

Case of *Granulicatella elegans* endocarditis triggering both ischemic and haemorrhagic stroke: A rare clinical presentation from eastern India

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SUMMARY

We report a rare clinical presentation of a 54-year-old male diagnosed with infective endocarditis caused by *Granulicatella elegans*, a nutritionally variant streptococcus (NVS) characterized by unique growth requirements and high pathogenic potential. The patient presented with prolonged fever and residual hemiparesis following an ischemic stroke. Blood culture confirmed *Granulicatella elegans*, and imaging identified vegetations on a bicuspid aortic valve. Despite prompt antibiotic therapy, the course was complicated by acute intraventricular hemorrhage (IVH) and hydrocephalus,

culminating in a fatal outcome. This report underscores the pathogenic challenges posed by *Granulicatella elegans*, highlights its catastrophic complications, and reviews its presentation and management in the context of existing literature and emphasizing the importance of prompt diagnosis, tailored antibiotic therapy, and vigilant monitoring.

Keywords: *Granulicatella elegans*, infective endocarditis, hemorrhagic stroke, ischemic stroke.

■ BACKGROUND

Infective endocarditis (IE) remains a critical illness with significant morbidity and mortality, especially when associated with less common pathogens like nutritionally variant streptococci (NVS). This group, first described in 1961, includes *Abiotrophia* and *Granulicatella* species, which are organisms characterized by their inability to grow

on standard media without specific supplements such as pyridoxal or L-cysteine [1].

NVS are part of normal oral flora but can cause endocarditis, including culture-negative and prosthetic-valve endocarditis accounting for around 5-6% of all IE cases often associated with a higher propensity for systemic embolization and treatment challenges compared to other streptococcal species [2-4]. Neurological complications in IE, including ischemic and haemorrhagic strokes, occur in 20-40% of cases [5]. However, simultaneous presentation of both types of cerebrovascular accidents (CVAs) is extremely rare, as seen in the present case. Among NVS, *Granulicatella elegans* is an

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especially rare but significant cause of IE. Although native valve endocarditis is more common in individuals with underlying structural heart disease, cases have been reported in patients without apparent risk factors [6]. There are only three reports of *Granulicatella adiacens* causing endocarditis in India [2-4]. Here, we report this rare pathogen *Granulicatella elegans* causing endocarditis with both ischemic and hemorrhagic CVA in a middle-aged male. This report aims to detail the clinical course of *Granulicatella elegans* IE, discuss its devastating complications, and review of the existing literature to provide insights into its diag-

nosis and management. This report is presented after approval from the Institutional Ethics Committee and informed consent was taken from the patient's wife.

■ CASE PRESENTATION

A 54-year-old male, with no prior history of diabetes, hypertension, or structural heart disease, presented with a two-week history of high-grade fever, generalized weakness, and residual hemiparesis following a prior ischemic stroke (one and half month back). On examination, the patient was pale and exhibited an ejection systolic murmur over the aortic area. Neurological evaluation revealed left-sided residual motor weakness with a power of 4/5 in both upper and lower limb of left side.

Routine laboratory tests showed anaemia (Hb 7.5 g/dL), leucocytosis, and elevated inflammatory markers, including CRP (71.1 mg/L) and procalcitonin (61.93 ng/mL). Liver and renal function tests were within normal limits. Investigations for fever workup including malaria, dengue, scrub typhus and leptospirosis were negative. His chest X-ray was unremarkable. Fundoscopic examination revealed bilateral Roth spots, suggestive of microembolic phenomena.

Three sets of blood cultures were obtained on admission, all of which were positive within one day showing growth of *Granulicatella elegans*. The blood culture was processed in BacT Alert system

