



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.2166778>

Available online at: <http://www.iajps.com>

Review Article

ANTENATAL CARE FOR HIGH RISK PREGNANCIES

Bashaer Abdulkareem Matouq¹, Rahaf Fadil Alturkistani², Nawfal Hamad Alsufayan¹,
Lama Mohammed Alomar³, Reem Fawzi Damanhuri¹, Ghufran Essa Al Khalfan⁴,
Lujain Saud M Alrabghi⁵, Amina Abduljalil Hasan Abdulla Maraj⁶, Fatima Jawad
Alissa⁷, Mohammed Saleh Alaskar⁸, Nada Tawfiq Danish²

¹ Batterjee Medical Collage,² King Abdulaziz University,³ AlMaarefa University

⁴ Ibn Sina National College,⁵ King Abdulaziz University,⁶ Southeast University,China,⁷ King
Faisal University in Alhassa,⁸ Al-Imam Muhammad Ibn Saud Islamic University

Abstract:

Introduction: Intrauterine growth restriction (IUGR) is the inhibition of fetal growth and failure of the fetus to maintain its growth. There has been a significant association between stillbirth and fetal growth restriction. Both are attributed due to a complex pathology arising from an interaction among maternal conditions, placenta and hormonal regulation. The term small for gestational age (SGA), often recognized as having a birth weight below the 10th percentile of an accepted reference standard, is usually used as a substitution measure for IUGR. It is estimated that about thirty million newborns per year suffers from intrauterine growth restriction in developing countries. To avoid complications associated with intrauterine growth restriction, it is essential to notice the condition and once noticed, take the appropriate actions to asses fetal well being in association with proper interference in case of fetal distress (for example early delivery) [1,10]. The main goal of this review is to study the screening and surveillance interventions that can help prevent stillbirths associated with IUGR. **Aim of work:** In this paper we review the methods used to detect IUGR in high risk pregnancies. **Methodology:** We did a systematic search for antenatal care for high risk pregnancies in the emergency department using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles. **Conclusions:** The detection and management of IUGR using maternal BMI screening, symphysis-fundal height measurement and targeted ultrasound may be effective method of reducing IUGR related stillbirths. So far there are no no studies available to check the effect of these methods. The doppler velocimetry of umbilical and fetal arteries for surveillance of diagnosed high risk pregnancies could lead to a decrease of twenty nine percent (95 % CI 2% to 48 %) in perinatal mortality. Overall, there is insufficient amount of studies to recommend fetal movement counting. More studies are needed to check this method particularly in developing countries.

Key words: Antenatal care, high risk pregnancy, management, surveillance.

Corresponding author:

Bashaer Abdulkareem Matouq,
Batterjee Medical Collage

QR code



Please cite this article in press Bashaer Abdulkareem Matouq et al., *Antenatal Care for High Risk Pregnancies.*,
Indo Am. J. P. Sci, 2018; 05(12).

INTRODUCTION:

Intrauterine growth restriction (IUGR) is the inhibition of fetal growth and failure of the fetus to maintain its growth [1]. There has been a significant association between stillbirth and fetal growth restriction [2]. The causes and the risk factors for stillbirth and IUGR are similar [3].

Both are attributed due to a complex pathology arising from an interaction among maternal conditions, placenta and hormonal regulation. An example, smoking, low educational level, advanced maternal age, nulliparity, and black race are significantly associated with higher risk of fetal growth restriction and stillbirth [4]. Similarly, maternal medical conditions such as gestational hypertensive disorders, pre and gestational diabetes, systemic lupus erythematosus, chronic renal disease, and thyroid disorders [5]. There has been significant correlation between IUGR and stillbirth that is believed to arise from prior delivery of a growth restricted infant is among the highest risk factors for stillbirth, comparable to the history of prior stillbirth. IUGR is a strong marker to check for complications of pregnancy [6]. But there's no standard definition of IUGR. Usually it is defined as a birth weight < 2 standard deviations below the median for gestational age, but other physicians use a threshold of 3rd or 5th percentile of weight for age for the given population [7].

The term small for gestational age (SGA), often recognized as having a birth weight below the 10th percentile of an accepted reference standard, is usually used as a substitution measure for IUGR. Despite the terms SGA and IUGR are not the same, there is association between the two and the higher the SGA rate, the greater the likelihood that SGA is a result of IUGR [8].

