Comparison of incidence of intra uterine fetal death and its causes at an interval of five years in Kathmandu University Hospital

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ABSTRACT

Aims: To compare the incidence of intra uterine fetal death and its causes at an interval of five years.

Methods: This retrospective study was conducted to compare the incidence of intrauterine fetal death and its causes during 2010 and 2011 versus 2016 and 2017.

Results: A total of 4219 deliveries conducted in the year 2010 and 2011, of them 90 (2.13%) were intrauterine fetal death. Likewise altogether 5873 deliveries conducted in the year 2016 and 2017, of them 105 (1.79%) were intrauterine fetal death. Mean age of mothers with fetal death were similar (25.47±5.64 vs 25.76±5.7 years; p>0.05). Common presenting complaints were reduced/absent fetal movement, abdominal pain, pre-labor rupture of membranes and antepartum hemorrhage. The majority of women were at low risk. Fetal characteristics of the intrauterine fetal deaths were almost comparable except fetal weight. Dead fetuses weighed lower significantly in the year 2016 and 2017 (2182.78±821.04 vs 1943.62±912.19 gram; p=0.05). In both periods, majority of stillborn babies appeared to be non-dysmorphic. There were significant numbers of referred-in cases who have complications.

Conclusions: The incidence of intrauterine fetal death is decreased in Kathmandu University Hospital over the years and referred-in cases are more for the obstetric care.

Keywords: fetal death, fetal movements, nuchal cord, placenta

INTRODUCTION

Intrauterine fetal death (IUFD) is a painful and terrible event. Timely detection of its risk factors and appropriate interventions are ways to prevent this condition. World health organization (WHO) defines IUFD as death prior to the complete expulsion or extraction of a product of conception from its mother after the age of viability American College of Obstetricians and Gynecologists (ACOG) considers IUFD as death prior to the complete expulsion or extraction of a product of conception from its mother after the age of viability American College of Obstetricians and Gynecologists (ACOG) considers 22 weeks as cut off point for viability.1,2 It is classified into early (<20 weeks), intermediate (20 to 27 weeks) and late (>27 weeks of gestation).

In countries where there is no adequate neonatal care facilities the pregnancy loss before 28 weeks of gestation is still a challenge for survival. Hence the IUFD cases ≥ 28 weeks of gestations are included in this study.

There were very few IUFD related studies conducted in Nepal till now.3,4 A few years back, a two years long study was conducted in same institution on probable causes of IUFD with incidence of 2.13%.3 Over the years, it was observed that the IUFD rate has been decreasing in Kathmandu University Hospital (KUH). Hence, this study was conducted to compare the incidence of IUFD and its causes at an interval of five years.

METHODS

This retrospective study was conducted in Department of Obstetrics and Gynecology to compare the incidence of IUFD and its causes at an interval of five years (i.e. 2010 and 2011 versus 2016 and 2017), reviewing the entire outpatient department, inpatient and operation theater records. Relevant demographic parameters were also analyzed. Cases of multiple pregnancy and fetal death diagnosed by ultrasound...
Comparison of incidence and causes of intra uterine fetal death

before 28th week of gestation were excluded. Ethical clearance was taken from the hospital IRC. All data were analyzed by SPSS 16 packages using rate, mean, standard deviation and Chi square test.

RESULTS

A total of 4219 deliveries conducted in the year 2010 and 2011, of them 90 (2.13%) were intrauterine fetal death with incidence of it was 2.13%. Mean age of mothers in the fetal death group was 25.47±5.64 years. Forty percent of them were of primiparous.

Most of the women with IUFD presented to the hospital with the complaints of reduced/absent fetal movement (n=37), antepartum hemorrhage (APH), (n=6), abnormal vaginal discharge (meconium stained) (n=3) and abdominal pain or preterm labor in the year 2010 and 2011.

Dead fetuses had significantly lower weight (2182.78±821.04 gram) for gestational age. Nearly half of them (44.4%) were expelled at preterm age (before 37 weeks). Incidence of IUFD gradually decreased as parity advanced [Table-1]. The incidence was higher in patients receiving antenatal care outside KUH [Table- 2].

Altogether 5873 deliveries conducted in the year 2016 and 2017, of them 105 (1.79%) were IUFD with incidence of it was 1.79%. Mean age of mothers in this group was 25.76±5.7 years. More than half of mothers were of primiparous and fetuses expelled were preterm 54.3% and 57.1% respectively.

In this period, common presenting complaints were reduced/absent fetal movement (n=52), abdominal pain (n=37), pre-labor rupture of membranes (n=10) and APH (n=9).

Mean weight of expelled fetus was 1943.62±912.19 gram. About two thirds (65.7%) of them were receiving antenatal care outside KUH [Table- 2]. Incidence of IUFD was gradually decreased as parity advanced in this period as well [Table-1].

