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Anesthetic Management of a Case with Uncorrected Tetralogy of Fallot Posted For Intracranial Aneurysmal Clipping

Dr.Mahesh Gandrikota, Dr.Sudhakar Ledalla, Dr.C.N.Chandra Sekhar

Department of Anaesthesiology and Pain Medicine, Yashoda Hospital, Somajiguda, Hyderabad

Correspondence Author: Dr.C.N.Chandra Sekhar, Department of Anaesthesiology and Pain Medicine, Yashoda Hospital, Somajiguda, Hyderabad, India.

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Abstract

Tetralogy of Fallot, which is one of the common congenital heart disorders, comprises right ventricular (RV) outflow tract obstruction (RVOTO) (infundibular stenosis), ventricular septal defect (VSD), aorta dextroposition, and RV hypertrophy. Few cases of uncorrected TOF present for non-cardiac surgeries. Intracranial Mycotic aneurysm is one of the rare complication of TOF (secondary to Infective endocarditis We present a case of Intracranial aneurysmal clipping under General anesthesia in a patient of uncorrected TOF

Keywords: TOF, Intracranial aneurysm, VSD, Vegetations

Introduction

Tetralogy of Fallot is the most common cyanotic congenital heart disease characterized by Aortic overriding, right ventricular hypertrophy, pulmonary stenosis and ventricular septal defect. TOF carries a high risk for the development of Infective endocarditis. Mycotic aneurysms are rare causes of intracranial aneurysms that develop in the presence of infections such as Infective Endocarditis. They carry high mortality rate when ruptured. We report anaesthetic and perioperative management of a 12 year old female child who developed intracranial aneurysm as a complication of TOF taken up for Craniotomy and aneurysmal clipping.

Case report

A 12-year-old female child Known case of Uncorrected tetralogy of Fallot came with a complaint of Right upper and lower limb weakness since one-month, sudden loss of speech 25 days back, and history of shortness of breath and chest pain since 20 days.

On examination patient was 30 kg body weight, conscious, coherent no evidence of cyanosis/ clubbing/ generalized lymphadenopathy/jaundice. Temperature 99.4 F, Pulse rate was 112/minute & Blood pressure was 90/60 mmHg. Cardiovascular examination S_1 & S_2 both were heard along with continuous holosystolic murmur over precordial area. Central nervous system examination revealed Nystagmus & Transcortical aphasia, decreased tone in the right upper and lower limbs & power 0/5 right upper limb, 3/5 in the right lower limb ,Brisk deep tendon reflex in the right side and Extensor plantar response. Respiratory system & per abdominal examination was normal. Her investigations showed Hb: 10.90gm/dl, TLC 5500, Platelets 2,70,000 INR 1.32

CXR showed haziness in left lower zone obscured by cardiac apex, ECG was normal, 2D ECHO revealed CHD large VSD of size 1.8 cms with left to right shunt, Valvular Pulmonic stenosis PJV 4.2 M/second, large vegetation on and pulmonary valve (1.5 x 1.5) tricuspid valve (0.7 x 0.6).

Fig 1: 2D ECHO showing vegetations on Tricuspid Valve

Fig 2: 2D ECHO Ventricular Septal Defect

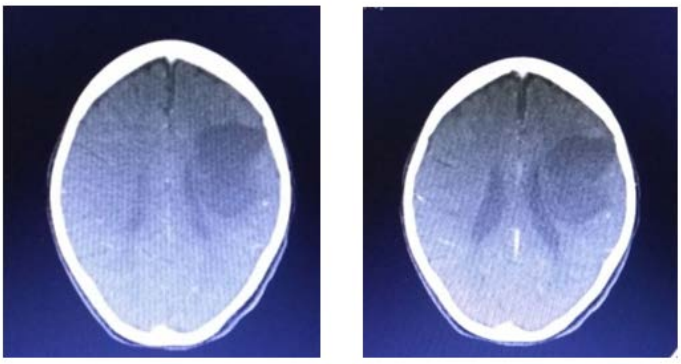

Fig. 3: Cerebral venography revealed sub-acute intraparenchymal bleed involving left parieto- temporal lobe with mass effect.

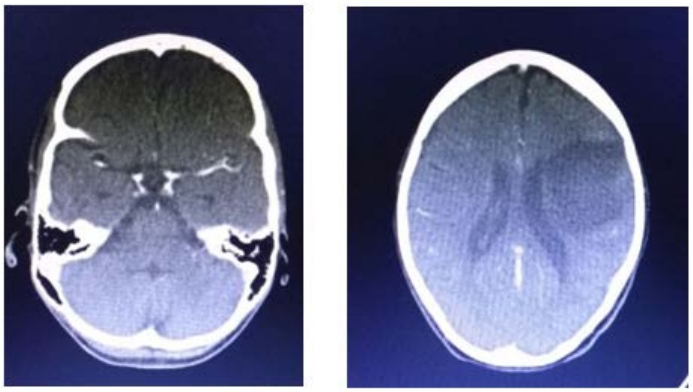

Fig. 4 Cerebral Venography showing abnormal out pouching seen along M3 segment of left MCA s/o. Aneurysm.

