placenta previa.
- To study the localization of placenta and its penetration into the myometrium and adjacent structures using Color Doppler Ultrasound and MRI.

MATERIALS AND THE METHODS:

MATERIALS:

All the cases of placenta previa admitted and delivered at the Government R.S.R.M. Lying – in Hospital, Chennai -600013 during the period of Sept 2015 to Sept 2016 were studied in detail.

METHODOLOGY:

A detailed history is elicited from all the cases of antenatal women from 28 to 40 weeks with ultrasound report of

varying degrees of placenta previa and they are subjected to

- General Examination
- Obstetric Examination
- Imaging with Colour Doppler Ultrasound and MRI to analyze placental localization, degrees of penetration into the myometrium and surrounding structures.
- The course of the pregnancy and mode of delivery, complications if any are all noted.
- Post-operative outcome for both mother and baby are noted.

INCLUSION CRITERIA:

- All pregnancies with Ultrasound report of low lying placenta with distance between the lower end of placenta and internal os being 2.5 cm or less.
- Gestational age: 28 to 40 weeks.

EXCLUSION CRITERIA:

- Patients in active labour.
- Placenta previa with active bleeding.
- Abruption placenta.
- Vasa previa.
- Gestational age less than 28 weeks.

SAMPLE SIZE:

25 cases of placenta previa.

PROCEDURE AND INVESTIGATION DETAILS:

Colour Doppler Ultrasound
M.R.I.

ANALYSIS PLAN:

Statistical analysis

OBSERVATION:

A prospective study of cases of placenta previa delivered at Govt. RSRM lying in hospital Chennai from September 2015 to September 2016. The total number of deliveries during this period was 12,462 out of these 63 cases of placenta previa were noticed 25 cases were selected for this study as they satisfied the inclusion and exclusion criteria of the present study.

Incidence of placenta previa

The incidence of placenta previa among total deliveries during this period in our hospital is 0.50%. The incidence of placenta previa in total live births during the study period is 5.0 per thousand.

DISCUSSION:

The incidence of placenta previa among the total deliveries in Govt. RSRM lying in Hospital, Chennai from Sept 2015 to Sept 2016 is 0.50%. The incidence of placenta previa in total

live birth during the study period is 5.0 per 1000.

Cresswell JA et al(2013) reported 0.5% incidence, Ahmed SR et al(2015) reported an incidence of 0.8% which were quiet similar to our current study.

AGE:

The incidence of placenta previa cases increases with advancing maternal age. In our present study, the maximum incidence was in the age group 20–24 years. The average age in our study is 25.24 and correlates with the Barnet et al. 1981.

GRAVIDITY:

In our study, the percentage of case increases with higher gravida, with statistically significant p value of 0.0064. It was observed from our study that with increasing gravidity the risk of placenta previa increased dramatically. Zhang 1999, also observed the same results.

PARITY:

Studies show that risk of placenta previa increases with increasing parity. Our present study also shows that the risk of occurrence of placenta previa is higher in multipara than nullipara with a statistically significant p value of 0.00006 and it correlates with above study

ABORTION:

Various authors point out that, the risk of placenta previa increases with previous history of abortions. Parazzini 1999 reports a relative risk of 1.8 and Ananth CV 1997 reports relative risk of 1.6 (spontaneous abortion) and 1.7 for induced abortion. In our current study only 16% of the study population had a history of abortion.

PREVIOUS LSCS:

The risk of placenta previa occurring in the pregnancy following a caesarian delivery is 1-4% relative risk of 1.2 for 1 previous caesarian section and 2.1 for 2 previous caesarian section. Studies showed that previous uterine scar had a 1.8 times higher risk of placenta previa in subsequent pregnancy than those without. In our study, only 36% of patients had previous history of LSCS.

MALPRESENTATION:

It is observed from different studies that malpresentations occur in 30-35% of placenta previa cases. In our study the incidence is 24% which accounts for about 1/4th of the total cases of placenta previa which is statistically significant.

MULTIPLE GESTATION:

Strong and bar reported that an increased incidence of placenta previa in multiple gestation (0.55%) Parazzini 1994 reported that there is no risk between multiple gestation and occurrence of placenta previa between singleton and multiple gestation. In our study, there was statistical significance between multiple gestation and placenta previa.

INTERPREGNANCY INTERVAL:

Nearly 70% of the study population has an interpregnancy interval of 2–4 years. According to studies it is proved that the incidence of placenta previa increases with decreasing inter pregnancy interval.

TYPE OF PLACENTA PREVIA:

Studies reported that the incidence of minor and major previa to be 73% and 27% respectively whereas our study reports 80% incidence of major previa. This may be explained based on the fact that our hospital being a tertiary care institute, many of the minor degrees of placenta previa cases get delivered without any complication.

