Case Series

Infective endocarditis: A case series

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Abstract: Infective endocarditis, characterized by inflammation of the inner lining and valves of the heart, presents a diagnostic challenge due to its diverse clinical manifestations. This case series examines five patients with infective endocarditis, each with unique presentations. This study highlights the importance of considering this diagnosis in patients with risk factors for fever or sepsis of unknown origin. A comprehensive history and meticulous physical examination are crucial for guiding the management and reducing morbidity and mortality. These cases demonstrate the potential of both intracardiac and extracardiac complications associated with infective endocarditis. By analyzing these successfully managed cases, this study aimed to enhance clinicians' understanding of the varied presentations of infective endocarditis and emphasize the significance of prompt recognition and appropriate management in improving patient outcomes.

Keywords: Infective endocarditis; diagnosis; bacterial endocarditis; antibiotic therapy; Surgical Intervention

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1. Introduction

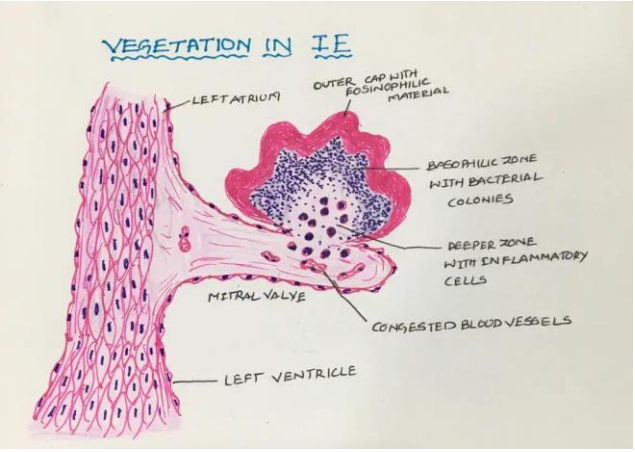
Infective endocarditis is a serious and potentially life-threatening condition characterized by inflammation of the endocardium, which includes the inner lining of the heart chambers and the heart valves. This infection can be caused by various microorganisms, most commonly bacteria, but occasionally fungi or other pathogens. The disease can manifest with a wide array of clinical presentations, making it a diagnostic challenge for healthcare providers. Symptoms may range from subtle and nonspecific, such as low-grade fever and fatigue, to more severe manifestations like acute heart failure or embolic events.

Clinicians should maintain a high index of suspicion for infective endocarditis in patients with known risk factors who present with unexplained fever or sepsis. Risk factors include pre-existing heart valve disease, prosthetic heart valves, intravenous drug use, and recent dental or surgical procedures. The disease can lead to numerous complications, affecting both cardiac and extracardiac structures. Cardiac complications may include valvular destruction, abscess formation, and conduction abnormalities, while extracardiac complications can involve embolic events to various organs, such as the brain, kidneys, or spleen.

Diagnosis of infective endocarditis relies on a combination of clinical, microbiological, and imaging findings. The modified Duke criteria, which incorporate these elements, are widely used to assist in diagnosis. Blood cultures are crucial for identifying the causative organism and guiding antibiotic therapy. Echocardiography, both transthoracic and transesophageal, plays a vital role in detecting vegetations, assessing valvular damage, and identifying complications.

A comprehensive patient history and meticulous physical examination are crucial in guiding appropriate management strategies, which can significantly reduce morbidity

and mortality associated with infective endocarditis. The history should focus on identifying potential sources of bacteremia, recent medical procedures, and symptoms suggestive of embolic events. Physical examination findings may include fever, new or changing heart murmurs, peripheral stigmata of endocarditis (such as Janeway lesions or Osler's nodes), and signs of systemic embolization.



Treatment of infective endocarditis typically involves prolonged courses of intravenous antibiotics tailored to the causative organism. In some cases, surgical intervention may be necessary, particularly for patients with severe valvular damage, large vegetations at high risk for embolization, or uncontrolled infection despite appropriate antibiotic therapy. The timing and indications for surgery should be carefully considered on an individual basis, taking into account the patient's overall clinical status and the specific characteristics of the infection.

Prevention of infective endocarditis is also an important aspect of management, particularly for high-risk patients. This may include antibiotic prophylaxis for certain dental or surgical procedures, although guidelines for prophylaxis have become more restrictive in recent years. Patient education regarding proper dental hygiene and the importance of seeking medical attention for potential sources of bacteremia is crucial.

