

A case report supporting early surgery in mitral valve infective endocarditis with recurrent cerebral infarcts

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Background

In patients with infective endocarditis, brain embolism portends a poor prognosis. The timing of surgery in patients who require emergency valve surgery in the setting of deteriorating level of consciousness from recurrent embolic events, and brain infarction with haemorrhagic transformation, remains controversial.

Case summary

We report a case of a 54-year-old male who presented with *Streptococcus salivarius* mitral valve endocarditis, recurrent episodes of cerebral embolic infarctions with haemorrhagic transformation and deteriorating level of consciousness, and successfully underwent emergency mitral valve surgery without extension of the preoperative cerebral embolic complication or worsening of neurological symptoms.

Discussion

Mitral valve surgery can be performed successfully in patients with mitral valve endocarditis and cerebral embolism earlier than the recommended 2–4 weeks, and this should be considered in deteriorating patients.

Keywords

Mitral valve infective endocarditis • Cerebral embolic infarction • Intracerebral haemorrhage • Early mitral valve surgery • Case report

ESC curriculum

7.5 Cardiac surgery • 4.11 Endocarditis

Learning points

- Timing of valve surgery in infective endocarditis (IE) patients involving a heart valve with cerebral embolization can be challenging.
- In deteriorating IE patients, emergency valve surgery can be successfully performed as early as 48 h after recurrent cerebral infarcts.
- Worsening neurological status should not be considered an absolute contraindication for heart valve surgery to remove the source of repeated cerebral infarction in IE.

Introduction

Infective endocarditis (IE) is an infection that may affect the native heart valves, prosthetic heart valves, the mural endocardium, or an indwelling cardiac device such as permanent pacemakers and cardioverter defibrillators.

The diagnosis of IE is based on modified Duke criteria, and surgery is indicated for patients with heart failure, uncontrolled infection, and prevention of embolism.¹

Systemic embolization can occur in IE, with the brain and spleen being the most frequent sites in left-sided IE.¹ Embolic event to the central nervous system is thought to occur in 25%–40% and is associated with poor outcomes.^{2–4} Cerebral infarcts have a high risk of haemorrhagic transformation, and especially with high dose of anticoagulation associated with cardiopulmonary bypass, there is an increased risk of intracranial haemorrhage (ICH) during surgery.⁴ To control bleeding in infarcts with haemorrhagic transformation,

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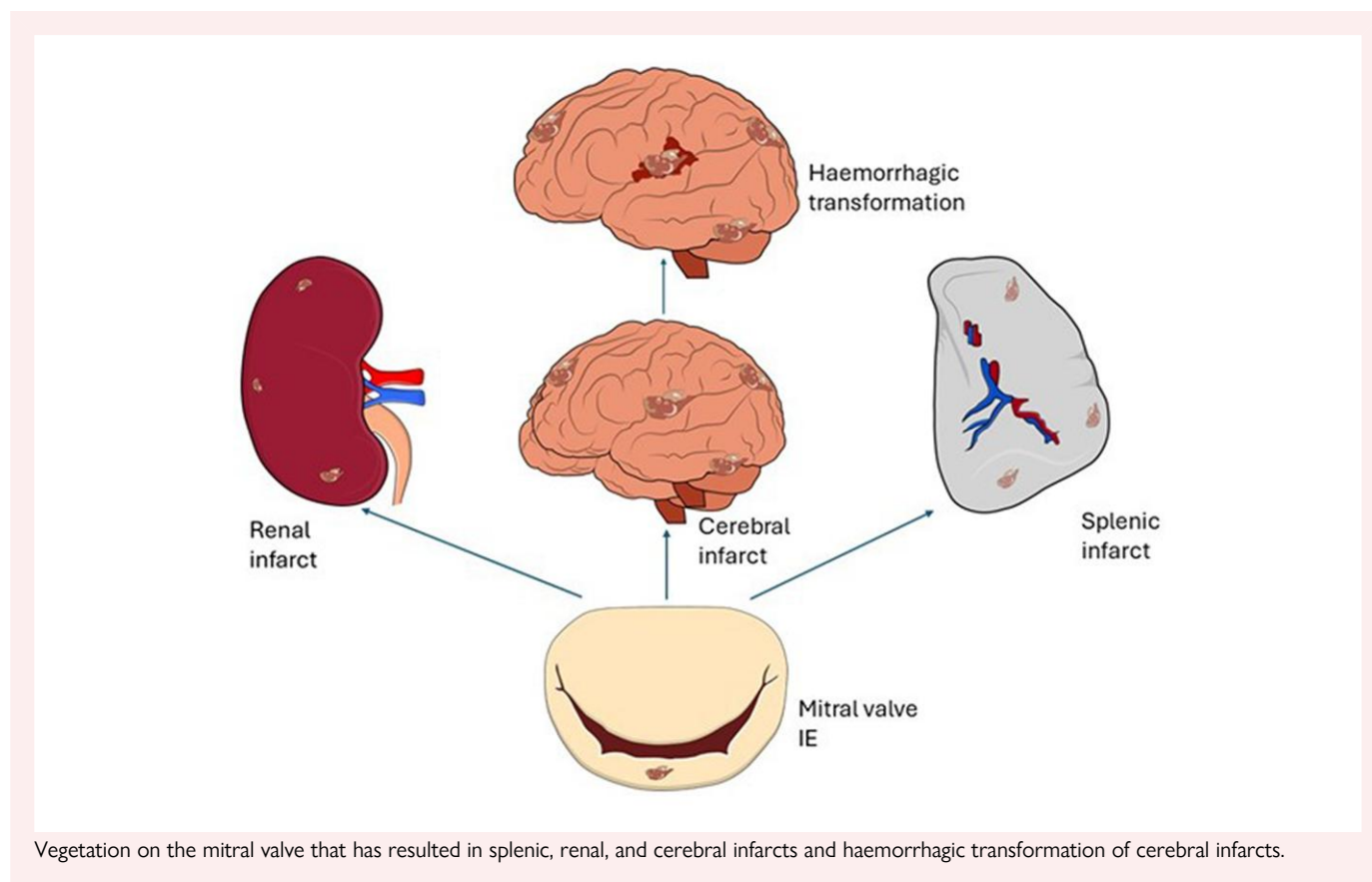
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additional neurointerventional or neurosurgical procedures may be indicated.