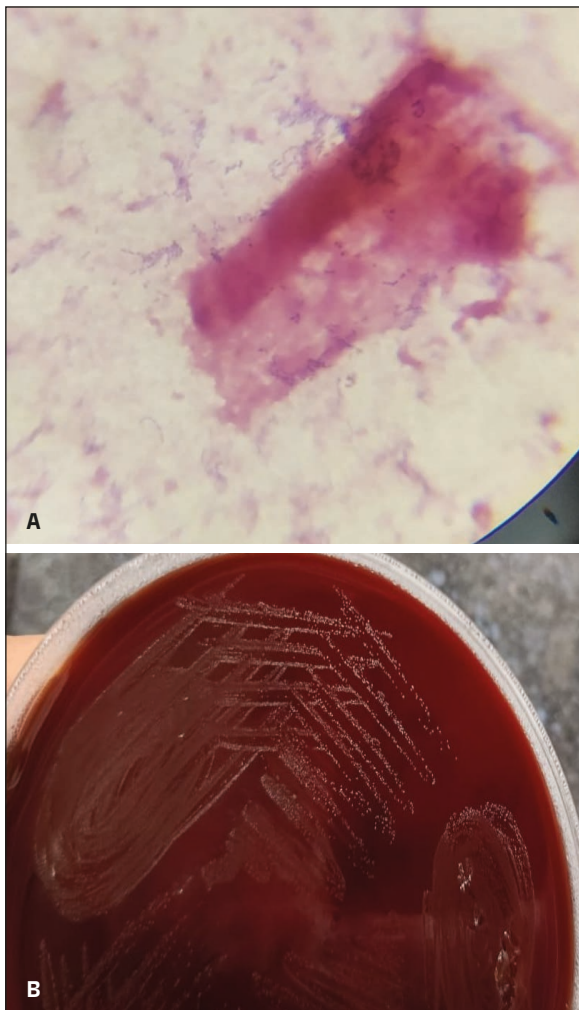


Figure 1A and 1B - Figure 1A shows small spherical Gram-positive cocci in chains and 1B shows growth of fine non hemolytic colonies.



Figure 2 - Transoesophageal echocardiography (TEE) revealed vegetations on a bicuspid aortic valve with mild aortic regurgitation.

(Biomerieux Inc), Gram stain showed small spherical Gram-positive cocci in chains (Figure 1A), subculture showed growth of fine non hemolytic colonies and features of satellitism (Figure 1B). The organism was identified as *Granulicatella elegans* by VITEK 2 Compact System (Biomerieux Inc.) and it was susceptible to penicillin, ceftriaxone, erythromycin, levofloxacin, vancomycin, and

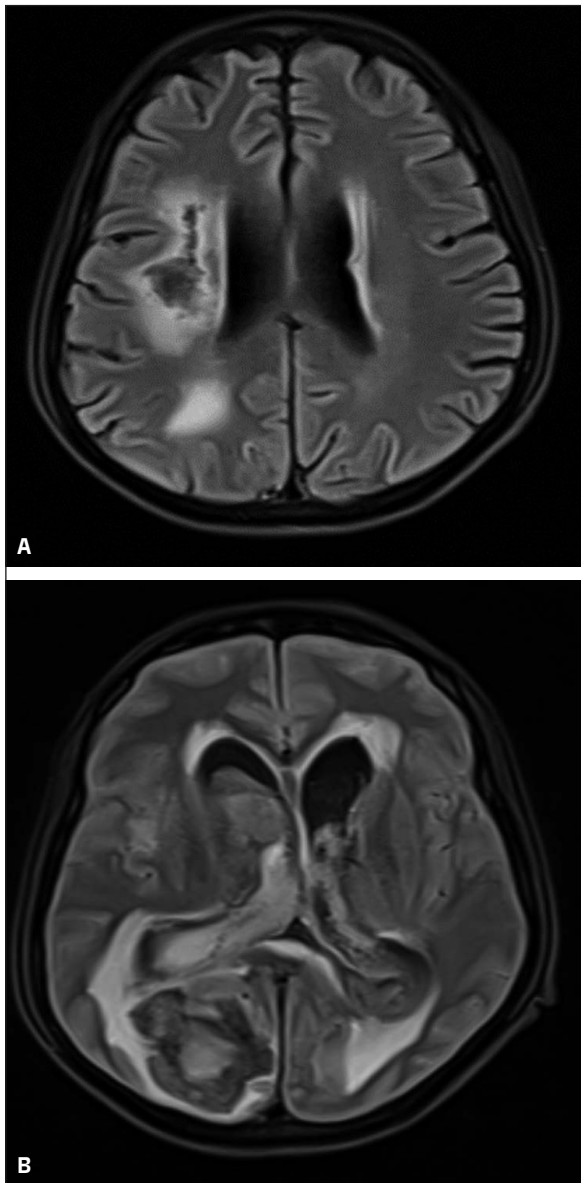


Figure 3A and 3B - MRI showed acute massive bi-ventricular haemorrhage (IVH) with midline shift to the left and hydrocephalus.

linezolid. MRI of the brain showed an old infarct in the middle cerebral artery (MCA) territory, likely secondary to a prior embolic event. Transesophageal echocardiography (TEE) revealed vegetations on a bicuspid aortic valve with mild aortic regurgitation (Figure 2).

The patient was diagnosed with native valve bacterial endocarditis caused by *Granulicatella elegans* and was initiated on intravenous ceftriaxone (2 g every 12 hours) and gentamicin (40 mg every 12 hours). His fever subsided, and inflammatory markers decreased significantly. Follow-up blood cultures on day 12 of therapy were negative and did not show any growth of organism.

However, on day 16, the patient experienced a sudden neurological decline, characterized by severe headache, projectile vomiting, bradycardia (54 beats/min), and hypertension (190/110 mmHg). Glasgow Coma Scale (GCS) assessment revealed a score of less than 8, necessitating immediate intubation. MRI showed acute massive bi-ventricular haemorrhage (IVH) with midline shift to the left and hydrocephalus (Figure 3A and 3B).

