



Case Study

SUCCESSFUL VAGINAL DELIVERY IN A PRIMIGRAVIDA WITH LATE-ONSET FETAL GROWTH RESTRICTION AND ABNORMAL CEREBROPLACENTAL RATIO

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Article info

Article History:

Received: 10-06-2026

Accepted: 14-07-2026

Published: 15-08-2026

KEYWORDS:

Fetal Growth Restriction, Late-onset FGR, *Garbha Alpavridhi*, *Garbha Poshana*, Cerebroplacental Ratio, Vaginal Delivery.

ABSTRACT

Fetal Growth Restriction (FGR) is a major cause of perinatal morbidity and mortality and is commonly associated with placental insufficiency. Appropriate intrapartum decision-making remains crucial in pregnancies complicated by late-onset FGR, particularly when Doppler abnormalities are present despite reassuring fetal surveillance. This case report describes a 25-year-old primigravida who presented in spontaneous labour at 38 weeks and 1 day of gestation. Obstetric ultrasonography with Doppler revealed late-onset FGR with an estimated fetal weight of 2451 g (3rd percentile), abdominal circumference below the 2nd percentile, and a reduced cerebroplacental ratio, while the umbilical artery demonstrated preserved forward end-diastolic flow. The biophysical profile and intrapartum cardiotocography remained reassuring throughout labour. Based on the overall fetal assessment, labour was managed expectantly under continuous maternal and fetal surveillance, resulting in spontaneous vaginal delivery of a healthy female neonate weighing 2.1kg with APGAR scores of 7, 8 and 9 at one, five and ten minutes, respectively. The newborn did not require neonatal intensive care unit admission, and both mother and baby were discharged in stable condition on the third postpartum day. According to Ayurvedic principles, impaired fetal growth may be conceptually correlated with *Garbha Alpavridhi* (restricted fetal growth), resulting from inadequate *Garbha Poshana* (fetal nourishment). This case emphasizes that an abnormal cerebroplacental ratio alone should not be considered an indication for cesarean delivery and highlights the importance of individualized obstetric management in achieving favourable maternal and neonatal outcomes.

INTRODUCTION

Fetal Growth Restriction (FGR) is a pathological condition in which the fetus fails to attain its genetically determined growth potential because of maternal, fetal, placental, or genetic factors. It affects approximately 5–10% of pregnancies worldwide and remains one of the leading contributors to perinatal morbidity, stillbirth, neonatal mortality, and long-term neurodevelopmental impairment. Placental insufficiency is the predominant underlying cause, resulting in chronic fetal hypoxia and inadequate

transfer of oxygen and nutrients necessary for normal fetal growth.^[1,2,9,10]

FGR is broadly classified into early-onset (<32 weeks) and late-onset (≥32 weeks) disease. Nearly 70–80% of affected pregnancies present as late-onset FGR, which poses a unique diagnostic and management challenge because conventional fetal surveillance may remain apparently reassuring despite progressive placental dysfunction. Consequently, Doppler velocimetry has become an indispensable component of fetal surveillance for identifying fetuses at increased risk of adverse perinatal outcomes and for determining the appropriate timing and mode of delivery.^[3,4]

Among the doppler parameters, the Cerebroplacental Ratio (CPR), calculated as the ratio of the middle cerebral artery pulsatility index to the umbilical artery pulsatility index, has emerged as a sensitive indicator of fetal adaptation to placental

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<https://doi.org/10.47070/ijapr.v14i8.4275>

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insufficiency. A reduced CPR reflects the brain-sparing phenomenon, an adaptive redistribution of fetal circulation towards vital organs in response to chronic hypoxaemia. Although an abnormal CPR has been associated with increased risks of intrapartum fetal compromise, operative delivery, low APGAR scores, neonatal acidosis and neonatal intensive care unit admission, it should not be interpreted in isolation. Current evidence recommends that the mode of delivery should be determined after comprehensive assessment of fetal wellbeing, incorporating umbilical artery doppler, biophysical profile, amniotic fluid assessment, cardiotocography and the overall clinical condition of the mother and fetus.^[2,4,5]

According to Ayurvedic classics, fetal growth depends upon the proper nourishment of the fetus through *Rasa Dhatu* and *Ambu*, while the integrity of *Beeja*, *Kshetra*, *Ritu* and *Ambu* is considered essential for normal fetal development. Disturbance in these physiological factors may conceptually correlate with *Garbha Alpavridhi*, which may be understood as impaired fetal growth. These principles provide an Ayurvedic framework for interpreting disorders of fetal nourishment.^[6-8]

Despite advances in fetal surveillance, the optimal mode of delivery in pregnancies complicated by late-onset FGR with an abnormal cerebroplacental ratio remains a matter of clinical judgement. Many clinicians favour operative delivery because of concerns regarding intrapartum fetal compromise, whereas emerging evidence suggests that carefully selected women with reassuring fetal surveillance may safely achieve vaginal birth under continuous intrapartum monitoring.^[4,5]

The present case describes the successful vaginal delivery of a primigravida diagnosed with late-onset FGR associated with an abnormal cerebroplacental ratio but preserved umbilical artery end-diastolic flow and reassuring fetal surveillance. The report highlights the importance of individualized obstetric decision-making and discusses the condition from both contemporary obstetric and Ayurvedic perspectives.

