

Escherichia coli prosthetic valve endocarditis from a non-genitourinary source: a case report and review of the literature

Robert Quiring¹, Victoria Burke M.D.²
¹LSUHSC School of Medicine, New Orleans, LA
²Department of Infectious Disease, LSUHSC, New Orleans, LA

Introduction

- Infective endocarditis (IE) is a life-threatening infection of the endocardial surface of the heart or heart valves which can result in severe cardiac dysfunction.
- Most cases are caused by gram positive organisms or fastidious gram-negative oral flora known as the "HACEK organisms."^{1,2}
- *Escherichia coli* typically lacks these traditional virulence factors that aid in endocardial adherence and is subsequently an infrequent cause of IE, accounting for only 0.5%.^{3,4}
- Previously described risk factors for the development of *E. coli* IE include:
 - Advanced age over 70, female sex, diabetes, immunosuppression, and implanted intravascular or cardiac devices.^{4,6,7}
- An antecedent infection in the urinary tract is often identified as a source of initial septicemia that seeds the heart valves in these cases.^{4,6}

Purpose

- In this report, we present a unique case of *E. coli* prosthetic mitral valve endocarditis in a 55-year-old Honduran man seeded from a presumed indolent gastrointestinal source.
- We subsequently review 10 cases of *E. coli* prosthetic valve endocarditis (PVE) found in the literature over the past 20 years and provide an updated characterization of this condition.

Background

First Hospital Presentation:

- SOB, nausea, B/L LE edema 2/2 HF exacerbation, 2/2 torrential mitral and tricuspid valve regurgitation
- Underwent bioprosthetic MV replacement and TV repair with ring annuloplasty
- Complications:
 - Peri-procedural PEA arrest
 - Line-associated DVT
 - Unstageable sacral wound present at discharge
 - Total time: ~ 1 month

Second Hospital Presentation:

- Readmitted 3 days after hospital stay 1
- Acute fever (105 F), nausea
- Septic shock – indolent *E. coli* septicemia
- CT A/P: mild dilation of SB – possible enteritis
- Treatment/ Course:
 - Empiric cefepime (out ICU day 2)
 - Clear repeat cultures day 2
 - Transitioned 2-week course PO cefpodoximine
- Dx: presumed transient septicemia 2/2 self limited GI source

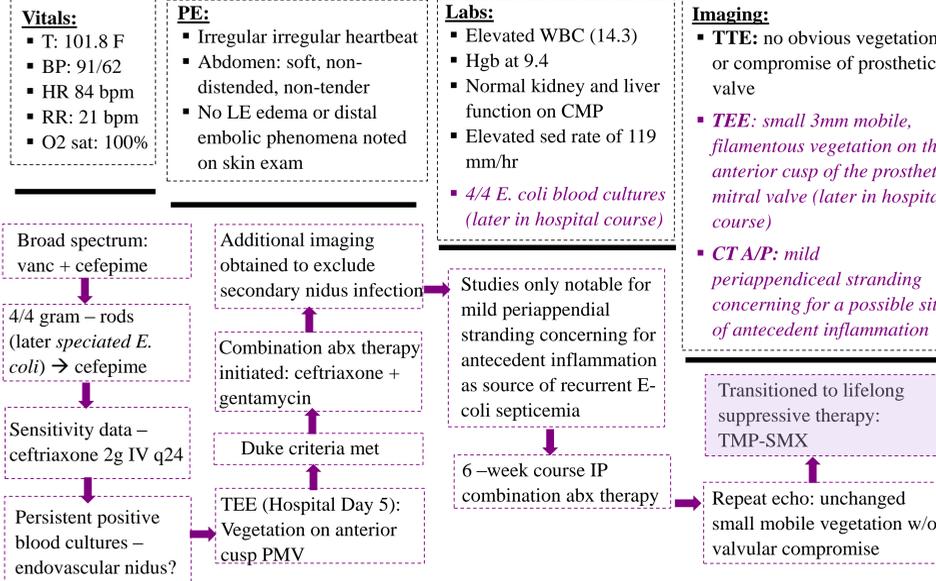
Case

Third/ Last Hospital Presentation:

HPI:

55-year-old visiting Honduran man who presented with 3-week history of progressive subjective fevers, night sweats, malaise, anorexia and weight loss.

