International Journal of
Science Inventions Today
www.ijsit.com
ISSN 2319-5436
Research Article

THE CLINICAL TREATMENT OF PONS AND MULTIPLE LOBAR BRAIN ABSCESSES ASSOCIATED WITH TETRALLOGY OF FALLOT: A CASE REPORT

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ABSTRACT

Background: Brainstem abscess due to tetralogy of fallot have rarely been reported in middle aged men. **Case Description:** We herein report a medically treated case of a 39-year-old male with unresolved congenital cyanotic heart disease (CCHD) presenting with right hemiparesis and difficuly in speaking who was diagnosed with brainstem abscess caused by *Staphylococcus, Moraxella, cutibacterium, corynebacterium, micrococcus and candida*.

The patient was treated with only intravenous antimicrobial therapy which led to the improvement of right hemiparesis and difficuly in speaking to baseline, patient was discharged following twelve weeks of intravenous antimicrobial therapy. The clinical diagnosis of the brainstem abscess was difficult due to the nonspecific presentation, highlighting the importance of cranial imaging without haste in patients at increased risk for brain abscesses such as those with CCHD, presenting with fever in the absence of localizing symptoms or fever, accompanied with abnormal neurological findings.

Conclusion: Brainstem abscess due to tetrallogy of fallot(TOF) may be treated with intravenous antimicrobial therapy alone leading to improvement of the clinical condition and decreased lesion size on imaging.

INTRODUCTION

Brainstem abscess(BSA) is an infection within the brain parenchyma that can arise as a complication of a variety of clinical conditions including infections, trauma, and surgery. [1] The incidence of BSA in the population with cyanotic heart disease (CHD) varies from 5 to 18.7%.[2]. Individuals with CHD are 10 times more prone to develop brain abscess than those with no CHD. Tetrallogy of fallot(TOF) is the most common cause[3,4]

BSA due to TOF is rarely reported and severe condition.[5, 6,7]

In the brainstem, pons is the most common site of the abscess. The midbrain is involved less often and medullary abscesses are distinctly rare.[9] The pons and midbrain are more commonly affected than other brain regions.[8 , 9]

The diagnosis and prognosis of BSA have recently undergone a remarkable change especially with the wide application of antimicrobial drugs, have contributed to the gradual decrease in the prevalence of this disease.[10]

The current study reports a case of BSA with CCHD, there are not many cases of a BSA successfully treated by antibiotic therapy alone. We report the successful medical management of a BSA in a 39-year-old patient with TOF.

CASE PRESENTATION

A male aged 39 years was admitted to our hospital with major complaints including speech failure and right hemiparesis for about 17 hours on february 5, 2022. He had a congenital cyanotic heart disease (CCHD), hypertension and history of gout.

On physical examination, he was conscious but drowsy with symmetrical and equally reacting pupils, mild hypertonia, Neurological examination did not reveal any meningeal signs. His vital signs were as follows: body temperature, 36.5°C, blood pressure, 139/72 mmHg; heart rate, 82 beats/min; respiratory rate, 20 breaths/min; and oxygen saturation, 80% with blue lips, purple finger tips and clubbing of digits in all four limbs, Cardiac examination showed an ejection systolic murmur which was heard best at the left upper sternal border.

Laboratory examination revealed polycythaemia with red blood cell count(RBC) 8.15×10^{12}/L (reference range: $4.3–5.8 \times 10^{12}$/L), white blood cell count(WBC) 6.82×10^{9}/L (reference range: $3.5–9.5 \times 10^{9}$/L) with hemoglobin, 233.0g/L (normal reference values: 130–175 g/L)

ECG shows sinus tachycardia, right atrioventricular hypertrophy with T-wave abnormalities. Echocardiography confirmed the diagnosis of tetralogy of Fallot. On the third day of hospitalization patient suffered from high fever after performing lumbar puncture(LP), cerebral spinal fluid(CSF) was collected and it was cloudy and yellow(figure 1) with an opening pressure about 300mmH2o, the result showed low CSF glucose 0.82 (normal reference values: 2.50-4.50) and white blood cells with value of 2.24×10^{9}/L (normal reference values: ($0 \sim 8 \times 10^{6}$/L) and CSF culturer was negative which shows severe central nervous system infection of the brain.

