

Polymicrobial Infective Endocarditis with Stroke in a Patient with Metastatic Colorectal Cancer

Emmanuel Ukenenye^{1*}; Nikola Stojanović¹; Alexa Kahn²; Bisrat Nigussie³; David Gunsburg¹; Abdullah Khan¹

¹Brookdale University Hospital Medical Center, Brooklyn, NY, USA.

²Maimonides Medical Center, Brooklyn, NY, USA.

³SUNY Downstate Health Sciences University, Brooklyn, NY, USA.

Corresponding Author: Emmanuel Ukenenye

Brookdale University Hospital Medical Center, Brooklyn, NY, USA.

Email: ukensmd@gmail.com

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Abstract

A rare instance of infective endocarditis by *Streptococcus viridans* and *Lactobacillus* spp in an elderly patient with advanced colorectal cancer, leading to an aortic valve abscess, infectious emboli, and stroke. Our hypothesis is the gastrointestinal tract served as the probable entry route for the bacteria.

Keywords: Lactobacillus; Infectious emboli; Stroke; Streptococcus viridans; Aortic valve abscess.

Abbreviations: TTE: Transthoracic Echocardiogram; TEE: Transesophageal Echocardiogram; AR: Aortic Regurgitation; IE: Infective Endocarditis; CT: Computed Tomography; CTA: Computed Tomography Angiography; MRI: Magnetic Resonance Imaging; ESC: European Society of Cardiology; IDU: Intravenous Drug Use.

History of presentation

This is a case of a 72-year-old African-American male who presented with new onset left facial droop, slurred speech, and left-sided hemiparesis that started on the day of presentation. Physical examination confirmed these complaints and was notable for cachexia.

- To detect the possible clinical features and presentation of polymicrobial infective endocarditis in colorectal cancer patients.

- To appreciate the possible imaging findings in polymicrobial infective endocarditis and its complications.

Past medical history

Hypertension

Cerebrovascular accident (2018) without residual deficits

Differential diagnosis

Stroke

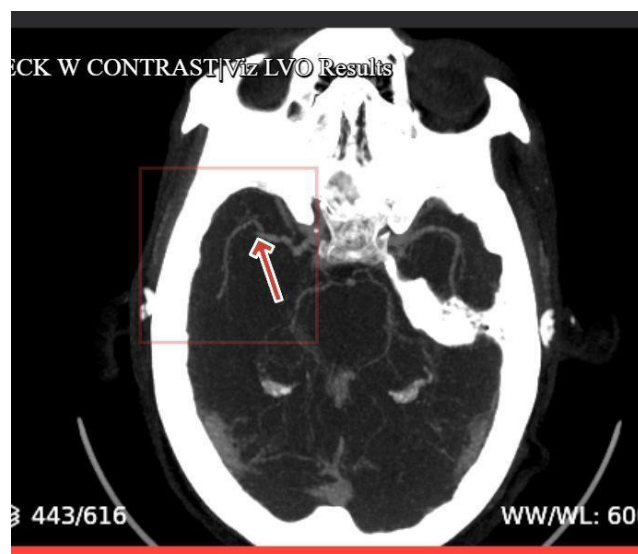


Figure 1: CT angiography of the brain depicting occlusion of the Right M2 superior division.

TIA

Brain mass

Seizures

Investigations

Computed Tomography (CT) brain was negative for acute intracranial hemorrhage, mass effect, and infarct. CT Angiography (CTA) brain reported Right M2 superior division occlusion (Figure 1) confirmed with an MRI, which identified an MCA infarct.

CTA abdomino-pelvic was done for rectal bleeding and it highlighted descending colon wall thickening and multiple liver masses. Carcinogenic Embryonic Antigen was 258 ng/mL (0.0-4.7 ng/mL). Liver biopsy sample and immunostaining showed a positive reaction for CDX2, CK20, and villain; and a negative reaction for CK 7, consistent with metastatic colonic adenocarcinoma.

