Detection of fetal growth restriction (FGR) Jan 2009

- FGR is linked to social inequalities, being 50% higher in the most deprived areas
- About 50% of corrected perinatal mortality in the West Midlands is associated with FGR
- Of stillbirths with FGR, 86% are potentially avoidable with better care
- Appropriate antenatal investigation for FGR significantly reduces perinatal mortality
- Currently, our antenatal detection of FGR is only 15 to 30%

The purpose of this paper is to summarise the evidence and rationale for the Perinatal Institute's regional strategy for monitoring FGR as a key quality indicator of maternity services within the NHS West Midlands Investing for Health project.

1. Relevance to perinatal and infant mortality and morbidity

Excluding congenital abnormalities, FGR is associated with about 50% of stillbirths and neonatal deaths [1,2]. While in the womb, an FGR baby has a 5-11 fold increased risk of dying [3]. Fetal growth restriction is also a precursor of perinatal morbidity and cerebral palsy [4,5], and has many adverse effects in childhood and adult life. Most instances of FGR are due to placental insufficiency.

2. Lessons learnt about avoidability

The avoidability of stillbirths with FGR has been highlighted in CESDI reports [6]. In the 2007 B&BC Confidential Enquiry into Stillbirths with FGR (which excluded babies who had a congenital abnormality or died before 30 weeks), 86% of deaths were found to have been potentially preventable [7]. There is no effective in-utero treatment for FGR; instead, management consist of detection of the at-risk baby, careful surveillance and, in consultation with the mother, timely delivery in the best possible condition, balancing between the potential adverse effects of prematurity and fetal growth restriction.

3. Detection of the at-risk baby

Antenatal detection of the small for gestational age (SGA) baby and referral for further investigation is fundamental to the assessment of fetal wellbeing. This is done mainly by

- fundal height measurement (to detect the babies which need further tests),
- ultrasound scan (to assess the size of the baby and its growth up to this date) and
- umbilical artery Doppler (to assess the function of the placenta).

In most instances, such investigations are reassuring; however in a small proportion of cases, they confirm that the baby is FGR and therefore at risk.

4. Screening by fundal height measurement

Serial measurement and plotting of fundal height is recommended by NICE guidelines [8], and the use of customised charts is recommended by the Royal College of Obstetricians & Gynaecologists [9]. A controlled trial has shown that when midwives are properly trained in fundal height measurement and plotting on customised charts, with appropriate referral pathways, the antenatal detection of FGR was improved significantly without an increase in overall workload and number of investigations [10]. The potential for increased detection has also been confirmed in a Birmingham audit [11].

5. Further investigations: ultrasound and Doppler

When fundal height measurements do not follow their own predicted curve, the next step is an ultrasound scan to check the size of the baby and the amniotic fluid [9]. Where fundal height measurement is not possible (e.g. due to maternal obesity, multiple pregnancy etc), or for women who have other complications or who are high risk on the basis of past history, serial ultrasound scans are recommended [12]. If the ultrasound confirms that the baby is SGA, measurement of the umbilical artery Doppler flow is indicated to asses the function of the placenta [9].

6. Evidence of benefit

Cochrane reviews of randomised trials have shown that referral for Doppler investigation in high risk pregnancy (e.g. SGA baby or maternal hypertension) leads to a reduction in perinatal mortality, without increasing neonatal mortality due to premature delivery [13]. Doppler is however not useful in the general population and may cause false alarm. The key therefore is to identify and refer those babies which are at risk and which will benefit from closer surveillance and, where necessary, earlier delivery.

7. FGR rates and detection in the West Midlands

FGR is linked to social deprivation which is high in the West Midlands [14]. In Birmingham and the Black Country (B&BC), the FGR rate ranges from **13%** (deprivation quintiles 1-3) to **19%** (quintile 5), an increase of about 50%. Only a minority of babies born FGR (<10th customised centile) are detected

to be small antenatally, and as many as 70-85% are missed. More detailed audits in several maternity units have highlighted problems at every step of the clinical pathway, including risk assessment, fetal growth surveillance, plotting of fundal height, referral for investigations, and ultrasound services.

8. Key problems and actions

We are acting on several problems which have been identified as the main barriers to improvement:

	Problem	Action
8.1	Many midwives and doctors are still not trained in standardised measurement and plotting of fundal height	PI has started regular training & accreditation workshops at the Institute and units around the region, for all staff engaged in antenatal care. The programme will be complemented by a rolling SGA audit.
8.2	Protocols are not consistently followed, e.g. for thorough risk assessment, or direct referral by community midwives to ultrasound	Providers are asked to ensure that regional as well as national recommendations [15, 8] are implemented in local protocols and that appropriate systems and processes are in place
8.3	There is an acute shortage of ultrasound resources in WM, which has led to unsafe scan protocols for monitoring high risk pregnancy	PI and RUG have developed best practice guidelines for serial scanning for at-risk pregnancies [12]. For implementation, commissioners are asked to provide enhanced resources for ultrasound services
8.4	There is a lack of trained ultrasound staff in the West Midlands	PI and RUG have developed, with the SHA & Deanery, a 3 year training programme to increase the staffing levels of ultrasonographers, starting in 2009.

In addition, there is a need to investigate and act on the inequalities and underlying factors which are responsible for the link between social deprivation and fetal growth restriction.

9. Implication

Fetal growth restriction is a common precursor of perinatal mortality. Better identification and management will lead to a reduction of avoidable deaths. Timely detection of FGR is

- vital for **patient safety** - babies being the clients of the NHS with the longest life expectancy;
- an indicator of **effectiveness of maternity care** across community and acute services;
- important for **equity of service provision**, focussing on the need to address inequalities; and
- essential for **maternal engagement** and decision making about appropriate care.

Antenatal identification of the at-risk baby is central to the West Midlands Investing for Health project for reducing perinatal & infant mortality. The limits for year-on-year improvement are currently being discussed, and the data collection project will allow benchmarking and monitoring of progress.

10. References

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