

RESEARCH ARTICLE

Open Access



On-call transthoracic echocardiographic interpretation by first year cardiology fellows: comparison with attending cardiologists

Aferdita Spahillari^{1,2}, Ian McCormick², Jesse X. Yang², Gene R. Quinn^{2,3} and Warren J. Manning^{2,4*}

Abstract

Background: Transthoracic echocardiograms (TTE) performed and interpreted by cardiology fellows during off-duty hours are critical to patient care, however limited data exist on their interpretive accuracy. Our aims were to determine the discordance rate between TTEs performed and interpreted by cardiology fellows and National Board of Echocardiography certified attending cardiologists and to identify factors associated with discordance.

Methods: Consecutive on-call TTEs acquired and interpreted by 1st year cardiology fellows over 4.6 years at an academic center were prospectively evaluated by attending cardiologists. Fellow interpretations were classified as concordant or discordant with the attending interpretation. We assessed the association of patient, imaging and fellow characteristics with discordance.

Results: A total of 777 TTE interpretations (730 patients) were performed/interpreted by 40 first year fellows and overread by 13 attendings. The most common indications were assessment of left ventricular function (40.9%) and pericardial effusion (37.3%). There was a major or minor discordance in 4.1 and 17.4% of studies, respectively with 42.1% of disagreements occurring in assessment of left ventricular size and function. The indication to assess left ventricular function [OR 2.19, 95% CI (1.32, 3.62), $P = 0.002$ vs. pericardial effusion] and greater duration of echocardiographic image acquisition (OR 1.02, 95% CI 1.01, 1.03, $P = 0.004$) were independently associated with overall discordance.

Conclusions: In this large prospective study we found that attending cardiologists disagreed with 1 in 5 fellow TTE interpretations. Standardized tools for evaluation of echocardiograms performed by fellows are needed to ensure quality of training and patient safety.

Keywords: Echo, Fellow, Training

Background

Transthoracic echocardiography (TTE) is a widely used, highly available and low cost non-invasive diagnostic imaging modality. Many teaching hospitals rely on cardiology fellows to perform and interpret emergent TTEs after regular laboratory business hours. These studies are critical to guide clinical decision-making and patient management.

While there is an increasing awareness of diagnostic errors as a major source of preventable patient harm [1], data evaluating accuracy of TTEs performed and interpreted by cardiology fellows are scarce. Prior work in this field is limited to retrospective studies of small sample size or fellow interpretations of sonographer-obtained TTEs [2].

Systems-related factors and cognitive errors contribute to wrong, missed or unintentionally delayed diagnoses [3] in many aspects of medicine and national organizations have identified diagnostic errors as a top priority [4]. Accordingly, the Core Cardiology Training Symposium (COCATS) mandates that training of cardiology fellows should include

* Correspondence: wjmanning@bidmc.harvard.edu

¹Departments of Medicine (Cardiovascular Division), Boston, USA

²Departments of Radiology, Beth Israel Deaconess Medical Center and Harvard Medical School, 330 Brookline Avenue, Boston, MA 02215, USA

Full list of author information is available at the end of the article



1 Year Of Cardiology

Léo Pomar



1 Year Of Cardiology:

Ignite the flame of optimism with Get Inspired by is motivational masterpiece, **1 Year Of Cardiology** . In a downloadable PDF format (PDF Size: *), this ebook is a beacon of encouragement. Download now and let the words propel you towards a brighter, more motivated tomorrow.

<https://gandalf.roeckerfam.com/data/scholarship/fetch.php/1916%20a%20novel%20of%20the%20irish%20rebellion.pdf>

Table of Contents 1 Year Of Cardiology

1. Understanding the eBook 1 Year Of Cardiology
 - The Rise of Digital Reading 1 Year Of Cardiology
 - Advantages of eBooks Over Traditional Books
2. Identifying 1 Year Of Cardiology
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an 1 Year Of Cardiology
 - User-Friendly Interface
4. Exploring eBook Recommendations from 1 Year Of Cardiology
 - Personalized Recommendations
 - 1 Year Of Cardiology User Reviews and Ratings
 - 1 Year Of Cardiology and Bestseller Lists
5. Accessing 1 Year Of Cardiology Free and Paid eBooks
 - 1 Year Of Cardiology Public Domain eBooks
 - 1 Year Of Cardiology eBook Subscription Services
 - 1 Year Of Cardiology Budget-Friendly Options
6. Navigating 1 Year Of Cardiology eBook Formats

