Does Performing Fetal Ultrasound Assessment Once Versus Twice in the Third Trimester in Low Risk Women Alter the Stillbirth Rate?

Abstract:

F Mone[1], S Meti[2], S Ong[2]
[1]School of Medicine and Medical Science, UCD, National Maternity Hospital, Dublin 2
[2]Department of Fetal Medicine, Royal Maternity Hospital, Grosvenor Rd, Belfast, BT12 6SB

Abstract

The aim of this retrospective observational study was to evaluate if performing fetal growth scans once or twice in the third trimester impacts on stillbirth rates in low risk pregnancies. The study was performed in a tertiary centre with 6,000 deliveries per annum. Data on all deliveries was collected via the National Maternity System Database and high risk pregnancies were excluded to calculate the stillbirth rate before and after 2011 when ultrasound assessment was performed twice and once in the third trimester. Between 2009-2012 there were 18,856 low risk-pregnancy deliveries with 45 stillbirths, (average stillbirth rate 0.26%). The stillbirth rate in 2009/2010 was 54/9423 (0.25%). The stillbirth rate in 2012 was 13/5615 (0.27%). [p= 0.897; chi square= 0.017; df =1]. There was no statistical difference in the stillbirth rate when low risk women were scanned once or twice in the third trimester.

Introduction

Growth restricted fetuses are at an eight times greater risk of stillbirth compared to those that are appropriately grown[1]. Evidence suggest that in cases of â unexplained stillbirthâ , low birth weight is commonplace, occurring in up to 30% of cases[2,3]. Antenatal detection of fetal growth restriction is poor where only 15-25% of cases are correctly identified[4]. Studies demonstrate heterogeneity of results as to how sensitive and specific fetal biometry and estimated fetal weight is in the detection of fetal growth restriction. A recent large population-based study performed in Sweden, 2005 demonstrated no significant difference in perinatal outcome between units when routine ultrasound screening in the third trimester was used[5]. An older Cochrane review concluded that routine ultrasound (USS) after 24 weeks gestation in low-risk pregnancy does not improve perinatal outcome[6]. The data to draw these conclusions come from eight trials, the most recent of which was 1999. One study introduced heterogeneity and conflicted with the conclusion[7]. This study found that mothers with a â low-riskâ pregnancy who had an ultrasound scan at 30-32 weeks gestation and 36-37 weeks gestation had increased detection of small-for-gestational age infants versus a control group receiving standard ante-natal care. This was statistically significant and the risk was reduced by one third. The intervention rate was also significantly increased in this group however with no difference in neonatal admissions[7].

The National Institute of Clinical Excellence (NICE) in the U.K. issued a guideline on antenatal care in 2008. It recommends routine symphysio-fundal-height measurements at each ante-natal appointment from 24 weeks gestation and clearly state that routine use of ultrasound scanning after 24 weeks gestation should not be offered as it is not evidence based[8]. It does however support the measurement of a single abdominal circumference measurement in the third trimester as a tool for diagnosing fetuses, which are below the 10th centile[8]. It also concedes that further prospective research is required into evaluating the diagnostic value and effectiveness (in terms of clinical and cost-effectiveness) of routine third trimester ultrasound scanning in predicting growth restricted fetuses[8]. Despite the lack of evidence demonstrating the efficacy of routine scanning in reducing stillbirth, in our unit in Belfast, The Royal Jubilee Maternity Hospital, we used to offer growth scans at 29 and 35 weeks for all pregnant women with a normal pregnancy. After the year 2011, we offered growth scans only at 29 weeks and omitted scanning at 35 weeks for these women. The purpose of this study was to see if we could detect a difference in stillbirth rate when women with normal pregnancy are scanned twice versus once in the third trimester.

Methods

Approval was obtained from the local audit committee. The board of clinical governance stipulated that ethical approval and informed patient consent was not deemed necessary as this was an anonymous data collection. This audit included 22,269 deliveries spanning the period 2009-2012 within a tertiary maternity unit, the Royal Jubilee Maternity Service, Belfast, which has approximately 6,000 deliveries per annum. Data was obtained from the computerized Northern Ireland Maternity System database (NIMATs). Before 2011 it was routine to perform an ultrasound scan which included fetal biometry and assessment of the fetal environment including amniotic fluid index and placental grading of low risk pregnancies at both the 29 week and 34 week antenatal visit. After 2011 patients were scanned at 29 weeks gestation only.