Case Report

A 25-year-old primigravida with a spontaneously conceived singleton pregnancy was

admitted to the Labour Room of the Department of Prasuti Tantra and Stri Roga, R.D. Memorial Ayurveda Hospital, Bhopal, at 38 weeks and 1 day of gestation with complaints of regular uterine contractions associated with show on 17/06/26 at 7:30pm. She had attended regular antenatal visits throughout pregnancy. Her medical history was unremarkable, with no evidence of chronic hypertension, gestational diabetes mellitus, thyroid dysfunction, renal disease, autoimmune disorders, or any previous surgical intervention. There was no history of infertility treatment or other significant obstetric risk factors.

Clinical Examination

On admission, the patient was conscious, alert and haemodynamically stable.

General examination revealed a pulse rate of 78 beats/min, blood pressure of 110/70mmHg and respiratory rate of 18 breaths/min. There was no pallor, icterus, cyanosis, clubbing or pedal oedema.

On admission, detailed per abdominal and per vaginal examinations were carried out to assess maternal and fetal status. The examination findings are summarized in Tables 1 and 2.

Investigations: Baseline laboratory investigations, including complete blood count, blood grouping, random blood sugar, urine examination and routine serological investigations, were within normal limits, as summarized in Table 3 and Figure 1.

On the following day (18/06/2026) Ultrasonography with fetal doppler assessment (figure 2) demonstrated a singleton live intrauterine fetus with an estimated fetal weight of 2451gm (3rd percentile) and an abdominal circumference below the 2nd percentile, consistent with late-onset fetal growth restriction. Doppler evaluation revealed a cerebroplacental ratio below the 5th percentile, suggestive of fetal circulatory redistribution. However, forward end-diastolic flow was maintained in the umbilical artery, indicating the absence of severe placental vascular compromise. The amniotic fluid index was within normal limits 11.76cm, and the biophysical profile score was reassuring (10/10). Continuous intrapartum cardiotocography demonstrated a reactive fetal heart rate pattern throughout labour (figure 3).

Table 1: Per Abdominal Examination at admission

S.No.	Parameters	Findings
1.	Fundal height	34 weeks
2.	Presentation	Cephalic
3.	Fetal heart sound	146 beats/min, regular
4.	Uterine contractions	Present

Table 2: Per Vaginal Examination at admission

S.No.	Parameters	Findings
1.	Cervical dilatation	1 cm (one finger admitted)
2.	Cervical consistency	soft
3.	Cervical position	midway
4.	Cervical effacement	20%
5.	Station	-2
6.	Membranes	Bulging membranes (BOM+)
7.	Show	present
8.	Pelvis	adequate

Table 3: Baseline Laboratory Investigations (18/06/26)

S.No.	Parameters	Results
1.	Blood group	A Positive
2.	Haemoglobin	12.9 gm/dl
3.	HBSAG, HIV, HCV, VDRL	Negative
4.	Blood sugar	79mg/dl
5.	PT INR	1.16


Figure 3: Intrapartum cardiotocography

Clinical Decision and Management

Considering the spontaneous onset of labour, reassuring fetal surveillance, preserved umbilical artery Doppler flow, normal biophysical profile and reactive cardiotocography, a multidisciplinary decision was made to continue with a supervised trial of labour. Maternal vital signs and fetal heart rate were monitored continuously, and labour progressed without any evidence of fetal compromise.

Outcome

The patient delivered a live female neonate by spontaneous vaginal delivery at 4:23 PM on 18 June 2026. The baby weighed 2.1kg at birth and had APGAR scores of 7, 8 and 9 at 1, 5 and 10 minutes, respectively. The neonate cried immediately after birth, maintained satisfactory cardiorespiratory adaptation and did not require NICU admission (figure 4).

The third stage of labour was uneventful. The placenta and membranes were delivered completely, and there was no postpartum haemorrhage or other maternal complication. Both mother and baby had an uncomplicated postnatal course and were discharged in satisfactory condition on the third postpartum day.

