Case Study: Brain Abscess

Mr. C is a 34-year-old male. He is a chronic smoker and occasional alcohol drinker. He came from the Philippines three years ago and was working as a nursing aid. On July 20th, he started to develop right-sided headache and progressive left hand weakness. On the morning of July 25th, his wife noticed he had mild left facial droop and unsteady gait. He was bought to the emergency room by his wife.

In the emergency department, Mr. C was oriented, he had mild decreased left hand grip, left facial droop, blurry of vision on his right eye, and ptosis of left eye. With his presentation, the preliminary diagnose was a stroke. A CT scan of head was ordered. CT scan showed a mass in the right cerebral hemisphere. The mass has a thin hyperdense rim and severe vasogenic edema that produced significant mass effect and left midline shift. Mr. C’s neurological dysfunction was believed to be related to the mass. Mr. C was referred to a neurosurgeon for further investigation and treatment.

The MRI of Mr. C

Mr. C denied any traveling or dental work recently. His last visit to the dentist was two years ago. He stated he had a lesion on the left upper gum line for more than a year. Physical examination revealed his had painful left anterior cervical lymph nodes. A dental workup was performed. At the left maxillary third molar, a small fragment was noted. Otherwise, the teeth were all normal (see below picture).

Mr. C’s CT scan showed a ring enhancing lesion (arrow)

The dental X-ray of Mr. C

Mr. C’s brain abscess was believed to be related to the dental caries. The Infection Prevention and Control (IP&C) department was consulted. Different treatment options, the risks and benefits of each option had been explained to Mr. C, and he decided to proceed with surgery. During the pre-operation period, dexamethasone was commenced to reduce cerebral edema. A transthoracic echocardiogram was performed to exclude septic embolism from cardiac source and the result was negative.

The initial assessment on admission on the neurological unit was alert and orientated, blood pressure 115/77, heart rate 67/min, SpO₂ 97% on room air, temperature 37.2°C. The laboratory results were white blood cell count 12 X 10⁹ per liter, and Neutrophil 9.2 X 10⁹ per liter.

A MRI was ordered. The MRI result demonstrated a large peripherally enhancing mass centered within the posterior right putamen/posterior limb of internal capsule. The size of the mass was 2.2 X 2.6 X 2.5 cm. There was extensive vasogenic edema around the mass, the edema extended to and involved the optic chiasm (see below picture). The CT scan and MRI findings were consistent with brain abscess.
On July 30\(^{th}\), a right temporal craniectomy, frameless stereotactic biopsy, aspiration of cerebral abscess, and irrigation with normal saline (0.9% saline water) was performed. Thirteen milliliter bloody pus was aspirated during the procedure. The pus was sent for culture. Post-operative orders include saline water 0.9% at 100mL/h, a bowel routine, dalteparin 5000u daily for deep venous prophylaxis, dexamethasone 2mg every 6 hours, morphine, oxycodone for pain control, ranitidine for gastrointestinal prophylaxis. Antibiotics therapy include Ceftriaxone 2gm every 12 hours and metronidazole 500mg twice a day.

The culture of the aspiration showed positive of streptococcus anginosus. According to the culture result, the antibiotic regime was changed to penicillin G 4 million units every 4 hours and metronidazole 500mg three times a day. It was planned to continue for 6 weeks. A central venous catheter was inserted for long term antibiotic therapy.

On August 6\(^{th}\), Mr. C was discharged home. He is to continue with the antibiotic therapy in an outpatient department. His dexamethasone was tapering off. He was recommended to be seen by a dentist for his dental issues. He was arranged to have a repeat CT scan and follow up in five weeks. However, a significant amount of patents after aspiration may require a second aspiration. Mr. C was instructed if his signs and symptoms return, he must seek for medical advice immediately.

**Case Highlight**

Mr. C did not have the typical triad presentation of brain abscess. He was afebrile at all time. His presentation was headache, left face and hand weakness, and visual dysfunction. It was believed to be resulted from the mass effect of the abscess and cerebral edema.

Mr. C is a healthy person, there was no evidence that he had any other source of infection or was immunocompromised. According to the dental checkup report, the source of brain abscess was believed to be related to the dental problem he had. Patient was recommended to be seen by a dentist to avoid further infection.

**Brain Abscess Case Study Quiz**

1) What is the most common location of brain abscess?
   a) Cerebral hemisphere  
   b) Cerebellum  
   c) Basal ganglia  
   d) Meninges

2) What is the most common causative organism of brain abscess?
   a) Anaerobic bacteria  
   b) Staphylococci  
   c) Streptococci  
   d) Fungus

3) What is the classic triad presentation of brain abscess?
   a) Motor dysfunction, fever, memory loss  
   b) Personality changes, headache, seizure  
   c) Headache, fever, and neurological deficits  
   d) Fever, nausea and vomiting, seizure

4) What is believed to be the source of Mr. C’s brain abscess?
   a) Endocarditis  
   b) Dental caries  
   c) Pneumonia  
   d) Sinusitis

5) Why central venous catheter is recommended for patient with brain abscess?
   a) Antibiotics are irritating to peripheral veins  
   b) Long term antibiotic therapy is required  
   c) Antibiotics can reach peak level faster  
   d) Antibiotics can be administered in faster rate

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