Hospital Course



Literature Review

Table 1

Case #	Author	Year	Age/Sex	Medical History	Source	Valve Infected	Echocardiography Findings	Embolic Events	Antibiotics	Surgery	Outcome
1	Branger ⁷	2005	60yo W	Colonic polyposis and prior AVR	GI source	Prosthetic AV	AI with cusp rupture	No	CEF + CIP x6wks	Yes	Alive
2	Branger ⁷	2005	76yo M	Kidney cancer and prior MVR	GI source	Prosthetic MV	Vegetation	No	CIP x 6wks	No	Alive
3	Branger ⁷	2005	66yo W	Prior MVR	GU source	Prosthetic MV	Vegetation + valve ring abscess	No	IMP + GENT x2wks → CTX x 4wks	Yes	Alive
4	Branger ⁷	2005	76yo W	Colonic polyposis, recurrent UTI's, and prior MVR	GU source	Prosthetic MV	WMA/AMI	Unknown	Unknown	Unknown	Unknown
5	Modi ¹⁰	2011	62yo W	Prior MVR	Unknown	Prosthetic MV	Vegetation + mild MR	No	IMP x 6wks	No	Alive
6	Senel ⁹	2012	60yo M	Prior AVR, recent hemorrhoidectomy, active enteritis	GI source	Prosthetic AV	Valve ring abscess	No	AMP/SUL + GENT x 6wks	Yes	Alive
7	Loubet ⁸	2015	82yo Unk	Prior AVR	GU source	Prosthetic AV	Valve ring abscess	No	Unknown + AVR	Yes	Alive
8	Loubet ⁸	2015	74yo Unk	Prior MVR	GI source	Prosthetic MV	Valve ring abscess	Yes	CTX + AMK	No	Alive
9	Loubet ⁸	2015	74yo Unk	Prior AVR	GU source	Prosthetic AV	Valve ring abscess	No	CTX + OFL x 6wks	No	Death
10	Quiring	2021	55yo M	Prior MVR and TV repair	GI source	Prosthetic MV	Vegetation	No	CTX + GENT x 4wks	No	Alive
Total	x	x	68.5yo	30% chronic GI pathology; 2 chronic GU pathology	50% GI, 40% GU, 10% unknown	60% MVR, 40% AVR	50% valve ring abscess	10% embolic events	heterogeneous; combination 60%	40% surgery	80% alive, 10% death, 10% unknown
Historical Cases	Akuwaza ¹¹	2018	70 PV, 60 NV	x	52% (range 37-80%) GU	Even split PV, more MV in NV	18% valve ring abscesses	24%-38%	heterogeneous; combination >90%	51% surgery	24% mortality

Discussion

- Table 1 illustrates the clinical characteristics of the 10 cases of *E. coli* PVE described in the literature, including our own case, over the past 20 years.⁷⁻¹⁰
- The average age of affected patients with PVE = 68 years old
 - This is similar to the overall average age of 70 among all *E. coli* IE cases previously described.¹¹
- A more even gender distribution was noted among the cases from our review
 - Note: Gender was unknown for 30% of cases which may have skewed this trend.
- In contrast to previously described *E. coli* IE cases, genitourinary infection preceded only 40% of PVE cases whereas antecedent gastrointestinal infection, including in our patient case, preceded the diagnosis of PVE in 50% of cases.
- The mitral valve was still the most affected valve in PVE cases reviewed, impacting 60% of cases with the other 40% occurring largely in aortic valve replacements.
- Although distant embolic events were less frequently described in *E. coli* PVE cases, impacting only 10% of patients, valve ring abscess occurred more commonly in *E. coli* PVE cases compared to native valve cases, impacting 50% of PVE patients.
- Among PVE cases, combination antibiotic therapy has now become the norm, utilized in 60% of cases, although the exact regimens chosen remains heterogeneous among providers.
- There has been a trend towards more frequent surgical intervention in *E. coli* PVE cases, now being performed in 40% of patients.
 - This increase in surgical intervention is likely a reflection of the increased incidence of intracardiac abscess seen in *E. coli* PVE cases compared to native valve IE cases.¹⁻²
- Lastly, it is encouraging to note that the early mortality rate among recent *E. coli* PVE cases is declining, now at 10% compared to the previously described rate of 24% in all *E. coli* IE cases.⁷⁻¹⁰

Conclusions/ Teaching Points

➤ Although UTI's historically have been described as the most prevalent source of *E. coli* septicemia, our case is consistent with the recent literature which suggests an increasing prevalence of non-genitourinary causes for nidus of infection

➤ Clinicians should be aware of the overall changing epidemiology of *E. coli* PVE cases when assessing for disease and considering treatment interventions.

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