Case Report

Clinical pharmacy of infective endocarditis

Shirlin M S*

Clinical Pharmacist, Heart city, Kauvery Hospital, Trichy, Tamil Nadu
*Correspondence

Abstract

Background: Infective Endocarditis (IE) remains a life-threatening condition with a global incidence of approximately 3–10 per 100,000 annually and a six-month mortality rate reaching 25–30%. Effective management in 2026 relies on early diagnosis via the Modified Duke Criteria and optimized, targeted antimicrobial therapy. This case highlights the critical impact of a clinical pharmacist in guiding antimicrobial selection and facilitating transition to outpatient care

Key words: Antimicrobial therap; Young man; Hepatitis C; Streptococcus gordonii

1. Case Presentation

A 21-year-old man presented with a 2-month history of intermittent, cold and cough with evening rise in temperature. The fever was insidious in onset, and progressive. He was suspected to be indulging in addictive drugs and was known to be positive for HCV.

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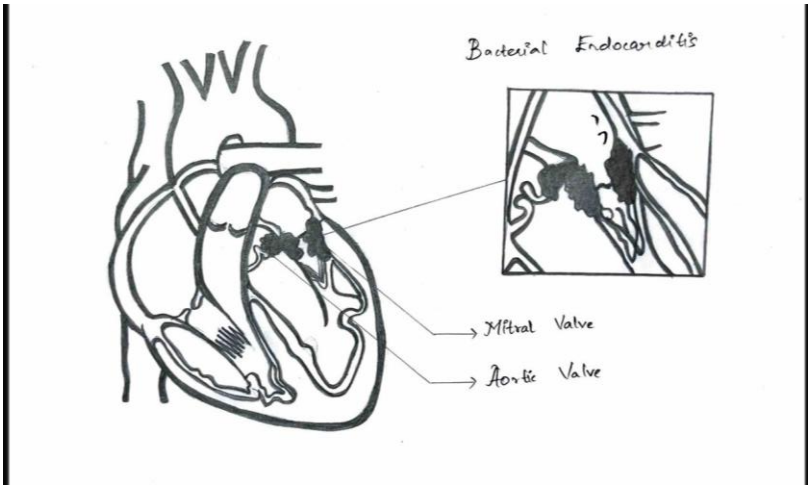
2. Clinical Findings

Lab findings: He had elevated ESR and CRP. Blood cultures on admission were positive for Streptococcus gordonii. His antibiogram revealed resistance only to macrolides.



Echocardiography: It demonstrated vegetations on mitral valve and aortic valve, severe Aortic Regurgitation, severe Left Ventricular dysfunction (EF 30 %) and normal sinus rhythm.

He was started on antimicrobial therapy:

3. Treatment

Drug	Dosage	Frequency
Inj. Ceftriaxone	2gm IV	OD
Inj. Ceftriaxone	1gm	OD

He was discharged in a stable condition and asked for review 2 weeks later in outpatient department.

4. Discussion

This case report describes a challenging case of Bacterial Endocarditis and its complications. Presumably both the Endocarditis and Hepatitis C arose owing to intravenous drug use. Infective endocarditis (IE) is an infection of the heart's endocardial structures, particularly valves. It may also infect congenital anomalies such as septal defects, Patent Foramen Ovale (PFO), Patent Ductus Arteriosus (PDA) an Coarctatrion of Aorta(CoA) and cause significant valve destruction and dysfunction if not treated promptly. It can affect native, bioprosthetic, and mechanical valves, including a bivuspid Aortic Valve, as well as cardiac implantable electronic devices such as pacemakers and defibrillators.IE is commoner in men.

It is increasingly observed in younger individuals in developing regions and among people who inject drugs, who often have coexisting infections such as HIV or HCV. The incidence of bacterial endocarditis among drug users is estimated at 1.5-20 cases per 100 individuals annually, nearly 20-fold higher than in the general population. Non-sterile injection practices introduce skin flora and other contaminants directly into the bloodstream, while particulate matter and impurities in injected substances can damage the endocardium, particularly on right-sided valves.

Right-sided IE accounts for only 5-10% of all cases and most frequently involves the tricuspid Mechanisms underlying IE in intravenous drug users also include high bacterial load from skin and needles inoculated into the venous side and right-sided circulation. IV drug associated vasospasm leads to intimal damage and thrombus formation, thus providing nidus for bacterial aggregation on valves.

Associated clinical consequences include valvular insufficiency, tissue destruction, intracardiac abscesses, atrioventricular block, and septic pulmonary emboli, which may manifest as pneumonia, pulmonary abscesses, or empyema. Although bacterial pathogens predominate, rare cases are caused by fungi such as Candida species andfastidious organisms including Coxiella burnetii, Tropheryma whipplei, and Bartonella species.

6. Clinical characteristics

The classic physical findings are rarely seen, appearing only in 5-15% of IE patients.