Early recognition and prompt intervention are key to improving patient outcomes in this potentially life-threatening condition. Ongoing research continues to refine diagnostic techniques, treatment strategies, and prevention measures for infective endocarditis. As our understanding of the disease evolves, management approaches may be further optimized to enhance patient care and reduce the burden of this serious infection.

2. Case Series

This paper presents a case series of five such successfully managed patients with infective endocarditis each of who presented with varied manifestations.

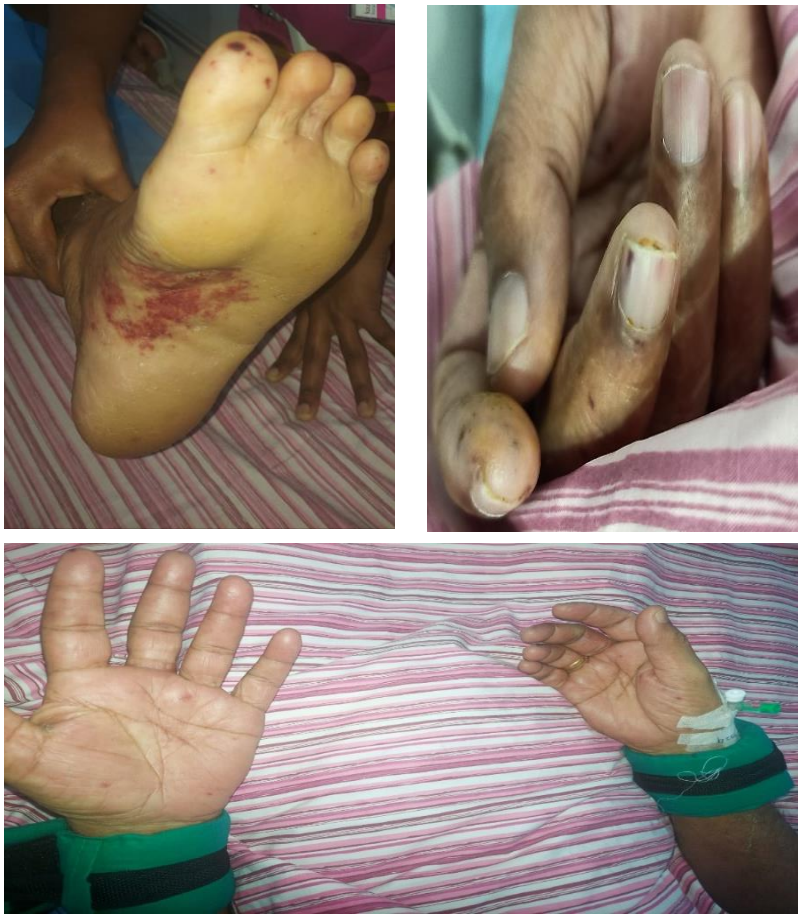
Here is the initial assessment of the five patients:

Vitals	**Case 1 Mr. J**	**Case 2 Mr. J**	**Case 3 Mr. A**	**Case 4 Mrs. S**	**Case 5 Mr. K**
Fever	+	+	+	+	-
Anorexia, weight loss, malaise	+	+	+	-	+
Myalgias, arthralgias	-	-	+	-	-
Heart murmur	+	+	+	+	+
Arterial emboli	+	-	-	+	-
Aneurysm	-	+	-	-	+
Pallor	+	+	+	+	+
Clubbing	+	+	+	-	+
Neurologic manifestations	+	-	-	+	-

Peripheral manifestations (Osler's nodes, subungual hemorrhages, Janeway lesions, Roth's spots)	+	-	-	-	-
Anemia ,Leukocytosis	+	+	+	+	+
Elevated CRP	+	+	+	+	+

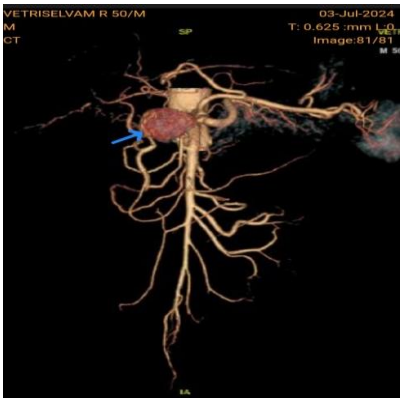
2.1. Case 1

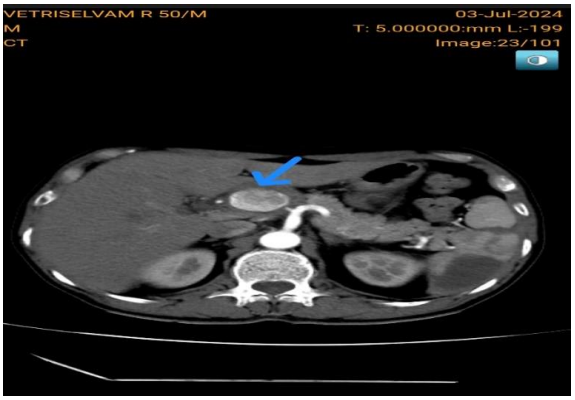
This patient presented with peripheral manifestations (Osler's nodes, subungual haemorrhages, Janeway lesions, Roth's spots).



