A rent in the heart, a crater in the brain

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16 year old girl a k/c/o VSD with TGA, presented with headache and vomiting.

ON PRIMARY SURVEY

Airway : Patent

Breathing : RR 18/min
SpO2 - 89% on RA

Circulation : Pulse 48/min
BP of 110/70 mmHg

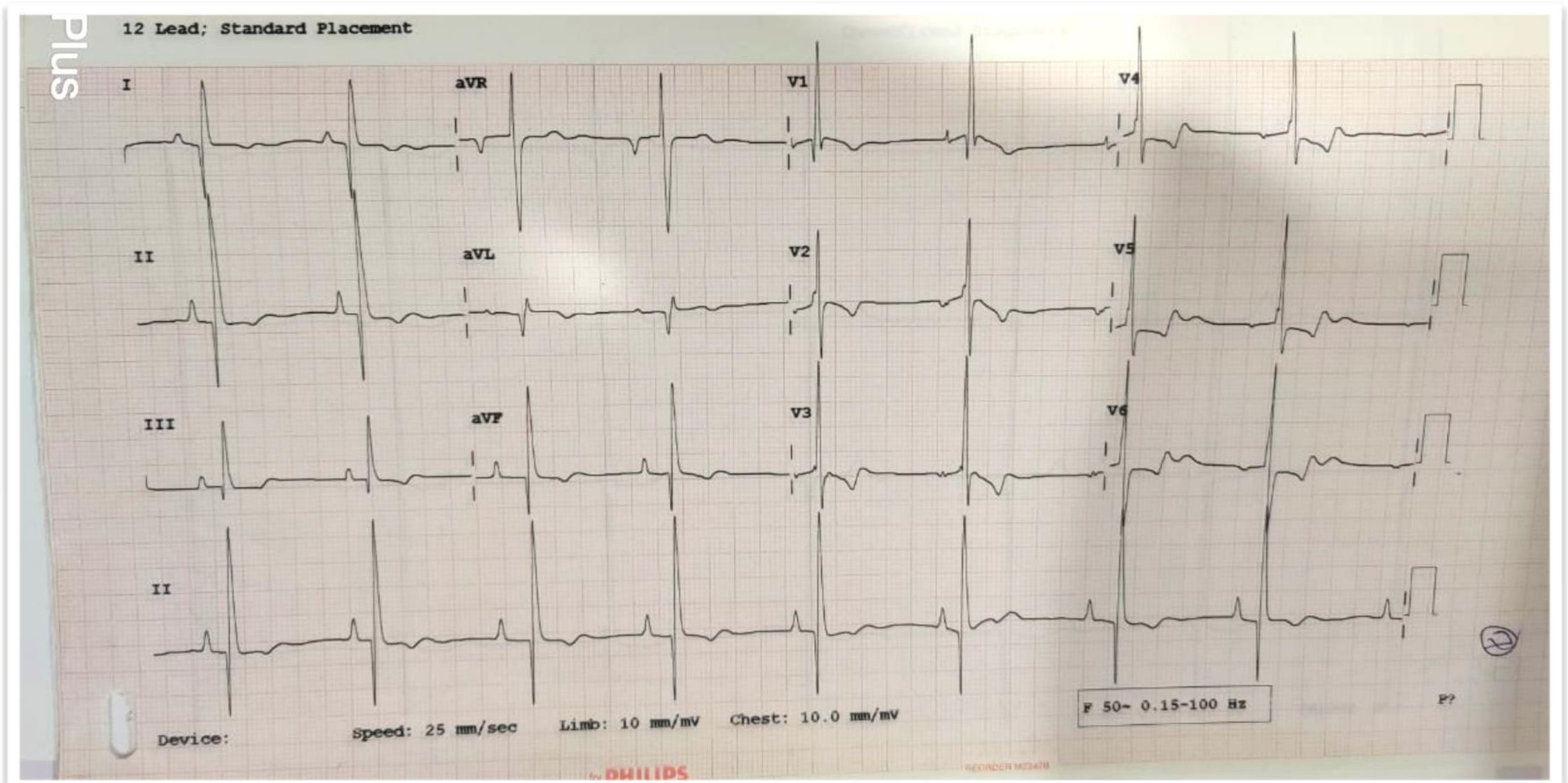
Disability : GCS 15/15, Patient was oriented to TPP
Pupils B/L equal and reactive

