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Original Research Article

Study on clinical profile, risk factors, morbidity and mortality patterns of intrauterine growth restricted babies admitted in neonatal intensive care unit of tertiary care hospital, Vijayapura

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ABSTRACT

Background: Intrauterine growth restriction (IUGR) is an important clinical problem associated with increased perinatal mortality and morbidity. The neonate may be either constitutionally small or small due to pathophysiological changes with maternal, placental or foetal factors involved. A foetus with IUGR has not achieved its genetic growth potential. In addition, emerging evidence suggests that they are also more likely than normal weight babies to suffer from degenerative diseases like hypertension, diabetes and cardiovascular diseases in adulthood.
Methods: This is a cross-sectional study carried out in the neonatal unit, tertiary care hospital, Vijayapura. This study was carried out between April 2022 to April 2024. 120 IUGR babies were included in this study.
Results: Of the 120 babies 22 (18.3%) have died in the hospital. 19 (15.5%) have been dischargedwith abnormal neurological examination and 79 (66.3%) have been discharged with goodcondition at discharge condition. Morbidity pattern of IUGR shows that hypoglycaemia (63.3%) and perinatal asphyxia (45.0%) are the commonest complication. Other commoner are sepsis (33.3%), hypocalcaemia (30.0%), hypothermia (28.3%) and thrombocytopenia (25.0%).
Conclusions: Perinatal asphyxia and meconium aspiration are significantly associated with abnormal neurological examination at discharge. Perinatal asphyxia, pulmonary haemorrhage and persistent PH are significantly associated with death during the hospital stay. 73 (77.5%) mothers had one or more risk factors. Malnutrition is the commonest (40.0%), other are anaemia (34.2%), pregnancy-induced hypertension (PIH) (18.3%), multiple gestations (8.3%) and lower age of the mother.

Keywords: Intrauterine growth restriction, Neonatology, Morbidity, Mortality, Metabolic

INTRODUCTION

The prevalent prenatal condition known as intrauterine growth restriction (IUGR) has serious long- and short-term effects that persist throughout adulthood.[1] Next to preterm birth, IUGR is the second leading cause of perinatal mortality.

After removing aneuploidic and anomalous babies, mortality rates are increased exponentially when compared to correctly growing babies, with perinatal mortality rates reaching as high as 120 per 1000 for all cases of IUGR. Growth constraint affects up to 26% of term stillbirths and 53% of preterm stillbirths. Intrapartum asphyxia affects up to 50% of survivors, raising the already significant danger of end-organ damage.

Definitions

Intrauterine growth restriction

Failure to achieve adequate intrauterine growth is defined as birth weight less than two standard deviations below the mean value for gestational age, or less than the 10th or 5th

percentile. The lower-than-normal rate of foetal growth in IUGR for the population and for the growth potential of a specific infant.[2]

Small for gestational age

A birth weight that is less than the 10th percentile on a population-specific birth weight vs. gestational age plot or more than two standard deviations below the mean is considered to be SGA for newborns. Broader definitions include growth characteristics that differ significantly even when they fall within the normal range, as well as anthropometric indexes that are below normal, like head circumference and length.

Consequently, SGA newborns are produced by IUGR. Normal but slower-than-average rates of foetal growth can give rise to SGA newborns. Prematurely sluggish foetal growth resulting from pathophysiologic disorders or illnesses can potentially give rise to SGA newborns. In the event if a child's weight falls inside the 25th percentile but its head circumference and length are within the 75th percentile, then the infant might be classified as "relatively" SGA. The weight/length ratio (also known as the Ponderal index, which is calculated by the given formula below.

$$Ponderal\ index = \frac{[(Weight(g)]}{[length(cm)]^3} \times 100$$

In this instance is less than usual, suggesting that the two main factors influencing weight adipose tissue and skeletal muscle grew at slower rates.

Symmetric and asymmetric IUGR

Disproportional/asymmetric or wasted IUGR

This is characterized by a normal height and head circumference (approximates to brain growth) and low weight for height and skin fold measurements. The ponderal index (PI) for such babies is less than 2. This kind of IUGR is generally assumed to be the result of poor fetal nutrition later rather than earlier in pregnancy.

Proportional/symmetric or stunted IUGR

This is characterized by proportionally low weight, height and head circumference. The PI for such babies is approximately 2-2.5. This is more likely to occur if the nutritional insult occurs earlier in gestation.