Figure 1

Computed tomography(CT) scan of the head showed the left side of the pons is seen with a mass of hyperdensity shadow, ranging from about 23 mm × 12 mm, with a CT value of about 48 HU, the density of cerebral hemisphere sulcus, cerebral fissure and intracisternal vascular density increases (figure 2A). On day five Magnetic resonance imaging(MRI) also demonstrated a patch of lesion in the pontine area with hyperintense lesion (T2-weighted fluid-attenuated inversion recovery figure 2(b)). Diffusion-weighted imaging (DWI) revealed uneven hyperintense lesion indicating limited diffusion with a low apparent diffusion coefficient Figures 2(c)

Figure 2(a)

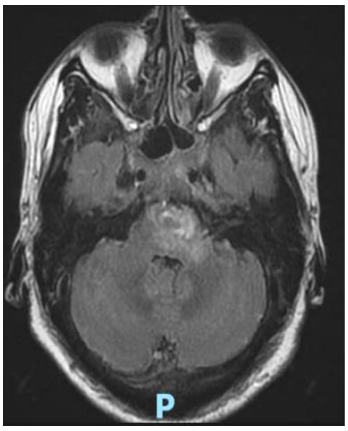

Figure 2(b)

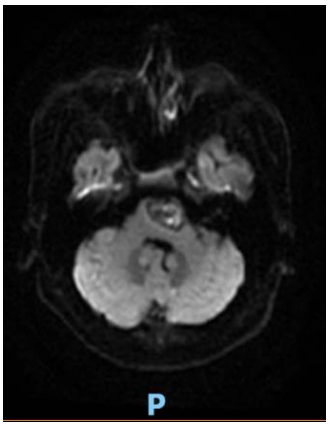

Figure 2(c)

Brain abscess detected by computed tomography(CT) and magnetic resonance imaging(MRI). (a) Computed tomography(CT) scan showing a mass of hyperdensity shadow. (b) T2-weighted fluid-attenuated inversion recovery image showing a hyperintense lesion. (c) Diffusion-weighted magnetic resonance image demonstrating a hyperintense signal within the lesion.

The clinical course of the patient is shown in Figure 3. Based on the clinical and imaging findings, the patient was diagnosed with a brain abscess and simultaneously administered oxycephalosporin initially, the antibiotics were changed from oxycephalosporin to vancomycin along with biapenem injection on day 4. The patient continued to have spikes of fever initially but became afebrile by the seventh day.

Additionally, oxazolidinone(linezolid) were administered to improve the brain abscess. The patient was discharged after 82 days of intravenous antimicrobial therapy, which comprised three days of intravenous oxycephalosporin and 76 days of intravenous biapenem along with vancomycin for about 24

days and vanconin for about 16 days and oxazolidinone antibioitic(linezolid) for 33 days.

Serial blood cultures were sterile after five weeks of parenteral antibiotic therapy from a hospital, he could speak fluently and did not have any residual neurological deficit. A repeat CT and MRI scans showed complete resolution of the BSA.

