Still- birth - a tragic journey: a critical analysis

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ABSTRACT

Despite improvement in antenatal and intrapartum care, late intrauterine fetal death at and after 28 weeks of gestation remains a persistent and challenging problem to the obstetricians. We undertook the retrospective review of the medical records of 89 women with singleton pregnancy who gave birth to still-born infants at or more than 28 weeks gestation during the period from April 1998 to April 2007 at Nepal Medical College Teaching Hospital to know the prevalence rate and devise preventive measures for still-born infants which accounts more than 50.0% of perinatal death in Nepal. Major malformations were present in 5 (5.6%) of 89 infants including three infants with neural tube abnormalities. Pre-eclampsia preceded the stillbirth and might have been an indirect cause of stillbirth in 16 (19.0%) of 84 women whose infants had normal formations.The cause of still birth in 68 non-pre-eclamptic women was unclear in 31 (45.6%) home breech delivery with head stuck in 11 (16.0%), abruptio placentae in 5 (7.3%), intrauterine fetal growth restriction in 10 (14.7%), infection in 6 (8.8%) and cord accidents in 5 (7.3%). The causes of still births were many and varied, with large population having no obvious cause, although autopsy was not done in any case in this study. Proper monitoring of women with preeclampsia and early diagnosis and prompt delivery for women with abruption placenta might be helpful in reducing the number of stillbirths. Great advocacy with community education on importance of community focused antenatal care and increasing institutional delivery with availability of emergency obstetric care is necessary to decrease the number of stillbirths and perinatal mortality in developing countries like Nepal.

Keywords: Abruptio placentae, breech delivery, cord accidents, infection, IUGR, preeclampsia, stillbirth.

INTRODUCTION

In recent years, intrapartum and neonatal mortality rates have been decreased significantly because of advances in obstetrics and neonatology. However late fetal deaths occurring after 28 weeks of gestation, remain a persistent and challenging problem.[1,2] The still birth rate varies from 4.9 to 12.1 per 1000 births and may account for as high as 75.0% of the perinatal death.[3,4] In many cases it is difficult to be certain of the etiology of still birth despite intensive investigation of potential causes and this makes the identification of specific preventive strategies difficult.

Identifying the cause of intrauterine fetal death (IUFD) is important for two reasons: the parents are entitled to an explanation and the cause of IUFD which might be relevant in a later pregnancy. A better understanding of the events leading to IUFD is the starting point for a critical evaluation of whether the outcome in a particular case was avoidable.

We reviewed the medical records of 89 women with singleton pregnancies who gave birth to still born infants at ≥ 28 weeks of gestation at our hospital. The aim of this study was to find out the underlying causes of late fetal death and to outline the possible preventive measures.

MATERIALS AND METHODS

Between April 1998 to April 2007, 89 women with singleton pregnancies gave birth to still born infants at ≥ 28 weeks of gestation at Nepal Medical College Teaching Hospital, Kathmandu, Nepal. The medical records of these 89 women were reviewed retrospectively regarding age, parity, gestational age, birth weight and causes of IUFD where possible.

We classify the possible causes of IUFD into following 8 categories:[5]

1. Congenital malformations incompatible with life.
2. Pre-eclampsia and any of complications eg: intrauterine growth restriction (IUGR), the syndrome of hemolysis, elevated liver enzymes and low platelet count (HELLP) syndrome and abruptio placentae.
3. IUGR in the absence of preceeding pre-eclampsia.
4. The Abruptio placentae in the absence of pre-eclampsia, IUGR and the HELLP syndrome.
5. Infection including chorioamnionitis
6. Cord accidents.
7. Breech delivery accidents.
8. Unexplained IUFD in which none of the above complications were identified

Pre-eclampsia was defined as a systolic or diastolic blood pressure ≥ 140mmHg or ≥90mmhg respectively, on two occasions 6 hours apart in association with the onset of proteinuria in a patient who has been normotensive during the first 20 weeks of pregnancy.[5,6]

An infant with IUGR was defined as an infant with a birth weight below 10th percentile when compared with fetal weight standard for term live birth.[6-8] The HELLP syndrome was diagnosed if a patient exhibited a perinatal platelet count ≤ 90,000/cumm, a perinatal serum level of aspartate aminotransferase AST ≥ 50IU/L and a perinatal serum level of Lactate Dehydrogenase ≥570IU/L.[4,7] A diagnosis of abruptio placentae required the presence of uterine pain or tenderness and blood clots behind the placenta as seen at ultrasonography or at caesarean section or at normal delivery.[4] We determine Prothrombin time, platelets count, Antithrombin III (AT III) activity and serum levels of fibrin/fibrinogen degradation products (FDP) when necessary. Abnormal values were defined as follows: a platelet count less than 90000/cumm, AT III activity <70.0%, a serum level of FDP > 80microgram/dl and a serum level of AST > 40IU/L (Normal reference value in our hospital is <30IU/L).

