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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/16505
DOI URL: http://dx.doi.org/10.21474/IJAR01/16505

RESEARCH ARTICLE

TO COMPARE THE FETAL OUTCOMES IN DICHORIONIC AND MONOCHORIONIC TWIN PREGNANCIES

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Manuscript Info

Manuscript History
Received: 25 January 2023
Final Accepted: 27 February 2023
Published: March 2023

ABSTRACT

INTRODUCTION

Twin pregnancy are associated with many adverse perinatal outcome. Monochorionic twin pregnancies are greater risk for growth abnormalities and other complications. This study aims to outline the obstetric problems faced by twins and also to determine the influence of chorionicity on perinatal outcome in twins.

OBJECTIVE

To compare the fetal outcomes in dichorionic and monochorionic twin pregnancies

METHODOLOGY:

A prospective study conducted in SAT, government medical college Trivandrum. All twin pregnancies, registered in the department of Obstetrics were studied over a period of one year. 180 cases were followed up from first trimester. Antepartum complications and perinatal outcome were compared between monochorionic and dichorionic twins. Data was analysed by statistical software(SPSS)

RESULTS

180 cases of twins studied, 90 dichorionic and 90 monochorionic. Preterm delivery was higher in MC twins which was statistically significant. Mean gestational age for MC- 32.21weeks & 35.81weeks for DC twins. Low APGAR scores< 7 for twin1 of MC 16.62 & DC 1.11% .Low APGAR scores in twin2 of MC was 34.7% and DC was 1.12%. Risk of NICU admission for twin1MC was25.5% and twin2 was52.2% compared to DCtwin1 was6.66% and twin2 was22.2%. Single fetal demise(13.3%), both fetal demise(10%),congenital anomalies(3.33%), selective fetal growth restriction(30%), TTTS(13.33%),one twin NND(10%) , both twin NND(6.66%) were more in MC group in comparison to DC group where it was (2.22%, 0% 0%, 6.66%, 0%, 0% 1.11%) respectively.

CONCLUSION

Monochorionic twin was significantly associated with adverse perinatal outcome when compared to dichorionic twin. Hence early diagnosis of chorionicity and referral to a tertiary centre with fetal medicine and neonatal intensive care unit is essential in reducing morbidity and perinatal mortality among MC twins.

Keywords: Monochorionic, Dichorionic, Pregnancy outcome, Perinatal outcome.

Introduction:-

Twins occur spontaneously in approximately one out of every 80 livebirths. Zygosity refers to type of conception and the chorionicity refers to placentation. The rise in assisted reproduction due to infertility has increased the rate of dizygotic twinning. Twin mortality compared with mortality in singletons is higher. Monochorionic twins are at increased risk for developmental and acquired birth defects that do not occur in the absence of monochorionic placentation(3). The excess morbidity and mortality in monochorionic compared with dichorionic twins is mainly related to the angioarchitecture of the monochorionic placentation, with the almost ever-present (96%) vascular anastomoses, which are virtually not exist in dichorionic twin pregnancies. TTTS remains one of the most challenging problems in contemporary obstetrics and is considered by many to be an enigmatic.

Fetal complications include growth discordance,selective fetal growth restriction, low birth weight,Intrauterine fetal demise of one or both twins, Congenital anomalies, Twin-to-twin transfusion syndrome, Twin reversed arterial perfusion(TRAP) syndrome are more in monochorionic twins. The most frequentcause of prenatal death is hypoxia,while postnatal death results most frequentlyfrom respiratory distress syndrome (80).Early neonatal mortality in twin pregnanciesis four times higher (P <0.001) than insingleton pregnancies (18.2/1000 vs. 4.7/1000) (16). Regarding perinatal outcomes, monochorionic twins are at significantlyincreased risk offetal prematurity and low birth weight,sequelae to preterm labour early preterm delivery <34 and <28 weeks, admission to the NICU,delivery at an earlier mean gestational age, and longer mean hospital stay than Dichorionic twins.