Brain and bodily growth are both limited, according to symmetric IUGR. Growing asymmetrically means that the head (and hence the brain) is not as free from constraints on growth as the body is. Brain development is deemed "spared" in these circumstances. Uncertainties surround the mechanisms that sustain brain growth at a rate higher than that of skeletal muscle and adipose tissue. A higher rate of cerebral blood flow in comparison to the umbilical and systemic circulations, which has been seen in some of these infants, may be a contributing cause.[3]

Factors associated with IUGR

Fetal

Factors include: chromosome abnormalities (autosomal trisomies); persistent infections in utero (syphilis, congenital rubella, cytomegalic inclusion disease); anomalies of birth syndrome combinations; radiation; pancreatic gestation in several; a lack of height; lack of insulin; deficiency of type I insulin-like growth factor; and an infection, such as rubella, malaria, toxoplasmosis, or CMV.

Placental

Factors include: diminished placental mass, cellularity, or both; diminished surface area infarction due to villous placentitis (bacterial, viral, or parasitic); placental detachment from tumor (chorioangioma, hydatidiform mole); and transfusion-related twin syndrome.

Maternal

Factors include: toxicology; renal dysfunction; hypoxaemia (cyanotic heart disease or lung illness at high altitudes); undernourishment; persistent disease sickle cell; anaemia; drugs and hazardous exposure (drugs, alcohol, tobacco, cocaine, antimetabolites, and cigarettes); hypertensive conditions diabetes pregestational; immunological conditions (APS, and SLE); and cardiac disease, such as congenital heart problems with complex cyanotic heart diseases brief time between pregnancies.

Socio-demographic

Factors include: residing at a high altitude living in a developing nation inadequate socioeconomic standing; maternal age extremes (<16 or >35); and low height-to-weight ratio of mother's low weight of the mother at delivery maternal small stature.

Aim and objectives

Aim and objectives were to study clinical profile of IUGR babies admitted in sick neonatal intensive care unit of tertiary care hospital, Vijayapura; and to find out maternal and fetal risk factor and their association with morbidity and mortality pattern of IUGR babies.

METHODS

Method of data collection

Among all the IUGR babies admitted in NICU during the above study period, the 120 babies who satisfied the Inclusion criteria were selected by systematic random sampling. Informed consent of their parents was taken

after explaining in detail about the method and procedures involved in the study in their vernacular language.

Study design

It was a cross sectional study.

Place of study

The study was conducted at the neonatal intensive care unit of tertiary care hospital, Vijayapura.

Study period

The study was called in between April 2022 to April 2024.

Sample size

120 IUGR babies were included in the study, where p is prevalence, q is 1-p, and d is error allowed (20% of p).

$$Sample\ size\ (n) = 4pq/d^2$$

Inclusion criteria

Newborns with IUGR defined by birth weight less than 10^{th} percentile were included.

Exclusion criteria

Newborns with chromosomal abnormalities and congenital anomalies were excluded.

Laboratory investigations

Laboratory investigations included complete blood count (CBC) - hemoglobin (Hb), packed cell volume (PCV), total count (TC) and differential count (DC), platelet count, erythrocyte sedimentation rate (ESR), blood sugar, urea, serum creatinine, serum calcium, chest X-ray, total and direct bilirubin (only for icteric babies), sepsis screening (only for the suspected sepsis babies) - peripheral smear for band forms and toxic granules, blood culture and sensitivity, and cerebrospinal fluid (CSF) analysis with culture and sensitivity.

CBC

Hemoglobin <13 mg/dl was considered as anemia, PCV >65% was taken as polycythemia, WBC count <5,000/cu.mm or >20,000/cu.mm was taken as abnormal and considered as suspicious of sepsis, differential count mainly to find out neutropenia which is indicative of sepsis, absolute neutrophil count less than 2000 was considered as neutropenia, platelet count <1,00,000 was considered as thrombocytopenia, micro ESR >15 mm at one hour was considered as sepsis, blood sugar <45 mg/dl in one or more occasions were considered as hypoglycemia, blood urea >40 mg/dl associated with serum creatinine >1 mg/dl was considered as acute renal failure, serum calcium <7 mg/dl was considered as hypocalcaemia.

Chest X-ray

Chest X-ray was done in all babies.

Total and direct bilirubin

Total and direct bilirubin were taken for only the clinical icteric babies and categorized as having hyperbilirubinemia based on bilirubin nomogram.