Data are reported as the mean ± SD. Mean data were analyzed by the students t-test. A p value <0.05 was accepted as statistically significant.

RESULTS

There were 5475 deliveries during the same period giving the still birth rate of 16.0 per 1000 birth and this represented 57.1% of perinatal deaths of this institution.

Congenital Malformations: Major congenital malformations were present in 5 (5.6%) of 89 still born infants. These infants were born at 34.2±3.45 weeks of gestation either spontaneously or after induction of labour which was significantly earlier than 84 infants without malformations (36.15±4.1 weeks) Table-1 (p<0.001). Central nervous system (CNS) abnormalities (anencephaly/hydrocephalus with meningocele) accounted for 60.0% of congenital abnormalities, multiple structural abnormalities 20.0% and gastrointestinal (GIT) abnormalities 20.0%. The mean birth weight in this sub-group was 1360±472 g.

Table-1: Congenital malformations

Defects	n (%)	Mean gestational Age	Mean Birth weight
Hydrocephalus with meningocele	1 (20.0)		
Anencephaly	2 (40.0)		
Structural abnormalities	1 (20.0)		
Omphalocele and imperforated anus	1 (20.0)		
Total	5 (100)	34.2±3.45 weeks	1360±422.3 gms

Infants with grossly normal appearance: Among the remaining 84 infants without any external malformations 43(51.2%) were born at ≥37 weeks of gestation. The female to male infants proportion were at 59.6% and 40.4% and 39 (46.4%) of infants were macerated still born. The loss of fetal movements during antenatal period varied from one day to more than a month. Table-2 summarizes the causes of IUFD among the 84 infants without malformations.

Table-2: Possible causes of still birth in infants without malformations

Possible causes	n (%)	Gestational weeks at delivery	Birth weight (gms)
Pre-eclampsia	16 (19 .0)	37.1±3.8	2193.7±641.3
Unexplained	31 (37.0)	36.3±2.8	2043.5±907.9
Breech accidents	11 (13.0)	35.6±4.5	2181.8±748.0
IUGR	10(12.0)	35.8±4.5	1125±721.6
Abruptioplacentae	5 (5.9)	33.6±3.0	1620±277.4
Infection	6(7.1)	31.0±2.9	1300±752.7
Cord accidents	5(5.9)	36.8±3.7	1640±847.3
Total	84 (100%)		

Infection: The clinical details of 6 cases of infection were as follows: Three primipara at 34 weeks, 29 weeks and 28 weeks of gestation were admitted in unconscious state suffering from viral hepatitis with encephalitis grade III. All of them had spontaneous labour and delivered still-born infants, weight being 2300gms, 1000gms and 950gms respectively. All the patients suffered from massive postpartum hemorrhage and coagulation failure and died in spite of intensive care management. One of them was positive for hepatitis E virus. Two patients with still-born infants were positive for veneral disease research laboratory (VDRL) and later confirmed by treponema pallidum hemagglutinaton test (TPHA). None of them had antenatal care. The sixth case was suspected chorioamnionitis with leaking of liquor for 35 hours at 40 weeks gestation, the white cell count (WBC) was 29000/cumm and pyrexia

Table-3: Breech and cord accidents

Accidents	n (%)	Meangestational age weeks	Mean birth weight (gms)
Breech	11 (16.1)	36.6±4.5	2181.8±748.0
Cord	5 (7.3)	36.8±3.7	1640.0±847.3

of 103Ú F. A normally formed still born infant was born weighing 3000gms. The placenta had characteristic features of chorioamnionitis but C reactive protein (CRP) was not done.

Unexplained: There were 31 cases of still born infants with unexplained category in this study accounting for 45.5% of still born cases. The mean gestational age was 36.2±2.8 weeks and birth weight of 2043.5±907.9 gms in this group. However genetic study or autopsy was not done in these cases due to technical difficulties and unavailability of expertise.