Methods:-

Aprospective study on twin pregnancies which was conducted at SAT hospital, medical college Trivandrum over a period of one year. A detailed history was taken, clinical examination and analysis of investigation including ultrasound were taken. Consent was obtained from the patients included in the study. Institutional ethical committee clearance was also obtained.

Inclusion Criteria

There were 180 cases of twin pregnancies, who had a first trimester detection of chorionicity by ultrasound, who subsequently delivered in the same hospital, were enrolled into the study of which 90 cases were monochorionic and 90 cases were dichorionic twins

Exclusin criteria

Patients who are not willing to participate in the study and whose chorionicity was not commented by the ultrasound scan were excluded from the study.

These patients were followed from antenatal period upon their registration in OP, and after admission, through their delivery and until discharge from hospital. The antepartum complications, mode of onset of labour, mode of delivery, condition of the newborns and perinatal outcome was studied with special reference to chorionicity. Chorionicity was diagnosed on the basis of first or second trimester ultrasound and confirmed by examination of placenta postnatally

Chorionicity was classified as dichorionic diamniotic (DCDA), monochorionic diamniotic(MCDA) and monochorionic monoamniotic (MCMA)

Statistical Analysis

Statistical test of significance-chi-square test for categorical variables. P<0.05 was taken as significant. Data analysis entered in excel and analysis done using statistical software(SPSS trial version)

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Results:-

Table 1:- Antepartum Fetal outcoes in dichorionic and monochorionic twin pregnancy.

SL.NO	VARIABLES	MONOCHORIONIC	DICHORIONIC	P VALUE
	1 TRIMESTER			
1	ABORTION	3(3,33%)	0	0.081
	2ND AND 3RD TRIMESTER			
	ANTEPARTUM			
2	CONGENITAL ANOMALIES	3(3,33%)	0	0.081
3	TTTS	12(13.3%)	0	0.000
4	FGR IN ONE TWIN	27(30%)	6(6%)	0.001
5	FGR IN BOTH TWINS	6(6%)	3(3.33%)	0.305
6	ABNORMAL DOPPLER	12(13.3%)	3(3.33%)	0.015
7	SINGLE FETAL DEMISE	12(13.3%)	2(2.22%)	0.005
8	BOTH FETAL DEMISE	9(10%)	0	0.002