S. No	Clinical Findings	Clinical Examination	Discovered by
1	Janeway lesions	Irregular, non-tender, erythematous, or hemorrhagic macules or papules commonly found on the palm and soles, lasting days to weeks.	Dr. Edward Janeway, 1899
2	Osler nodes	Tender, purple-pink nodules with a pale center and an average diameter of 1-1.5 mm. They are generally found on the distal fingers and toes, though they can also present on the lateral digits, hypothenar, and thenar muscles. The pain usually proceeds with nodule development, and they disappear in hours to days, leaving no sequelae.	Dr. William Osler, 1893.
3	Roth's spots	These retinal spots are round, oval, or flame shaped hemorrhages with a small white center. The white spot forms because a tiny clot of fibrin develops where a small vessel has ruptured. When the retinal capillary breaks, blood leaks out, platelets stick to the injured area, and a clot forms-creating the white- centered appearance.	Mortiz Roth, 1872
4	Splinter hemorrhages	It reflects rupture of the longitudinally oriented capillaries within the nail plate, resulting in blood extravasation and producing the characteristic linear discoloration.	George Blumer,1923

Symptoms of right-sided IE typically reflect pulmonary involvement-cough, dyspnea, hemoptysis-along with fever, chest pain, and fatigue.

Blood Culture: At least 3 sets of blood cultures obtained from different venipuncture sites should be obtained, with the first and last samples drawn at least 1 hour apart. Arterial blood cultures may be required.

7. Antibiotic therapy

Eradicating bacteria from the fibrin-platelet thrombus in infective endocarditis is challenging due to the

- Extremely high bacterial burden within vegetations,

- The deep-seated location of organisms,
- Their reduced metabolic and replicative activity, and
- The inhibitory effect of fibrin and leukocytes on antibiotic penetration.

Consequently, bactericidal antibiotics are essential for successful treatment of valvular infection. Early detection of bacteremia and prompt initiation of broad-spectrum intravenous antibiotics are critical. Staphylococcal infections are notably aggressive, often leading to severe regurgitation and acute heart failure that may necessitate early surgical intervention. Standard management typically involves a 6-week course of targeted antimicrobial therapy based on blood culture results, while empiric regimens should provide coverage for staphylococci, streptococci, and Enterococcus faecalis.

Empiric antibiotic regimens for suspected infective endocarditis

Primary antibiotic agents: Penicillin, gentamicin, Vancomycin or daptomycin: These agents cover gram-positive organisms such as, MSSA, MRSA, streptococci, and most enterococci.

Secondary antibiotic agents: Ceftriaxone: Covers gram-negative and gram-positive organisms. It provides superior coverage for Streptococci and HACEK organisms. -OR-Cefazolin: Synergistic MSSA coverage when used with vancomycin or daptomycin.

8. Recommendations

- It is reasonable to administer penicillin for 4 weeks with single daily-dose gentamicin for the first 2 weeks of therapy.
- If the isolate is susceptible, then ceftriaxone alone may be considered. In our case ceftriaxone was prescribed, since the organism is susceptible to ceftriaxone.
- Vancomycin alone may be a reasonable alternative in patients who are intolerant of beta lactam therapy.

9. Streptococcus gordonii

Streptococcus gordonii is a member of the Viridans group, is a gram-positive, non-motile coccus that grows in pairs or chains. Organisms within this genus are comprised of both pathogenic bacteria (S. pneumoniae and S. pyogenes) and non-pathogenic bacteria (S. gordonii andS. mutans). It is typically non-pathogenic bacterium found in the skin, oral cavity, upper respiratory tract, and intestine. Although it predominantly resides on mucosal surfaces—particularly within the oral cavity, it can also be isolated from environmental sources such as water, soil, plants, and food. As an early colonizer, S. gordonii adheres readily to host tissues, including tooth surfaces and heart valves, and contributes to the formation of biofilms. Although known as a commensal organism, viridans streptococci are becoming recognized as an opportunistic pathogen in the immunocompromised host.

10. Conclusion

Timely diagnosis of Staphylococcus-associated infective endocarditis requires a high index of suspicion, particularly in individuals with a history of intravenous drug use, and is best achieved through coordinated management by a multidisciplinary team. Improving outcomes in this population depends on increasing awareness of intravenous drug use, strengthening preventive outreach services, and facilitating early access to care. Equally important are strategies that emphasize the importance of medication adherence, including structured patient education, counselling, and close follow-up—often supported by clinical pharmacists—to reinforce understanding of treatment goals and the necessity of completing prolonged antibiotic regimens. In patients at high risk for poor adherence, treatment failure in the outpatient setting is a significant concern, with an increased likelihood of being lost to follow-up. Non-adherence to drug therapy substantially elevates the risk of adverse outcomes, including sudden death. Effective antibiotic stewardship, with timely escalation or de-escalation guided by microbiological data, further optimizes therapeutic efficacy while minimizing resistance and toxicity. Recognizing the high risk of treatment failure, mandatory post-discharge follow-up calls were implemented to reinforce compliance, ensure continuity of care, and improve overall outcomes. Integrating these measures into a patient-centered care model promotes early detection, reduces complications, and enhances the quality of care for patients with infective endocarditis.