Exposure : WNL

BSL - 122mg/dl and Temperature was - 37.8 C

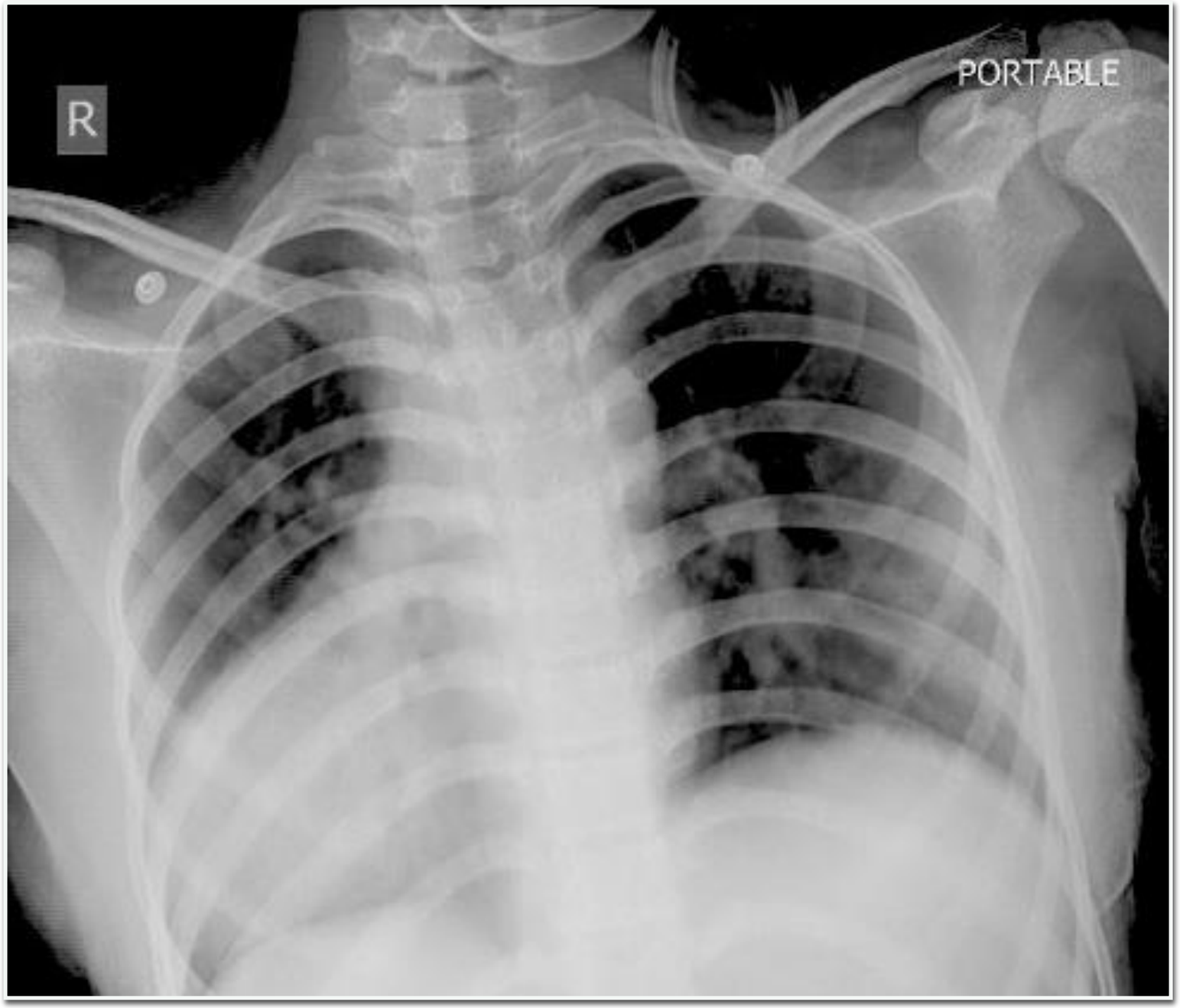
ECG

Dextrocardia with Sinus bradycardia



INVESTIGATIONS

RADIOLOGY – CHEST X–RAY



DEXTROCARDIA

SYSTEMIC EXAMINATION

CVS - Apex beat localised to Rt 5th ICS
S1 heard,
Ejection systolic murmur in Rt 2nd ICS (Grade5)
Single S2.
Palpable thrill+

RS - B/L NVBS+

P/A - Soft NT, no Organomegaly.

CNS - No FND or sensory impairment , Reflexes and plantars - WNL

DIFFERENTIALS

CEREBRAL ABSCESS

INTRACRANIAL THROMBOSIS

INTRACRANIAL MASS

INTRACRANIAL BLEED

MIGRAINE

COVID –19 PNEUMONITIS

LRTI

CARDIAC FAILURE

ACUTE GASTROENTERITIS

CLINICAL LAB

- Complete Blood Count
- Arterial Blood Gas
- Troponin I & BNP
- Serum Electrolytes
- PT-INR & D-dimer
- Liver & Renal Functions
- Blood Cultures

RADIOLOGICAL

- CXR
- 2D-Echo
- MRI Brain

- COVID RAT

HISTORY OF PRESENTING ILLNESS

- **SIGNS AND SYMPTOMS** –
  - SEVERE HEADACHE(8/10) X 3 DAYS
    - HOLOCRANIAL
  - NON–PROJECTILE VOMITING X 4 EPISODES

- **ALLERGIC HISTORY** – NIL
- **MEDICATION HISTORY** – NIL
- **PAST HISTORY** – KNOWN CASE OF CONGENITAL HEART DISEASE, VSD WITH TGA & PS
  ADMISSION IN LOCAL HOSPITAL FOR SAME COMPLAINTS
- **LAST MEAL** – DINNER

EVENTS –NIL

TREATMENT

- 4 litres O2 by facemask
- Inj Ondensetran 4mg iv
- Inj Paracetamol 1gm iv
- Inj. Ceftriaxone 2gm iv

