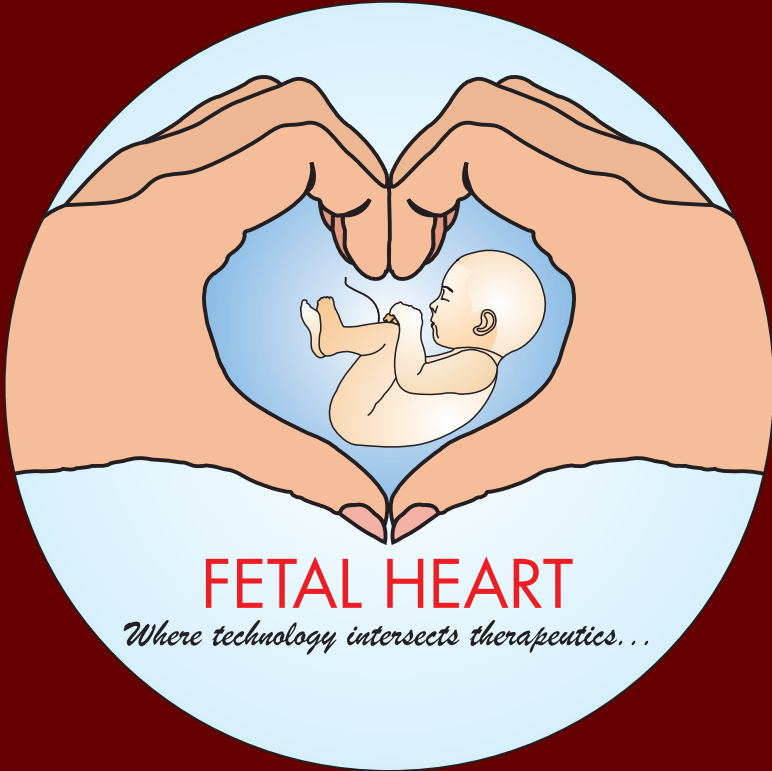


Amrita Institute of Medical Sciences and Research Centre
Kochi, Kerala, India

Fetal Cardiology Division



Fetal Cardiology Division

Department of Pediatric Cardiology



Fetal Cardiology Division, AIMS, Kochi

The fetal cardiology division at Amrita Institute of Medical Sciences, Kochi was launched in January 2008. The aim of this service is to create awareness among the medical community regarding the need and potential benefits of prenatal diagnosis of birth defects of the heart. This will provide the concerned families with more options for management rather than facing the trauma of taking a decision after the baby is born. We offer a comprehensive approach to the patient including facilities for diagnosis, counseling and treatment of various types of heart problems in the developing fetus. We have the state of art equipment for fetal heart imaging including 4D STIC ultrasound technology for the fetal heart. We have pioneered the concept of prenatal diagnosis and planned perinatal care for fetuses with critical heart defects in India with onsite delivery and expedited neonatal cardiac care, all under one roof. We have a dedicated fetal cardiologist, counselor and a coordinator and we work in close liaison with the allied departments like obstetrics and gynecology, radiology, genetics, cardiac surgery and neonatology. We have also established out-reach services for fetal heart screening in high-risk obstetric units in Kerala.

Since its inception in January 2008, we have already done more than 7500 fetal echo studies, including our extended services. More than 300 women with a fetus with critical heart defect have undergone planned delivery at AIMS and more than 100 neonatal cardiac procedures have been accomplished with a near total success rate. Fetal Heart is our annual academic event, bringing together a multidisciplinary forum of experts from all over the country to discuss the state of art developments in the field of Fetal Cardiology. We offer training facilities for those medical professionals who are interested in learning the art of fetal heart scan. Prof. Balu Vaidyanathan heads the program, supported by Dr Shine Kumar (associate consultant). Dr Balu is the recipient of the prestigious commonwealth fellowship (UK) in fetal cardiology.



Fetal Echocardiography: Some FAQs

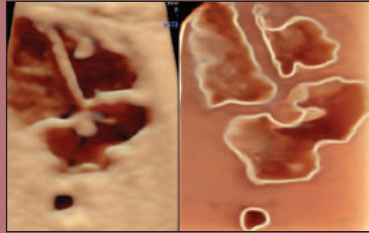
What is fetal echocardiography ?

Fetal echocardiography is a highly specialized form of prenatal scan where a detailed evaluation of the heart is carried out. It involves scanning the fetal heart from around 12 -14 week's pregnancy. The entire structure of the heart (chambers, valves, blood vessels and partitions (septa)) can be visualized by this technique. The heartbeat of the fetus can be evaluated and the pumping efficiency of the heart can also be assessed. This enables prenatal diagnosis of various forms of birth defects of the heart (congenital heart defects) and heart beat disorders (rhythm problems) in the fetus.

