

Barcelona Staging Using Doppler Velocimetry As a Predictor Of Perinatal Outcome Among Intrauterine Growth Restriction Fetuses – A Record Based Study At a Tertiary Care Hospital

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ABSTRACT Intrauterine growth restriction (IUGR) is a pathological condition in which a fetus has not achieved his genetic growth potential , regardless of size

Objectives –To study the perinatal outcome in growth restricted fetuses with the help of Doppler Velocimetry using Barcelona Staging.

Methods - Record Based Study from 7 June 2021 to 7 march 2022 will be analysed.

Results Out of 86 pregnancies,35 cases of abnormal doppler velocimetry were included under Barcelona staging and outcome was studied. 51.4% were of age group -20-24yrs. 57.1% were primigravidas. Most common associated risk factor is Preeclampsia and oligohydromnios. 68.5%,2.8%,14.2%,14.2% were in Barcelona stage 1 ,2,3 and 4 respectively. Maternal and perinatal outcome were good in stage 1.Perinatal death 3 cases

Conclusion Management using Barcelona staging will be helpful for Obstetrician to determine the proper monitoring and timing of delivery

Key words – Barcelona staging , Doppler Velocimetry , Intrauterine growth restriction.

INTRODUCTION

Intrauterine growth restriction (IUGR) is a pathological condition in which a fetus has not achieved his genetic growth potential , regardless of size.It is important to understand that a

fetus does not need to be small to growth restricted and that fetal growth restriction (FGR) and Small for gestational age (SGA) are not synonymous. It is estimated that the majority of FGR fetuses are SGA, while 50-60% of SGA fetuses have grown appropriately but are constitutionally small.¹ FGR is sometimes defined as SGA with abnormal Doppler indices such as umbilical artery (UA) pulsatility index (PI) above the 95 th centile or mean uterine artery (UtA) PI above the 95 th centile.¹ Bloodstream in the umbilical cord is typically high flow and low resistance with the increased end diastolic flow as gestational age advances.² Color Doppler evaluation plays an imperative role in pregnancy and widely acknowledged functional methods of evaluating fetal wellbeing. Flow velocity waveforms provide essential information from the early stages of pregnancy to term. Umbilical arterial Doppler waveforms reflect the status of the placental course, and an increase in end-diastolic stream that is seen with advancing gestation is a direct result of an increase in the number of tertiary stem villi that takes place with placental maturation.³ Diseases that obliterate small muscular arteries in placental tertiary stem villi result in a progressive decrease in end-diastolic flow in the umbilical arterial Doppler waveforms until absent, and then reverse flow during diastole is noted.⁴ Reversed diastolic flow in the umbilical arterial circulation represents an advanced stage of placental compromise, and is associated with more than 70% of placental arterial obliteration.⁵ The absent or reversed end diastolic flow in the umbilical artery is commonly associated with severe intrauterine growth restriction and oligohydramnios.⁶ The cerebral circulation is normally a pronounced impedance circulation with the continuous forward flow throughout the cardiac cycle.⁷ The middle cerebral artery (MCA) is the most accessible, cerebral vessel to ultrasound imaging in the fetus, and it brings more than 80% of cerebral blood flow.⁸

Barcelona staging gives information that how frequently we have to monitor in each stage, at what period of gestation we have to terminate the pregnancy and by what mode (induction of labour or cesarean section). As there is no standard protocol for IUGR babies. We do early intervention to prevent still birth, but that will result in preterm delivery. Barcelona staging can be used in all hospitals as a uniform protocol for management of IUGR babies. It will help obstetrician to make decision on till how long pregnancy can be continued, monitoring frequency and mode of delivery. This study shows the perinatal outcome of using Barcelona staging