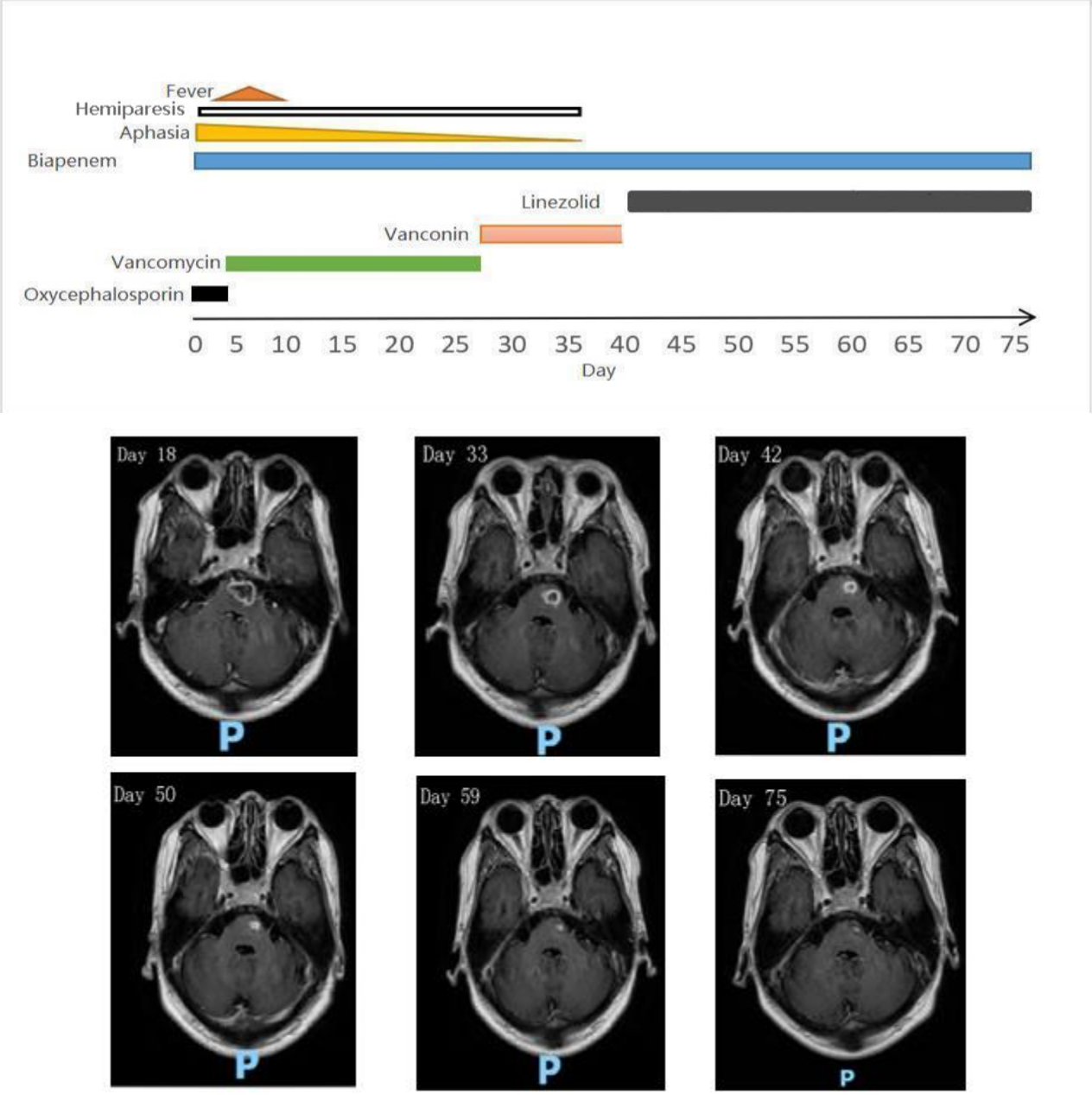

Figure 3: Clinical course of the patient. Neurological symptoms and MRI findings are improved by antimicrobial therapy-.

DISCUSSION

In the current case, the correct diagnosis was important, just a few days before coming to the hospital the patient was diagnosed with subarachnoid hemorrhage, which was a misdiagnosis, the thermogram suggested delayed high fever, and the body temperature reached 39.4℃, after performing lumbar puncture(LP) the patient was diagnosed with intracranial infection.

Standardize anti-infection treatment, ultra-long-term antibacterial treatment, can refer to domestic and foreign intracranial infection treatment guidelines for in-depth discussion,

At present, Tetralogy Of Fallot has no indication of cardiac surgery, and later infective endocarditis may occur and falling off bacterial emboli may result in abscess at the distant part of the heart, so the patient's head needs to be regularly reviewed by MRI contrast scan + enhancement

Most bacterial intra-cerebral infections are caused by hematogenous transmission of primary infections outside the brain, and a few direct violations from nearby tissue and organ infections or direct infections of brain trauma. Prepuberty and middle-aged people are predisposed to the disease as a result of congenital heart disease, ear or sinus infections and drug abuse in this age group. The incidence is higher in men than in women. Common pathogenic bacteria include Staphylococcus aureus, streptococcus, hemolytic streptococcus, pneumococcus and gram-negative bacteria; Anaerobic bacteria include anaerobic streptococcus and protomycetes.[11]

CONCLUSION

Pontine abscesses are rare, combined with multiple supratentorial lobe brain abscesses, which also related with the low resistance of patients and are easily misdiagnosed;

The anti-infective treatment has high intensity, long duration and high nursing intensity, the underlying disease of tetralogy of Fallot exists for a long time and the recurrence of brain abscess is likely to be high.

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