Breech and cord accidents: Eleven cases of home breech delivery with after coming head stuck and 5 cases of cord prolapse were brought to hospital and all of them except one had fresh still born infant Table-3. One was macerated still born at 30 weeks gestation with two true knots in the umbilical cord. None of them had antenatal care and one of them positive for hepatitis B virus.

Association between pre-eclampsia, IUGR, the HELLP syndrome and abruptio placentae in 31 women with these complications: After excluding 53 cases due to breech (11), unexplained (31), cord accidents (5), infections (6), the remaining 31 women had one or more of the following complications: pre-eclampsia, IUGR, Abruptio placentae and HELLP syndrome as shown in Table-4.

Sixteen patients suffered from pre-eclampsia and 6 (37.5%) of them suffered from at least one other complication. One patient with preeclampsia developed HELLP syndrome and acute renal failure needing dialysis. She could survive with active ICU management. Pre-eclampsia preceeded in 4 of 10 IUGR still- born infants. Only one woman with preceding pre-eclampsia developed abruptio placentae.

Abruptio placentae: Abruptio Placentae was a direct cause of death in 5 (5.9%) of 84 intrauterine deaths among normally formed infants (Table-2). Pre-eclampsia preceded in one case of abruptio placenta who developed HELLP syndrome and acute renal failure. Coagulation profile was markedly dearranged with marked decrease in platelet count 85000/cumm (150,000-400000/cumm) and AT III activity. Very high serum urea and creatinine level needed dialysis and ICU treatment. Next 4 cases of Abruptio placentae had vaginal delivery of fresh still-born infants. The mean gestational age was 33.6±3.0 weeks and mean birth weight was 1620±277.4 gms. The coagulation profile was normal in these patients. Abruptio placentae was diagnosed with the presence of retroplacental clots.

IUGR: There were 10 (15.0%) cases of IUGR still-born infants. Pre-eclampsia preceded in 4 (40.0%) cases of IUGR. The women with severe pre-eclampsia and IUGR exhibited a marked reduced platelet counts 90000/cumm and concomitant rise in the serum level of FDP 90 mcg/dL. The remaining 6 cases of IUGR had normal delivery with two macerated still-born infants. The mean gestational age in this subgroup was 35.8±4.5 weeks and mean weight was 1125±721.6 gms.

DISCUSSION

The cause of still birth continues to be elusive. It is reportedly uncertain in 12.0-50.0% of the cases.[2,7-14] Around half of all late fetal death in our study 31 (45.5%) were antepartum death for which no specific cause could be identified. Studies reported that autopsy disclosed the cause of death in 18.0-31.0% of the cases.[9,11,12] In addition, autopsy could provide valuable new information in approximately 20.0-30.0% of the cases.[12] Autopsy was not done in this study. In most of the underdeveloped countries the expertise for autopsy are lacking and the parents also do not give consent for it. It is of wide concern as failure to investigate the underlying causes of fetal death will hamper efforts to understand and prevent future mortality.

Pre-eclampsia with or without IUGR was responsible for 16 (19.0%) still birth in this study. Autopsy could have clarified the further causes of these deaths.[12,13] Fetuses which are small for gestational age are at increased risk of antenatal death. Studies[6,15] suggested that growth restriction may be an important factor in a significant

Table-4: Association between pre-eclampsia, IUGR, HELLP Syndrome and Abruptio Placentae in 31 women

	Abruptio	IUGR	HELLP syndrome	ARF	PET
With preceding pre-eclampsia No=6	1	4	1*	1*	16
Not preceding pre-eclampsia	4	6			
Total	5	10	1*	1*	15

*HELLP syndrome and acute renal failure in one patient

proportion of fetal death as much as 40.0% of currently classified as unexplained death.[6] One major difficulty is in establishing a clear definition of IUGR. The diagnosis may be made on the basis of clinical features, autopsy findings, or assigned wholly on the basis of low weight for gestational age. In fact the risk of still-birth increases with declining percentile of birth weight. However it is the fetal growth impairment and not the small size that is associated with still-birth.[15,16] Unlike small for gestational age fetuses, the fetuses with impaired growth are those that are smaller than expected after physiologic factors determining fetal size were considered. Several recent studies demonstrated strong "dose-dependent" and biologically plausible associations between concentration of early and mid pregnancy placental hormones and still-birth.[6,15] The underlying etiologies of this process and value of intervention such as serial growth monitoring and early delivery also merit further investigations.

