

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Infective endocarditis complicated by cerebral abscess and mycotic intracranial aneurysm: A case report [☆]

Irfa Musthafa, MBBS*, Devraj Kandel, MBBS, Kritisha Rajlawot, MD,
Nirmal Prasad Neupane, MD, Asim Sitaula, MD

Department of Radiodiagnosis and Imaging, Shahid Gangalal National Heart Centre, Bansbari, Kathmandu, Nepal

ARTICLE INFO

Article history:

Received 16 May 2022

Revised 13 June 2022

Accepted 21 June 2022

Keywords:

Infective endocarditis

Mycotic aneurysm

Intracranial abscess

Neurological complications

Contrast CT head

ABSTRACT

Infective endocarditis (IE), is an infection of the endocardial surfaces of the heart, which primarily affects the valve leaflets, the mural endocardium, chordae tendinae and prosthetic valves among others. IE has various complications among which neurological complications include stroke, infected intracranial aneurysms, intracranial abscesses, meningitis, encephalopathy and seizures which could prove fatal if not treated on time. We report a case of a 17 year old girl, who was a known case of bacterial endocarditis that presented with sudden onset deterioration of mental status, fever and dizziness. On CT scan imaging of the brain, the patient showed features of intracranial abscess and mycotic aneurysm. Since early detection, diagnosis and timely management is crucial for the prognosis of the patient, we should always opt for timely imaging in patients of infective endocarditis with neurological symptoms.

© 2022 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Infective endocarditis, is defined as an infection of the endocardial surfaces of the heart, which primarily affects the valve leaflets, the mural endocardium, chordae tendinae, prosthetic valves, and implanted devices as well. The different types of infective endocarditis have varying causes and involve different pathogens with staphylococcus aureus being the most common causative agent. It is more common in men than

women ($2 > 1$), with an estimated general prevalence of 3 to 9 cases per 100,000 [1] with an increased risk observed in intravenous drug users. Infective endocarditis has intracardiac and extracardiac complications which if left untreated, is inevitably fatal. Even with advances in diagnosis and therapy, the morbidity and mortality rate is significantly high with a number of complications that may lead to re-hospitalization and surgical intervention. Septic emboli is a well-recognized complication occurring in 13%-44% of patients which may affect any organ or tissue with an arterial supply with the cen-

Abbreviations: IE, Infective Endocarditis; CECT, Contrast Enhanced Computer Tomography; MRI, Magnetic Resonance Imaging; CTA, Computed Tomography Angiography.

[☆] Competing Interests: All authors declare no conflict of interest.

* Corresponding author.

E-mail address: irfatish@gmail.com (I. Musthafa).