2.2. Case 2

This patient presented with the above-mentioned complaints, was advised for CT scan





Impression

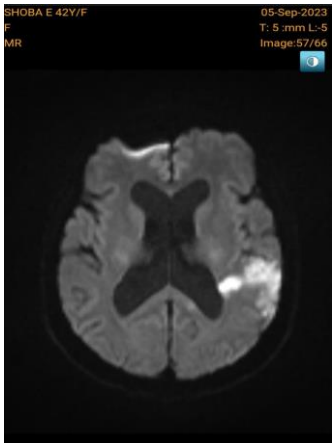
CECT: Pseudo aneurysm with partial thrombus - distal common hepatic artery

2.3. Case 3

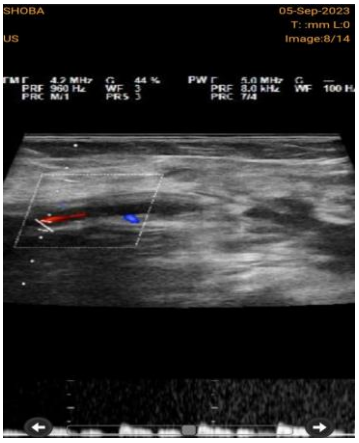
This patient presented with complaints of fever, anorexia, weight loss, and malaise along with an elevated ESR. Absence of neurologic and peripheral manifestation.

2.4. Case 4

This patient was confirmed with the above-mentioned initial assessments, especially with neurologic manifestation. so advised for MRI and Doppler Tests.



MRI



Doppler

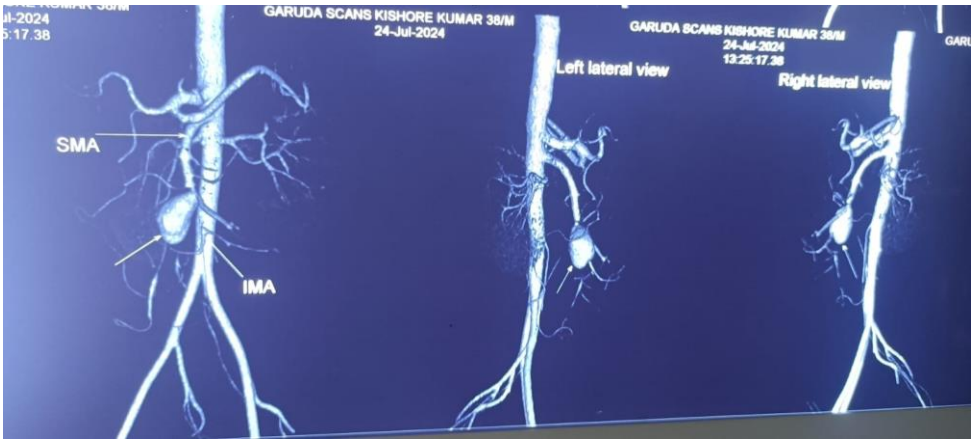
Impressions

MRI Brain: Acute infarct involving left temporal lobe, posterior parietal and B/L periventricular cortex

Doppler: Subacute thrombosis of right distal brachial artery.