The patient became febrile and the first blood culture sets grew *Streptococcus viridans* (anaerobic bottles) and *Lactobacillus* species (aerobic bottles). Three additional sets of blood cultures drawn 30 minutes apart resulted in the same findings. Transthoracic echocardiography revealed a poorly visualized aortic valve, valve leaflets mildly thickened with mild regurgitation, and hyperdynamic left ventricular systolic function. Transesophageal Echocardiography (TEE) demonstrated 1 cm mobile vegetation in the aortic valve with leaflet perforation, abscess, and severe Aortic Regurgitation (AR) as shown in Figures 2 and 3.

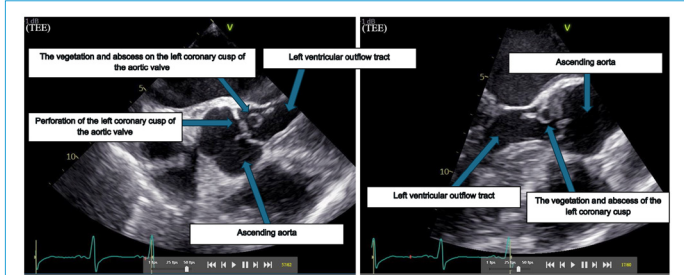


Figure 2: Transesophageal echocardiogram showing aortic valve vegetation and perforation on the left, and vegetation and abscess on the right.

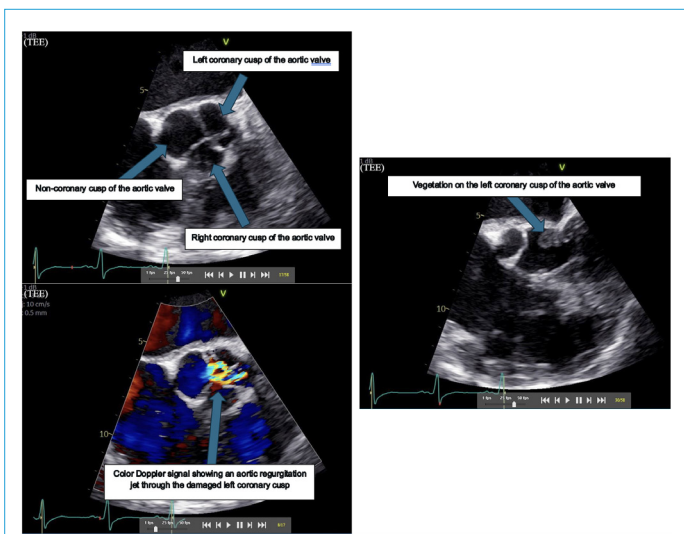


Figure 3: Transesophageal echocardiogram depicting aortic valve regurgitation on the bottom left image.

Management

The patient was outside the window for tissue plasminogen activator and was not amenable to endovascular intervention. Aspirin 81 mg and ticagrelor 160 mg were started.

He was transfused 3 units of packed red blood cells for bleeding per rectum with a drop in hemoglobin (10 g/dL to 7 g/dL). Antiplatelet and anticoagulant were held.

Based on sensitivity results, ampicillin 2 g every 6 hours and gentamicin 60 mg every 12 hours were started. Repeat blood cultures were negative after the initial four sets of positive cultures. Cardiothoracic surgery recommended no aortic valve surgical management citing prognosis. The goal of care was established, and the Code Status was changed to “Do Not Resuscitate, Do Not Intubate” pending transfer to a hospice facility.

Discussion

IE is a life-threatening condition that is mostly caused by bacterial but sometimes fungal or even non-infectious causes that remain a clinical challenge due to variable clinical presentation that requires a high index of suspicion.

The initial clinical assessment should include evaluating for risk factors (Table 1).

Table 1: Infective endocarditis risk factors.

Cardiac risk factors	Non-cardiac risk factors
Previous IE	Central venous catheter
Valvular heart disease	Intravenous drug injection
Prosthetic heart valve	Immunosuppression
Transvenous cardiac implantable electronic device	Recent dental or surgical procedure
Congenital heart disease	Recent hospitalization
	Hemodialysis

Our patient had a risk factor of relative immunosuppression in the setting of active stage four gastrointestinal malignancy.