<https://doi.org/10.1016/j.radcr.2022.06.068>

1930-0433/© 2022 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

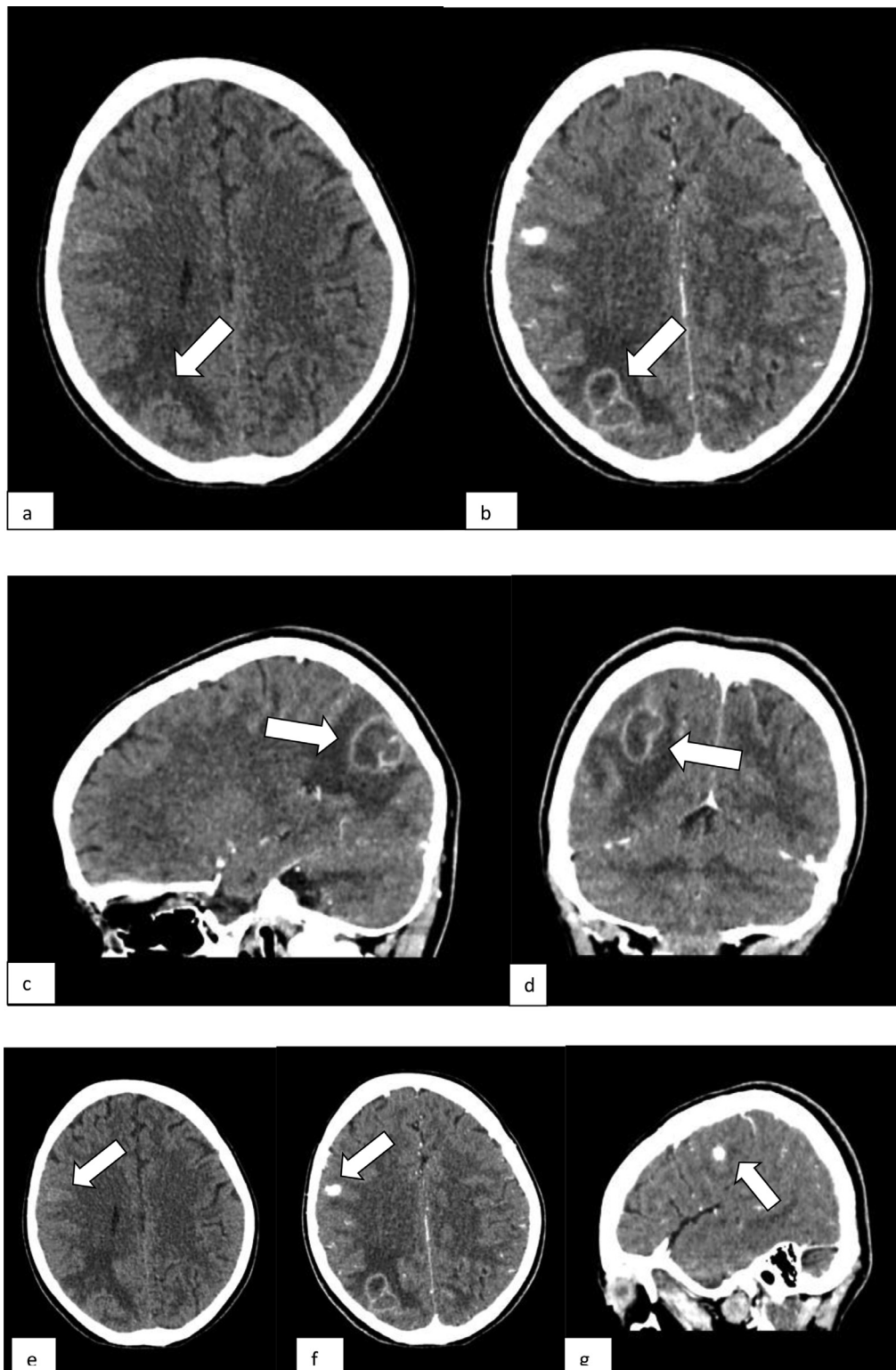


Fig. 1 – (a) Shows an ill-defined hypodense lesion in right parieto-occipital lobe in axial non contrast images. Figure 'b' shows peripheral enhancement of the lesion on axial postcontrast images. (c) Sagittal and (d) coronal postcontrast images of the brain, showing well-defined peripheral enhancement of the aforementioned lesion. (e) Shows an ill-defined hyperdense lesion in right parieto-occipital lobe in axial non contrast images of the brain. In postcontrast sagittal images (f), and sagittal images (g), significant homogeneous enhancement of the lesion appearing as a focal contrast filled out-pouching is seen.

tral nervous system being the most commonly affected [2]. Neurological clinical manifestations include ischemic or hemorrhagic stroke, infected intracranial aneurysm, meningitis, brain abscesses, spinal epidural abscess, encephalopathy, and seizures. We present a case of a 17-year-old female with history of endocarditis and its neurological sequelae.

Clinical history

A 17-year-old girl was transferred to our hospital where she presented to the emergency department with sudden deterioration of mental status. She was disoriented, dizzy, and was running a high-grade fever. She was a diagnosed case of infective endocarditis and was on intravenous antibiotics for past 3 days when she developed this sudden deterioration. Causative agent of endocarditis was found to be *Staphylococcus aureus* based on blood culture reports. Echocardiography report showed vegetations in mitral valve leaflet. On arrival, emergency plain and contrast enhanced CT scan of the brain was performed with 640 slice CT scanner following standard imaging protocols which showed an intracranial abscess and a mycotic aneurysm of the right cerebral hemisphere. The patient was treated conservatively for both neurological complications as there was no evidence of rupture of aneurysm or significant mass effect during time of examination and advised to review at higher center for neurosurgical consultation upon discharge.