Material and Methods

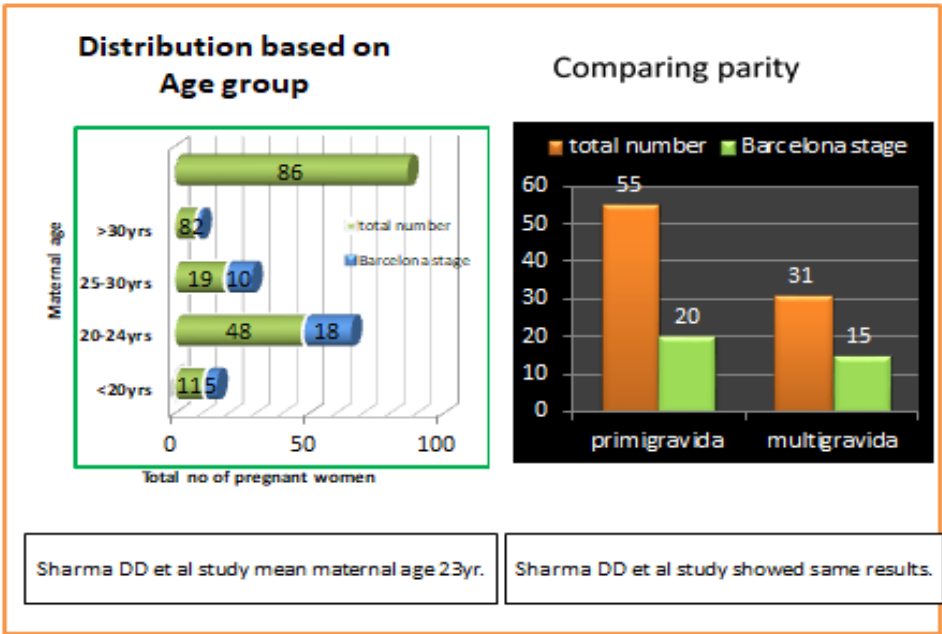
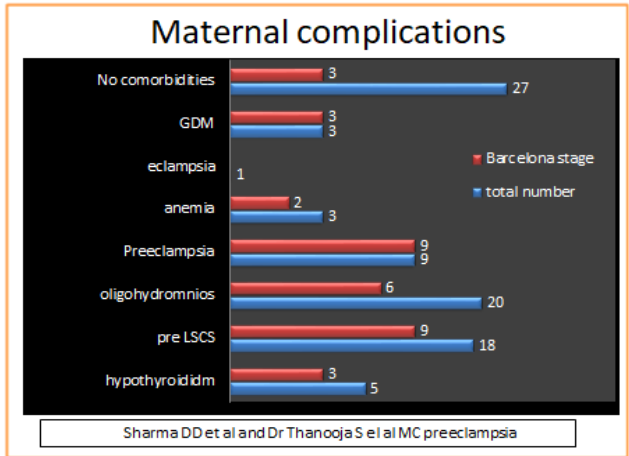
Study Design: Record Based Study, Study Period: Records from 7 June 2021 to 7 March 2022 will be analysed. The study will be conducted after ethical committee clearance for period of 1 month. Inclusion Criteria: 1. All Record of pregnancies diagnosed as growth restriction from 28WOG by ultrasonography Exclusion Criteria: Unbooked cases where there is no ultrasonography to calculate exact period of gestation. Sample Size-86 (based on the number of cases available during study period) Sampling Method: Data will be collected from all the available records. Method of Data Collection (study tools): Data will be collected from antenatal case sheets. Demographic details, Primigravida or multi gravida, associated with any maternal complications, at what weeks of gestation pregnancy termination was done, mode of delivery (induction of labour or cesarean section), Birth weight, APGAR score, need of neonatal care unit admission. All these details will be analysed with respect to each Barcelona staging and each staging is compared to know the outcome. Statistical analysis is

done through SPSS(statistical Package for social sciences)version 20 trial.(IBM SPAS statistics(IBM corp.released 2011) was used to perform the statistical analysis.

Results

- Out of 86 pregnancies,35 cases of abnormal doppler velocimetry were included under Barcelona staging and outcome was studied.
- 51.4% were of age group -20-24yrs.
- 57.1% were primigravidas.
- Most common associated risk factor is Preeclampsia and oligohydromnios.
- 68.5%,2.8%,14.2%,14.2% were in Barcelona stage 1 ,2,3 and 4 respectively.
- Maternal and perinatal outcome were good in stage 1.
- Perinatal death 3 cases.

Stage	Pathophysiological correlation	Criteria	
I	Very small EFW or moderate placental insufficiency	EFW<P3 EFW<P10+ any of these criteria 1. CPR<P5 2. PI MCA<P5 3. PI UTA >P95	24
II	Severe placental insufficiency	EFW <P10+AEDF IN UA	1
III	Low suspicious of fetal acidosis	EFW<P10+any of these criteria • Reversal diastolic flow in UA • PI-DV>p95 or absent diastolic flow in the DV	5
IV	High suspicious of fetal acidosis	EFW<P10+Any of these criteria • Reverse diastolic flow in the DV • Pathological CTG	5