Peripheral smear

Presence of band forms and toxic granules in peripheral smear study was considered as abnormal and considered as sepsis.

Blood culture and sensitivity

It was done only in the cases of suspected sepsis. For the blood culture, 1 ml of blood was drawn form a peripheral vein. This was then incubated at 37°C under aerobic condition and subculture was made on MacConkey agar media after 24 hours of incubation. If any growth occurred at 48 hours, it was again sub-cultured in MacConkey agar. Cultures were taken as sterile if no growth occurred at 96 hours. Anaerobic cultures were not done.

CSF analysis and culture

It was done only in the cases of suspected sepsis. CSF was obtained by lumbar puncture performed aseptically with a24-gauze disposable needle. Sample was transported promptly to the laboratory for analysis and culture and sensitivity.

Outcome measures

The following outcome measures were quantified in the study: immediate complications, condition at discharge, and risk factors associated with IUGR–maternal risk factors associated with IUGR-fetal.

Maternal risk factors

The socio-demographic and antenatal characteristics of the mothers were analysed and the following maternal risk factors associated with IUGR were considered in this study: lower age (≤25) (mean); rural residence; lower education (≤primary school); lower income (monthly family income ≤Rs. 3000) (mean); anemia (Hb ≤10 mg/dl); lower weight gain (≤10 kg); malnutrition (pre-pregnancy BMI ≤8.5); multiple gestations; heart disease (RHD and CHD); pulmonary disease (bronchial asthma and COPD); pregnancy induced hypertension (BP>140/90 mm Hg); diabetes mellitus (by history); tobacco use (using

tobacco more than 2 years); long infertility (infertility >8 years) and UTI (from ANC record).

Fetal risk factors

The fetal risk factors considered for analysis of this study were: gender, weight, gestational age (by LMP and New Ballard scoring), asymmetrical IUGR (Ponderal index ≤2), and mode of delivery.

Immediate complications

Immediate complications include - metabolic: hypoglycemia and hypocalcaemia; hematological: neutropenia, polycythemia, anemia and thrombocytopenia; organ dysfunction: acute renal failure, perinatal asphyxia, meconium aspiration, pulmonary hemorrhage, persistent pulmonary hypertension and respiratory distress syndrome; and infection/others: sepsis, meningitis, hypothermia and hyperbilirubinaemia.

Perinatal asphyxia was considered when Apgar score was ≤3 at 5 minutes and requiring bag and mask ventilation; seizures within 24-48 hours after birth in asphyxiated babies. The staging was done using Sarnat and Sarnat stages of hypoxic ischemic encephalopathy.[4]

Meconium aspiration syndrome was considered in babies born with meconium-stained amniotic fluid associated with early onset respiratory distress (defined by Downes scoring) with poor lung compliance and hypoxemia with characteristic radiographic features in lungs (hyperinflation of lung fields with flattened diaphragms and coarse irregular patchy infiltrates). Pulmonary hemorrhage was diagnosed by gross bloody secretions in the endo tracheal tube accompanied by respiratory decompensation requiring increased respiratory support.

Persistent pulmonary hypertension was diagnosed by cyanosis with severe illness by clinical exam and prominent precordial impulse, loud S2 with single/narrowly split and/or a systolic murmur consistent with tricuspid regurgitation by cardiac examination and pre and post ductal difference in oxygen saturation ≥10% in the absence of structural heart disease and confirmed by echocardiography.

Respiratory distress syndrome was considered in preterm babies presenting with respiratory difficulty including tachypnoea (>60 breaths/minute), chest retractions results were analysed using the statistical test like simple proportions, Risk ratio and with or without grunting, cyanosis in room air that persisted or progressed over the Chi-square test. The p value <0.05 was considered as statistically significant. first 48-96 hours of life with the characteristic chest radiography (uniform reticulo-granular pattern and peripheral air bronchograms).

Hypothermia was considered when axillary temperature <36.5 ^{0}C.

Statistical analysis

Data were entered in excel spreadsheet and analysed using statistical package for the social sciences (SPSS) version 13.0. The results were analyzed using the statistical test like simple proportions, risk ratio and Chi-square test. The p value <0.05 was considered as statistically significant.

RESULTS

General characteristics

Of the 120 babies 66 (55.0%) are in the birth weight category of 2.0–2.5 kg and 38 (37.7%) are in the birth rate category of 1.5–2.0 kg. 10 (8.3%) babies are in the category of 1.0–1.5 kg and 6 (5.0%) babies are in less than 1.0 kg category.

