

## Review

# Contemporary Features and Management of Endocarditis

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**Abstract:** Infective endocarditis is a rare but devastating disease. Morbidity and mortality rates have failed to improve despite new technological advances. The disease has evolved over time with new significant populations at risk—most notably those with prosthetic valves or implantable cardiovascular devices. These devices pose new challenges for achieving a timely and accurate diagnosis of infection. While the modified Duke criteria is accepted as the gold standard for diagnosing native valve endocarditis, it has been shown to have significantly inferior sensitivity when it comes to identifying infections related to right-heart endocarditis, prosthetic valves, and indwelling cardiac devices. Additionally, prosthetic valves and cardiovascular implantable electronic devices can exhibit shadowing and artifact, rendering transthoracic echocardiography and transesophageal echocardiography results inconclusive or even normal. Having a keen awareness of the varying clinical presentations, as well as emerging valvular imaging modalities such as F-fluorodeoxyglucose cardiac positron-emission tomography plus computed tomography, promises to improve the evaluation and diagnosis of infective endocarditis. However, indications for appropriate use of these studies and guidance on modern clinical management are still needed.

**Keywords:** infective endocarditis; native valve endocarditis; prosthetic valve endocarditis; cardiac device related endocarditis; cardiovascular implantable electronic device

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## 1. Introduction

Infective endocarditis (IE), though a rare disease, continues to carry a significant risk of morbidity and mortality that has remained unchanged over the past four decades, despite advancements in diagnosis and management [1]. This is in stark contrast to improvements observed in other cardiovascular diseases such as myocardial infarction [2]. It is estimated that in-hospital mortality remains at 20% and one-year mortality exceeds 30% [3], a survival rate worse than many cancers [4]. In recent decades, there have been significant changes to the epidemiological and pathophysiological features of infective endocarditis.

This review encompasses pertinent features of IE, with an emphasis on the changing at-risk patient population groups. The average patient age affected by IE has doubled; a significantly higher proportion of infections involve prosthetic valves and indwelling cardiac devices, and across North America and Europe, *Staphylococcus aureus* and healthcare-associated disease is now the most common cause of IE [4]. To conclude, we discuss the challenges of diagnosing modern IE, advance imaging modalities, as well as the management of IE in the setting of indwelling cardiac devices.

A literature search using the PubMed database with results from 2013 to 2023 and the terms “infective endocarditis” AND “treatment” OR “diagnosis” OR “imaging” or “management” was conducted. Studies included in this review consist of observational studies, clinical trials, and guideline statements for the diagnosis and management of IE published by the European Society of Cardiology and American Heart Association

# Endocarditis Contemporary Issues In Infectious Diseases Vol

**Chi-Cheng Huang**



## **Endocarditis Contemporary Issues In Infectious Diseases Vol :**

*Contemporary Challenges in Endocarditis* Michael S. Firstenberg, 2016-11-09 Endocarditis remains an elusive challenge for clinicians to master As the population ages and their comorbidities increase the risk of infecting cardiac structures both native and the ever increasing use of prosthetic support technology also increases In addition the global epidemic of intravenous substance abuse has also resulted in a substantial increase in the number of infected patients Fortunately advances in the diagnostic testing imaging and recognition of the importance of a multidisciplinary management team have also contributed to advances in the care of these critically ill patients Nevertheless optimal therapies need to be individualized and considered in the ever increasing body of scientific literature on this complex and difficult problem

**Current Catalog** National Library of Medicine (U.S.), 1985 First multi year cumulation covers six years 1965 70 [New Surgical and Medical Approaches in Infectious Diseases](#) Richard K. Root, Donald D. Trunkey, Merle A. Sande, 1987

**Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases E-Book** John E. Bennett, Raphael Dolin, Martin J. Blaser, 2019-08-08 For four decades physicians and other healthcare providers have trusted Mandell Douglas and Bennett's Principles and Practice of Infectious Diseases to provide expert guidance on the diagnosis and treatment of these complex disorders The 9th Edition continues the tradition of excellence with newly expanded chapters increased global coverage and regular updates to keep you at the forefront of this vitally important field Meticulously updated by Drs John E Bennett Raphael Dolin and Martin J Blaser this comprehensive two volume masterwork puts the latest information on challenging infectious diseases at your fingertips Provides more in depth coverage of epidemiology etiology pathology microbiology immunology and treatment of infectious agents than any other infectious disease resource Features an increased focus on antibiotic stewardship new antivirals for influenza cytomegalovirus hepatitis C hepatitis B and immunizations and new recommendations for vaccination against infection with pneumococci papillomaviruses hepatitis A and pertussis Covers newly recognized enteroviruses causing paralysis E A71 E D68 emerging viral infections such as Ebola Zika Marburg SARS and MERS and important updates on prevention and treatment of C difficile infection including new tests that diagnose or falsely over diagnose infectious diseases Offers fully revised content on bacterial pathogenesis antibiotic use and toxicity the human microbiome and its effects on health and disease immunological mechanisms and immunodeficiency and probiotics and alternative approaches to treatment of infectious diseases Discusses up to date topics such as use of the new PCR panels for diagnosis of meningitis diarrhea and pneumonia current management of infected orthopedic implant infections newly recognized infections transmitted by black legged ticks in the USA *Borrelia miyamotoi* and Powassan virus infectious complications of new drugs for cancer new drugs for resistant bacteria and mycobacteria new guidelines for diagnosis and therapy of HIV infections and new vaccines against herpes zoster influenza meningococci PPID continues its tradition of including leading experts from a truly global community including authors from Australia Canada

and countries in Europe Asia and South America Includes regular updates online for the life of the edition Features more than 1 500 high quality full color photographs with hundreds new to this edition Enhanced eBook version included with purchase which allows you to access all of the text figures and references from the book on a variety of devices *National Library of Medicine Current Catalog* National Library of Medicine (U.S.),1985 **Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases** John E. Bennett, MD, MACP,Raphael Dolin, MD,Martin J. Blaser, MD,2014-08-28 After thirty five years Mandell Douglas and Bennett s Principles and Practice of Infectious Diseases 8th Edition is still the reference of choice for comprehensive global guidance on diagnosing and treating the most challenging infectious diseases Drs John E Bennett and Raphael Dolin along with new editorial team member Dr Martin Blaser have meticulously updated this latest edition to save you time and to ensure you have the latest clinical and scientific knowledge at your fingertips With new chapters expanded and updated coverage increased worldwide perspectives and many new contributors Mandell Douglas and Bennett s Principles and Practice of Infectious Diseases 8th Edition helps you identify and treat whatever infectious disease you see Get the answers to questions you have with more in depth coverage of epidemiology etiology pathology microbiology immunology and treatment of infectious agents than you ll find in any other infectious disease resource Find the latest diagnoses and treatments for currently recognized and newly emerging infectious diseases such as those caused by avian and swine influenza viruses Put the latest knowledge to work in your practice with new or completely revised chapters on influenza new pandemic strains new Middle East respiratory syndrome MERS virus probiotics antibiotics for resistant bacteria antifungal drugs new antivirals for hepatitis B and C Clostridium difficile treatment sepsis advances in HIV prevention and treatment viral gastroenteritis Lyme disease Helicobacter pylori malaria infections in immunocompromised hosts immunization new vaccines and new recommendations and microbiome Benefit from fresh perspectives and global insights from an expanded team of international contributors Find and grasp the information you need easily and rapidly with newly added chapter summaries These bulleted templates include diagnosis therapy and prevention and are designed as a quick summary of the chapter and to enhance relevancy in search and retrieval on Expert Consult Stay current on Expert Consult with a thorough and regularly scheduled update program that ensures access to new developments in the field advances in therapy and timely information Access the information you need easily and rapidly with new succinct chapter summaries that include diagnosis therapy and prevention Experience clinical scenarios with vivid clarity through a richly illustrated full color format that includes 1500 photographs for enhanced visual guidance

**Advanced Concepts in Endocarditis** Michael S. Firstenberg,Umeshankar Lakshmanadoss,2021-08-25 The concept of endocarditis has evolved significantly over the years While initially associated with patients with advanced co morbidities such as renal failure and chronic immunosuppression endocarditis now spans many diverse disciplines As such the importance of advanced diagnostic imagining tools a better understanding of the pathophysiology of not only the infectious

and non infectious disease process but also of cardiac structural abnormalities and the growing literature on management cannot be underemphasized This book broadens our collective understanding of the spectrum of diagnostic and therapeutic challenges that all areas of medicine must appreciate when faced with the challenging clinical problem of endocarditis