It is estimated that about thirty million newborns per year suffers from intrauterine growth restriction in developing countries. This rate is 6 times higher than that in developed countries. The highest burden of prevalence of SGA/IUGR babies lies in Asia about seventy five percent, especially South East Asia, followed by Africa about twenty percent and Latin America about five percent.

To avoid complications associated with intrauterine growth restriction, it is essential to notice the condition and once noticed, take the appropriate actions to assess fetal well being in association with proper interference in case of fetal distress (for example early delivery) [9]. The main goal of this review is to study the screening and surveillance

interventions that can help prevent stillbirths associated with IUGR.

In this paper we review the methods used to detect IUGR in high risk pregnancies.

METHODOLOGY:

We did a systematic search for antenatal care for high risk pregnancies in the emergency department using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles.

The terms used in the search were: Antenatal care, high risk pregnancy, management, surveillance.

The detection of IUGR

There are many methods used to predict and monitor growth of the fetus including but not limited to maternal BMI screening, symphysis-fundal height measurement and routine ultrasound [10]. Maternal BMI screening was proposed as an effective method to detect and predict fetal growth by a group of experts. However, two published Cochrane reviews on routine ultrasonographic evaluation in early (before 24 weeks of gestation) and late pregnancy (after 24 weeks) concluded no effect in reducing overall peri-natal mortality [11]. Ultrasound in early pregnancy i.e. before twenty four weeks was helpful in detecting multiple pregnancies and reducing rates of induction of labor for post-term pregnancies.

In another published Cochrane review on effectiveness of symphysis fundal height measurement was indecisive because only one trial was included [12]. Studies proposed three interventions. These interventions including (1) maternal BMI screening, (2) symphysis-fundal height measurement and (3) targeted ultrasound.

The most recent evidence for these interventions is described based on our previous review and a summary of results is presented below assessing gestational age compared to recall of LMP, however the accurateness of both the methods was less than that of ultrasound. Authors proposed the use of symphysis-fundal height measurement as a cost-effective way and almost a reliable way of age assessment and fetal growth monitoring. In another study concluded that weekly self-administered symphysis-fundal measurements could be used to monitor fetal growth [13]. Alike findings were reported in an observation study conducted in Brazil in which more than seven hundred low risk women

were followed with periodic symphysis fundal height measurement and the findings were used to draw a curve. Findings showed a sensitivity of more than eighty percent for detection of SGA infants.

Though the routine ultrasound early (before twenty-four weeks) or late (more than twenty four weeks) in pregnancy have not been correlated with a significant decrease in perinatal mortality, when the ultrasound was repeated it was estimated that the growth could be used to diagnose abnormal fetal growth. A study proposed that if this is combined with monitoring of fetal growth by symphysis-fundal height measurement in addition to the appropriate management (for example early delivery), it could reduce the perinatal mortality and stillbirth significantly.

Detection and management of IUGR

Maternal BMI screening is considered one of the ways that have been suggested to predict growth of fetus and related occurrence of low birth weight, and other perinatal adverse outcomes¹⁴. Due to the lack of of RCTs; a published review on effectiveness of measurement of symphysis fundal height for detecting IUGR was questionable. But it is a cost effective and precise method to detect or at least suspect abnormal fetal growth.

If there is a clinical suspicion, it is recommended to repeat ultrasound. It can assess fetal growth and a judgment can be made about optimal or suboptimal growth. But, it was found that the routine ultrasound for every woman irrespective of indication or risk factor is not associated with reduction in perinatal mortality. A study suggested a model to detect and manage IUGR with an expected reduction in stillbirths. This model includes three screening methods a) maternal BMI. b) symphysis-fundal height measurement. C) Targeted ultrasound coupled with management of cases identified.

There are no studies that examined this combination, experts opinion on the expected benefit of these combined interventions in reducing IUGR and stillbirths including Delphi consensus (medians) determined the effect to be about twenty percent decrease in ante-partum stillbirth with an inter-quartile range of ten percent to about thirty seven and twenty percent reduction in intra-partum stillbirth with an inter-quartile range of five percent and thirty percent.

Surveillance of high risk pregnancies

Some studies have been suggested to detect and manage high risk pregnancy during the antenatal or

intrapartum period. These interventions include the assessment of fetal well-being by taking into consideration measures like fetal movement, fetal heart rate pattern, and/or growth; and feto-placental and/or uteroplacental circulatory dynamics. There has been no recognized criterion to differentiate between a 'high' or 'low' risk pregnancies.