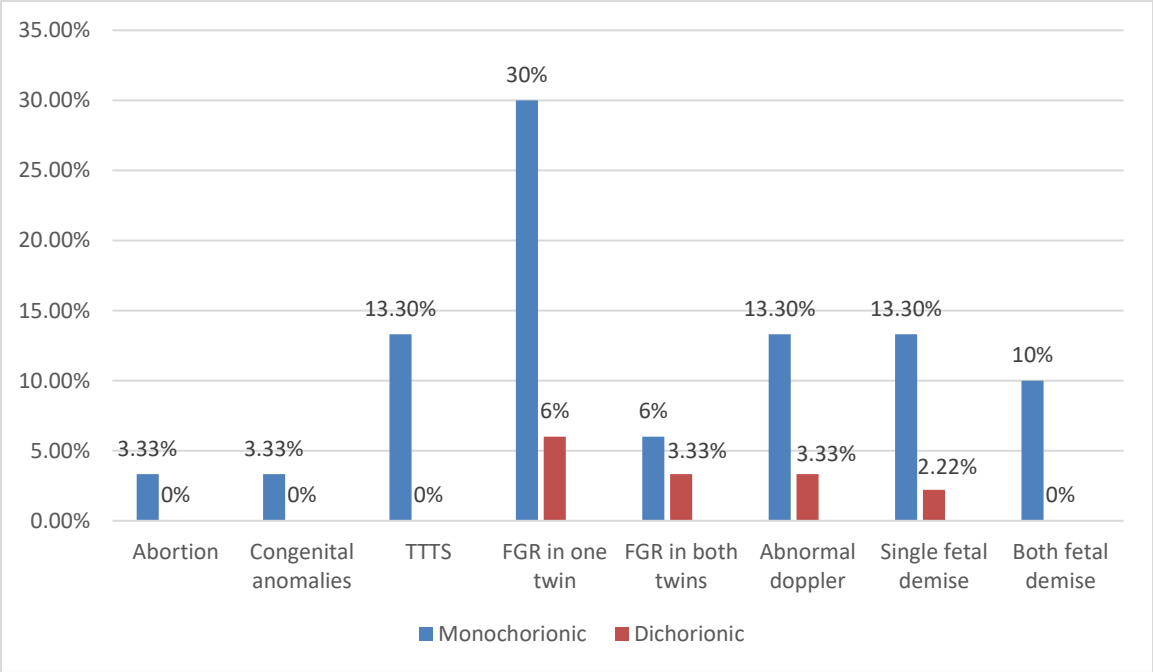

Figure 1. Antepartum Fetal outcomes in dichorionic and monochorionic twin pregnancy

Table 2. Intrapartum Fetal outcomes in dichorionic and monochorionic twin pregnancy

	INTRAPARTUM			
1	PPROM	5(5.6%)	6(6.66%)	0.756
2	CORD PROLAPSE	1(1.11%)	0	
3	GESTATIONAL AGE AT DELIVERY(MEAN)	32.21	35.81	0.001