INVESTIGATIONS

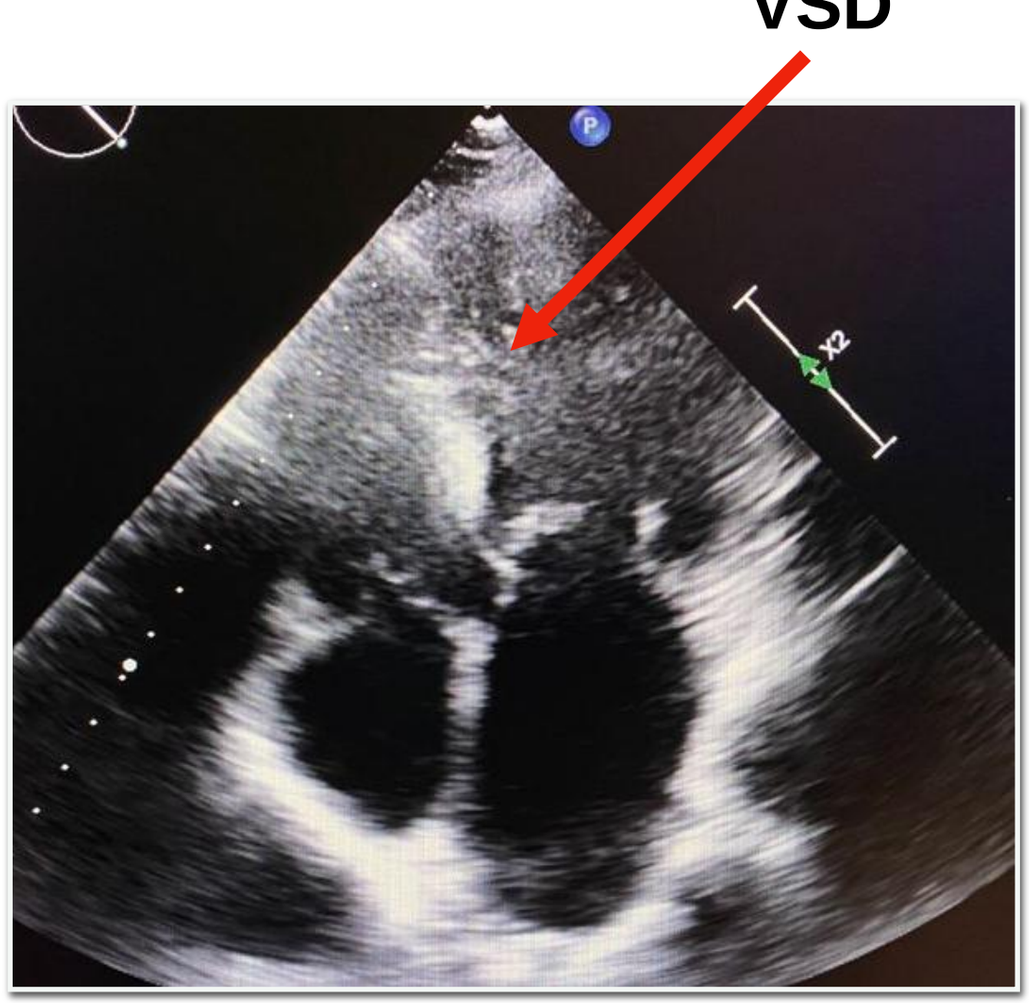
2D ECHOCARDIOGRAPHY

- Large non-restrictive VSD with bi-directional shunting
- ccTGA
- LVOT obstruction

  - severe pulmonic stenosis
- Good bi-ventricular function
- No evidence of clots,