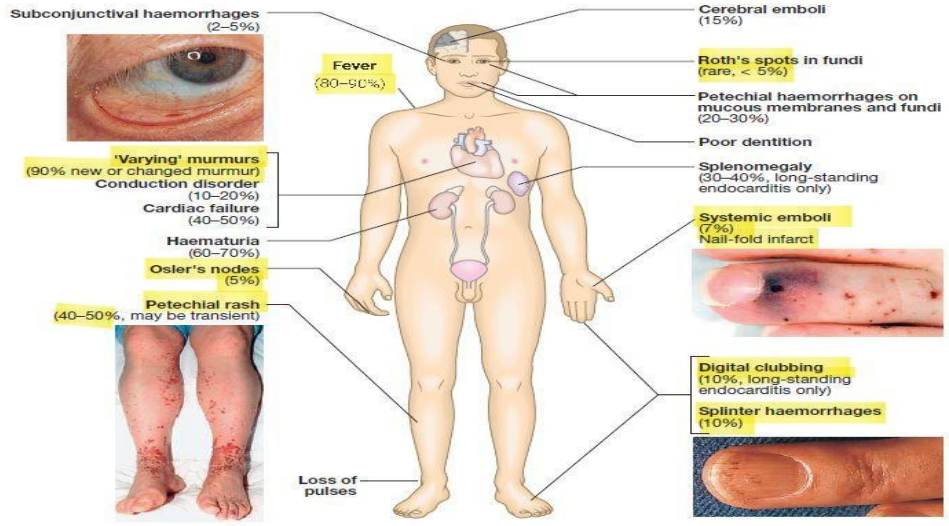
2.5. Case 5

This patient presented without fever but with anemia, leukocytosis and elevated ESR. CT - angiogram was advised for the patient.



Impression

CT angio: 3.3×3.1×3.6 cm SMA Aneurysm



Blood culture drawing

Three, two-bottle blood culture sets containing the appropriate volume of blood (10 mL per bottle) were obtained from different venipuncture sites over 1–2 hr.

Management

Vitals	Case 1 Mr. J	Case 2 Mr. V	Case 3 Mr. A	Case 4 Mrs. S	Case 5 Mr. K
Echo	Flail AML – mass attached to aml, Mass attached to pml, Severe MS/ moderate MR, Moderate LV dysfunction (ef – 38%)	MVP-PML, grade 2 MR, normal LV function	Bicuspid aortic valve thickened, Vegetations attached to aortic valve, Severe AR, Normal LV function	RHD/ flail aml / moderate MR/ mobile vegetation of size 5*5mm attached to tip of AML/ Mild AR/TR/PAH.	Ruptured chordae, Vegetations in mitral valve (1.4×1.1cm), Severe MR, Normal LV function
Empirical antibiotic therapy	Ceftriaxone and vancomycin	Ceftriaxone and vancomycin	Ceftriaxone and gentamicin	Ceftriaxone and vancomycin	Ceftriaxone and vancomycin

Emergencies

Case 1 Mr. J

1. Had developed bradycardia and complete heart block
2. Had to undergo emergency temporary pacemaker implantation
3. Reverted to sinus rhythm and pacemaker removed

Case 2 Mr V

1. Had pseudoaneurysm with thrombus from distal common hepatic artery + Splenic infarcts
2. Had to undergo percutaneous glue embolization under fluoroscopy guidance of large common hepatic artery mycotic aneurysm

Case 5 Mr K

1. Had features of impending SMA mycotic aneurysm rupture and suspicion of bowel ischemia
2. Undergone explorative laparotomy with ligation of SMA aneurysm

3. Re exploration after 48 h showed normal bowel.

Vitals	Case 1 Mr. J	Case 2 Mr. J	Case 3 Mr. A	Case 4 Mrs. S	Case 5 Mr. K
Blood culture	MRSA	Vre - enterococcus faecalis - left metacarpal, left cubital	Streptococcus mutants	Streptococcus mutans	Enterococcus faecalis (right and left femoral line and right brachial line)
Antibiotic tailoring	Teicoplanin, Daptomycin + linezolid	Daptomycin and linezolid	Vancomycin, teicoplanin	Ceftriaxone and vancomycin	Ampicillin 12g per day (2g 4th hourly) along with ceftriaxone
Modified duke criteria	1 major + 3 minor	2 major	1 major +3 minor	1 major + 3 minor	2 major

TABLE 128-3 The Modified Duke Criteria for the Clinical Diagnosis of Infective Endocarditis[a]

Major Criteria

1. Positive blood culture
   - Typical microorganism for infective endocarditis from two separate blood cultures
     - Viridans streptococci, *Streptococcus gallolyticus*, HACEK group organisms, *Staphylococcus aureus*; *or*
     - Community-acquired enterococci in the absence of a primary focus,
     - ***or***
   - Persistently positive blood culture, defined as recovery of a microorganism consistent with infective endocarditis from:
     - Blood cultures drawn >12 h apart; *or*
     - All of 3 or a majority of ≥4 separate blood cultures, with first and last drawn at least 1 h apart
     - ***or***
   - Single positive blood culture for *Coxiella burnetii* or phase I IgG antibody titer of >1:800
2. Evidence of endocardial involvement
   - Positive echocardiogram[b]
     - Oscillating intracardiac mass on valve or supporting structures or in the path of regurgitant jets or in implanted material, in the absence of an alternative anatomic explanation, *or*
     - Abscess, *or*
     - New partial dehiscence of prosthetic valve,
     - ***or***
   - New valvular regurgitation (increase or change in preexisting murmur not sufficient)

