

# Intrauterine Growth Restriction (IUGR)

*Patient Information Series – What you should know, what you should ask.*

## **What is Growth Restriction?**

Intrauterine growth restriction means that your baby is not growing at a normal rate—or, rarely, is not growing at all—in the womb, and is therefore smaller than it should be for the gestational age (meaning the age, in weeks, of the fetus). During each antenatal ultrasound examination, measurements are taken of the size of your baby's head, abdomen and thigh, after which the baby's weight is calculated and ranked in percentiles for gestational age.

So, if a baby's weight is found to be below the 10th percentile for its gestational age, the baby is then said to be 'small for gestational age' (SGA). Although about 60% of these 'small for gestational age' babies are simply physiologically small, which means that there is no problem, the other 40% are babies whose growth is pathologically restricted (pathological SGA, i.e. involving a physical problem). Furthermore, even a baby that is seen to be above the 10<sup>th</sup> percentile but whose development subsequently slows down as pregnancy proceeds is also said to have fetal growth restriction.

## **What causes Growth Restriction?**

There are many possible causes of growth restriction. Apart from genetic abnormalities of the baby, there are several medical conditions that a woman may have that could contribute to IUGR. For example, maternal age over 40 years, smoking, other substance abuse (alcohol, drugs), severe malnutrition or anemia, advanced diabetes, chronic hypertension, preeclampsia, heavy bleeding during pregnancy, and others. A woman who has had a baby with IUGR in the past is at risk of having another baby with growth restriction.

## **What risks are there for my baby?**

IUGR puts the baby at risk for a number of health problems during pregnancy, at delivery, after delivery and even long-term. For instance, the likelihood of impaired development during pregnancy is higher, while there is also the possibility of the baby dying in the womb. The baby

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can also be more susceptible to distress and asphyxia during labour, have lower resistance to infection and might, in the long-term, develop diabetes and hypertension. It is highly recommended that IUGR babies be particularly closely followed up both during pregnancy and during labor so that any possible complications can be identified and treated promptly.

## **What exactly is Doppler ultrasound?**

A Doppler ultrasound measures the blood flow in your blood vessels as well as your baby's. It can also examine the baby's organs, for example its umbilical cord, brain and liver. In the management of a growth restricted unborn baby, accurate diagnosis is very important in order to optimise the timing of delivery as well as survival of the newborn. This is best carried out via the non-invasive method of Doppler velocimetry. This technique has, in fact, been in use over the last few decades in all branches of medicine, and has become a regular component of fetal surveillance in cases of complicated pregnancies. Assessment by umbilical artery Doppler significantly reduces the likelihood of labour induction, cesarean delivery and perinatal death.

## **How is a Doppler test done, and how long does it last and will it be painful?**

A Doppler ultrasound test can be done simultaneously with an ordinary obstetrical ultrasound. A Doppler functions by transmitting sound waves from the probe into the baby's body—to its internal organs and to its arteries and vessels—to produce images in real time on the screen. A Doppler scan only takes a few minutes. Immediately after the test, you will be told the results by your doctor. The test is pain-free.

## **What measurement does a Doppler examination take?**

The heart function operates in two phases: systole (contraction) and diastole (relaxation). During the systole phase, the heart pumps the blood through the vessels at high speed. In the diastole phase, the heart relaxes its pressure and blood flow and supply is lower in the fetal tissues. A Doppler ultrasound test measures the velocity (speed) and direction of moving red blood cells in the artery or vein that is being scanned.

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Doppler sonography calculates the resistance to blood flow, which enables determination of whether the baby's oxygen supply (oxygenation) is adequate or not. This is achieved by evaluating the Doppler waveform pattern in systole and diastole. Blood flow velocity in the vessels is also assessed. The velocity is important because an abnormal flow is a strong indication of deterioration of the baby's circulation.

A large number of studies have confirmed the value of Doppler measurements in the management of IUGR, enabling doctors to ensure the healthy prolongation of a pregnancy which, without Doppler monitoring, could result in a preterm birth, a stillbirth or even a baby that can suffer lifelong effects.

## **Just how important is a Doppler examination for my IUGR baby?**

The Doppler exam is very important in the management of IUGR in pregnancy. Firstly, Doppler results will help your doctor decide on pregnancy follow-up and when to schedule your next examination. Secondly, vital organs of the baby can be examined so as to monitor their oxygenation and development rate. For example, thanks to the Doppler scan, doctors and sonographers are able to promptly diagnose a poorly working placenta.

Finally, in the event of a pathological diagnosis, Doppler tests also play a big role with regard to delivery and the baby's life after birth as well as to choice of clinic. Concerning IUGR pathologies, if for instance there is diagnosis of a fetal syndrome or a congenital anomaly, a Doppler ultrasound will provide the needed information for a better pregnancy outcome. Moreover, Doppler results will also determine if there is the need for selection of a specialized hospital for delivery, since both doctors and parents will be forewarned as to the possibility of a challenging after-birth condition requiring specialist care: IUGR babies are likely to have respiratory and other problems at delivery and after birth, which must be treated immediately in a specialized neonatal unit. Crucially, a Doppler study will help determine if there is any increased risk of the

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baby dying. Such a finding will speed up your doctor's decisions and interventions to prevent this from happening.

## How about the safety of my baby and me?

A Doppler study, which is carried out during the 2nd and 3rd trimesters, is safe for both the mother and her baby when it is performed by an experienced and trained sonographer or doctor.

## Are there any risks to having frequent Doppler ultrasound scans?

There are no limitations to the number of times you can take this exam. When IUGR is suspected, a Doppler test is done once a week. However, when there are pathological Doppler findings, the scan will be performed two or three times per week; in special cases, it might be done daily. According to the available evidence, Doppler scans appear to be safe for both the mother and the unborn baby.

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