  vegetations or thrombus

VSD



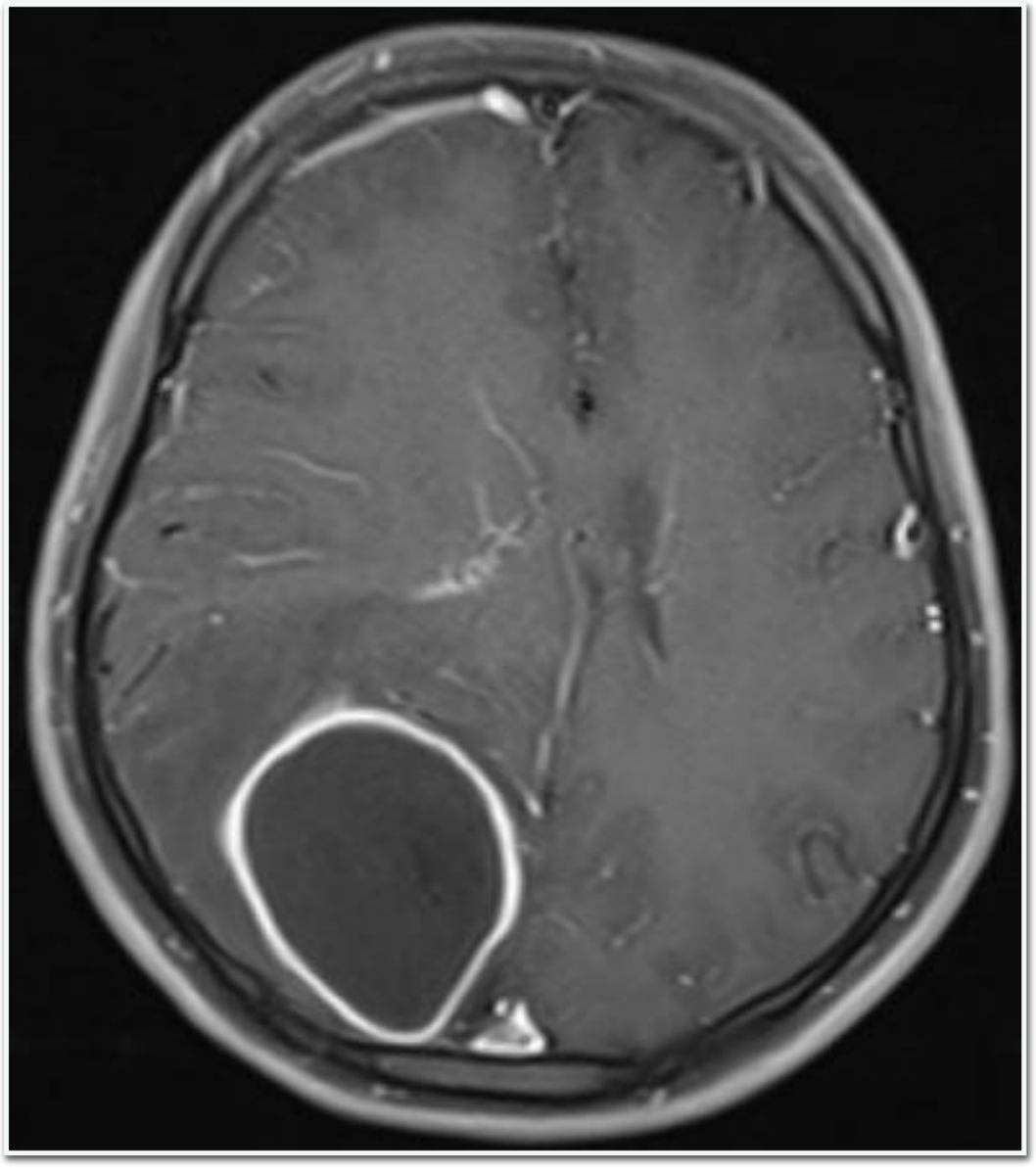
INVESTIGATIONS

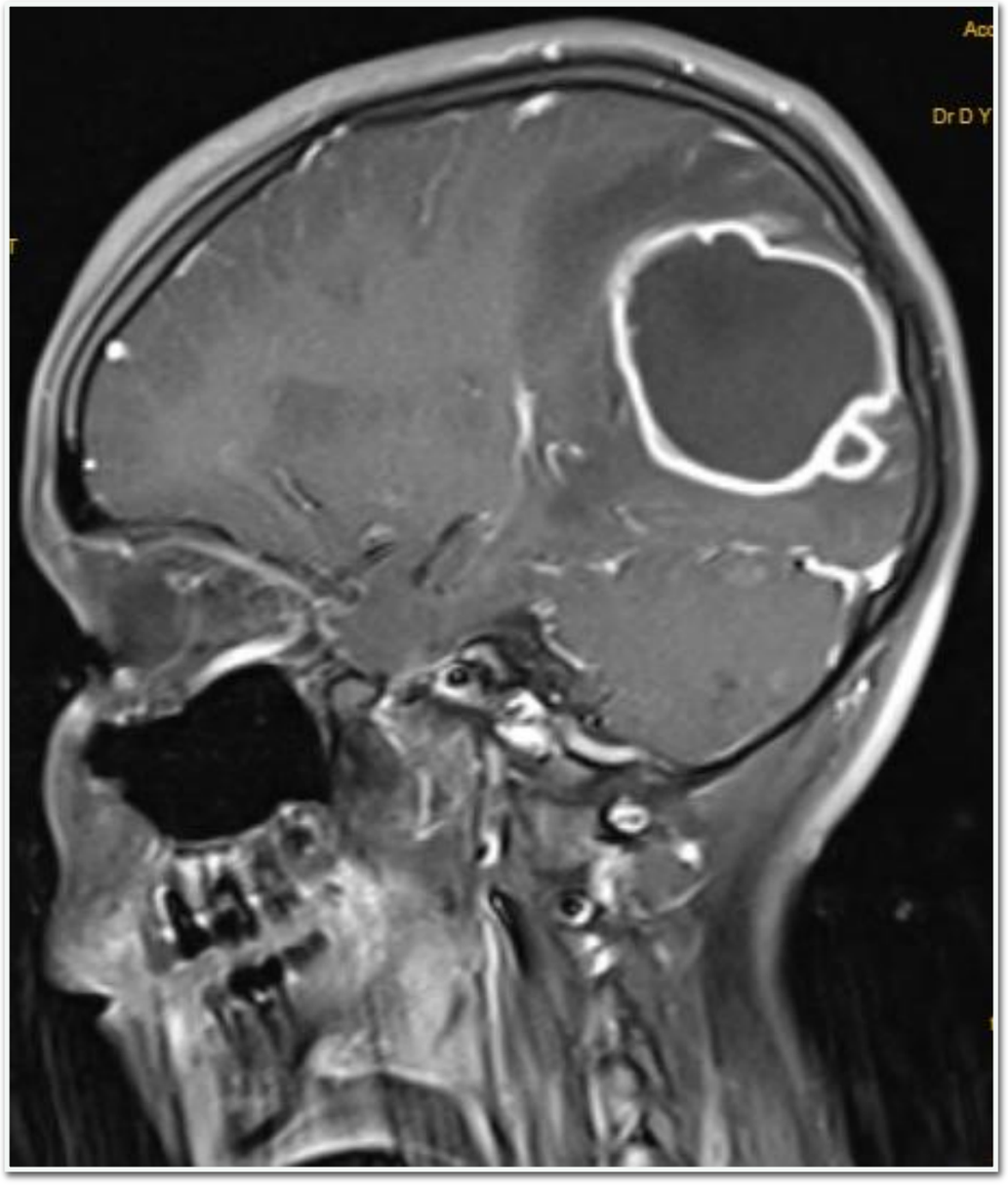
LAB INVESTIGATIONS

Complete Blood Count	Hb- 15.60 g/dL WBC- 12,500 cells/mm3 Platelet-2,61,000 cells/mm3 PCV - 48.80 %
Electrolytes	Na-139 mmol/Lt K-3.8 mmol/Lt Cl-102 mmol/Lt
RFT	Urea 35 mg/dl Creat -0.58 mg/dl