- ePub, PDF, MOBI, and More
 - 1 Year Of Cardiology Compatibility with Devices
 - 1 Year Of Cardiology Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of 1 Year Of Cardiology
 - Highlighting and Note-Taking 1 Year Of Cardiology
 - Interactive Elements 1 Year Of Cardiology
 8. Staying Engaged with 1 Year Of Cardiology
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers 1 Year Of Cardiology
 9. Balancing eBooks and Physical Books 1 Year Of Cardiology
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection 1 Year Of Cardiology
 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
 11. Cultivating a Reading Routine 1 Year Of Cardiology
 - Setting Reading Goals 1 Year Of Cardiology
 - Carving Out Dedicated Reading Time
 12. Sourcing Reliable Information of 1 Year Of Cardiology
 - Fact-Checking eBook Content of 1 Year Of Cardiology
 - Distinguishing Credible Sources
 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

1 Year Of Cardiology Introduction

Free PDF Books and Manuals for Download: Unlocking Knowledge at Your Fingertips In today's fast-paced digital age, obtaining valuable knowledge has become easier than ever. Thanks to the internet, a vast array of books and manuals are now available for free download in PDF format. Whether you are a student, professional, or simply an avid reader, this treasure trove of downloadable resources offers a wealth of information, conveniently accessible anytime, anywhere. The advent of online libraries and platforms dedicated to sharing knowledge has revolutionized the way we consume information. No longer confined to physical libraries or bookstores, readers can now access an extensive collection of digital books and manuals with just a few clicks. These resources, available in PDF, Microsoft Word, and PowerPoint formats, cater to a wide range of interests, including literature, technology, science, history, and much more. One notable platform where you can explore and download free 1 Year Of Cardiology PDF books and manuals is the internet's largest free library. Hosted online, this catalog compiles a vast assortment of documents, making it a veritable goldmine of knowledge. With its easy-to-use website interface and customizable PDF generator, this platform offers a user-friendly experience, allowing individuals to effortlessly navigate and access the information they seek. The availability of free PDF books and manuals on this platform demonstrates its commitment to democratizing education and empowering individuals with the tools needed to succeed in their chosen fields. It allows anyone, regardless of their background or financial limitations, to expand their horizons and gain insights from experts in various disciplines. One of the most significant advantages of downloading PDF books and manuals lies in their portability. Unlike physical copies, digital books can be stored and carried on a single device, such as a tablet or smartphone, saving valuable space and weight. This convenience makes it possible for readers to have their entire library at their fingertips, whether they are commuting, traveling, or simply enjoying a lazy afternoon at home. Additionally, digital files are easily searchable, enabling readers to locate specific information within seconds. With a few keystrokes, users can search for keywords, topics, or phrases, making research and finding relevant information a breeze. This efficiency saves time and effort, streamlining the learning process and allowing individuals to focus on extracting the information they need. Furthermore, the availability of free PDF books and manuals fosters a culture of continuous learning. By removing financial barriers, more people can access educational resources and pursue lifelong learning, contributing to personal growth and professional development. This democratization of knowledge promotes intellectual curiosity and empowers individuals to become lifelong learners, promoting progress and innovation in various fields. It is worth noting that while accessing free 1 Year Of Cardiology PDF books and manuals is convenient and cost-effective, it is vital to respect copyright laws and intellectual property rights. Platforms offering free downloads often operate within legal boundaries, ensuring that the materials they provide are either in the public domain or authorized for distribution. By adhering to copyright laws, users can enjoy the benefits of free access to knowledge while supporting the authors and publishers who make these resources

available. In conclusion, the availability of 1 Year Of Cardiology free PDF books and manuals for download has revolutionized the way we access and consume knowledge. With just a few clicks, individuals can explore a vast collection of resources across different disciplines, all free of charge. This accessibility empowers individuals to become lifelong learners, contributing to personal growth, professional development, and the advancement of society as a whole. So why not unlock a world of knowledge today? Start exploring the vast sea of free PDF books and manuals waiting to be discovered right at your fingertips.