There were differences in parity and antenatal care places of mothers but statistically not significant [Table-2]. The majority of women were at low risk. Associated medical disorders included preeclampsia, diabetes, anemia, heart disease, asthma and sepsis.

And fetal characteristics of the IUFD cases were almost comparable except fetal weight [Table-3]. Sixty six (73.3%) and 91 (86.7%) babies were born through vaginal route in former and latest period respectively. Most of the fetal deaths were expelled within 24 hours. Majority of stillborn babies appeared to be non-dysmorphic.

| Table-1. Maternal variables of the IUFD cases |
| Variables | In the year 2010 and 2011 (n=90) | In the year 2016 and 2017 (n=105) | P-value |
| Maternal age (years) | 25.47±5.64 | 25.76±5.7 | >0.05 |

| Table-2. Comparison of different variables |
| Variables | In the year 2010 and 2011 (n=90) | In the year 2016 and 2017 (n=105) | P-value |
| Parity | Par1-40%, Par2-27.8%, Para 3-21.1%, Par 4-5.6%, ≥ Para 5-5.6% | Par1-54.3%, Par2-25.7%, Par 3-6.7%, Par 4-6.7%, ≥ Par 5-6.7% |
| Primi | 36 (40%) | 57 (54.3%) | >0.05 |
| Multi | 54 (60%) | 48(45.7%) |
| ANC | Outside/no ANC 61 (67.8%) | 69 (65.7%) | >0.05 |
| KUH | 29 (32.2%) | 36 (34.3%) |
| Total | 90 | 105 |

* Significant at 95% level of confidence

| Table-3. Fetal characteristics of the IUFD cases |
| Variables | In the year 2010 and 2011 (n=90) | In the year 2016 and 2017 (n=105) | P-value |
| Gestational age | Preterm -40 (44.4)% | Preterm - 60 (57.1)% | >0.05 |
| Term - 48 (53.3)% | Term - 41 (39.1)% | >0.05 |
| Postterm - 2 (2.2)% | Postterm - 4 (3.8)% |
| Fetal weight (gram) | 2182.78±821.04 | 1943.62±912.19 | <0.05* |
| Fetal gender | Male - 61.1% Female - 38.9% | Male - 54.3% Female - 45.7% | >0.05 |
Comparison of incidence and causes of intra uterine fetal death

In the former period, 14 cases had cord prolapse, three had nuchal cord and one case had true knot. In this period, there were six cord prolapse cases and five nuchal cord cases. There were 13 and 18 referrals in the former and later period respectively.

DISCUSSION

Studies have proved that fetal outcome worsens with advancing maternal age.7-10 Mean age of the mothers in both period and other studies3-6 in Nepal was quite similar [Table-1]. There were seven cases of more than 35 years of age in both these periods but there were no documents of routine screening for chromosomal aneuploidy.

The incidence was higher in patients receiving antenatal care outside KUH. In a study by Raymond et al showed stillbirth was not associated with primiparity but it seems that in multiparous women, previous delivery of live birth is a protective feature.8 Primiparous cases were 40 and 54.3% % respectively in these periods. And incidence of IUFD gradually decreased as parity advanced in this period as well [Table-1]. Though there were differences in parity, antenatal care places and address of mothers but statistically not significant in these periods [Table 2 and 3].

In more than half of the recorded cases (54.7%) the complaint was of reduced or absent fetal movements. Reduced fetal movements can be associated with adverse fetal outcome. Efkarpidis S et al found that a proportion of women did not have any complaint at all, with 14% of IUFDs detected on a routine antenatal clinic appointment when the fetal heart was not audible.11 A study (n=436) carried out from July 2013 to December 2014 in the same institute, revealed decreased fetal movements problems affect 5 to 15% of pregnant ladies.12 Presenting complaints in IUFD cases were similar in both these periods [Table-1].

Efkarpidis S et al found that there is a strong association between fetal growth restriction and IUFD. An improvement in the identification of intrauterine growth restriction (IUGR) may improve the outcome for some pregnancies. However, the majority of pregnancies complicated by IUFD were apparently low-risk pregnancies in which IUGR was not detected antenatally.13 A study conducted in same institute by Shrestha et al, the incidence of IUGR was 1.08% with 5.5% perinatal deaths among them.13 There were cases of undiagnosed diabetes in the group of pregnancies that ended in stillbirth as all these women were investigated after diagnosis of fetal death. A prospective study (n=1598) related to gestational diabetes screening using 50 gram glucose, detected incidence of gestational diabetes was 0.75% at KUH.14

In these studies, risk factors like body mass index, smoking habit and maternal blood group were not studied but some studies have confirmed an association between these risk factors and risk of fetal deaths,6, 10, 15-17 but others have not.18