INVESTIGATIONS

RADIOLOGY – MRI BRAIN





MANAGEMENT

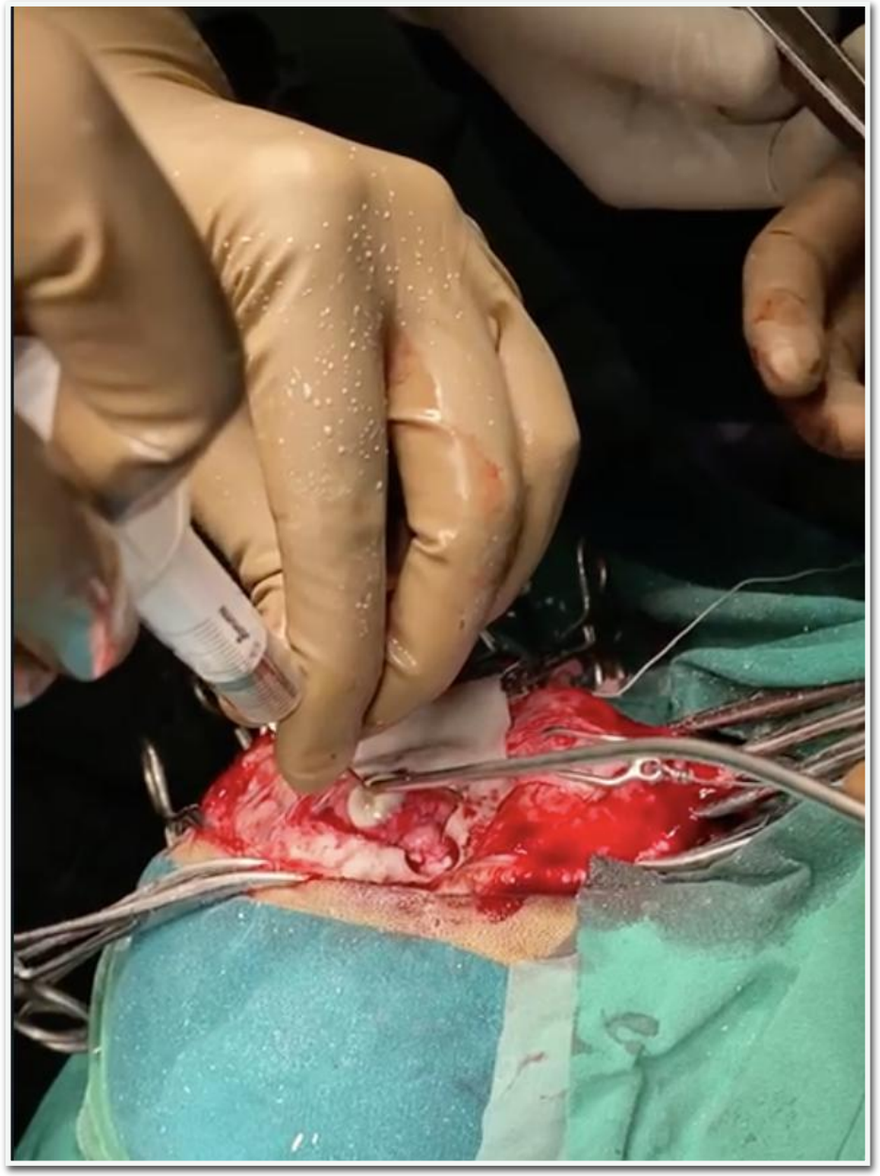
MEDICAL

- Broad spectrum antibiotics -
    - Inj. Meropenem 40mg/kg iv Q24hrs
    - Inj. Vancomycin 15mg/kg iv Q24hrs
- Seizure prophylaxis - Inj. Levetiracetam iv 30mg/kg
- Anti-edema measures - Inj Mannitol 0.5mg/kg