Despite aggressive medical management, including mechanical ventilation and broadening of antibiotic coverage with vancomycin and meropenem, the patient's condition continued to deteriorate. He succumbed to his illness on day 29 of hospitalization.

■ DISCUSSION

Granulicatella species have emerged as a rare but virulent cause of IE, with increased diagnostic difficulty owing to their nutritional needs [1, 6]. While IE typically manifests as systemic embolization in one-third of cases, concurrent ischemic and haemorrhagic complications are exceedingly rare [5, 7].

This case highlights three critical dimensions:

- *Pathogenesis of neurological complications* - Infective endocarditis, being a complex disease, often leads to the formation of vegetations on heart valves, composed of fibrin, platelets, and bacterial colonies [6]. IE-related ischemic stroke arises primarily from embolic occlusion of cerebral arteries, whereas haemorrhagic strokes can result from mycotic aneurysm rupture, septic arteritis, or haemorrhagic transformation of ischemic infarct [8, 9]. In this case, vegetations from the *Granulicatella elegans* infection

Table 1 - Review and outcome of some published cases of Infective Endocarditis caused by Nutritionally variant Streptococcus.

Authors (Year)	Clinical Presentation	Outcome
Shailaja TS et al. (2013) [3]	A 63-year-old male was diagnosed with infective endocarditis due to <i>Granulicatella adiacens</i> . Echocardiography revealed multiple vegetations on the mitral valve, accompanied by rheumatic heart disease (RHD) and moderate mitral regurgitation.	Complete recovery was seen following treatment with high-dose ampicillin and gentamicin administered over 28 days.
Padmaja K et al. (2014) [4]	A 49-year-old male presented with native mitral valve endocarditis caused by <i>Granulicatella adiacens</i> . Echocardiography revealed large vegetations on the valve. Symptoms included prolonged fever, weight loss, and fatigue.	Complete clinical recovery was seen after six weeks of combined therapy with intravenous penicillin and gentamicin.
David Ethan Kahn et al. (2011) [11]	A 72-year-old male with <i>Streptococcus viridans</i> aortic valve endocarditis was complicated by a severe subthalamic hemorrhage causing a 1.9 cm midline shift.	Patient remained in a vegetative state post-stroke and was later declared deceased.
Arun Kumar et al. (2022) [12]	A case of <i>Granulicatella adiacens</i> -induced aortic valve endocarditis. Prompt diagnosis led to initiation of intravenous vancomycin (1 g twice daily) and gentamicin (80 mg twice daily).	Significant clinical improvement with reduction in vegetation size following targeted antibiotic therapy.

likely dislodged and travelled to the cerebral arteries, causing an embolic stroke. This blockage caused an ischemic stroke in the affected brain area, leading to left-sided hemiparesis. Emboli from infective endocarditis may carry bacteria that infect cerebral blood vessels. This can weaken vessel walls and predispose them to rupture, leading to haemorrhagic stroke around two months later from initial cerebrovascular accident.

- *Challenges in diagnosis* - Diagnosing NVS-associated IE is particularly challenging due to the organism's fastidious growth requirements. Conventional blood culture systems may fail to isolate the organism without pyridoxal-enriched media [6]. In this case, the BacT Alert system along with subculture with *Staphylococcus aureus* successfully obtained a culture and identification of *Granulicatella elegans*.
- *Treatment challenges and prognostic considerations* - Standard therapy for NVS includes prolonged beta-lactam antibiotics combined with aminoglycosides [10]. Despite initial microbiological clearance, the patient's clinical deterioration highlights the limitations of current therapeutic approaches in preventing embolic and haemorrhagic complications. The persistence of vegetations and embolic risks despite microbial clearance underscores the need for vigilant monitoring.

Mortality in NVS endocarditis approaches 20%, with worse outcomes seen in cases complicated

by intracerebral haemorrhage [10]. The prognosis of NVS IE is determined by several factors, including the extent of valvular damage, embolic complications, and the timeliness of intervention. The high mortality associated with intracranial complications, as seen in this case, underscores the need for vigilance and multidisciplinary care.

The rarity of *Granulicatella elegans* IE complicates the establishment of standardized management protocols. A review of some published cases reveals diverse outcomes as delineated in Table 1. These cases underscore the spectrum of IE-related neurological complications and reinforce the need for tailored therapeutic strategies.

■ CONCLUSIONS

This case demonstrates the lethal potential of *Granulicatella elegans* IE, particularly its association with severe neurological complications. Early recognition, supported by advanced microbiological techniques, is crucial for initiating appropriate therapy. Further research is needed to optimize treatment strategies and mitigate embolic and haemorrhagic risks in NVS IE.

Conflict of interest

None to declare.

Funding

None to declare

Ethics approval

The study was approved by the Institutional Ethics Committee, All India Institute of Medical Sciences, Kalyani (IEC/AIIMS/Kalyani/certificate/2024/369)

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