Immediately planned for emergency craniotomy. Attendants were councelled regarding emergency craniotomy and clipping of aneurysm and also need for postop elective ventilation and the outcome

Patient shifted to OT. Patient connected with standard monitoring I.e. ECG, NIBP SPO_2, $ETCO_2$. Invasive B.P monitoring done with by using 20g switch canula and pressure transducer. After preoxygenation with 100 % O2 for 3 minutes, Induction was done with Inj.Fentanyl 2 mic/Kg, Etomidate 0.2 mg/Kg & relaxant Atracurium 0.6mg/kg loading dose and 6 micrograms/Kg/Hour as a maintenance dose & Desflurane, O_2 , Air for maintenance. IV fluids 2 units RL and 1 unit NS was given. Blood loss was 1000 ml, so 1 unit of PRBC was transfused intraoperatively. Urine output was 300 ml. Procedure was uneventful.

Patient shifted to SICU with ETT for elective ventilation. Patient was sedated with Midazolam, Fentanyl and paralyzed with Atracurium Patient was monitored overnight.

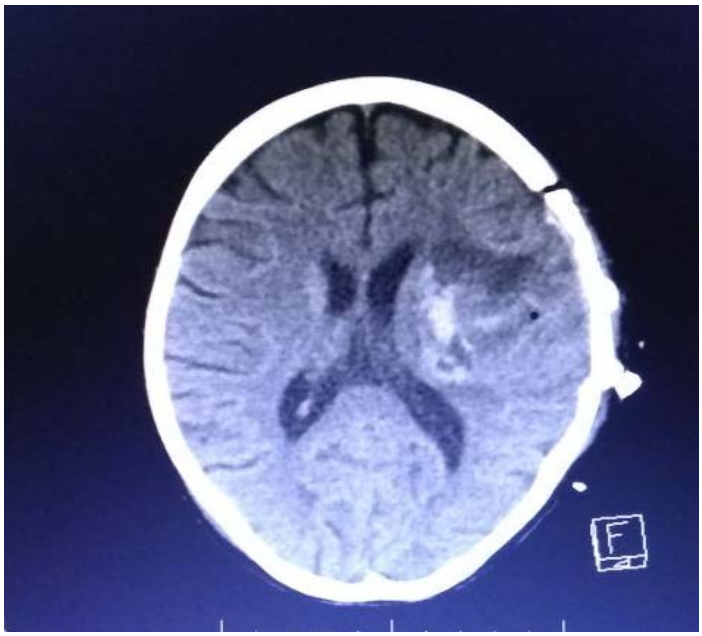

Fig. 5 Post op CT showing resolving haematoma

Patient was gradually weaned off from ventilator. Physiotherapy & Speech therapy were started and patient recovered well & was discharged on 8th post-operative day.

Discussion

Tetralogy of Fallot is the commonest cyanotic congenital heart disease with an incidence of 3 in 10000 births, representing 10% of all CHDs. The classical description comprises of a non-restrictive ventricular septal defect (VSD), an overriding aorta, right ventricular outflow tract obstruction (RVOTO), with resultant right ventricular hyper trophy. Presentation is usually cyanosis and murmur in the neonatal period, although it can present later in milder forms[1].

When associated with atrial septal defect it is known as pentalogy of Fallot[2]. Association with Chromosomal abnormalities are described with microdeletion of 22q11.2 (of DIGEORG and Velo cardiofacial syndromes), being most frequent and trisomy 21,13,and 18 are also expressed[1].

Incidence of CVA in children with CHD is 1.5 to 2% (of these most common cause is TOF[3]). Cerebral mycotic aneurysm incidence is 2 to 4% of cases of infective endocarditis and has a mortality rate of 30%with unruptured aneurysms and mortality reaching 80% with ruptured aneurysm[4].

Left to right shunts are the most common lesions representing 50% of children with CHD. Left to right shunts lead to excess pulmonary flow and pulmonary congestion. 100% oxygen and hyperventilation leads to further congestion and thus should be avoided. High pulmonary flow in unrestricted left to right shunt leads to pulmonary hypertension and congestive heart failure[5]. Shunt reversal occurs if systemic vascular resistance drops or pulmonary vascular resistance increases[6].

Reversal of flow or right to left shunt causes deoxygenated blood to flow into systemic circulation causing reduced pulmonary blood flow, cyanosis, cardiovascular collapse and death[7,8], hence should be avoided.

Aim of management of these patients is to maintain systemic vascular resistance and avoid factors that predispose to pulmonary hypertension. (Sympathetic stimulation, Acidemia, Hypoxia, Hypercarbia, Lighter planes of anaesthesia[8,9]).

Etomidate and Ketamine are the drugs of choices. Ketamine has minimal effect on SVR, MAP, PVR and PAP[10,11].

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