MANAGEMENT

SURGICAL

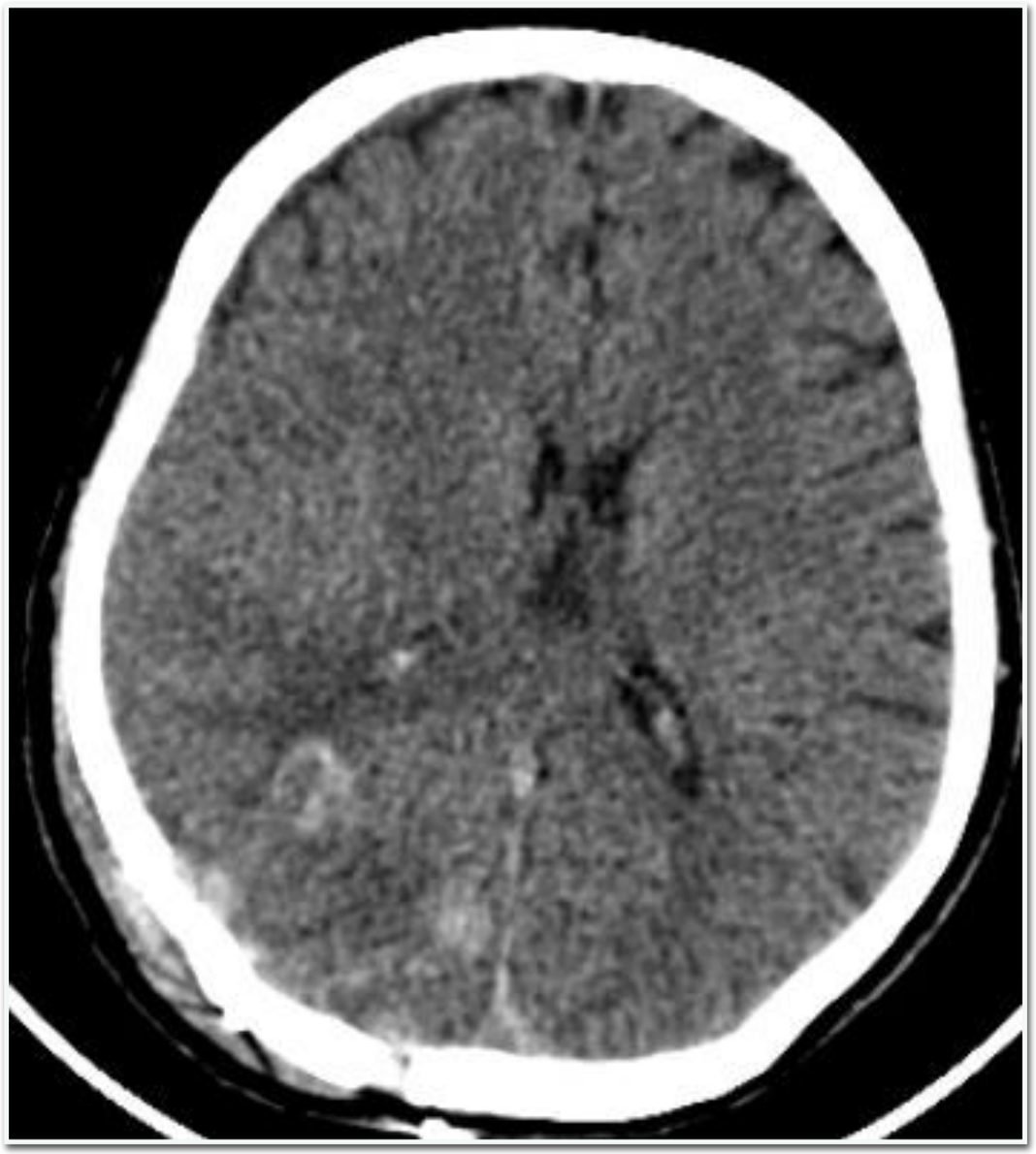
- Urgent Neurosurgical referral



- Decompressive Craniectomy with abscess excision.

