

Endocarditis: Why a team approach is the strongest predictor of survival

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Infective endocarditis (IE) remains a severe condition with high morbidity and mortality, despite advances in antimicrobial therapy and surgical techniques. The complexity of its presentation, diagnosis, and management often necessitates a coordinated approach, moving beyond the traditional single-specialty model. This shift towards multidisciplinary care has emerged as a significant factor in improving patient outcomes.

KEY TAKEAWAYS

- **The Pivot:** Multidisciplinary team involvement is now recognized as a key intervention with a strong signal for improved survival in infective endocarditis.
- **The Data:** Patients managed by an endocarditis team consistently show lower in-hospital and long-term mortality rates compared to those receiving standard care.
- **The Action:** Clinicians should prioritize early referral to a dedicated endocarditis team for all suspected or confirmed cases, integrating this approach into routine practice.

Infective endocarditis, a microbial infection of the endocardial surface of the heart, primarily affecting the heart valves, presents a formidable challenge in clinical practice. Its incidence, while relatively low, carries a substantial burden of disease, with in-hospital mortality rates remaining stubbornly high, often ranging from 15% to 30%. The disease is characterized by a wide spectrum of clinical manifestations, from subtle, non-specific symptoms to acute, life-threatening complications such as heart failure, systemic embolization, and sepsis. Diagnosing IE requires a high index of suspicion and relies on a combination of clinical criteria, microbiological evidence, and imaging findings, particularly echocardiography. The Duke criteria, a cornerstone of diagnosis, integrate these elements to classify cases as definite, possible, or rejected IE. But even with established diagnostic pathways, the sheer complexity of managing these patients often overwhelms individual specialties.

The patient population affected by IE is diverse, encompassing individuals with pre-existing valvular heart disease, prosthetic valves, congenital heart defects, intravenous drug use, and healthcare-associated infections. This heterogeneity means that management strategies must be highly individualized, considering factors such as the causative microorganism, the extent of valvular damage, the presence of complications, and the patient's overall comorbidity burden. Standard-of-care involves prolonged courses of intravenous antibiotics, often guided by susceptibility testing, and surgical intervention for indications such as severe heart failure, uncontrolled infection, large vegetations with embolic risk, or prosthetic valve dehiscence. The decision to operate, and its timing, is often fraught with difficulty, balancing the risks of surgery in critically ill patients against the risks of ongoing infection and complications. This is

where the concept of an 'endocarditis team' has gained traction, recognizing that no single clinician or specialty possesses all the necessary expertise to navigate these intricate cases effectively.

The Rationale for Team-Based Care

The argument for a multidisciplinary endocarditis team stems from the inherent complexity of the disease. IE demands expertise from a diverse array of medical and surgical specialties. A typical endocarditis team might include cardiologists, infectious disease specialists, cardiac surgeons, neurologists (given the high incidence of embolic stroke), microbiologists, and intensivists. The coordinated input from these specialists allows for a holistic assessment of the patient, ensuring that all aspects of their condition, from antimicrobial selection to surgical timing and complication management, are addressed comprehensively. This integrated approach contrasts sharply with fragmented care, where patients might be managed sequentially by different specialists, potentially leading to delays, conflicting advice, or missed opportunities for optimal intervention.

The team's role extends beyond initial diagnosis and treatment planning. It involves ongoing monitoring, adjustment of therapy, and long-term follow-up. For instance, the infectious disease specialist guides antibiotic choice and duration, while the cardiologist monitors cardiac function and assesses valvular damage. The cardiac surgeon evaluates surgical candidacy and timing, a decision often made in conjunction with the entire team, weighing the risks and benefits. This collaborative decision-making process is particularly important for patient survival in cases where surgical intervention is borderline or highly complex, such as in patients with prosthetic valve endocarditis or extensive perivalvular abscesses. The team approach ensures that all relevant clinical data are considered, and a consensus-driven management plan is developed, minimizing the potential for errors or suboptimal care.

The Impact on Patient Outcomes

The most compelling evidence for the endocarditis team model lies in its consistent association with improved patient outcomes. Studies examining the impact of these teams have repeatedly demonstrated a significant reduction in both in-hospital and long-term mortality. This mortality benefit is not merely anecdotal; it reflects a tangible improvement in survival that transcends variations in patient demographics or disease severity. Patients managed by a dedicated endocarditis team are more likely to receive appropriate and timely antimicrobial therapy, undergo necessary surgical interventions at the optimal time, and experience fewer complications. The team's collective expertise facilitates quicker diagnosis, more accurate risk stratification, and a more aggressive, yet judicious, approach to management. This is particularly relevant given the high rates of cardiovascular disease mortality globally, where conditions like IE contribute significantly.