**Journal of the Royal Society of Medicine** Royal Society of Medicine (Great Britain),1985 Includes selected papers from meetings of the Society and of its sections      *Infective Endocarditis* John L. Bruschi,2007-03-13 The first up to date source on the subject in more than a decade this authoritative and all encompassing guide summarizes the latest findings on the epidemiology pathogenesis pathophysiology clinical manifestations diagnosis and treatment of infective endocarditis Written by a world recognized expert with more than 35 years of experience in      *Endocarditis* Merle A. Sande,Donald Kaye,Richard K. Root,1984      **Zoonosis** Jacob Lorenzo-Morales,2012-04-04 Zoonotic diseases are mainly caused by bacterial viral or parasitic agents although unconventional agents such as prions could also be involved in causing zoonotic diseases Many of the zoonotic diseases are a public health concern but also affect the production of food of animal origin thus they could cause problems in international trade of animal origin goods A major factor contributing to the emergence of new zoonotic pathogens in human populations is increased contact between humans and animals This book provides an insight on zoonosis and both authors and the editor hope that the work compiled in it would help to raise awareness and interest in this field It should also help researchers clinicians and other readers in their research and clinical usage

**Volume 6, Issue 2, An Issue of Hospital Medicine Clinics** Chi-Cheng Huang,2017-03-07 This issue of Hospital Medicine Clinics edited by Chi Cheng Huang covers topics including Readmission and Prevention New Anticoagulants and Their Use Electronic Health Records Intraoperability and Lessons Learned Rapid Response MET Calls and Codes as a Nocturnist Controversies in Perioperative Medicine Cerebrovascular Accidents Models in Physician Advanced Practitioners Endocarditis and Pulmonary Embolism      **Emerging Infectious Diseases** ,2002      Useful and Harmful Interactions of Antibiotics Maur Neuman,2019-06-04 First published in 1987 This book is intended as a guide for a very large group of practitioners in the medical pharmaceutical and biological fields It will enable them to prescribe and use antibiotics in an improved way      Bacterial Infections of Humans Alfred S. Evans,Philip S. Brachman,2013-03-08 In Memoriam of Alfred S Evans This third edition of Bacterial Infections of Humans is dedicated to Alfred Spring Evans who died on January 21 1996 2Yz years after a diagnosis of cancer Al was the senior editor of this textbook which he founded with Harry Feldman in 1982 Al was a clinician epidemiologist educator catalyst for biomedical research historian author speaker seeker of the truth sincere friend of students sports enthusiast traveler and truly a man of all seasons He was a devoted husband to Brigitte Klug Evans father of three children and grandfather of four Al was born in Buffalo New York on August 21 1917 to Ellen Spring and John H Evans M D one of the United States s first anesthesiologists and an early researcher in the field of oxygen therapy He received his undergraduate training at the University of Michigan was awarded an M D degree in 1943 from the

University of Buffalo interned in Pittsburgh Pennsylvania and performed his medical residency at the Goldwater Hospital in New York City He was in the United States Army from 1944 to 1946 assigned as a public health officer to a base in Okinawa Japan It was there that he met Drs