FOLLOWUP

SURGICAL

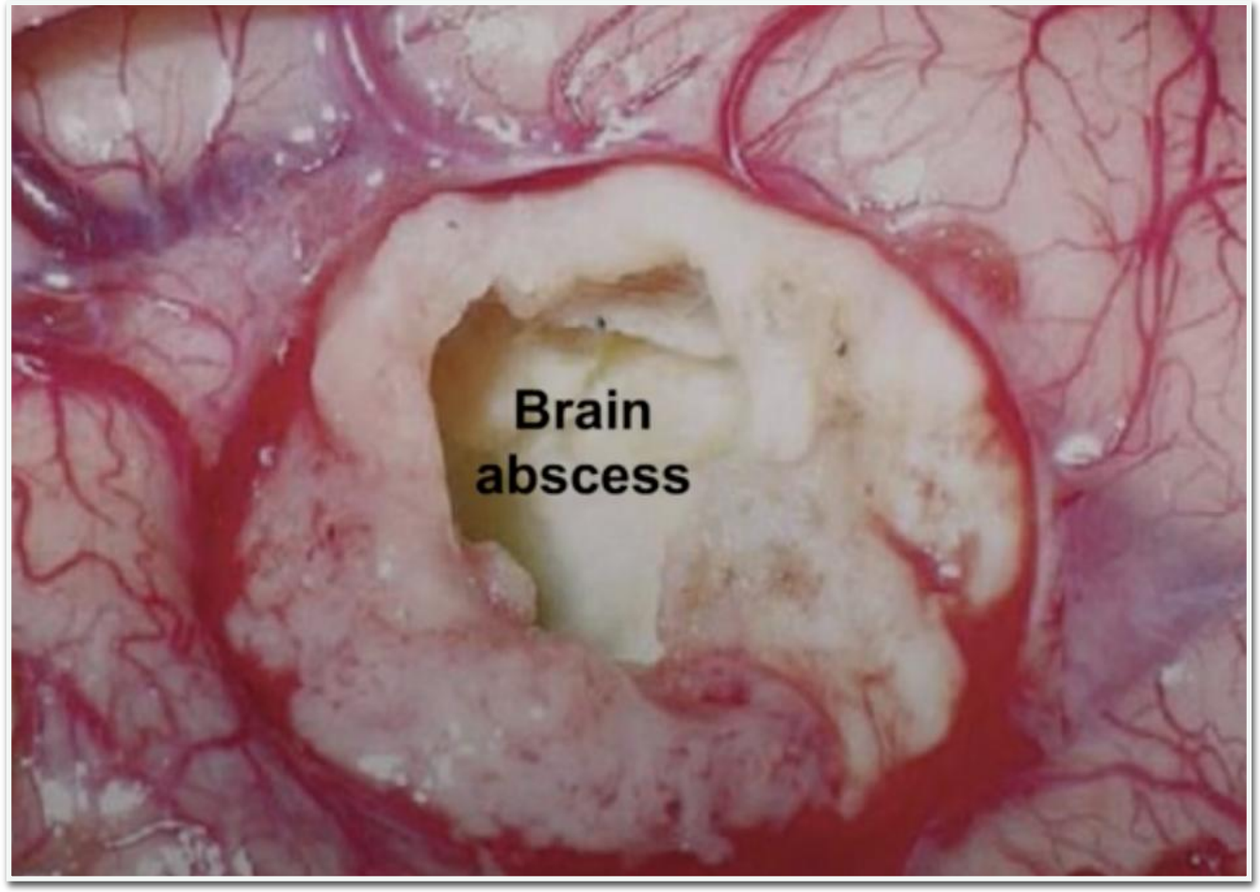


- Quick recovery after surgery
- Asymptomatic 4 weeks post surgery.

DISCUSSION

BRAIN ABSCESS

- A brain abscess is a pathologic response typical of a relatively competent immune system against an infection.



DISCUSSION

AETIOLOGY

Source	Prevalence	Common Organism
Contiguous extension	25 to 50%	Gram negative rods, anaerobic and microerophilic streptococci
Hematogenous Seeding	25 to 30%	Polymicrobial, anaerobic and microerophilic streptococci
Direct Spread	8 to 20%	Staphylococci
Unknown	15-20%	

DISCUSSION

SIGNS AND SYMPTOMS

- Indolent to fulminant
- Classic clinical triad - fever, headache & focal neurologic deficit < 20%
- Headache 50-75%
- Fever <50 %
- Meningeal Signs - 25%
- Seizures 7-10%

@ Helweg-Larsen J, Astradsson A, Richhall H, Erdal J, Laursen A, Brennum J. Pyogenic brain abscess, a 15 year survey. *BMC Infect Dis*. 2012 Nov 30. 12:332.

DISCUSSION

- Any neurological abnormality or evidence of raised intracranial pressure in a patient with cyanotic congenital heart disease must be considered a possible brain abscess until proven otherwise

@ Clinical Neuro surgery- Chapter XV Brain Abscess and Congenital Heart Disease DAVID B. CLARK, M.D., PH.D.
@ Brain abscess in congenital heart disease Donald d. Matson, Maria salam, Pediatrics may 1961, 27 (5) 772-789;

DISCUSSION

- Factors responsible for the occurrence of brain abscess in CCHD patients.
    - Pulmonary circulation is bypassed, blood is not filtered by normal alveolar phagocytes.
    - Hypoperfusion due to hypoxemia and metabolic acidosis (from secondary polycythemia)

- This increases the probability of direct entrance of pathologic microorganisms into the circulation of brain.