There are very few publications on IE patients with preoperative complex neurological complications requiring emergency or urgent surgery.

We believe that this report will contribute to the evidence that emergency surgery can be safely performed in a select cohort of these patients with good results and without further neurological deterioration postoperatively.

Summary figure



Case summary

A 54-year-old Caucasian male was referred from a district hospital for consideration of surgery for mitral valve IE.

He presented to the referring centre with an 8-week history of fever, generalized malaise, and weight loss. He also developed blurred speech and ataxia. He had a history of recreational use of cannabis, and he developed severe periodontal disease prompting four dental extractions before surgery.

Blood culture grew *Streptococcus salivarius*. An initial transthoracic echocardiography revealed thickened mitral valve leaflet, vegetations on the posterior mitral leaflet, severe mitral regurgitation, posterior leaflet prolapse, dilated left atrium, and normal left ventricle. Regurgitant volume was >60 mL ([Supplementary material online, Videos S1 and S2](#)).

An abdominal computed tomography scan revealed renal and splenic infarcts. He was commenced on intravenous ceftriaxone and gentamicin.

Just before transfer to our unit, he developed weakness of both limbs, worse on the right, and impaired vision of the right eye. Cranial MRI revealed multiple acute and subacute embolic infarcts, several haemorrhagic predominantly in the posterior circulation but also involving the bilateral anterior circulation. There were bilateral foci of ICH; however, intracranial angiography revealed no evidence of mycotic aneurysm.

Within days of the onset of paraparesis, he developed new-onset absent seizures and deteriorating level of consciousness, and a repeat cra-

nial MRI was performed that revealed numerous new and enlarging areas of haemorrhage with the largest haematoma centred on the left temporal lobe measuring 2.3 cm ([Figure 1](#)).

A repeat transthoracic echocardiography performed after 16 days revealed torrential mitral regurgitation, increased size of vegetation on the posterior mitral leaflet measuring 1.7×1.0 cm², new vegetation on the anterior mitral leaflet and left atrium, and enlarged left atrium ([Supplementary material online, Videos S3 and S4](#)).

Clinically, he remained febrile (temperature above 38°C), anaemic (haemoglobin 77 mg/dL), and tachycardiac, and his Glasgow coma score (GCS) dropped to 10/15 (eye opening to pain, inappropriate words, localized pain). Inflammatory markers remained elevated (white blood count 26.7×10^9 /L, C-reactive protein 48–87 mg/L).

On account of worsening sepsis, imminent heart failure, and to reduce further risk of cerebral embolization, high-risk emergency mitral

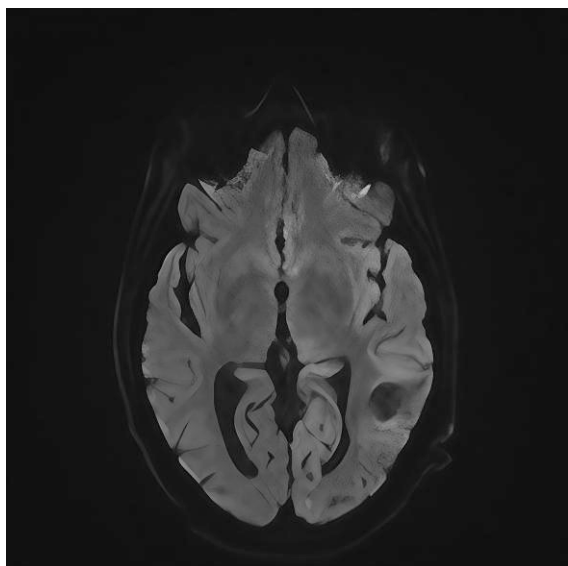


Figure 1 Haematoma on the left temporal lobe.

valve surgery was decided by endocarditis multidisciplinary team (MDT).