Beyond mortality, team-based care also improves other critical endpoints. Patients are less likely to experience recurrent infections, require fewer re-hospitalizations, and often have a better quality of life post-discharge. The team's focus on comprehensive care extends to secondary prevention strategies, including patient education on antibiotic prophylaxis and recognition of symptoms, which are vital for preventing future episodes. For example, the team can educate patients on the importance of medication adherence, perhaps even recommending tools like a 7-Day Weekly Pill Organiser to support complex antibiotic regimens. This proactive approach to patient management is a hallmark of effective multidisciplinary care. The benefits are seen across various subgroups, including those with prosthetic valve endocarditis, a particularly

challenging form of the disease with higher mortality rates. The team's ability to coordinate complex care pathways, from initial presentation to post-discharge follow-up, is a key driver of these improved outcomes.

Implementing and Sustaining Team-Based Care

Establishing an effective endocarditis team requires institutional commitment and a clear organizational structure. It is not enough to simply have a collection of specialists; they must function as a cohesive unit, with regular meetings, established communication protocols, and shared decision-making processes. The team should have a designated leader, often an infectious disease specialist or a cardiologist with expertise in valvular heart disease, who facilitates communication and ensures adherence to agreed-upon protocols. Regular case conferences, where complex cases are discussed and management plans are formulated, are essential for fostering collaboration and ensuring consistency of care. These meetings also serve as valuable educational opportunities for team members, promoting continuous learning and skill development.

Challenges to implementing this model include resource allocation, particularly in smaller hospitals or those without dedicated cardiac surgery units. But even in such settings, a virtual endocarditis team, leveraging telemedicine and remote consultations, can provide significant benefits. The key is to ensure that patients with IE, regardless of where they initially present, have access to the collective expertise of specialists. This might involve formal referral pathways to tertiary centers with established endocarditis teams. The long-term sustainability of these teams also depends on ongoing institutional support, including funding for dedicated personnel, administrative support, and access to necessary diagnostic and therapeutic resources. The investment in these teams is justified by the significant improvements in patient survival and reduction in healthcare costs associated with prolonged hospital stays and complications from suboptimal care. The broader implications of healthcare policy on patient outcomes are evident here, as systemic support for such teams can dramatically alter the trajectory of a severe illness.

Where it falls short

Despite the clear benefits, the widespread implementation of dedicated endocarditis teams faces practical hurdles. Not every hospital, particularly those in rural or underserved areas, possesses the full complement of specialists required for a comprehensive team. This disparity in resources can lead to unequal access to optimal care, with patients in smaller institutions potentially receiving fragmented management. But even in well-resourced centers, the effectiveness of a team relies heavily on the commitment and collaboration of its members. Personality clashes, differing clinical philosophies, or a lack of clear leadership can undermine the team's efficacy. The evidence, while strong, often comes from observational studies or retrospective analyses, which, while robust, cannot definitively establish causality in the same way a randomized controlled trial might. But given the ethical and practical challenges of randomizing patients with a life-threatening condition like IE to either team-based or standard care, such studies are unlikely to materialize. Still, the consistent signal across multiple cohorts provides a compelling argument for this model of care. The challenges in implementing new care models, even when evidence is strong, are well-documented across various medical fields. The precise composition and optimal structure of an endocarditis team can also vary, and there is no single universally accepted model. Some teams may be more heavily weighted towards surgical expertise, while others may prioritize infectious disease input. The ideal balance likely depends on the specific patient population served and the institutional resources available. But the core principle remains: bringing together diverse expertise to manage a complex disease.

The benefits of this collaborative approach are not limited to endocarditis; similar models have shown success in other complex conditions, such as cancer and heart failure. The future of IE management will undoubtedly involve further refinement of these team-based approaches, potentially incorporating advanced technologies like artificial intelligence for risk stratification or remote monitoring. For now, the message is clear: an endocarditis team is not a luxury, but a necessity for improving patient survival.

CLINICAL IMPLICATIONS

The data on endocarditis teams are unequivocal: this is an intervention with a mortality signal that cannot be ignored. For clinicians, particularly those in general practice or emergency medicine, the immediate implication is to recognize the high importance of early referral. Suspected or confirmed cases of infective endocarditis should trigger an urgent consultation with a specialist team, not just an individual cardiologist or infectious disease physician.

The industry, particularly medical device manufacturers and pharmaceutical companies, should take note. While developing new antibiotics or prosthetic valves is vital, optimizing the delivery of existing therapies through integrated care models offers a significant, often overlooked, opportunity to improve patient outcomes. Investment in infrastructure and training to support these teams could yield substantial returns in public health. For patients, this means advocating for comprehensive, team-based care. Knowing that a multidisciplinary approach offers the best chance of survival should empower patients and their families to seek care at institutions that embrace this model. It highlights that the quality of care in a complex disease like IE is not solely about the drug or the surgeon, but the entire ecosystem of support.

This shift in focus, from individual expertise to collective intelligence, represents a maturation of our approach to complex medical conditions. It acknowledges that the sum of specialized parts is greater than any single component. The Oxford Handbook of Infectious Diseases and Microbiology provides a solid foundation for understanding the pathogens involved, but the clinical reality of IE demands a broader, more integrated strategy.

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