Studies done by Petridou E et al and Parazzini F et al found that there is a possible association between sex of the fetus and risk of stillbirth.7,19 Other studies suggested that male fetuses are more likely to suffer from antenatal hypoxia (ante- or intra-partum). Other studies have shown an association of male fetal sex with intra-partum hypoxia (fetal distress) in terms of low Apgar scores at 5 minutes, low umbilical artery pH, and risk of emergency cesarean section.20-22 About two third 55(61.6%) and 57 (54.3%) babies born were male in year 2010 and 2011 and in the year 2016 and 2017 respectively but it was not statistically significant in our study [Table-3]. Though dead fetuses weighed lower significantly in the year 2016 and 2017, mean weight of the IUFD fetuses in these periods [Table-3] are similar to other studies5,6 in Nepal. The gestational age of the IUFD cases was not much different in these periods [Table-3].

The postmortem examination helps in finding probable causes after such a tragic event. Though postmortem examination was not done in these periods, placenta was sent for histopathological examination in most of the cases. Tamrakar SR et al analyzed pathological reports of placenta of 288 IUFD cases. Of them, 213(74%) were normal where as rest were infection 53(18.3%), chorangiosis 10(3.5%), infarction 8(2.8%), chorangioma 3(0.9%) and intervillus hemorrhage 1(0.3%).23

In a study of fetal histology and stillbirth, Genest DR et al estimated that 80% of all IUFDs are expelled within one week after death.24 Bias attributed to differences between fetal weight at time of death and...
weight at the time of delivery is likely to be limited.\textsuperscript{25} Majority of stillborn babies appeared to be non-dysmorphic. In the year 2010 and 2011, two fetuses were recorded with multiple congenital abnormalities and another one had cleft lip and palate. And 25 fetuses were macerated. In the year 2016 and 2017, nine fetuses had congenital anomalies (like anencephaly, Dandy Walker syndrome, hydrop fetalis, multicystic kidney disease etc). And 52 fetuses were macerated.

Kumari S et al found 258 (2.15\%) babies had cord abnormalities. Nearly 32\% of these cases had fetal distress and 20.5\% had low Apgar score. Of the various cord problems, nuchal cord was noted in 79.1\%, cord prolapse in 12.4\% and true knots in 3.9\% cases. Perinatal mortality rate with cord problems was 85.27/1000 births.\textsuperscript{26} There were instances of cord problems in these periods. A study conducted in same institute by Tamrakar SR et al. found the incidence of nuchal cord was 6.85\%.\textsuperscript{27}

There were significant numbers of cases who had antenatal care outside KUH [Table-2], and referred at last moment with IUFD and its complications. In the year 2010 and 2011, six cases transferred in utero with hand prolapse, additional two cases with transverse lie (TL), one each case with shoulder presentation and fetal distress. Besides, other two cases referred with obstructed labour, one underwent hysterectomy with bladder repair and another had uterine rupture so underwent subtotal hysterectomy. In the year 2016 and 2017, two cases were referred with severe preeclampsia, one each case with shoulder dystocia, cord prolapse and TL. One additional case was referred with abruption, hand prolapse and rupture uterus, who underwent laparotomy and repair of ruptured uterus after extraction of dead fetus. Four cases needed intensive care unit care, five cases needed blood transfusions (ranging three to four pints). Two cases presented in hemorrhagic shock, one case in diabetic ketoacidosis and one in severe sepsis.

**CONCLUSIONS**

Intra uterine fetal death is important indicator of obstetric care. The incidence of IUFD is decreased in KUH over the years.

**CONFLICT OF INTEREST**

No conflict of interest was declared by the authors.

**REFERENCES**

1. Olyai R, Mittal C. Fetal death. In.Dutta D K, editor. Recent advances in high risk pregnancy. India: Jaypee Brothers Medical Publishers (P) Ltd; 2010. P155-64.

2. ACOG technical bulletin: International Journal of Gyn and Obs 1993;42(3).

3. Tamrakar SR, Chawla CD. Intrauterine Fetal Death and its Probable Causes: Two year Experience in Dhulikhel University Hospital – Kathmandu University Hospital. Kathmandu Univ med J 2012;10(4):44-8.