FAQs About 1 Year Of Cardiology Books

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer webbased readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. 1 Year Of Cardiology is one of the best book in our library for free trial. We provide copy of 1 Year Of Cardiology in digital format, so the resources that you find are reliable. There are also many Ebooks of related with 1 Year Of Cardiology. Where to download 1 Year Of Cardiology online for free? Are you looking for 1 Year Of Cardiology PDF? This is definitely going to save you time and cash in something you should think about. If you trying to find then search around for online. Without a doubt there are numerous these available and many of them have the freedom. However without doubt you receive whatever you purchase. An alternate way to get ideas is always to check another 1 Year Of Cardiology. This method for see exactly what may be included and adopt these ideas to your book. This site will almost certainly help you save time and effort, money and stress. If you are looking for free books then you really should consider finding to assist you try this. Several of 1 Year Of Cardiology are for sale to free while some are payable. If you arent sure if the books you would like to download works with for usage along with your computer, it is possible to download free trials. The free guides make it easy for someone to free access online library for download books to your device. You can get free download on free trial for lots of books categories. Our library is the biggest of these that have literally hundreds of thousands of different products categories represented. You will also see that there

are specific sites catered to different product types or categories, brands or niches related with 1 Year Of Cardiology. So depending on what exactly you are searching, you will be able to choose e books to suit your own need. Need to access completely for Campbell Biology Seventh Edition book? Access Ebook without any digging. And by having access to our ebook online or by storing it on your computer, you have convenient answers with 1 Year Of Cardiology To get started finding 1 Year Of Cardiology, you are right to find our website which has a comprehensive collection of books online. Our library is the biggest of these that have literally hundreds of thousands of different products represented. You will also see that there are specific sites catered to different categories or niches related with 1 Year Of Cardiology So depending on what exactly you are searching, you will be able to choose ebook to suit your own need. Thank you for reading 1 Year Of Cardiology. Maybe you have knowledge that, people have search numerous times for their favorite readings like this 1 Year Of Cardiology, but end up in harmful downloads. Rather than reading a good book with a cup of coffee in the afternoon, instead they juggled with some harmful bugs inside their laptop. 1 Year Of Cardiology is available in our book collection an online access to it is set as public so you can download it instantly. Our digital library spans in multiple locations, allowing you to get the most less latency time to download any of our books like this one. Merely said, 1 Year Of Cardiology is universally compatible with any devices to read.

Find 1 Year Of Cardiology :

1916 a novel of the irish rebellion

15 percussion ensembles element

160 miracles and mysteries of the quran

1850 voyage san francisco to baltimore

1996 north american emergency response guidebook by

1789 the emblems of reason

1985 pacific salmon treaty sharing conservation burdens and benefits

1984 postage stamp catalogue and inventory checklist

160 birds to know

1996 business rankings annual serial

1987 michelin france

199495 vip address

1997 tappi advanced coating fundamentals symposium philadelphia pa may 910 1997 proceedings