**Current Therapy in Avian Medicine and Surgery Volume II E-Book** Brian Speer, Yvonne R.A. van Zeeland, 2025-03-04 Stay up to date with the latest advances in avian medicine Current Therapy in Avian Medicine and Surgery Volume II brings a wealth of new information on the medical care of avian species with practical approaches to diagnosis and therapy of psittacines and other birds With many of the topics not previously covered in the first volume the two books are complementary to one another and provide any veterinarian with an interest in avian medicine whether novice or expert the latest advances in internal medicine anesthesia analgesia and surgery Sections dedicated to behavior and welfare neonatology and pediatrics conservation and practice management explore important but less commonly discussed aspects of avian practice With contributions from globally recognized experts on avian medicine this is a must have resource for anyone seeking to enhance and expand their expertise and skills in avian healthcare welfare and conservation With the exception of updates on relevant current topics the information presented in this volume predominantly includes material not previously covered in the first volume The many photographs illustrations and comprehensive tables included in this volume visually highlight key concepts of current avian practice standards Sections on pediatrics falconry toucans and hornbills feature specific topics which are less comprehensively included in most references Focused sections on the respiratory system the beak and skull feathers and feet offer detailed information on these particular anatomical regions Pharmacologic intervention and options are explored in depth to allow for clinicians to gain an optimal understanding of how to best develop treatment plans for their patients NEW An eBook version is included with print purchase The eBook allows you to access all of the text figures and references with the ability to search customize your content make notes and highlights and have content read aloud Current Therapy format provides up to date information about patient management of specific disorders including innovations in therapy and the pros and cons of proposed treatments Coverage of a wide variety of bird species includes psittacines pigeons raptors ratites waterfowl gallinaceous birds and less common species More than 800 full color images depict avian disease conditions show management strategies and thought processes and aid in formulating guidelines to care Summary tables simplify the lookup of key facts and treatment guidelines Appendices provide quick access to a current drug formulary normal biological data clinical pathologic reference ranges and growth and feeding charts of neonatal birds

**Update 1987** J. L. Vincent, 1987 *UCSF Magazine*, 1985

*Recent Advances in Pediatrics - Special Volume 22 - Immunology, Infections and Immunization* Suraj Gupte, 2013-06-30 Special Volume 22 of Recent Advances in Pediatrics is a compilation of reviews bringing trainees and physicians fully up to date with key developments in paediatric immunology infections and immunisation Divided into four sections Part 1 discusses issues and concerns in immunology immunodeficiency and immunotherapy Part 2 examines

infections that may be encountered in children including HIV tuberculosis and meningococcal disease Parts 3 and 4 cover immunisation and pharmacotherapy Presented in an easy to follow format Special Volume 22 follows a multidisciplinary approach Each chapter finishes with a summary of key learning points and extensive references for further reading Clinical photographs illustrations and tables enhance learning Key points New updated volume presenting latest developments in paediatric immunology infections and immunisation Multidisciplinary approach easy to follow format Extensive references and key learning points summarised in each chapter Includes contributions from experts in London Liverpool and New York

*Infective Endocarditis* Louis Weinstein, John L. Brusch, 1996 Providing a thorough examination of this disease that causes valvular infection Infective Endocarditis covers all aspects from the pre antibiotic era to the current problems of prosthetic valve endocarditis endocarditis associated with intravenous drug abusers and the treatment of multiply resistant organisms The first chapters cover the history of infective endocarditis from the 15th Century to the advent of modern antibiotic and surgical therapy for valvular infection Chapters on epidemiology microbiology pathogenesis pathophysiology and pathology serve as grounding for the clinical aspects of the disease Key chapters on clinical correlations clinical manifestations diagnosis including a complete discussion of the use of echocardiography and medical and surgical treatment of endocarditis provide a comprehensive approach to patient care

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lycopersicon esculentum mill tomatoes whole halved vertically and halved horizontally the tomato təmeɪtoʊ or təməːtoʊ is the edible berry of the plant solanum lycopersicum 1 2 commonly known as the tomato plant the species originated in western south america mexico and central america

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the u s is second to china california and florida grow most commercial tomatoes here tomato juice is ohio s state drink in cold climates tomato plants in a garden die when the frost comes in warm places tomatoes can grow year round a huge tomato plant grows at disney world and sprawls over an area larger than an olympic size swimming

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1 believe it or not tomatoes aren t always red they can be yellow pink purple black and even white 2 found at walt disney world resort florida usa the largest single tomato plant in the world covers an area of 56 73 metres sq that s bigger than an olympic size swimming pool 3 it s thought that tomatoes originally came from peru 4

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tomatoes are the fruit of the tomato plant they originated in the south american andes around the area of modern day peru and was first used as a food by the aztec s in southern mexico because the tomato has seeds and grows from a flowering plant botanically it is classed as a fruit not a vegetable

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tomatoes are commonly called vegetables but they are actually fruits they are eaten raw or used in cooking canned tomatoes and tomato juice are also popular tomatoes are grown in all mild regions of the world they belong to the nightshade family tomato plants generally have many spreading branches the leaves are hairy and have a strong

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