The maternal circumstances commonly correlated with adverse perinatal outcomes involve conditions like diabetes (chronic and gestational), hypertensive disorders (chronic hypertension and pre-eclampsia) and cardiac, renal, autoimmune and thrombophilic disorders [15]. Fetal settings related to 'high risk' pregnancy involve fetal growth restriction, and placental insufficiency [16]. Doppler velocimetry is considered an important method to check fetal wellbeing in cases of intrauterine growth restriction (IUGR). It provides information on fetal and placental cardiovascular function on the basis of the blood flow dynamics measured in uterine, umbilical and fetal arteries [17].

A published Cochrane study included sixteen studies and involving more than ten thousands newborns showed that the fetal and umbilical artery Doppler ultrasound in high risk pregnancies can reduce the perinatal mortality by about twenty nine percent, when obstetric services were in place to ensure safe and timely delivery of the baby when needed. on the other hand, Analysis of the uterine artery Doppler may recognize compromised fetuses at risk of stillbirth, especially in cases of placental underperfusion associated with preeclampsia and/or growth restriction; but studies does not show its effectiveness of subsequent intervention to prevent stillbirths.

A study recommended a reduction of about twenty nine percent in stillbirths for high risk pregnancies if these are identified, it should be followed by Doppler velocimetry of fetal and umbilical arteries and managed with the appropriate intervention.

However, the result for reduction in stillbirths was statistically insignificant. It was found that the overall quality for the pooled studies for still births was 'low'. This is believed due to quality of methods of sequence generation and allocation concealment was inadequate in some of the included studies. So, the study proposed to take reduction in perinatal mortality as a proxy for reduction in stillbirths. It is critical to take into consideration that Doppler ultrasound is used as a diagnostic assessment method and the clinical outcomes depend on availability of and implementation of timely interventions such as

early delivery e.g. via caesarean sections.

Fetal movement counting is considered a simple, inexpensive and one of the old method to assess the condition of the baby during pregnancy and is considered to be an indirect measure of central nervous system integrity [18]. The fetal movements in the uterus can be felt by the mothers from around sixteen to twenty weeks of gestation. A decrease in fetal movements is linked with reduction in oxygenation, which may lead to fetal growth compromise or stillbirth. A published review on twenty-four Western studies showed that reduced fetal movements were linked to adverse pregnancy outcomes, both in high and low risk pregnancies¹⁹. So, the reduction in fetal movements could be an indication of fetal compromise or impending fetal demise. There are other causes of reduced fetal movements including but not limited to decreased amniotic fluid, drugs, sedatives and sleep state in the fetus [17]. Another published Cochrane study by Mangesi and Hofmyer, used four randomized controlled trials and including more than seventy one thousands females, did not find any significant evidence to recommend in favor or against routine fetal movement monitoring in unselected or high risk pregnancies.

In the developing countries, the advanced facilities are usually not available, fetal movement monitoring could be feasible; however its use is currently not supported by scientific evidence. A study graded the current evidence as 'very low' which means that there is not sufficient evidence to include this intervention in the LiST model. But it important to study this simple and oldest intervention in more depth to check if it is helpful to diagnose and follow high risk pregnancies in the developing countries.

CONCLUSIONS:

Intrauterine growth restriction (IUGR) is the inhibition of fetal growth and failure of the fetus to maintain its growth [1]. There has been a significant association between stillbirth and fetal growth restriction [2]. It is estimated that about thirty million newborns per year suffers from intrauterine growth restriction in developing countries The causes and the risk factors for stillbirth and IUGR are similar [3,4]. To avoid complications associated with intrauterine growth restriction, it is essential to notice the condition and once noticed, take the appropriate actions to asses fetal well being in association with proper interference in case of fetal distress (for example early delivery) The detection and management of IUGR using maternal BMI screening, symphysis-fundal height measurement and targeted

ultrasound may be effective method of reducing IUGR related stillbirths. So far there are no studies available to check the effect of these methods. Based on the expert opinion of experts in the field, this combinateion combined with effective management could decrease IUGR related antepartum and intrapartum stillbirth by twenty percent each.