Minor Criteria

1. Predisposition: predisposing heart conditions[c] or injection drug use
2. Fever ≥38.0°C (≥100.4°F)
3. Vascular phenomena: major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, Janeway lesions
4. Immunologic phenomena: glomerulonephritis, Osler's nodes, Roth's spots, rheumatoid factor
5. Microbiologic evidence: positive blood culture but not meeting major criterion, as noted previously,[d] *or* serologic evidence of active infection with an organism consistent with infective endocarditis

Example

Definite IE: 2 major (or) 1 major + 3 minor (or) 5 minor
Possible IE: 1 major + 1 minor (or) 3 minor

3. Discussion

Treatment options

Empirically start on ceftriaxone + vancomycin

Streptococcus	
Penicillin-susceptible streptococci:	Penicillin resistant:
Ceftriaxone (2 g daily as a single dose for 4 weeks) Vancomycin (15 mg/kg IV q12h for 4 weeks) OR Ceftriaxone for 4 weeks plus Gentamicin for 4 weeks	Ceftriaxone for 6 weeks + Gentamicin for 6 weeks Vancomycin for 6 weeks
Enterococcus	
Susceptible Enterococci:	VRE - Vancomycin Resistant Enterococci:
Ampicillin (2 g IV q4h) plus ceftriaxone (2 g IV q12h), both for 6 weeks	Daptomycin + Linezolid for 6 weeks
Staphylococcus	
MSSA infecting native valves:	MRSA of native valves:
Vancomycin (15 mg/kg IV q12h for 6 weeks)	Vancomycin (15mg/kg IV q8–12h) or daptomycin (8–10 mg/kg daily) for 6 weeks

Failed Medical Therapy

Case 1: Mr J

1. Developed thrombocytopenia again. Linezolid stopped.
2. Fever with large vegetations persisted despite 14 days of Daptomycin. Stopped and Vancomycin started.
3. Because of Failed Medical Therapy shifted to Heart City – for mitral valve replacement
4. MVR done and patient was stable.

Case 2: Mr. A

1. He had a persistent fever so switched to Vancomycin, but developed leucopenia
2. Also developed heart failure
3. Vancomycin stopped, switched to Teicoplanin, and then shifted to Heart City for AVR under high risk.
4. Started responding to teicoplanin, and showed clinical improvement.
5. AVR done, on regular followup – the patient was stable

Surgery Indications

1. Persistent bacteremia without an extracardiac cause despite 7–10 days of optimal antimicrobial therapy
2. Heart failure or shock
3. Paravalvular extension of infection with abscess, fistula, or heart block
4. Fungal or Brucella infection
5. Large (>10-mm) hypermobile vegetation, particularly with prior systemic embolus and significant valve dysfunction
6. Very large (>30-mm) vegetation
7. Right-sided vegetation larger than >20mm.

Measures to Prevent Infective Endocarditis

Which patients	Which procedures
Prosthetic heart valve/surgical or trans catheter Valve clips, annuloplasty, Previous relapsed or recurrent IE, Repaired congenital defect or residual defect adjacent to the patch, RHD – regurgitant lesions and AS, HOCM.	Invasive dental or oral procedures maximum risk dental extractions. OGD, TEE, Colonoscopy or cystoscopy, - can be considered on individual basis

Table 2: Oral antibiotic regimens for prevention of endocarditis prior to dental procedures¶

	Agent	Adult dose	Pediatric dose (not to exceed adult dose)
Preferred agent	Amoxicillin	2 g	50 mg/kg
Options for patients allergic to penicillins (eg, ampicillin)	Cephalexin◇	2 g	50 mg/kg
	OR		
	Azithromycin or clarithromycin	500 mg	15 mg/kg
	OR		
	Doxycycline	100 mg	<45 kg: 2.2 mg/kg ≥45 kg: 100 mg

*Single oral dose 30 – 60 min before the procedure

Take Home Message

1) Anyone coming with history of fever, with pallor clubbing and heart murmur on examination – suspect infective endocarditis
2) Immediately send blood cultures according to IE protocol
3) Start on Empirical antibiotic therapy (ceftriaxone and vancomycin) after cultures are taken.
4) Apply Duke's Criteria
5) Tailor antibiotics after culture reports