1940 the world in flames

1998 scd baseball card price guide

1 Year Of Cardiology :

Technique of Latin Dancing: Laird, W. Specialist product for the advanced latin dancers, good reference book for potential teachers. not for beginners or people without basic knowledge. Technique of Latin Dance 7th Edition (BOOK) 9070
Technique of Latin Dance 7th Edition (BOOK) 9070 edited by Walter Laird. Clear, precise and logical presentations of the principles and techniques of Latin ... Latin Technique Latin Technique. Latin Basics - the Mechanics of Latin Dancing · Latin Basic Movement · Latin Turns · Latin Positions and Partnering · Latin Styling. Latin Technique Also a great latin dance book is "A Technique Of Advanced Latin American Figures" by Geoffrey Hearn, this book contains developments and definitions of ... LAIRD TECHNIQUE OF LATIN DANCING (NEW 2022 ... This new edition of the Laird Technique of Latin Dancing is the first major revision since 2014. It is a definite 'must have' for anyone training candidates ... The Laird Technique Of Latin Dancing (Book) The clear, precise and logical presentation of the principles and techniques of Latin dancing in the book will make a study of this fascinating subject an ... Buy 9070 The Laird Technique Of Latin Dancing The "Laird" technique is used throughout the world for the training of medal test pupils, students, trainers, teachers and coaches and is also used as the ... Ebook - Technique of Latin Dancing (Latin General) This book presents in a clear and logical manner details of the techniques upon which the. Latin-American dances are based. A knowledge of these techniques ... Walter Laird - Technique of Latin Dancing (... It is essential that dancers, particularly in the formative stages of their training, are taught figures that use techniques based on sound principles to help ... Medical Assisting, 9th Edition - 9780357502815 MindTap for Blesi's, Medical Assisting: Administrative & Clinical Competencies, 9th Edition is the digital learning solution that powers students from ... Medical Assisting: Administrative and Clinical Competencies This comprehensive text helps you develop the critical knowledge, skills, and behaviors to succeed as an entry-level medical assistant. Medical Assisting: Administrative & Clinical Competencies ... Strengthen your knowledge base as well as the critical skills and behaviors needed to become a successful entry-level medical assistant with Blesi's MEDICAL ... Medical Assisting, Administrative and Clinical Competencies Over 20 new administrative and clinical procedures that include notes, rationales, and charting examples; New chapter on medical terminology; Electronic health ... Comprehensive Medical Assisting Administrative and ... Divided into three sections, chapters start with general topics, including therapeutic communications, coping skills, and professionalism. Administrative ... Medical Assisting, 8th Edition - 9781337909815 MEDICAL ASSISTING: ADMINISTRATIVE AND CLINICAL COMPETENCIES UPDATE, Eighth Edition, delivers the critical cognitive (knowledge base), psychomotor (skills) and ... Medical Assisting, Administrative and Clinical Competencies Description: This comprehensive text helps you develop the critical knowledge, skills, and behaviors to succeed as an entry-level medical assistant. Medical Assisting: Administrative &

Clinical Competencies Strengthen your knowledge base as well as the critical skills and behaviors needed to become a successful entry-level medical assistant with Blesi's. Workbook to Accompany Medical Assisting This entry-level medical assistant workbook is part of a proven comprehensive learning system that covers all of the administrative, clinical, and general ... Bundle: Medical Assisting: Administrative & Clinical ... Buy Bundle: Medical Assisting: Administrative & Clinical Competencies (Update), 8th + MindTap Medical Assisting, 4 terms (24 months) Printed Access Card ... UCLA Language Materials Project The UCLA Language Materials Project (LMP), is an on-line bibliographic database of teaching and learning materials for over 100 less commonly taught languages ... UCLA Language Materials Project UCLA Language Materials Project · Bibliographic database of teaching materials · Database and guide to authentic materials · Language profiles · Materials reports ... Unique Archive of Language Materials Extends Scope The UCLA Language Materials Project, a database for teachers of less-studied languages ... Authentic materials have been popular among language teachers for at ... UCLA Language Materials Project: Main The UCLA Language Materials Project is an on-line bibliographic database of teaching and learning materials for over 150 less commonly taught languages. UCLA Language Materials Project This website offers a searchable database with hundreds of resources for language education, including both instructional and authentic material. UCLA Language Materials Project - CommonSpaces Jun 21, 2015 — The UCLA Language Materials Project ... The Authentic Materials page of this website provides more information about the materials, and a guide to ... UCLA Language Materials Project The project, funded by the U.S. ... The Authentic Materials page provides a guide to using those materials in the classroom, including sample lesson plans. UCLA Language Materials Project The UCLA Language Materials Project (LMP) is an on-line bibliographic database of teaching and learning materials for over 150 Less Commonly Taught ... Site Reviews: UCLA Language Materials Project This project offers an online bibliographic database of teaching resources for less commonly taught languages. AESTHETICS: The consistent layout and color ... Spotlight on UCLA's Language Materials Project and ... The Language Materials Project maintains portals to each of the 151 languages offered, each with a language profile that provides a regional map, key dialects, ...