4. KC A, Nelín V, Wrammert J, Ewald U, Vitrikoti R, Baral GN et al. Risk factors for antepartum stillbirth: a case-control study in Nepal. BMC Pregnancy and Childbirth 2015;15:146. doi: 10.1186/s12884-015-0567-3

5. Shrestha J, Shrestha R, Gurung S. Stillbirths - determining the associated factors and causes according to relevant condition at death: an experience from Pokhara. Journal of Nobel Medical College 2017;6(2):58-65. [DOI]

6. Thakur A, Basnet P, Rai R, Agrawal A. Risk Factors Related to Intrauterine Fetal Death. J Nepal Health Res Coun 2019;17(42): 46-50. [DOI]

7. Petridou E, Kotsifakis G, Revinthi K, Polychronopoulou A, Trichopoulos D. Determinants of stillbirth illness in Greece. Soc. Prenatmed. 1996;41: 70-8. doi: 10.1007/ BF01323085. [PubMed]

8. Raymond EG, Cnattingius S, Kiely JL. Effects of maternal age, parity and smoking on the risk of stillbirth. Brit J Obstet Gynaecol.1994;101:301-6. [PubMed]

9. Ogunyemi D, Jackson U, Buyse S, Risk A. Clinical and pathological correlates of stillbirths in a single institution. Acta Obstet Gynecol Scand. 1998;77:722-8. [PubMed]

10. Cnattingius S, Forman M R, Berendes H W, Isotalo L. Delayed child bearing and risk of adverse perinatal outcome. A population-based study. JAMA.1992;268:886-90. [PubMed]

11. Efkapidis S, Alexopoulous E, Kean L, Liu D, Fay T. Case-control study of factors associated with intrauterine fetal deaths. Med Gen Med. 2004 May;6(2):53. [PubMed]

12. Manandhar S. Study of decreased fetal movements and its perinatal outcome in pregnancies beyond 28 weeks [MD thesis]. Dhulikhel, Nepal:Kathmandu University;2017.

13. Shrestha A, Pradhan N, Kayastha B. Risk factors for intrauterine growth restriction: 9 years analysis in tertiary care hospital. JBPKIHS 2019;2(1): 77-82.

14. Shrestha A, Chawla CD. The glucose challenge test for screening of gestational diabetes. Kathmandu Univ Med J 2011;13(2):22-5.

15. Cohen BH, Sayre JE. Further observations on the relationship of maternal ABO and Rh types to fetal death. Am J Hum Gen. 1968;20:310-60. [PubMed]

16. Fedrick J, Adelstein P. Factors associated with low birth
Comparison of incidence and causes of intra uterine fetal death

weight of infants delivered at term. Br J Obstet Gynaecol.1978;85:1-7. [PubMed]

17. Stanwell-Smith R, Thompson SG, Woolf L. Factor VIII in pregnancy and birthweight. Thromb Res. 1984;34:199-211. [PubMed]

18. Cnattingius S, Haglund B., Kramer MJ. Differences in late fetal death rates in association with determinants of small for gestation age fetuses: population based cohort study. BMJ.1998;316:1483-87. [PubMed]

19. Parazzini F, Pirotta N, La Vecchia C, Bocciolone L, Fedele L. Determinants of perinatal and infant mortality in Italy. Rev Epidemiol Sante Publique. 1992;40:15-24. [PubMed]

20. Hoffmann AL, Hjortdal JO, Secher NJ, Weile B. The relationship between Apgar score, umbilical artery pH and operative delivery for fetal distress in 2778 infants born at term. Eur J Obstet Gynecol Reprod Biol. 1991;38:97-101. [PubMed]

21. Lau TK, Chung KH, Haines CJ, Chang AM. Fetal sex as a risk factor for fetal distress leading to abdominal delivery. Aust N Z J Obstet Gynaecol.1996;36:146-9. [PubMed]

22. Lieberman E, Lang JM, Cohen AP, Frigoletto FD, Acker D, Rao R. The association of fetal sex with the rate of cesarean section. Am J Obstet Gynecol. 1997;176:667-71. [PubMed]

23. Tamrakar SR, Dhakal B, Timalsina N, Tripathi P. Clinical profile of pregnancy loss and placental histopathology at a University Hospital. Nep J Obstet Gynecol. 2019;14(29):26-30. [DOI]

24. Genest DR, Williams MA, Greene MF. Estimating the time of death in stillborn fetuses: I. Histologic evaluation of fetal organs: an autopsy study of 150 stillborns. Obstet Gynecol. 1992;80(4):575-84. [PubMed]

25. Clausson B, Gardosi J, Francis A, Cnattingius S. Perinatal outcome in SGA births defined by customized versus population-based birth weight standards. Br J Obstet Gynaecol.2001;108: [PubMed]

26. Kumari S, Saxena A, Monga D, Malik A, Kabra M, Kurray RM. Significance of cord problems at birth. Indian Pediatr. 1992 Mar;29(3):301-5.

27. Tamrakar SR. Incidence of nuchal cord, mode of delivery and perinatal outcome: A notable experience in Dhalikhel Hospital – Kathmandu University Hospital. Nepal Med Coll J 2013; 15(1): 40-5.