Our primary objective was to determine the difference in stillbirth rate in apparently low risk pregnancies. We therefore removed patients from our analysis who were deemed â high riskâ . We removed patients that were positive for Group B streptococcal infection, women who had a multiple pregnancy, fetal congenital anomalies and women affected by medical conditions such as cardiac disease, haematological and renal conditions and diabetes, to form a low risk group. We calculated the total number of stillbirths for each year and also those that occurred in what were deemed â low riskâ pregnancies. Because we wanted to know if scanning had an impact on stillbirth, and as scanning in our unit occurred at 29 weeks, we also removed deliveries before 28 weeks from our final analysis (Table 1). The changeover of this scanning regime of twice in the third trimester to once in the third trimester occurred in March of 2011. Given that there was would be some overlap in the changeover period, we removed the year 2011 from our analysis. Statistical analysis was conducted using SPSS software (IBM, Armonk, NY, USA). Comparisons were drawn between groups using a Chi-squared test with Yates correction. All case notes were reviewed by hand where a stillbirth had occurred in the â low riskâ group using a standardized proforma which was designed and piloted to determine the causes in this group. The birthweight centiles were calculated using a customized calculator obtained from www.gestation.net to see how many stillbirths had underlying growth restriction.

Results

During the study there were a total of 22,269 deliveries from 2009-2012. After high risk pregnancies were removed there were a total of 18,856 deliveries. In total there were 106 stillbirths spanning the period 2009-2012. After high risk pregnancies were removed this was a total of 45 with an average stillbirth rate of 0.25% per number of low risk pregnancies per annum. The stillbirth rate in the 2009/2010 group was 0.25%. The stillbirth rate in the 2012 group was 0.27%. This difference was not statistically significant [p= 0.897; chi square= 0.017; df =1] (Table 1) . On review of the individual stillbirths from â low riskâ women, we found that 19 out of 45 (42%) babies were growth restricted [mean centile = 26.1; centile range 0-96], when we classified growth restriction as below the 10th centile customized for the individual woman based upon a standardized birthweight centile calculator[9]. The scatterplot shown in Figure 1 demonstrates that a high proportion of stillbirths are at the lower birthweight centile. There is no apparent cluster of stillbirths of any particular gestation between 2009- 2012.

Discussion

This study indicates that there is no difference in stillbirth rate when a strategy of scanning once or twice in the third trimester of pregnancy is employed in women with an apparent normal pregnancy. This strength of this study lies in the fact that we have a robust data collecting system and that all cases of apparent unexplained stillbirth were reviewed by hand. The weakness of this study lies in the fact that this was retrospective and the relative small sample size. A randomized controlled trial should ideally be performed. However, in order to demonstrate a 10% reduction in stillbirths with a power of 0.8, a power calculation indicates that we would require 266,841 patients in each arm. It is therefore unlikely that such a trial would ever be undertaken. Clinicians are therefore likely to base their decisions on large observational studies. This study also reiterates the point made by others that a large proportion of â unexplainedâ stillbirths are growth restricted[3]. The question of course remains as to how we can reliably detect growth restriction. Recent research suggests that further trials must be undertaken to assess both sympysio-fundal height measurement and ultrasound scanning in detecting fetal growth restriction and the impact of

these modalities on peri-natal outcome[4,9]. Northern Ireland is unique in that we are already performing ultrasound scanning for women with a normal pregnancy. In some respects, we can almost answer the question in reverse: We have not detected a significant difference in the stillbirth rate when we moved from a strategy of scanning twice versus once in the third trimester for women with an apparently normal pregnancy. Is it possible that we would not alter the stillbirth rate if we moved from a strategy of scanning once to not scanning at all in the third trimester?

Correspondence: F Mone
School of Medicine and Medical Science, UCD, National Maternity Hospital, Holles St, Dublin 2
Email: fmone@nmh.ie

References

1. Gardosi J, Madurasinghe V, Williams M, Malik A and Francis A. Maternal and fetal risk factors for stillbirth : population based study. BMJ 2013: 346; 108

2. Office for National Statistics (2011). Death registration summary tables, England and Wales. 2010. 2012. www.ons.gov.uk/ons/publications/re-references-tables.html?edition=tcm%3A77-230730

3. Gardosi J, Kady SM, McGeown P, Francis A, Tonks A. Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. BMJ 2005; 331: 1113-7

4. Figueras F, Gardosi J. Intrauterine growth restriction : new concepts in antenatal surveillance, diagnosis and management. AJOG 2011; 204: 288-300

5. Sylvan K, Ryding EL, Rydhstroem H. Routine ultrasound screening in the third trimester : a population based study. Acta Obstet Gynecol Scand 2005; 84: 1154-8

6. Bricker L, Neilson JP. Routine ultrasound in late pregnancy (after 24 weeksâ gestation).Cochrane Database Syst Rev 2008;CD001451.

7. McKenna D, Tharmaratnam S, Mahsud S, Bailie C, Harper A, Dornan J. A randomised trial using utrasound to identify the high-risk fetus in a low-risk population. Obstetrics and Gynaecology 2003: 101; 262-32

8. Antenatal Care : routine care for the healthy pregnant woman NICE Guideline : issued March 2008. [Accessed online at www.nice.org.uk/CG62 on 13th February 2013]

9. Gardosi J, Francis A. Controlled trial of fundal height measurement plotted on customised antenatal growth charts. BJOG 1999; 106: 309-17