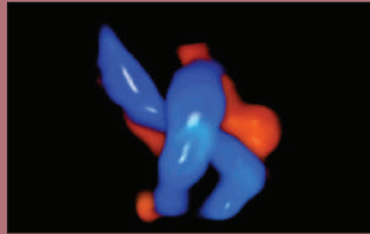
How is fetal echocardiography performed?

The principle of ultrasound scan is used for this technique. All aspects of ultrasound imaging (2D/3D/4D, M-mode and color Doppler) are used. A minimum requirement for screening the fetal heart is a combination of 4 chamber view (heart chambers, valves and partitions), outflow tract view and 3-vessel view (blood vessels) which enables most of the cardiac defects to be detected. Current technology involves utilization of the advanced 4D STIC technology to visualize the detailed internal

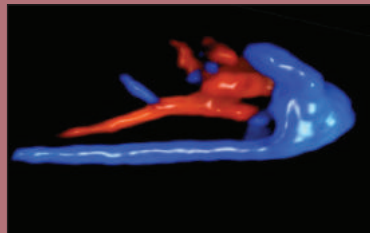
Four Chamber View



Crossing Outflow Tracts



Ductal arch



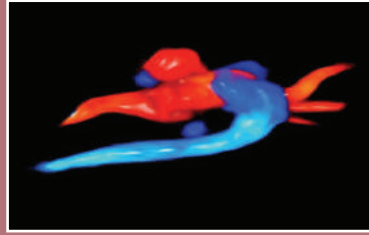
structure of the heart, with possibilities of off-line analysis.

A basic level heart scan can be done by most of the sonologists who are adept in doing pregnancy scans using basic obstetric ultrasound machines. However, a detailed heart scan requires highly specialized training and advanced ultrasound machines. More importantly, the person doing the specialized heart scan should have a thorough knowledge about the various types of birth defects of the heart and what all treatment can be offered including the costs involved. Such a facility is called a specialized fetal cardiology unit. Very few centers in India have a specialized fetal cardiology unit that provides a comprehensive facility for diagnosis, counseling and then treatment for various birth defects of the heart.

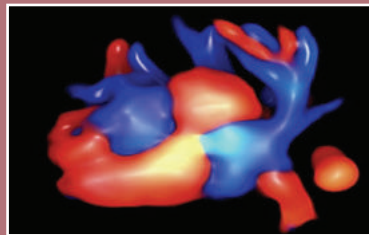
When can a fetal heart scan be done?

With advances in ultrasound, accurate diagnosis of major cardiac defects can be done as early as 12-14 weeks of gestation. The ideal timing of fetal heart scan would be around 16 – 18 weeks. It is preferable to conduct these scans before 20 weeks gestation (legal upper limit for medical termination of pregnancy), so that if a problem is diagnosed, the family can be offered all possible options for management.

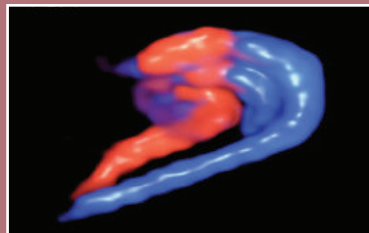
Aortic arch



Pulmonary Veins



TGA



What are the indications for a fetal heart scan?

A basic heart scan (4 chamber and outflow views) should be compulsorily done as a part of every single obstetric scan. However, certain pregnancies are considered to be high-risk and in such cases a detailed fetal echocardiography (specialized heart scan) should be advised. Such high risk pregnancies should be referred for a detailed heart scan at around 16-18 weeks gestation. Table 1 summarizes the indications for fetal echocardiography.

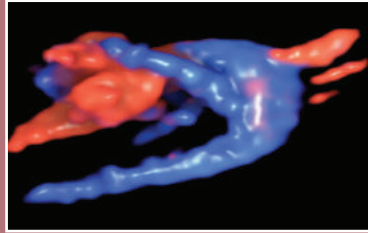
Are there any harmful effects due to such scans?

Fetal echocardiography uses the common ultrasound principle and it has been shown without any doubt that this is very safe, even if performed multiple times, in pregnancy.

What is the relevance of doing fetal echocardiography in our setting?