Fever (77.7%), cardiac murmur (64.5%), congestive heart failure (27.2%), embolic complications (25.3%), and cardiac conduction abnormalities (11.5%) are the most common IE clinical manifestations [1-6]. Atypical presentation is common in elderly or immunocompromised patients [7]. Our patient was admitted with acute neurological symptoms indicative of embolic complications stemming from IE, accompanied by fever and a newly observed murmur associated with AR. A significant aspect of this case is the patient’s cancer-related cachexia and frailty, which might account for the absence of typical clinical indicators of IE until the onset of embolic complications.

The most recently validated modified diagnostic criteria of IE were provided in the 2023 European Society of Cardiology (ESC) modified diagnostic criteria of IE (see Table 2). Definitive IE was classified if at least two major criteria, one major and at least three minor criteria, or five minor criteria were met.

Table 2: Major diagnostic criteria for infective endocarditis.

Major criteria	
Blood cultures positive for IE	Imaging positive for IE valvular, perivalvular, periprosthetic, and foreign material anatomic and metabolic lesions suggestive of IE detected by any of the following imaging techniques:
a. Typical microorganisms consistent with IE from two separate blood cultures (oral streptococci, Streptococcus gallolyticus), HACEK group, S. aureus, E. faecalis	a. Echocardiography
b. Microorganisms consistent with IE from continuously positive blood cultures	b. Cardiac CT
- Two or more positive blood cultures of samples drawn at least twelve hours apart	c. 18F-fluorodeoxyglucose positron emission tomography (PET) combined with CTA
- All of three or a majority of four or more separate blood culture (with first and last samples drawn at least an hour apart)	d. WBC single PET and CT
c. Single positive blood culture positive for C. burnetti or phase I IgG antibody titer>1:800	

The minor criteria as per the 2023 ESC, modified diagnostic criteria of IE, are listed in Table 3 below:

Table 3: Minor diagnostic criteria for infective endocarditis.

Minor criteria
Predisposing risk factors (as outlined in the Table 1)
Fever: temperature of 38 degrees Celsius or more
Embolic vascular dissemination
- Major systemic and pulmonary emboli, infarcts, and abscesses
- Hematogenous osteoarticular septic complications
- Mycotic aneurysms
- Intracranial ischemic or hemorrhagic lesions
- Conjunctival hemorrhage
- Janeway’s lesions
Immunological phenomena
- Glomerulonephritis
- Osler nodes
- Roth spots
- Positive rheumatoid factor
Microbiological evidence
- Positive blood culture but does not meet a major criterion
- Serological evidence of active infection with organism consistent with IE

The minor criteria as per the 2023 ESC, modified diagnostic criteria of IE, are listed in Table 3.

As per the 2023 ESC modified diagnostic criteria of IE, our patient fulfilled the criteria for definite IE.

The Transthoracic Echocardiography (TTE) report prompted Transesophageal Echocardiogram (TEE) to be conducted. TEE showed a large left coronary cusp vegetation of 10 mm with an estimated size of 4 mm that was missed by TTE, as well as an aortic valve abscess and possible fistula formation. Vegetation characteristics and size, perivalvular complications (abscess, pseudoaneurysm, and dehiscence of the valve), intracardiac fistula, and leaflet perforation are the main echocardiographic findings for the diagnosis and evaluation of local complications of IE.

Surgical intervention was initially considered. However, considering the patient’s stage four colorectal cancer, cachexia, and dire prognosis, the patient and family agreed to a do-not-resuscitate and do-not-intubate status. This case underscores the importance of weighing all factors and adopting a personalized

treatment strategy to manage complex health conditions. The elderly, as a fragile subgroup of the patient, have more comorbidities, underuse of curative cardiac procedures, and higher mortality of IE when compared to younger patients [8].

Aminoglycosides such as gentamicin synergize with cell wall inhibitors for bactericidal activity. They help shorten the duration of therapy and more successfully eradicate microorganisms [6]. The patient received prolonged intravenous antibiotics. Subsequent blood cultures all returned negative.