Table 1: Distribution by birth weight.

Birth weight (gm)	Number	Percent
<1000	6	5.0
1000–1499	10	8.3
1500–1999	38	31.7
2000–2500	66	55.0
Total	120	100

Among the 120-study population 82 (68.3%) babies were classified as asymmetrical IUGR and 38 (31.7%) babies were classified as symmetrical IUGR as per Ponderal index (Table 2).

Table 2: Distribution of IUGR by Ponderal index.

Ponderal index group	Number	Percent
Asymmetrical (PI≤2)	82	68.3
Symmetrical (PI>2)	38	31.7
Total	120	100

Table 3 shows the distribution of various morbidity conditions of IUGR babies with their outcome. Perinatal asphyxia and meconium aspiration are significantly associated with abnormal neurological examination at discharge. Perinatal asphyxia, pulmonary hemorrhage and persistent pulmonary hypertension are significantly associated with death during hospital stay.

Maternal risk factors and mortality

Malnutrition and anemia have significant association (p value <0.05) as shown in Table 4.

There is a statistically significant association that the higher the number of maternal risk factors, higher the mortality (p value <0.001) (Table 5).

Weight ≤2 kg, preterm, and normal delivery have the statistically significant association with mortality (p value <0.05) (Table 6).

Higher the HIE stage, higher the mortality in IUGR. This association is also statistically significant (p value <0.001). In the category of HIE stage 3, all 4 have abnormal neurological examination, put on anti-epileptic drugs (AED) and having poor-feeding (Table 7).

Table 3: Morbidity pattern and outcome.

Complications	Good condition at discharge (n=79) (%)	Abnormal NE at discharge (n=19) (%)	P value	Dead (n=22) (%)	P value
Metabolic					
Hypoglycemia	52 (65.8)	8 (42.1)	0.057	16 (72.7)	0.541
Hyperglycemia	8 (10.1)	2 (10.5)	0.959	0 (0.0)	0.120
Hypocalcaemia	21 (26.6)	5 (26.3)	0.981	10 (45.5)	0.090
Hematological					
Neutropenia	4 (5.1)	0 (0.0)	0.317	2 (9.1)	0.480
Polycythemia	3 (3.8)	1 (5.3)	0.772	2 (9.1)	0.311
Anemia	20 (25.5)	4 (21.1)	0.156	4 (18.2)	0.482
Thrombocytopenia	20 (25.5)	2 (10.5)	0.165	8 (36.4)	0.318
Organ dysfunction					
Acute renal failure	14 (17.7)	4 (21.1)	0.736	4 (18.2)	0.960
Perinatal asphyxia	27 (34.2)	13 (68.4)	0.006	14 (63.6)	0.013
Meconium aspiration	7 (8.9)	9 (47.4)	0.000	4 (18.2)	0.215
Pulmonary hemorrhage	0 (0.0)	0 (0.0)	-	6 (27.3)	0.000
Persistent pulmonary hypertension	0 (0.0)	0 (0.0)	-	4 (18.2)	0.000
Infection/others					
Sepsis	24 (30.4)	8 (42.1)	0.328	8 (36.4)	0.594
Meningitis	2 (2.5)	2 (10.5)	0.114	2 (9.1)	0.163
Hypothermia	22 (27.8)	8 (42.1)	0.226	4 (18.2)	0.359
Hyperbilirubinaemia	10 (12.7)	4 (21.1)	0.348	6 (27.3)	0.097

Table 4: Factors associated with morbidity and mortality pattern.

Maternal factors	Death (n=22)	No death (n=98)	Odds ratio	95% CI	Chi^2 value	P value
Primigravida	16 (72.7)	66 (67.3)	1.29	0.46-3.62	0.240	0.624
Lower weight gain	14 (63.6)	62 (63.3)	1.02	0.39-2.66	0.001	0.974
Malnutrition	15 (68.2)	33 (33.7)	4.22	1.57-11.4	8.915	0.003
Anemia	14 (63.6)	27 (27.6)	4.60	1.74-12.2	10.40	0.001
PIH	6 (27.3)	16 (16.3)	1.92	0.65-5.66	1.438	0.230
Multiple gestations	2 (9.1)	8 (8.2)	1.13	0.22-5.71	0.020	0.887

Table 5: Number of maternal risk factors and mortality.