Pre-natal diagnosis offers a much wider options to the expectant family, especially in the setting of developing countries with limited resources to treat complex heart defects. It is possible that early pre-natal diagnosis (before 20 weeks) and termination of pregnancy may reduce the burden of very complex forms of congenital

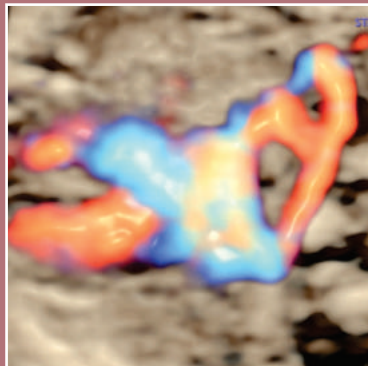
DORV



Coarctation of Aorta



ARSA



heart disease that can only be offered palliative therapy after birth.

Pre-natal diagnosis may possibly improve the post-natal outcomes of infants with critical but correctable heart defects like transposition of great arteries (TGA) or duct dependent conditions by in-utero transport to a pediatric cardiac facility. Certain forms of heart defects (especially heart beat problems) can be offered in-utero treatment with excellent outcomes to the fetus.

Hence, in the current era, it is extremely important to screen the fetal heart using a combination views in all pregnancies and refer all suspected cases for a more expert evaluation. Once a cardiac lesion is diagnosed, a multi-disciplinary approach is required to provide an adequate counseling and then to manage the condition through the perinatal period. All these services are provided by the Fetal cardiology Division at AIMS.

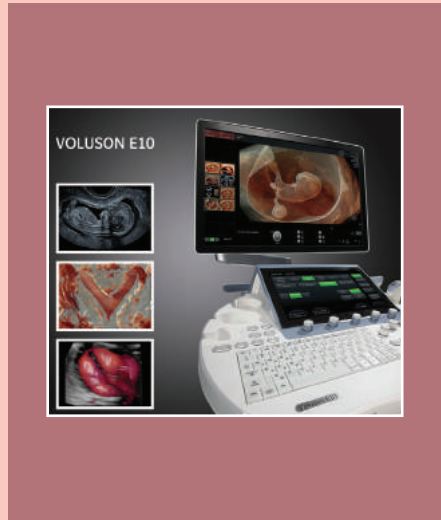
Table I: Indications for referral for a specialized heart Scan

Early scan at 14 - 16 weeks	Routine scan at 16 - 18 weeks
Previous child with birth defect of heart	Diabetes mellitus in pregnant mother
Abnormal heart in routine obstetric scan	Exposure to harmful medicines or toxins
Irregular heart beat (both fast and slow)	Intra-uterine infections
Hydrops fetalis (abnormal fluid collection)	Abnormal antibodies in mother (auto-immune disease)
Increased first trimester nuchal fold thickness > 2.5 mm	Major abnormalities of other organs detected in antenatal scan.
Chromosomal anomaly in fetus	Babies conceived by in-vitro fertilization (IVF) or intra-cytoplasmic sperm injection (ICSI)

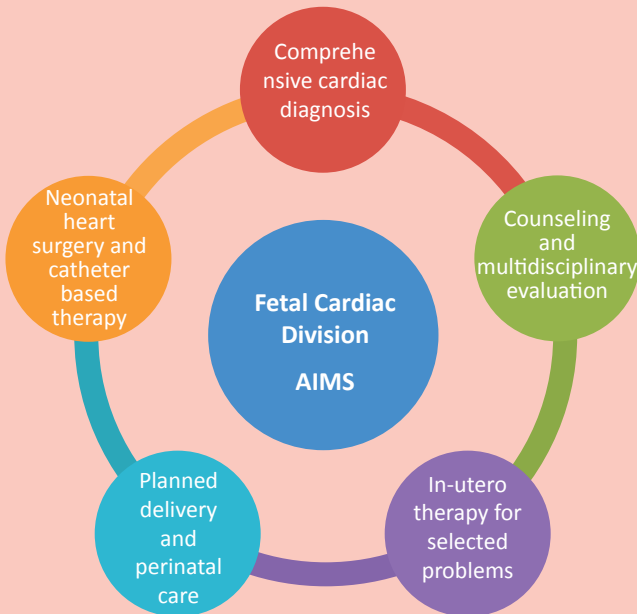


The State of Art in Fetal Heart Imaging

We have the most advanced imaging technology in the form of the Voluson E10 ultrasound equipment with its full array of transducers including the 4D matrix probe (e-STIC), transvaginal and specialized first trimester transducers. This enables a comprehensive evaluation of the fetal heart with 4D real time and offline analysis, volumetric assessment and evaluation of very fine anatomic details. This aids counselling and decision making in fetal heart defects with more precision.



Fetal Cardiology Division AIMS Services Offered





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