Polymicrobial IE among patients with IE is unusual (<5%). Over half of these patients had a prosthetic heart valve, and fewer than half had a history of Intravenous Drug Use (IDU). The most common pathogens were *Enterococcus*, coagulase-negative staphylococci, and *Candida* [9]. Polymicrobial IE is associated with IDU and is otherwise rare [10]. Our patient had no history of IDU. Our hypothesis suggests that the gastrointestinal tract served as the probable entry route for both bacteria, facilitated by the breakdown of the gastrointestinal barrier with active colorectal cancer and weakened immune system in an elderly cachectic patient. The patient was previously unaware of

his colorectal cancer diagnosis, which was inadvertently discovered following the initiation of rectal bleeding. This unforeseen complication arose after the commencement of anticoagulation and antiplatelet therapies.

Follow-up: Not applicable (our patient died during this admission).

Conclusion

In summary, this report documents IE atypical presentation in an immunocompromised elderly patient with metastatic colorectal cancer, showcasing the unique challenge of diagnosing and managing IE with dual microorganisms. The case underscores the possible critical role of compromised gastrointestinal integrity and diminished immune function in the pathogenesis of this condition. This case also highlights the necessity of considering a broad range of potential etiologies in IE and the value of personalized care in managing such intricate medical scenarios.

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References

1. Isenberg H, Painter B. Indigenous and pathogenic microorganisms of humans. Published online. 1981. <https://www.cabidigitallibrary.org/doi/full/10.5555/19810882482>.
2. Arshad F, Mehmood R, Hussain S, Khan MA, Khan MS. Lactobacilli as probiotics and their isolation from different sources. researchgate. Net FA Arshad, R Mehmood, S Hussain, MA Khan, MS Khan British Journal of Research, 2018•researchgate.net. 2018; 5(3): 43. doi:10.21767/2394-3718.100043.
3. Antoun M, Hattab Y, Akhrass FA, Hamilton LD. Uncommon Pathogen, Lactobacillus, Causing Infective Endocarditis: Case Report and Review. Case Rep Infect Dis. 2020; 2020: 1-4. doi:10.1155/2020/8833948.
4. Pasala S, Singer L, Arshad T, Roach K. Lactobacillus endocarditis in a healthy patient with probiotic use. IDCases. 2020; 22. doi:10.1016/J.IDCR.2020.E00915.
5. Husni RN, Gordon SM, Washington JA, Longworth DL. Lactobacillus bacteremia and endocarditis: Review of 45 cases. Clinical Infectious Diseases. 1997; 25(5): 1048-1055. doi:10.1086/516109.
6. Habib G, Erba PA, lung B, et al. Clinical presentation, aetiology and outcome of infective endocarditis. Results of the ESC-EORP EURO-ENDO (European infective endocarditis) registry: A academic.oup.comG Habib, PA Erba, B lung, E Donal, B Cosyns, et al. Prendergast European heart journal. 2019. academic.oup.com. doi:10.1093/eurheartj/ehz694.
7. Saamir D, Hassan A, Sahassan, et al. Characteristics of infective endocarditis in a cancer population. openheart.bmj.comC Grable, SW Yusuf, J Song, GM Viola, O Ulhaq, et al. Hassan Open Heart, 2021•openheart.bmj.com. 2021; 8: 1664. doi:10.1136/openhrt-2021-001664.
8. Pazdernik M, lung B, Mutlu B, et al. Surgery and outcome of infective endocarditis in octogenarians: Prospective data from the ESC EORP EURO-ENDO registry. Springer M Pazdernik, B lung, B Mutlu, F Alla, R Riezebos, et al. 2022•Springer. 2022; 20(5): 22. doi:10.1007/s15010-022-01792-0.
9. Shah S, Shrestha N, Gordon S. Polymicrobial Infective Endocarditis. Open Forum Infect Dis. 2015; 2(suppl_1). doi:10.1093/OFID/OFV133.573.
10. Sousa C, Botelho C, Rodrigues D. JAE journal of, 2012 undefined. Infective endocarditis in intravenous drug abusers: an update. SpringerC Sousa, C Botelho, D Rodrigues, J Azeredo, R Oliveira European journal of clinical microbiology & infectious diseases, 2012•Springer. 2012; 31(11): 2905-2910. doi:10.1007/s10096-012-1675-x.