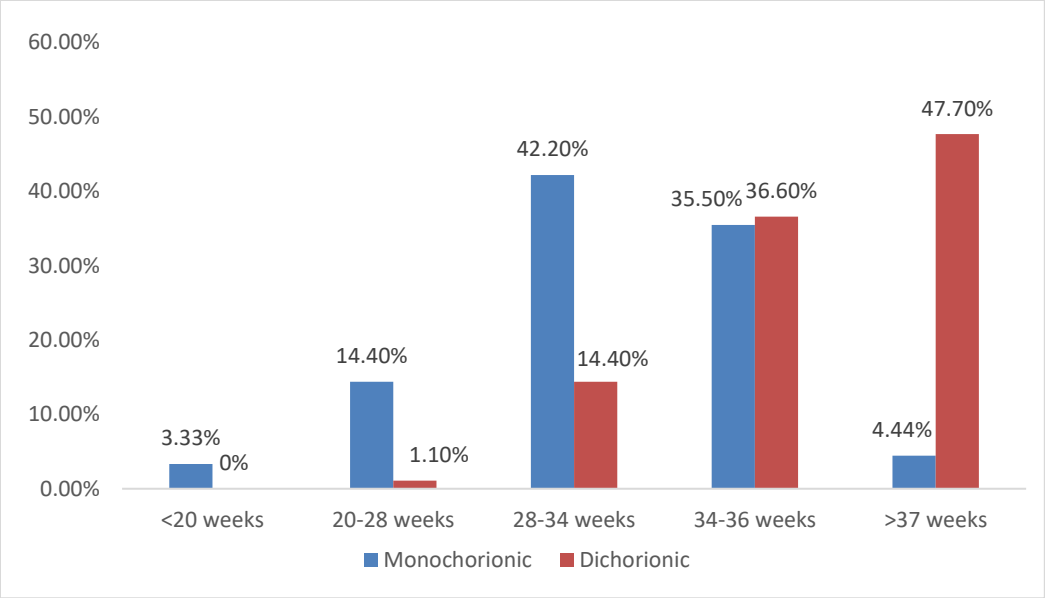

Figure 2a. Gestational age at the time of delivery

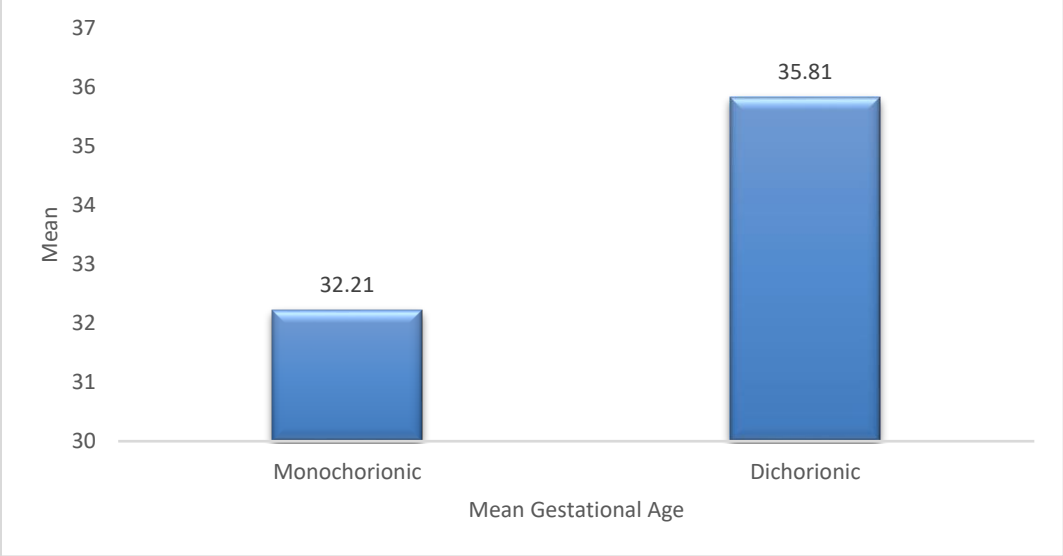

Figure 2b. Mean gestational age at the time of delivery

Table 3. Postpartum Fetal outcomes in dichorionic and monochorionic twin pregnancy

	POSTPARTUM			
1	BIRTH WEIGHT(MEAN)			
	TWIN 1	1.79	2.16	0.001
	TWIN 2	1.47	2.04	0.001
2	LOW APGAR(<7)			
	TWIN 1	13(16.62%)	1(1.11%)	0.001
	TWIN 2	24(34.7%)	1(1.11%)	0.001

3	NICU ADMISSION			
	TWIN 1	23(25.5%)	6(6.66%)	0.001
	TWIN 2	47(52.2%)	20(22.2%)	0.001
4	ONE TWIN NND	9(10%)	0	0.002
5	BOTH TWIN NND	6(6.66%)	1(1.11%)	0.054

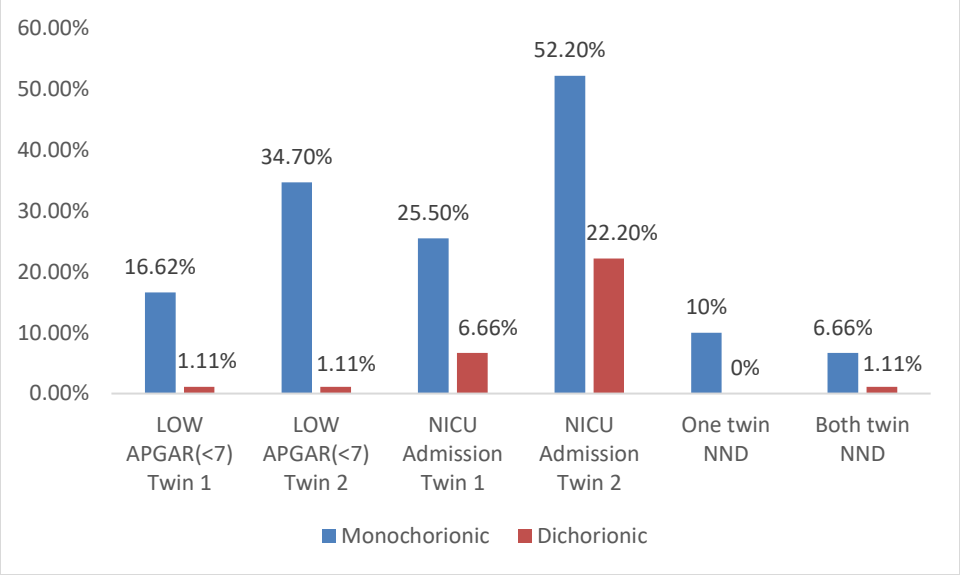

Figure 3. Postpartum outcome

Table 4. Birth weight of twin one

Birth weight Twin 1	Chorionicity		Total	Fisher's exact test	p value
	Monochorionic	Dichorionic			
<1 kg	15(16.6%)	1(1.11%)	16(8.9%)	25.120	0.001*
1-1.49 kg	12(13.3%)	3(3.33%)	15(8.3%)		
1.5-1.99 kg	25(27.7%)	23(25.5%)	48(26.7%)		
2.0-2.49 kg	35(38.8%)	57(63.3%)	92(51.1%)		
2.5-2.99 kg	3(3.33%)	6(6.66%)	9(5.0%)		
Total	90(100%)	90(100%)	180(100%)		