Imaging findings

Plain and post contrast CT scan of the brain shows an ill-defined hypodense lesion (arrow) in the grey-white interface of the parieto-occipital lobe of the right cerebral hemisphere with marked perilesional edema (Fig. 1a) which on postcontrast images appears as a well-defined lobulated peripherally enhancing lesion (Figs. 1b–d) suggestive of an intracerebral abscess. Plain CT scan of the brain shows another ill-defined hyperdense lesion (arrow), noted anteriorly in the frontal lobe of the right cerebral hemisphere, in the subcortical region (Fig. 1e) which on post contrast images appears as a focal contrast filled out-pouching with no extravasation of the contrast (Figs. 1f and g) suggestive of intracranial mycotic aneurysm.

Discussion

Infective endocarditis is an infection of the inner lining of the heart with multiple intracardiac and extra cardiac complications that could affect a number of organ systems with central nervous system involvement being the most common extra cardiac complication [3]. Patients may present with a large spectrum of neurological disorders namely, ischemic and hemorrhagic strokes, cerebral abscesses, mycotic aneurysms, meningitis, and encephalopathy. Various imaging modalities can be used in the detection and diagnosing of these neurological sequelae among which multislice plain and contrast enhanced CT scan of the brain is a noninvasive

imaging technology which is easily accessible in majority of the hospitals and early diagnosis and management could be ensured. The treatment of neurological complications of infective endocarditis should be managed by a multidisciplinary team consisting of cardiologists, neurologists, intensive care specialists, and cardiac surgeons [2].

Bacterial brain abscesses are a rare complication affecting 1%–7% of cases and seen most commonly in the setting of methicillin-resistant *S.aureus* [2]. Treatment of brain abscesses is conservative with intravenous antibiotics with possibility of surgical intervention and drainage of the abscess if large and causing significant hydrocephalus and brain herniation [4].

Intracranial mycotic aneurysm accounts for 5% of all intracranial aneurysm [2]. CT angiography and MRI can be used in the diagnosis, however, gold standard for the diagnosis of intracranial mycotic aneurysm is digital subtraction angiography by which the fusiform shape, multiplicity, distal location, and change in size could be also be assessed on follow-up angiography [2,5]. Treatment of mycotic intracranial aneurysm depends on the presence of rupture, characteristics of the aneurysm and overall health of the patient [2,6]. If the aneurysm has not ruptured and the patient is at high surgical risk, conservative therapy with antibiotics guided by blood and cerebrospinal fluid cultures is advised. Surgical management includes open surgery and clipping of the mycotic aneurysm [2]. There is also treatment with endovascular surgery which include an indirect approach by parent artery occlusion using coils or liquid embolic agents and direct approach by embolization with the aneurysm coils, stent-assisted coiling and liquid embolic agents [5,6].

Conclusion

Infective endocarditis is a clinically challenging condition with multiple intracardiac and extracardiac complications with resultant lethal outcomes especially with neurological involvement. Plain and contrast enhanced multislice CT scan of the brain is easily accessible, time saving and can diagnose hemorrhage, ischemia, cerebral abscess, and intracranial aneurysms with ease and without the need of invasive procedures. Since early detection, diagnosis and timely management is crucial for the prognosis of the patient, we should always opt for timely imaging in patients of infective endocarditis with neurological symptoms.

Patient consent statement

Written informed consent has been obtained for publication of the case report.

REFERENCES

- [1] Cahill TJ, Prendergast BD. Infective endocarditis. *Lancet* 2016;387(10021):882–93 Available from: doi:10.1016/S0140-6736(15)00067-7.

-
- [2] Morris NA, Matiello M, Lyons JL, Samuels MA. Neurologic complications in infective endocarditis: identification, management, and impact on cardiac surgery. *The Neurohospitalist* 2014;4(4):213–22.
- [3] Nakamura K. Infective endocarditis. *Radiopedia* 1997;36(11):755–6.
- [4] Novy E, Sonnevile R, Mazighi M, Klein IF, Mariotte E, Mourvillier B, et al. Neurological complications of infective endocarditis: new breakthroughs in diagnosis and management. *Med Mal Infect* 2013;43(11–12):443–50.
- [5] Zanaty M, Chalouhi N, Starke RM, Tjoumakaris S, Gonzalez LF, Hasan D, et al. Endovascular treatment of cerebral mycotic aneurysm: a review of the literature and single center experience. *Biomed Res Int* 2013:2013.
- [6] Oohara K, Yamazaki T, Kanou H, Kobayashi A. Infective endocarditis complicated by mycotic cerebral aneurysm: two case reports of women in the peripartum period. *Eur J Cardiothorac Surg* 1998;14(5):533–5.