Fetal Cardiology Simplified: A Practical Manual

Mark Steven Sklansky

Division of Pediatric Cardiology, Department of Pediatrics, David Geffen School of Medicine at UCLA, CA 90095, USA ■ mksklansky@mednet.ucla.edu

Author: Gurleen Sharland
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Synopsis: *Fetal Cardiology Simplified: A Practical Manual* represents an exceptionally well-written, bedside guide for students and clinicians involved with the sonographic evaluation of the fetal heart. Combining profound clinical expertise and insight with a wealth of normal and abnormal fetal cardiac images, and organized strategically for the busy practitioner, this manual of fetal cardiology promises to be an invaluable reference for students and experienced clinicians seeking to improve their expertise with interpreting fetal cardiac images obtained in actual practice.

Congenital heart disease (CHD), with an incidence of roughly 1% in live births, represents the most common form of congenital malformation. The outcome for newborns with major forms of CHD, particularly for those who require emergent neonatal intervention, may be improved with prenatal detection. Unfortunately, throughout most of the world – including the most developed countries – the prenatal detection rate for even these most critical forms of CHD continues to be poor, with most series finding more than 50% being missed at the midgestation anatomic survey/anomaly scan. Because most cases of congenital heart disease occur in low-risk pregnancies, the importance of traditional risk factors pales in comparison with the suspicion of an abnormal heart on the routine screening ultrasound.

As a result, efforts to improve prenatal detection at the midgestation anomaly scan continue to be pursued around the globe. The original approach to screening the fetal heart for CHD, as described in the early 1980s using the four-chamber view, has slowly expanded to include the left and right ventricular outflow tracts. Just this year, the American Institute of Ultrasound in Medicine, in conjunction with the American College of Radiology, the American College of Obstetricians and Gynecologists, and the Society of Radiologists in Ultrasound, revised its guidelines for obstetric sonography upward, now recommending inclusion of both outflow tracts along with the four-chamber view [1]. As these and other guidelines strive to raise the bar and improve prenatal detection of CHD, clinicians will need to follow suit and improve their ability to screen the fetal heart in low-risk pregnancies.

Fetal Cardiology Simplified: A Practical Manual represents a welcome and timely contribution to a small but expanding set of clinically useful references in the field of fetal cardiology. This well written and clinically oriented manual responds to the widely recognized need to improve prenatal detection of CHD, and also to improve the ability to evaluate and diagnose cardiac structural malformations once a cardiac abnormality has been suspected or identified.

Organization

The text is organized largely as a bedside tool, aiming to help the clinician interpret fetal cardiac abnormalities encountered in clinical practice – how to recognize what is abnormal, and then how to complete the evaluation in order to come up with the correct diagnosis. As such, chapters tend to be organized according to primary echocardiographic findings. Individual chapters discuss fetal cardiac position/situs, the four-chamber view, the right and left ventricular outflow tracts, and aortic arch abnormalities separately, so that clinicians can refer to the respective chapters during, or soon after, actual scanning. Descriptions of diagnoses include definitions, the prenatal/postnatal prevalence, fetal echocardiographic features, associations, management and outcomes. Additional chapters address cardiomyopathies, cardiac tumors, arrhythmias and counseling.

Highlights

Fetal Cardiology Simplified represents an outstanding contribution to the field. Some of the text's highlights/greatest strengths include the following:

Book Review

Future Cardiology

Gurleen Sharland

Dr Gurleen Sharland is an internationally recognized leader in the field of fetal cardiology, with decades of experience. The text and wealth of pathology reflect her expertise.

The final chapter: 'What could fetal cardiac findings mean?'

This chapter, in itself, represents a succinct, well designed, clinically useful reference tool. This final chapter summarizes and categorizes fetal cardiac pathology according to the general type of sonographic abnormality seen (i.e., large right atrium, small right ventricle or dysplastic tricuspid valve), lists potential diagnoses, and suggests ways to help determine the correct diagnosis.

Fetal echocardiographic 2D/color-flow images

The text provides an exceptionally large number of excellent 2D images, many with color-flow Doppler. Dr Sharland rightly emphasizes that color-flow imaging should be considered an integral part of the fetal heart examination, despite many guidelines not recommending the routine use of color-flow Doppler for the evaluation of the fetal heart in low-risk pregnancies. The importance of color-flow imaging, even in low-risk pregnancies, represents one of the text's invaluable lessons.

Physical characteristics

Fetal Cardiology Simplified has been published as a well designed, soft-covered manual, which is easy to carry, with a tremendous number of high-quality, glossy pages and figures.

Chapter 2: 'The normal fetal heart'

This important introductory chapter, exceptionally relevant and succinct, discusses the most important considerations in evaluating the normal fetal heart and provides a wealth of outstanding images to complement the text.

Shortcomings

While an outstanding clinical reference/tool, Fetal Cardiology Simplified has areas of relative weakness as well:

Biometry/z-scores

The text provides only limited discussion of the role of linear cardiac measurements and the utility of respective z-scores. While qualitative assessments trump quantitative linear measurements, cardiac biometry deserves greater discussion.

Valvar morphology

The text provides only limited discussion of the importance of evaluating valvar morphology of all four valves (beyond valve presence, relative size and excursion). Too often, fetal cardiology guidelines and textbooks overlook the importance of leaflet morphology, not only of the mitral and tricuspid valves, but particularly of the aortic and pulmonary valves. Subtle valvar abnormalities at mid-gestation may progress and impact upon other areas of cardiac development and function, and may also serve as markers of aneuploidy.

Coarctation

The discussion of sonographic clues for coarctation does not include the importance of a bicommissural ('bicuspid') aortic valve or persistent left superior vena cava. Both abnormalities have been noted to represent markers for arch obstruction.

Management of the left superior vena cava

The text recommends against follow-up for isolated left superior vena cava (LSVC). However, given the association of LSVC with sometimes subtle left-sided obstructive lesions (which may elude prenatal detection), neonatal follow-up may be prudent.

3D/4D imaging

Admittedly, 3D/4D imaging has not become a first-line approach to fetal cardiac imaging and rightly remains investigational. Nevertheless, some discussion of the technique's potential roles may have been useful.

Technique of scanning

As wisely and correctly noted on page 2 of the text, the prenatal detection of cardiac abnormalities is "mainly dependent on the skill of sonographers performing routine obstetric ultrasound scans." Unfortunately, Fetal Cardiology Simplified chooses largely to avoid discussing the technique of acquisition, despite the author's vast personal experience. As a gratifying exception to this rule, the discussion of ventricular septal defects importantly notes that imaging parallel to the ventricular septum may lead to false-positive drop-out. More such scanning tips scattered throughout the text would have been welcome.

Fetal echocardiographic images

Some figures contain overly small images of the fetal heart and the text does not provide digital images or clips for review.

Ductal constriction

The text provides limited discussion of ductal constriction, with no images of a constricted ductus or of a ductal constriction waveform, and no mention is made in the text of the utility of the pulsatility index.

Conclusion

Fetal Cardiology Simplified responds to a critical need for improvement in the prenatal detection and evaluation of CHD. As noted in the book's foreword, the text aims to help interpret cardiac structural abnormalities and to aid in making a correct cardiac diagnosis. The book's greatest assets are its author (a widely recognized, international authority in the field of fetal cardiology) the clinically oriented organization/approach and the tremendous number of excellent sonographic images with fetal cardiac pathology. Fetal Cardiology Simplified should be of great interest and clinical value to obstetric

sonographers, obstetricians, fetal medicine specialists, pediatric cardiologists, and all students interested in fetal cardiology.

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No writing assistance was utilized in the production of this manuscript.

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