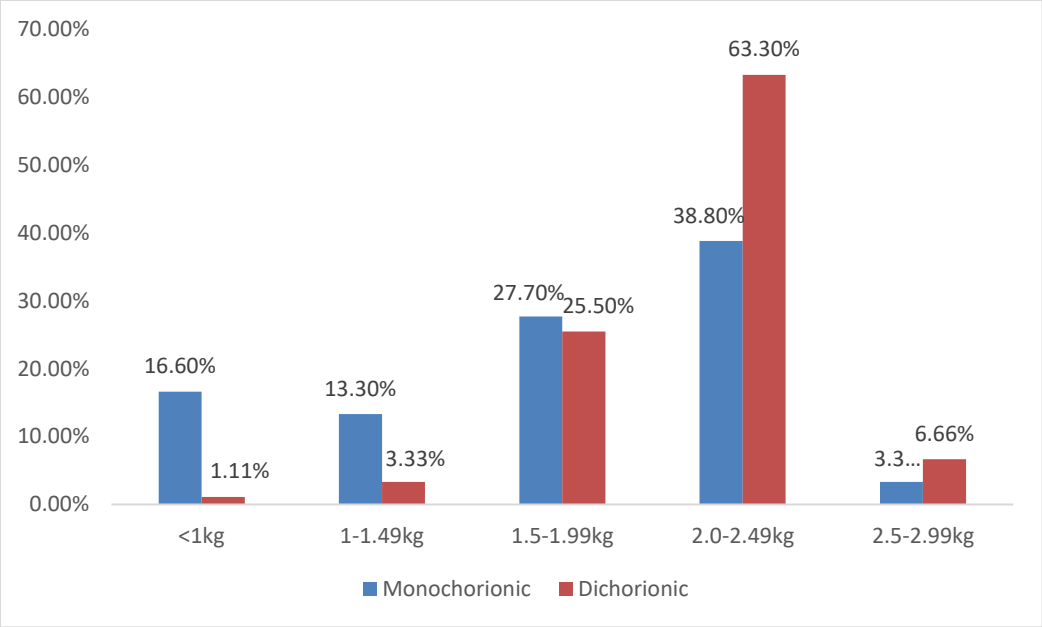

Figure 4. Birth weight of twin one

Table 5. Birth weight of second twin

Birth weight Twin 2	Chorionicity		Total	Fisher's exact test	p value
	Monochorionic	Dichorionic			
<1 kg	27(30.0%)	2(2.22%)	29(16.1%)	48.006	0.001*
1-1.49 kg	24(26.6%)	9(10.0%)	33(18.3%)		
1.5-1.99 kg	18(20.0%)	23(25.5%)	41(22.8%)		
2.0-2.49 kg	18(20.0%)	46(51.1%)	64(35.6%)		
2.5-2.99 kg	3(3.33%)	10(11.1%)	13(7.2%)		
Total	90(100%)	90(100%)	180(100%)		