Number of maternal risk factors	Dead (n=22) (%)	Alive (n=98) (%)	Total (%)
No risk factor	6 (27.3)	21 (21.4)	27 (22.5)
One	5 (22.7)	51 (52.0)	56 (46.7)
Two	5 (22.7)	18 (18.3)	23 (19.2)
Three	4 (18.2)	8 (8.2)	12 (10.0)
Four	2 (9.1)	0 (0.0)	2 (1.7)
Total	22 (100)	98 (100)	120 (100)

Chi^2: 14.762, df: 4, p value: 0.005

Table 6: Fetal risk factors and mortality.

Fetal factors	Death (n=22) (%)	No death (n=98) (%)	Odds ratio	95% CI	Chi^2 value	P value
Sex-male	13 (59.1)	52 (53.1)	1.28	0.50–3.26	0.263	0.608
Weight ≤2 kg	15 (68.9)	39 (39.8)	3.24	1.11–9.76	5.850	0.015
GA – preterm	8 (36.4)	14 (14.3)	3.43	1.22–9.67	5.849	0.016

Continued.

Fetal factors	Death (n=22) (%)	No death (n=98) (%)	Odds ratio	95% CI	Chi^2 value	P value
Symmetrical IUGR	10 (45.5)	28 (28.6)	2.08	0.81–5.37	2.367	0.124
Normal delivery	18 (81.8)	54 (55.1)	3.67	1.16–11.63	5.343	0.021

Table 7: Perinatal asphyxia stages and outcome (n=54).

HIE stage	Dead (%)	Abnormal NE at discharge (%)	Good condition at discharge (%)	Total (%)
Stage I	0 (0.0)	0 (0.0)	21 (100)	21 (100)
Stage II	5 (25.0)	9 (45.0)	6 (30.0)	20 (100)
Stage III	9 (69.2)	4 (30.8)	0 (0.0)	13 (100)
Total	14 (25.9)	13 (24.1)	27 (50.0)	54 (100)

Chi^2:42.390, df: 4, p value: 0.000

DISCUSSION

General characteristics

Of the 120 IUGR babies under the study, 65 (54.2%) are male and 55 (45.8%) are female. Among their respective mothers, 82 (68.3%) mothers are primigravida and 28 (23.3%) are 2nd gravida mothers. The 3rd gravida mothers are 8 (6.7%) and only 2 (1.7%) are the 4th gravida mothers.

72 (60.0%) have been delivered by normal vaginal delivery and 10 (8.3%) have been delivered by assisted delivery. 38 (31.7%) have been delivered by caesarian section. 22 (18.3%) are preterm babies and 98 (81.7%) are term babies.

66 (55.0%) are in the birth weight category of 2.0-2.5 kg and 38 (31.7%) are in the birth weight category of 1.5-2.0 kg. 10 (8.3%) babies are in the category of 1.0-1.5 kg and 6 (5.0%) babies are in less than 1.0 kg category. 82 (68.3%) babies were classified as asymmetrical IUGR and 38 (31.7%) babies were classified as symmetrical IUGR as per Ponderal index.

Of the 120 IUGR babies 22 (18.3%) have died at hospital and 98 (81.7%) have been discharged. Of these 98 babies, 79 (66.3%) have been discharged with good condition and 19 (15.5%) with abnormal neurological examination.

Morbidity and mortality pattern

Regarding the complications, hypoglycemia (63.3%) and perinatal asphyxia (45.0%) are the commonest of the complications observed in this study.

Carbohydrate metabolism is seriously disturbed and these infants are highly susceptible to hypoglycemia as the consequence of diminished glycogen reserves and decreased capacity to gluconeogenesis.[5] IUGR infants frequently do not tolerate labor and vaginal delivery, and signs of fetal distress are common.

Other commoner are sepsis (33.3%), hypocalcemia (30.0%), hypothermia (28.3%) and thrombocytopenia (25.0%). Other complications are hyperglycemia (10-8.3%), neutropenia (6-5.0%), polycythemia (6-5.0%), anemia (24-20.0%), acute renal failure (22-18.3%), meconium aspiration (20-16.7%), pulmonary hemorrhage (6-5.0%), persistent pulmonary hypertension (4-3.3%) and meningitis (6-5.0%).

There are totally 22 preterm babies. Among them only 7 (31.8%) babies have respiratory distress syndrome. This is due to as McIntire et al explained.[6] In their study that in IUGR babies, accelerated fetal pulmonary maturation occurs secondary to chronic intra uterine stress.