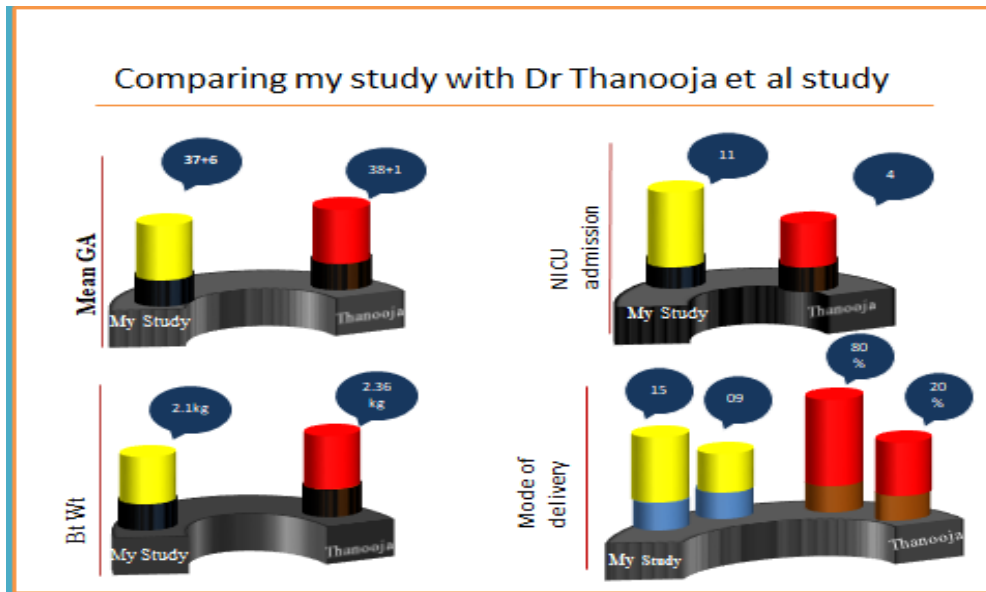


STAGE -1

Parameters	Mean GA	Mean BW	Mode of delivery	NICU Admission
1	37.6WOG	2.1KG	<ul style="list-style-type: none"> • Vaginal-15 Spontaneous-3 Induced-12 • C-section-9 	11
	<ul style="list-style-type: none"> • Previous LSCS 6 • Oligohydromnios 4 • Preeclampsia 1 No associated risk 6 			<ul style="list-style-type: none"> • Observation 1 • Weak cry 1 • LBW 7 • Grunting 1 • Chest retractions 1

STAGE -2

Sl no	GA	Risk associated	Delivery outcome	sex	BW (kg)	APGAR	NICU admission
1	28+6wog	preeclampsia	induced	boy	0.70	• 7/10	NICU(LBW)

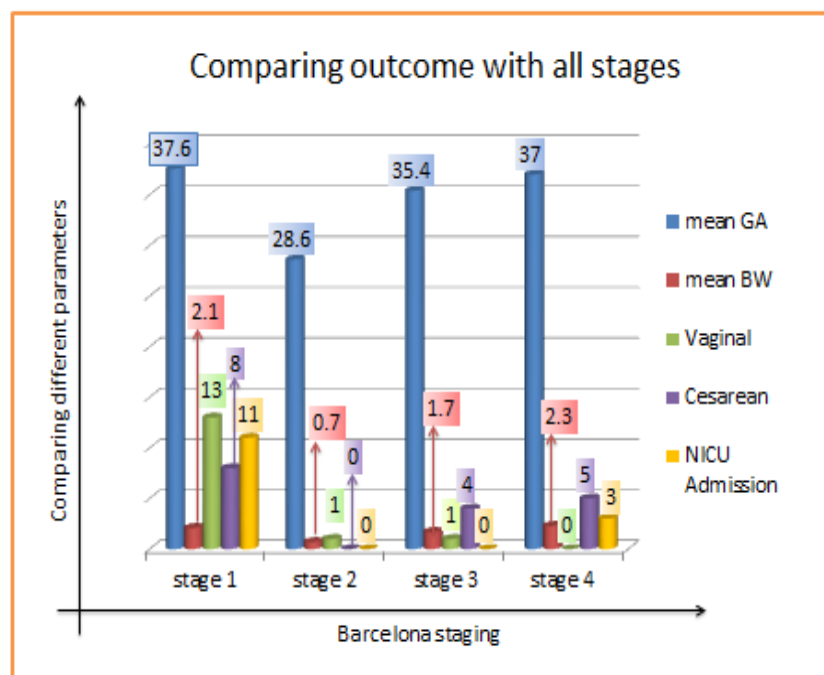


STAGE 3

SI no	GA (WOG)	RISK ASSOCIATED	DELIVERY OUTCOME	SEX	BT WT (Kg)	APGAR	NICU ADMISSION
1	33+5	OLIGOHYDROMNIOS (AFI-7CM) HYPOTHYROID	EMER LSCS	BOY	1.5	8/10	PRETERM
2	29	PREECLAMPSIA	INDUCED	GIRL	540	DIED	-
3	37+2	PREECLAMPSIA	EMEG LSCS	BOY	1.94	8/10	TACHYPNEA
4	38+3	GDM	EMER LSCS	GIRL	2.34	8/10	CHEST RETRACTIONS
5	39+4	OLIGOHYDROMNIOS (1.8CM)	EMER LSCS	BOY	1.98	9/10	LBW

STAGE 4

SI no	GA (WOG)	RISK ASSOCIATED	DELIVERY OUTCOME	SEX	BT WT (Kg)	APGAR	NICU ADMISSION
1	40+1	OLIGO(5.4CM)	EMER LSCS	BOY	2.34	9/10	MOTHERS SIDE
2	40	-	EMER LSCS	BOY	2.4	8/10	TACHYPNEA
3	37	OLIGO(5CM) GDM PRE LSCS	EMER LSCS	GIRL	2	9/10	OBSERVATION
4	37	GDM PREECLAMPSIA PRELSCS	EMER LSCS	GIRL	2.48	9/10	MOTHER SIDE
5	35+4	-	EMER LSCS	BOY	2.3	8/10	TACHYPNEA



CONCLUSION

FGR is an important cause of still birth, perinatal and neonatal morbidity and mortality. Early prediction and preventive strategies, timely diagnosis can be made by Barcelona staging. Management using Barcelona staging will be helpful for Obstetrician to determine the proper monitoring and timing of delivery. This can improve perinatal outcome.

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