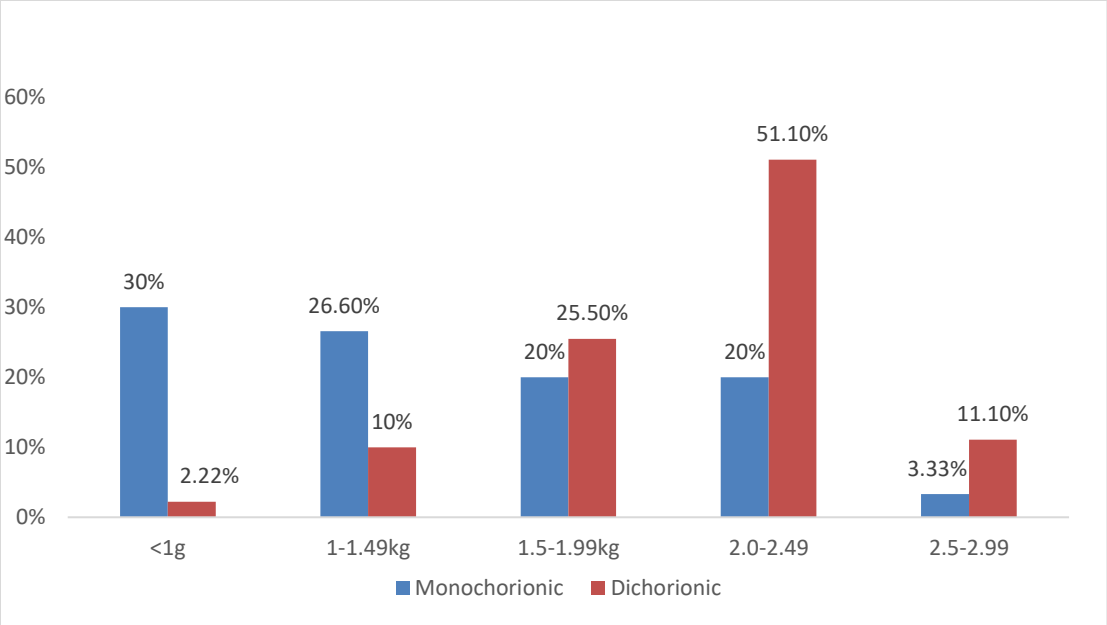

Figure 5. Birth weight of second twin

Table 6. Mean birth weight

Variable	Monochorionic			Dichorionic		
	N	Mean	SD	N	Mean	SD
Birth weight twin 1	89	1.79	0.588	90	2.16	0.345
Birth weight twin 2	89	1.47	0.648	90	2.04	0.415

Discussion:-

Twin gestation is a high risk pregnancy with unique maternal and fetal complications. Among the twin pregnancy monochorionic twins have increased risk of complications and poor perinatal outcome due to imbalance in placental sharing. Fetal complications like abortion, congenital anomalies, selective intrauterine growth restriction, twin–twin transfusion syndrome, single fetal demise, prematurity, low birth weight are all higher in monochorionic twins than dichorionic twins.

In this study 2.8% of twin gestations were monoamniotic twins that is 5 in number of which 2 had intrauterine fetal demise, L Cordero, A Franco(53) et al also mentioned thatCord entanglement, a condition unique to monochorionic monoamniotic twin pregnancies,occurs in 42 to 80% of the cases and it has been traditionallyrelated to high perinatal mortality.

In this study, there was significant association between the parity and chorionicity. Majority of women in this study population were primigravida and among the multigravida dichorionic twin gestations were more when compared to monochorionic

In Dichorionic twins 24.4% had family history of twinning compared to monochorionic 5.5%.

37.2% of twinning were infertility treated among 180 twins. 47.7% of dichorionic twins were infertility treated compared to monochorionic 26.6% and 26.1% had twinning as a result of ovulation induction, 11.1% resulted from assisted reproductive techniques like IUI 5% and IVF 6.1% Among the ovulation induction 66.7% were dichorionic.

Jin Liang Zhu, Olga Basso(10) et al also concluded thatthe prevalence of DZ twinning substantiallyincreased with infertility treatment, whereas theprevalence of MZ twinning remained constant.

In this study , the most frequent combination of presentation was cephalic-cephalic 51.7% followed by breech - breech 21.1% and breech-cephalic(15.6%) , cephalic -breech 6.1%. 4.4% presented as transverse-breech, 1.1% presented as cephalic-transverse. The frequency of presentation was not affected by Chorionicity.

Less than 20 weeks , there were 3 cases of spontaneous abortions and all of them were monochorionic twins. David M. Sherer, M.D et al (124) also mentioned that,higher rate of fetal loss is observed in monochorionic compared with dichorionicpregnancies prior to24 weeks' gestation.