Figure 4: Healthy neonate after spontaneous vaginal delivery

DISCUSSION

Fetal growth restriction represents chronic placental dysfunction that compromises fetal oxygenation and nutrient supply, thereby increasing the risk of adverse perinatal outcomes. Although late-onset FGR is generally less severe than early-onset disease, its diagnosis is often challenging because fetal compromise may remain clinically silent until the final weeks of pregnancy. Consequently, management should rely on comprehensive fetal surveillance rather than fetal biometry alone.

In the present case, fetal biometry fulfilled the diagnostic criteria for late-onset FGR, with an estimated fetal weight at the 3rd percentile and abdominal circumference below the 2nd percentile. The reduced cerebroplacental ratio indicated fetal haemodynamic adaptation to placental insufficiency. However, preserved forward end-diastolic flow in the umbilical artery, a reassuring biophysical profile, normal amniotic fluid volume and reactive intrapartum cardiotocography suggested that fetal compensation was still adequate. These findings supported expectant intrapartum management under continuous surveillance instead of immediate operative delivery.

The decision regarding the mode of delivery in pregnancies complicated by FGR should be individualized. While an abnormal cerebroplacental ratio is associated with an increased likelihood of intrapartum fetal compromise, it should not be considered an independent indication for cesarean delivery. Clinical judgement should integrate doppler findings with gestational age, fetal wellbeing, maternal condition and labour progress. In the present case, favourable antenatal and intrapartum surveillance permitted a carefully monitored trial of labour, culminating in an uncomplicated vaginal birth with satisfactory neonatal adaptation.

The favourable neonatal outcome observed in this case further supports the importance of individualized obstetric management. Despite evidence of placental insufficiency, the neonate had satisfactory APGAR scores (7/10, 8/10 and 9/10 at 1, 5

and 10 minutes, respectively), required no NICU admission and had an uneventful early neonatal course. This emphasizes that meticulous fetal surveillance can help identify pregnancies in which vaginal delivery remains a safe and appropriate option.

According to Ayurveda, fetal development depends upon the proper interaction of *Beeja* (healthy gametes), *Kshetra* (healthy uterus), *Ritu* (appropriate reproductive period) and *Ambu* (maternal nourishment), collectively described as the essential factors for normal conception and fetal growth. Adequate *Garbha Poshana* (fetal nourishment) occurs through well-formed *Rasa Dhatu* (primary nourishing tissue), which continuously nourishes the developing fetus. Any disturbance in maternal nourishment or fetal nutrition may conceptually be correlated with *Garbha Alpavridhi*. These classical concepts emphasize the importance of optimal maternal nutrition and physiological balance throughout pregnancy, which closely parallels the modern understanding of placental function and fetal growth.

The present case demonstrates that successful vaginal delivery is achievable in carefully selected pregnancies complicated by late-onset fetal growth restriction, even in the presence of an abnormal cerebroplacental ratio. Rather than relying on a single doppler parameter, clinical decision-making should incorporate gestational age, fetal doppler assessment, biophysical profile, cardiotocography and the overall maternal-fetal condition. An individualized approach may help avoid unnecessary cesarean delivery without compromising neonatal safety. From an Ayurvedic perspective, maintaining optimal *Garbha Poshana* (fetal nourishment) through balanced maternal nutrition and physiological homeostasis remains fundamental for healthy fetal growth. The integration of evidence-based obstetric care with Ayurvedic principles of maternal and fetal wellbeing may provide valuable directions for future clinical research in the management of fetal growth restriction.

CONCLUSION

Late-onset fetal growth restriction remains a challenging obstetric condition that requires careful antenatal surveillance and individualized intrapartum management. This case demonstrates that an abnormal cerebroplacental ratio should not be considered an isolated indication for cesarean delivery. Comprehensive assessment incorporating fetal Doppler studies, biophysical profile, cardiotocography and maternal clinical status facilitated successful vaginal delivery with favourable maternal and neonatal outcomes. This case reinforces the importance of individualized obstetric decision-making and highlights the need for further clinical research integrating contemporary obstetric practice with Ayurvedic principles in the management of fetal growth restriction.

Patient Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical information. Every effort has been made to maintain patient confidentiality, and no identifying information has been disclosed.

Acknowledgement

The authors sincerely acknowledge the Department of Prasuti Tantra and Stri Roga, R.D. Memorial Ayurveda Hospital and P.G. College, Bhopal, for providing academic guidance and clinical support. We also thank the patient for providing consent to publish this case.

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Cite this article as:

Preeti Mandre, Reetu Pandey, Meenakshi Singh. Successful Vaginal Delivery in a Primigravida with Late-Onset Fetal Growth Restriction and Abnormal Cerebroplacental Ratio. *International Journal of Ayurveda and Pharma Research.* 2026;14(8):147-151.

<https://doi.org/10.47070/ijapr.v14i8.4275>

Source of support: Nil, Conflict of interest: None Declared

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