Fetal growth attributable to infection are increasing significantly over the time. The most commonly identified organism is Group *B Streptococcus*. Bacterial infection is more prevalent among still-birth in developing countries.[9,10,16] The ascending bacterial infections both prior to and after membrane rupture with organisms such as *Escherichia coli*, Group B *Streptococcus* and *Ureaplasma urealyticum* is the most common infectious causes of still-birth.[9,10] Studies investigating the role of amniotic fluid infection in fetal death report a substantial incidence of chorio-amnionitis suggestive of ascending infection in live birth although lower than seen in still-births. This suggests that over diagnosis is a risk and that clear case definitions are required to monitor the true contribution of infection as a cause of fetal death. In endemic areas, syphilis may cause a large proportion of still-births. Two cases in our study were positive for VDRL and reconfirmed by *Trepanema pallidum* haemaglutination test (TPHA). Both of them had no antenatal care. Screening for syphilis is advised as this organism is generally accepted cause of still-birth. A maternal viral hepatitis with viral encephalitis grade III were responsible for 50.0% of still-birth due to infection in this study. The proportion of still-birth because of viral infection is uncertain, partly because of a lack of a systematic approach to the detection of viral infection in still-born infants. Serology for intrauterine viral and protozoal agents including *Toxoplasma, Rubellavias, Cytomegalo virus, Herpes Simplex Virus* (TORCH) organism is of questionable utility. The most convincing proof of an infectious etiology for a still-birth is a carefully performed autopsy and histologic evaluation of the placenta, membranes and umbilical cord. [11.]

Abruptio placentae is one of the leading direct cause of IUFD and accounted for 5 (7.3%) of 84 deaths in the present study with normal infants. Pre-eclampsia and IUGR is reported as the risk factors for Abruptio placentae.[4] It is of great clinical importance to develop measures for identifying women who have an increased risk of abruptio placenta in the absence of pre-eclampsia. Antenatal thrombocytopenia is a risk factor for the development of HELLP syndrome in pre-eclamptic patients in which platelet count gradually declined before the manifestation of the HELLP syndrome.[4] Because abruptio placentae and the HELLP syndrome share many similarities, it can be said that the platelet count might decrease gradually before the development of abruptio placentae in women who develop the HELLP syndrome. If so, monitoring the platelet count might help to avoid abruptio placentae in some women.

Fetal deaths due to congenital abnormalities have declined significantly over the past few decades. The use of ultrasound screening and other techniques for identifying congenital anomalies has become widespread and termination of pregnancy is likely to have contributed to the observed reduction in late fetal death. In addition the underlying prevalence of some anomalies such as neural tube defects (NTDs) has reduced although chromosomal abnormalities are increasing as a result of rising maternal age in conceiving. Among the lethal abnormalities 3 (60.0%) died due to NTD. NTD are likely to occur in subsequent pregnancies after a first occurrence.[17] Folic Acid supplement in women who had children with NTDs reduces the risk of these defects in subsequent pregnancies and it might be helpful to prescribe folic acid for these women before the next pregnancy is initiated.[17-23]

Avoidable causes like home breech delivery with after coming head stuck and cord prolapse are common in developing countries where good antenatal care, skilled birth attendants and institutional delivery and counseling are almost non-existent.

The rate of unexplained antepartum death which accounted for around half of all death in developed and developing countries has shown a notable resistance to change. Greater understanding of this group of death is required, including further investigation and improved surveillance of the potentially preventable conditions of growth restriction and infection. An autopsy is a very important step in clarifying the exact cause of infant death and action to encourage clinicians and parents to view autopsy in a positive light is urgently needed. Increased monitoring for women with pre-eclampsia might be helpful in reducing the number of still-births. Women who have suffered from abruptio placentae or

the HELLP syndrome are likely to experience recurrence in subsequent pregnancy, these women should be carefully monitored. It is possible that the monitoring of the platelet count is helpful in avoiding lethal abruptio placentae and the HELLP syndrome. Folic acid supplementation in women who had children with NTDs might reduce the risk of these defects in subsequent pregnancies. Community education on importance of regular antenatal care and institutional delivery are greatly needed in developing countries.

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