In this study, 3 cases of congenital anomalies were there, all of them are monochorionic twins. The congenital anomalies were ventricular septal defect, patent ductus arteriosus , congenital diaphragmatic hernia. S.V. Glinianaia, J. Rankin et al (24) also found that the rate of congenital anomalies was nearly doubled in MC compared with DC twin pairs.

In this study, there was 13.33% of twin pregnancies had twin – twin transfusion syndrome , all the twins were monochorionic.

Sharon A. Durbin et al (54) also mentioned that the TTTS is the complication result of an imbalanced intertwin blood exchangethrough the placental interconnection. This placentalsharing allows the transfusion of blood from the donor (intrauterine growth-restricted, oligohydramnios) twin tothe recipient (macrosomic, polyhydramnios) twin. This leads to high risk of perinatalmortality and morbidity. Severe TTTS typically presents at 16 to 24 weeks' gestation with the anhydramnios/ polyhydramnios sequence.

In this study, MC twins 30% had selective intrauterine growth restriction when compared to 6.66% DC twins that was statistically significant.

D. Buca1, G. Pagani et al(107) also said that management of selective IUGR in MC twin pregnancy was challenging and based on expert opinion and this, in turn, had a profound influence on the occurrence of any adverse perinatal outcome.

In this study, monochorionic twins 13.3% had single fetal demise when compared to 2.22% dichorionic twins that was statistically significant.Isaac Blicksteinet al (123) also said that risk of single fetal demise was more when

compared to dichorionic twins. The causes may be twin–twin transfusion, placental insufficiency, intrauterine growth restriction related to pre-eclampsia, velamentous insertion of cord, cord stricture or true knot, cord around the neck, and congenital abnormalities(121)

In this study , 5% were both fetal demise out of 180 twin pregnancies, all of them were monochorionic twins when compared to dichorionic twins that was statistically significant.

David Danon, MD et al (70) also concluded that fetal mortality in "apparently" uncomplicated monochorionic–diamnioticpregnancies remains high across the third trimester even with intensive monitoring.

In this study, delivery after 37 weeks was 26.1% compared to before 37 weeks the delivery was 73.9%. less than 28 weeks 10.6% were delivered, the majority of twins were monochorionic compared to dichorionic twins. The rate of prematurity (< 37 weeks) were significantly increased in monochorionic twins 95.4% compared to dichorionic twins 52.1%.

In this study, mean gestational age of delivery for monochorionic twins was 32.21weeks whereas 35.81 weeks for dichorionic twins.

Amanda Roman1, Gabriele Saccone et al (32) identified that the monochorionic twin pregnancies had a higher rate of spontaneous preterm birth and fetal indications for pretermdelivery compared with dichorionic pregnancies. LekshmiMurukesan et al (95) also concluded that mean gestational age for monochorionic was 33.2 weeks whereas in dichorionic, it was 35.6 weeks

In this study, , low birth weight were more in monochorionic than dichorionic twins. 16.6% of MC twin1 had extremely low birth weight (<1 kg), which was statistically significant when compared to DC twin1 1.1%. 30% of MC twin 2 had extremely low birth weight (<1 kg), when compared to DC twin 2 2.22% that was statistically significant. Low birth weight was associated with second of twin when compared to first of MC.

In this study, low APGAR scores < 7 , were more in MC twins compared to DC twins. Low APGAR scores in twin 1 of MC was 16.62% whereas twin 1 of DC was 1.11% which was statistically significant. Low APGAR scores < 7 in twin 2 of MC was 34.7% and twin 2 of DC was 1.12% that was also statistically significant. Low APGAR scores were more associated with second twin MC 34.7% when compared to first twin MC 16.62%.

Zehra Nihal Dolgun et al (41) also found that growth restriction and earlier occurrence of the delivery will result in worse Apgar scores.