The doppler velocimetry of umbilical and fetal arteries for surveillance of diagnosed high risk pregnancies could lead to a decrease of twenty nine percent (95 % CI 2% to 48 %) in perinatal mortality. The direction of effect on the incidence of stillbirths was also similar but statistically insignificant [RR 0.65, 95 % CI 0.41-1.04]. Studies recommend an estimate reduction of twenty nine percent (95 % CI 2% to 48%) in stillbirths for inclusion in the Lives Saved Tool on the basis of rules developed by Child Health Epidemiology Reference Group. Overall, there is insufficient amount of studies to recommend fetal movement counting. More studies are needed to check this method particularly in developing countries.

REFERENCES:

1. **Mandrizzato G, Antsaklis A, Botet F, Chervenak FA, Figueras F, Grunebaum A, Puerto B, Skupski D, Stanojevic M(2008)** Intrauterine restriction (IUGR). *J Perinat Med* 2008, 36(4):277-281.
2. **Bukowski R(2010)** Stillbirth and fetal growth restriction. *Clin Obstet Gynecol* 2010, 53(3):673-680.
3. **Smith GC, Fretts RC(2007)** Stillbirth. *Lancet* 2007, 370(9600):1715-1725.
4. **de Onis M, Blossner M, Villar J(1998)** Levels and patterns of intrauterine growth retardation in developing countries. *Eur J Clin Nutr* 1998, 52(Suppl 1): S5-15.
5. **Barros FC, Bhutta ZA, Batra M, Hansen TN, Victora CG, Rubens CE(2010)** Global report on preterm birth and stillbirth (3 of 7): evidence for effectiveness of interventions. *BMC Pregnancy Childbirth* 2010, 10(Suppl 1):S3.
6. **Ferro-Luzzi A, Ashworth A, Martorell R, Scrimshaw N** Report of the IDECG Working Group on effects of IUGR on infants, children and adolescents: immunocompetence, mortality, morbidity, body size, body composition, and physical performance. *Eur J Clin Nutr* .
7. **Bakketeig LS(1998)** Current growth standards, definitions, diagnosis and classification of fetal growth retardation. *Eur J Clin Nutr* 1998, 52(Suppl 1):S1-4.
8. **WHO(1995)** Physical status: the use and

- interpretation of anthropometry. Report of a WHO Expert Committee: Technical Report Series No. 854. Geneva: World Health Organization; 1995, 121-160.
9. **Miller J, Turan S, Baschat AA(2008)** Fetal growth restriction. *Semin Perinatol* 2008, 32(4):274-280.
 10. **Haws RA, Yakoob MY, Soomro T, Menezes EV, Darmstadt GL, Bhutta ZA(2009)** Reducing stillbirths: screening and monitoring during pregnancy and labour. *BMC Pregnancy Childbirth* 2009, 9(Suppl 1):S5.
 11. **Bricker L, Neilson JP(2000)** Routine ultrasound in late pregnancy (after 24 weeks gestation). *Cochrane Database Syst Rev* 2000, , 2: CD001451.
 12. **Neilson JP(2000)** Symphysis-fundal height measurement in pregnancy. *Cochrane Database Syst Rev* 2000, , 2: CD000944.
 13. **Bergman E, Axelsson O, Kieler H, Sonesson C, Petzold M(2011)** Relative growth estimated from self-administered symphysis fundal measurements. *Acta Obstet Gynecol Scand* 2011, 90(2):179-185.
 14. **Backstrand JR(1995)** Annex: Maternal anthropometry as a risk predictor of pregnancy outcome: the Nutrition CRSP in Mexico. *Bull World Health Organ* 1995, 73(Suppl):96-98.
 15. **Westergaard HB, Langhoff-Roos J, Lingman G, Marsal K, Kreiner S(2001)** A critical appraisal of the use of umbilical artery Doppler ultrasound in high-risk pregnancies: use of meta-analyses in evidence-based obstetrics. *Ultrasound Obstet Gynecol* 2001, 17(6):466-.
 16. **Ashworth A(1998)** Effects of intrauterine growth retardation on mortality and morbidity in infants and young children. *Eur J Clin Nutr* 1998, 52(Suppl 1): S34-41.
 17. **Hoffman C, Galan HL(2009)** Assessing the 'at-risk' fetus: Doppler ultrasound. *Curr Opin Obstet Gynecol* 2009, 21(2):161-166.
 18. **Velazquez MD, Rayburn WF(2002)** Antenatal evaluation of the fetus using fetal movement monitoring. *Clin Obstet Gynecol* 2002, 45(4):993-1004.
 19. **Froen JF(2004)** A kick from within—fetal movement counting and the cancelled progress in antenatal care. *J Perinat Med* 2004, 32(1):13-24.