Perinatal asphyxia and meconium aspiration are significantly associated with abnormal neurological examination at discharge. Perinatal asphyxia, pulmonary hemorrhage and persistent pulmonary hypertension are significantly associated with death during the hospital stay.

Factors associated with morbidity and mortality pattern of IUGR

Maternal factors

Malnutrition is the commonest (48–40.0%) maternal risk factor in this study. Malnutrition during uterine growth leads to the onset of stunting which is not completely reversed even with long term exposure to goodnutrition.[7] According to Harding, fetal nutrition is the end result of a precarious supply chain, of which maternal nutrition and intake during pregnancy is only the starting point.[8]

The other commoner maternal risk factors are anemia (41-34.2%), PIH (22-18.3%) and multiple gestations (10-8.3%). In a study done by Jones et al, anemia was observed in women who had adverse birth outcomes, 33.8% had moderate to severe anemia.[9] PIH results in decreased utero placental bold flow which results in impaired delivery of oxygen and other essential nutrients which in turn limit organ growth and musculoskeletalmaturation.[10] Others factors found in this study are heart disease (8-6.7%), pulmonary disease (8-6.7%), diabetes mellitus (2-1.7%),

tobacco use (4-3.3%), long infertility (4-3.3%) and UTI (6-5.0%).

27 (22.5%) mothers didn't have any specific risk factors. 56 (46.7%) mothers had only one risk factor and 23 (19.2%) had two risk factors. 3 risk factors were present in 12 (10.0%) mothers and only 2 (1.7%) mothers have four risk factors. There is a statistically significant association that the higher the number of maternal risk factors, higher the mortality (p value <0.001).

Primigravida, lower weight gain, malnutrition, anemia, PIH and multiple gestations are the risk factors associated with mortality in IUGR. Among them malnutrition and Anemia have significant association (p value <0.05).

Gawande etal found in their study that primigravida is more common in IUGR and significantly associated with morbidity.[11] Bakketeig et al in their study proved that lower weight gain is one of the important factors associated with IUGR.[12] Maternal malnutrition and anemia in particular have been established as a critical factor behind IUGR problem in India in other studies done by Acharya et al at Karnataka, Ferriera et al at and CSSM review report.[13,14]

Sociodemographic factors

The lower age of the mother and the lower monthly income of the family are significantly associated with mortality in IUGR (p value <0.05). Lower maternal age and its relationship with mortality in IUGR has been proved in the study done by Gawande et al. Families with IUGR infants tend to be more disadvantaged in income, housing, and parental education than families of appropriately grown infants.

Fetal factors

Weight ≤2 kg, preterm and normal delivery have the statistically significant association with mortality (p value <0.05). Hack et al in their study on outcome of extremely low birth weight and gestational age IUGR babies found that lower birth weight and lower gestational age are significantly associated with morbidity and mortality.[15] It is consistent with study done by McIntire et al.

Lower gestational age is significantly associated with higher chance of death during hospital stay as compared to higher gestational ages. Garite et al found that preterm infants have higher incidence of abnormalities than the general population because they are subjected to the risk of prematurity in addition to the risks of IUGR.[16] IUGR infants delivered before 28–30 weeks had worse outcomes.

In this study also, of the 8 infants born before 32 weeks, 7 have died. This is statistically significant (p value <0.01).

Morbidity in IUGR is significantly associated with normal delivery than other mode of deliveries (p value <0.01). IUGR babies frequently have birth asphyxia as they tolerate the stress of labour poorly. This is consistent with other studies by Hawdon et al and Pérez-Escamilla et al.[17,18] This may be due to labour is stressful for IUGR fetuses. Skilled resuscitation should be available because perinatal depression is common. The availability of pediatrician for the skillful resuscitation also may contribute for the favorable outcome of IUGR in assisted delivery/caesarian section.

Limitations

Placental factors significantly contribute to IUGR, but only non–placental factor associated with IUGR have been considered in this study due to inclusion on out born babies also.

CONCLUSION

Hypoglycemia (63.3%) and perinatal asphyxia (45.0%) are the commonest complications of IUGR. Other commoner is sepsis (33.3%), hypocalcaemia (30.0%), hypothermia (28.3%) and thrombocytopenia (25.0%). Hypoglycemia, hypocalcaemia and hypothermia are the common treatable complications in this study which can be easily identified and treated. So, in IUGR babies it is important to anticipate these conditions and treat appropriately to prevent further morbidity and mortality.

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