@ Lakhani, Murk et al. “Brain abscess: A rare complication in a child with tetralogy of Fallot.” *IDCases* vol. 22 e00954. 9 Sep. 2020, doi:10.1016/j.idcr.2020.e00954

DISCUSSION

- 2-3X more common in men
- Rare but potentially fatal in people in adulthood.
- Generally, cerebral abscesses in CCHD patients are attributed to infection by non-hemolytic streptococci

@ Lakhani, Murk et al. “Brain abscess: A rare complication in a child with tetralogy of Fallot.” *IDCases* vol. 22 e00954. 9 Sep. 2020, doi:10.1016/j.idcr.2020.e00954

DISCUSSION

- Preferred initial imaging is MRI or a CT scan with or without contrast.

- Findings in MRI - differentiating cerebral tumor, stroke, and abscess.

DISCUSSION

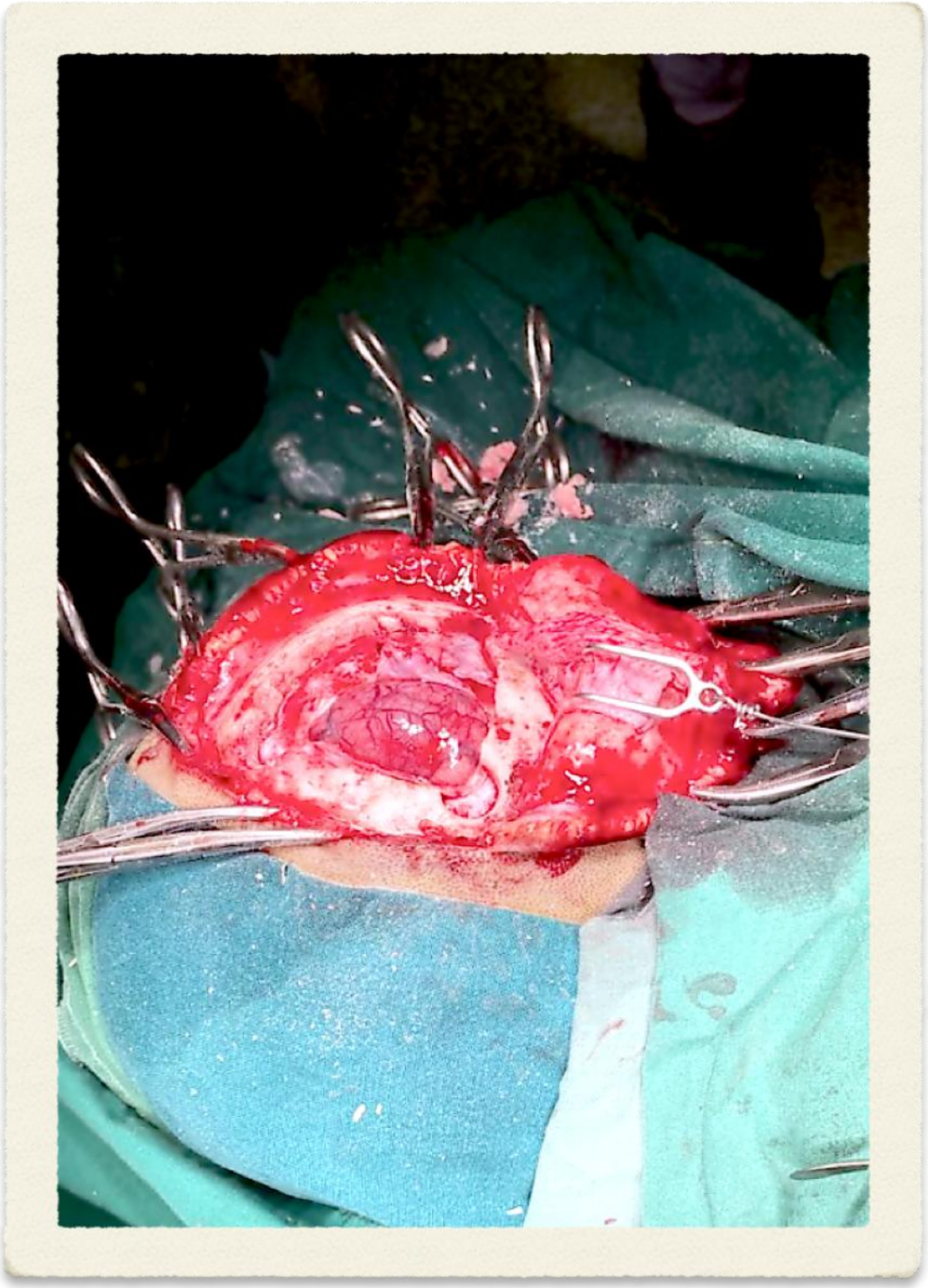
TREATMENT GUIDELINES

- Multidisciplinary team approach
- Broad spectrum antibiotic with coverage of anaerobic pathogens
- Identify and the source.
- Treatment of mass effect and seizure prophylaxis.
- Early neurosurgical referral for operative intervention

Alvis Miranda, Hernando et al. “Brain abscess: Current management.” *Journal of neurosciences* vol. 4,Suppl 1 (2013): S67-81. doi:10.4103/0976-3147.116472

Teaching points

- High index of suspicion for cerebral abscess in those with cCHD.
- Non specific complaints can hide sinister diagnoses.



Thank You