He had emergency/salvage mitral valve replacement using 31 mm MITRIS RESILIA bioprosthetic valve. Findings at surgery were an enlarged left atrium, severe mitral regurgitation, large vegetations on the anterior mitral valve leaflet, posterior mitral valve leaflet, and left atrial wall, and prolapsing posterior mitral valve leaflet.

Heparin was given (300 IU/kg) to achieve an activated clotting time of >480 s and maintained at this level with top-ups of heparin when necessary.

The patient was cooled to 32 degrees on cardiopulmonary bypass, and mean arterial pressure was maintained at about 50–60 mmHg. Bypass time was 87 min with cross cross-clamp time of 72 min. A full dose of aprotinin was used. MITRIS RESILIA tissue valve was implanted because of the long durability of this valve and the avoidance of warfarin postoperatively. Postoperatively, he was transferred to the ICU in stable conditions and was extubated after 3 h. He remained haemodynamically stable. He developed hyperactive delirium, which improved considerably, and was transferred to the ward after 3 days.

His neurologic deficits did not deteriorate postoperatively. He benefited from neuro-rehabilitation and was discharged 9 days after surgery.

He has not attended the cardiac surgery outpatient clinic, but his hospital records indicate he is alive and doing well clinically.

Discussion

Unlike in patients with IE affecting heart valve(s) and transient ischaemic attack or stroke that have indications for surgery, where cardiac surgery is recommended without delay, surgery in those with ICH should be postponed for at least 1 month.¹ In another subset of IE patients with ICH and heart failure, uncontrolled infection, or persistent embolic risk, surgical intervention should be weighed against the likelihood of a meaningful neurological outcome. Management decisions including the timing of surgery are best made in endocarditis MDT setting with neurologist/neurosurgeon in attendance.¹ This case highlights the effectiveness of this strategy. Our patient developed neurological deterioration due to repeated cerebral embolism, and cerebral infarction complicated with haemorrhagic transformation. He also had

uncontrolled sepsis, worsening/torrential mitral regurgitation with imminent heart failure, and risk for further cerebral embolism.

He received a tissue valve to avoid warfarin, which has the potential to worsen ICH.

García-Cabrera *et al.*⁵ in their retrospective analysis of 1345 consecutive episodes of left-sided IE revealed that neurological complications had a negative impact on outcome. Moderate-to-severe ischaemic stroke and ICH were found to be significantly associated with a poorer prognosis, and mortality was higher when surgery was performed within 4 weeks of the haemorrhagic event in those with ICH.⁵ However, recent studies have revealed that in critically ill IE patients with an indication for surgery and previous cerebral events, a better propensity-adjusted neurological outcome was associated with surgery compared with medical treatment. Neurological deterioration before surgery (GCS < 10) was also found not to be a factor of worse prognosis in patients that had cardiac surgery.⁶

In IE patients with cerebral infarcts < 2 cm, early valve surgery (within 3 days) improved clinical results and no increase in the incidence of postoperative neurological complications was noted.⁷ Cardiac surgery has been proposed to be more effective in patients with severe neurological damage who also have an indication of urgent surgery due to the presumed dismal prognosis of the IE-related disease.⁸ Salaun *et al.*⁹ noted that in IE patients with ICH, mortality was higher in non-operated compared to the operated patients when cardiac surgery is indicated. Similar to our index patient, none in their series experienced neurological deterioration postoperatively. Diab *et al.*¹⁰ also revealed that preoperative ICH was not an independent predictor for postoperative neurological deterioration or hospital mortality.

Conclusion

Neurological manifestation of IE is associated with poor prognosis.

Valve surgery is indicated to tackle locally uncontrolled infection, remove the source of recurrent systemic emboli, and eliminate the risk of heart failure in IE. This can be performed as an emergency if indicated, even in the presence of multiple cerebral infarcts with haemorrhagic transformation.

Lead author biography



Dumbor L. Ngaage is an honorary professor at Hull York Medical School and a consultant cardiac surgeon at Hull University Teaching Hospitals NHS Trust, with an interest in minimally invasive techniques in cardiac surgery, mitral surgery, arterial grafts, and AF surgery. He has FWACS, FRCS(C-Th), FETCS in cardiovascular surgery, FETCS in thoracic surgery, and MS in clinical research from The Mayo Graduate School, USA. He has a track record in clinical research, is well published, and is on the editorial board of cardiothoracic and intensive care journals.

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Supplementary material

[Supplementary material](#) is available at *European Heart Journal – Case Reports* online.

Consent: Despite the best efforts of the authors, they have been unable to obtain consent for publication. Every effort has been made to anonymize the case. This situation has been discussed with the editors.

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Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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