MODE OF DELIVERY:

In our study 92% of placenta previa were delivered by

caesarian section. In our series 33% of minor degree and 100% of major degree were delivered by caesarean section, which is similar to the rate observed by the above study.

MODE OF DELIVERY	PERCENTAGE
Vaginal	8%
LSCS	92%

MODE OF DELIVERY	MINOR DEGREE		MAJOR DEGREE	
	No of cases	Percentage	No of cases	Percentage
Vaginal	2	8%	0	0%
LSCS	1	4%	22	88%

TYPE OF ANEASTHESIA:

McShane 1985 reported the use of general anaesthesia in 75% of cases, our current study has similar results with 61% cases with general anaesthesia.

BLOOD TRANSFUSION:

In Mahesh kumar at Timkur 2000 observed that 60% of cases required blood transfusion. But in our study almost 80% of cases received blood transfusion.

PRETERM:

Brenner(1978), Crane(1999) reported that incidence of preterm births in placenta previa were 40% and 46.65% respectively. In our current study the incidence is 44% which is similar to the above studies.

LOW BIRTH WEIGHT:

In our study only 40% of babies were less than 2.4 kg which is similar to Zhanghna(1992) which was 47%.

MRI AND COLOUR DOPPLER ULTRASOUND IN DETECTION OF PLACENTA PREVIA:

Out of 25 cases of placenta previa in our study, 2 cases of placenta accreta were detected which were confirmed pathologically post-delivery. Both these cases were antinatally diagnosed by both MRI and Color Doppler ultrasound. One of them was placenta percreta involving the bladder serosa which was initially diagnosed by Color Doppler ultrasound and then confirmed by MRI.

The second case was placenta increta which was also initially diagnosed by Color Doppler ultrasound. Based on the observations, Color Doppler ultrasound proves to be a valuable initial screening tool with 100% accuracy, cost-effectiveness and easy availability. MRI being an expensive tool which needs expertise should be reserved primarily for equivocal ultrasound findings of abnormal placentation or posterior placenta with risk factors. There are no statistically proven significance noted between accuracies for diagnosis of placenta accrete by Color Doppler.

PLACENTA ACCRETA	NO OF CASES
Total	2
Detected by MRI	2
Detected by colour Doppler USG	2

SUMMARY

The total number of deliveries from September 2015 to September 2016 is 12,426 out of which 63 cases were reported as placenta previa, with the incidence of placenta previa being 0.50%, that is 5 per 1000 live births.

The risk of placenta previa is increased with advancing maternal age, gravidity, parity and previous history of invasive uterine procedures or uterine surgeries.

The risk of malpresentations increases with major degree of placenta previa.

In our study, it was observed that there was association between male babies and placenta previa.

It was also observed that the risk of placenta previa decreases as the interpregnancy interval increases(>4yrs).

Maximum cases(80%)of placenta previa had their gestational age at delivery to be more than 34 weeks.(34 to 37 weeks – 44%; >37 weeks –

About 92% cases of placenta previa were delivered by Caesarean section (minor – 33%; major – 100%).

Out of the Caesarean deliveries, 61% were given general anaesthesia.

Almost 80% of the cases needed blood transfusion either intra operatively or post operatively which was statistically significant.

56% of the babies were of term and 60% of the babies were born with birth weight >2.5 kg which were statistically proven to be significant.

80% of the observed placenta previa belonged to major subtype.

Out of the 63 cases of placenta previa, only 2 cases of placenta accreta are reported, the incidence of placenta accreta being 3.1% of total placenta previa and 0.016% of total deliveries in the study period.

Colour Doppler Ultrasound and Magnetic Resonance Imaging are both effective in detecting the myometrial invasion in suspected cases of placenta accreta with Colour Doppler USG being used as an initial screening tool which is both sensitive ,specific and cost effective whereas MRI being an expensive ,time consuming and expertise requiring tool be used as an adjunct to Colour Doppler when there is equivocal results with USG or when the placental position is posterior.

CONCLUSION

Placenta previa whether found fortuitously by Ultrasound or with the clinical emergency of maternal hemorrhages, carries significant maternal and fetal risks. Accurate diagnosis ,judicious expectant management with transfusions as and when required and prompt delivery at the time of fetal maturation can lead to the most favourable outcome.

With the emerging era of caesarean sections, anticipation of clinical life threatening complications like placenta accreta requiring a multidisciplinary approach to management are on the increasing trend. The prompt diagnosis of placenta accreta before delivery will allow us to plan in a multi disciplinary approach to reduce both the maternal and perinatal morbidity and mortality

Colour Doppler Ultrasound is accurate enough in diagnosing placenta accrete and also in detecting the amount of myometrial invasion specifically whereas MRI can be used in specific cases as an adjunct in ambiguous cases and in suspected cases of placenta posterior.

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