NICU admission for twin 1 was 16.1% and twin 2 was 37.2% out of 180 twins. Among the twin 1 of MC, 25.5% needed NICU admission and 6.66% of twin 1 DC needed NICU admission that was statistically significant. 52.2% of twin 2 of MC needed NICU admission when compared to 22.2% of twin 2 of DC that was also statistically significant. The leading causes for NICU admission for twin 1 and twin 2 was found to be preterm care followed by RDS.

Hence the risk of NICU admission were more in monochorionic when compared to dichorionic twins. Study done by Dr.Mamta Ramteke et al (67) also concluded that NICU stay for monochorionic twins were more when compared to dichorionic twins.

In this study, 52.2% of twin pregnancies underwent caesarean delivery and 46.1% of twin pregnancies underwent vaginal delivery, 1.7% underwent caesarean delivery for second twin. Among the caesarean delivery, 51.1% of monochorionic underwent caesarean delivery compared to dichorionic 48.9%.

Lata Singh, Kiran Trivedi et al (15) also reported that the rate of cesarean section in the delivery of twin pregnancies is statistically higher than that in singleton pregnancies (32.67% versus 18.67%). The increase in the use of cesarean section to deliver twin pregnancies may be due to increased incidence of other obstetric indications for cesarean deliveries such as hypertensive disorders, malpresentation, cord prolapse, and premature rupture of membranes as observed in this study. Mode of delivery was not associated with any difference in outcome.

In this studyamong the like-sexed twins, both females was higher 75% compared to both males 25%.

In this study, all the twins were delivered within 30 minutes. 58.8% of monochorionic twins were delivered within 5 minutes and 60% of dichorionic twins were delivered within 5 minutes.Time interval between delivery of the babies was not found to be significantly affected by chorionicity. This was comparable with observations of LekshmiMurukesan et al (95)

In this study, one twin neonatal death in MC twin was 10% when compared to DC that was statistically significant. Both twin neonatal death in MC twin was 6.66% when compared to DC that was also statistically significant. Study done by Dr.Mamta Ramteke et al (67) also had results of the neonatal mortality and morbidity in twin deliveries is high in Monochorionic pregnancy as compared to Dichorionicpregnancy.

In this study, maternal complications include Spontaneous abortion, anaemia, hyperemesis gravidarum, gestational diabetes, preterm labour, gestational hypertension, preeclampsia, antepartum haemorrhage, caesarean delivery, postpartum haemorrhage were seen. The complications were not significantly affected by Chorionicity. Ebony B. Carter et al (47) also said that there are no significant differences in maternal outcomes by chorionicity.

In this study, there was adverse perinatal outcome in monochorionic twins when compared to dichorionic twins. Risk of abortion was more in monochorionic when compared to dichorionic twin pregnancy. Single fetal demise, both fetal demise, single neonatal death, both neonatal death all were statistically significant risk in monochorionic twins compared to dichorionic twins.

Selective intrauterine growth restriction, abnormal doppler, congenital anomalies, low APGAR scores, extreme preterm delivery, very low birth weight, NICU admission, prematurity all were more common with monochorionic twins than dichorionic twins.

Twin – twin transfusion syndrome had poor perinatal outcome. Dr.Mamta

Ramteke et al (67) also concluded thatthe neonatal mortality and morbidity is higher in Monochorionic pregnancy when compared to Dichorionic pregnancy

Liesbeth Lewi et al (2) also concluded that the Monochorionic twins with their single placenta and vascular anastomoses still compose the unique problems and chorionicity determination plays a key role in the appropriate management of these high-risk pregnancies.

Conclusion:-

Twin pregnancies are associated with poor perinatal outcome especially in monochorionic twins when compared to dichorionic twins. The early identification of Chorionicity by 11 + 0 to -13+ 6 weeks is essential to prevent perinatal complications. Every two weeks ultrasound examination of monochorionic twins and every four weeks for dichorionic twins up to 28 weeks then every two weeks until delivery, identification of early complication, management and optimal timing of delivery is recommended. Steps to prevent preterm delivery, intrapartum monitoring, availability of expert obstetrician to conduct twin delivery and good neonatal intensive care facilities are recommended to improve the perinatal outcome of twin pregnancy

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