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RESEARCH ARTICLE

ANESTHETIC MANAGEMENT OF A PATIENT WITH CONGENITAL CYANOTIC HEART DISEASE (TOF) UNDERGOING CARDIAC SURGERY. AN ANTICIPATED DIFFICULT INDUCTION.

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Abstract

Introduction:-

- TOF tetralogy of fallot is the commonest cause of cyanotic CHD in children, accounting for 10% of CHD.
- Occurs in 3-6 infants for every 10,000 births. This disorder accounts for one third of all CHD in patients younger than 15 years.
- commonly in males than in females.
- Genetic studies indicate that in some patients with tetralogy of Fallot, there may be 22q11.2 deletion and other submicroscopic copy number alterations.
- The prevalence of congenital heart defects within India is approximately 4 cases per 1,000 live births with TOF comprising 7 to 32% of these cases, making it among the most common congenital anomalies.
- Tetralogy of Fallot,
- Right ventricular (RV) outflow tract obstruction (RVOTO)
- Ventricular septal defect (VSD),
- Aorta dextroposition,
- RV hypertrophy
- Difficulty with feeding
- Failure to thrive
- Episodes of bluish pale skin during crying or feeding (ie, "Tet" spells)
- Exertional dyspnea, usually worsening with age
- Cyanosis of the lips and nail bed is usually pronounced at birth
- After age 3-6 months, the fingers and toes show clubbing

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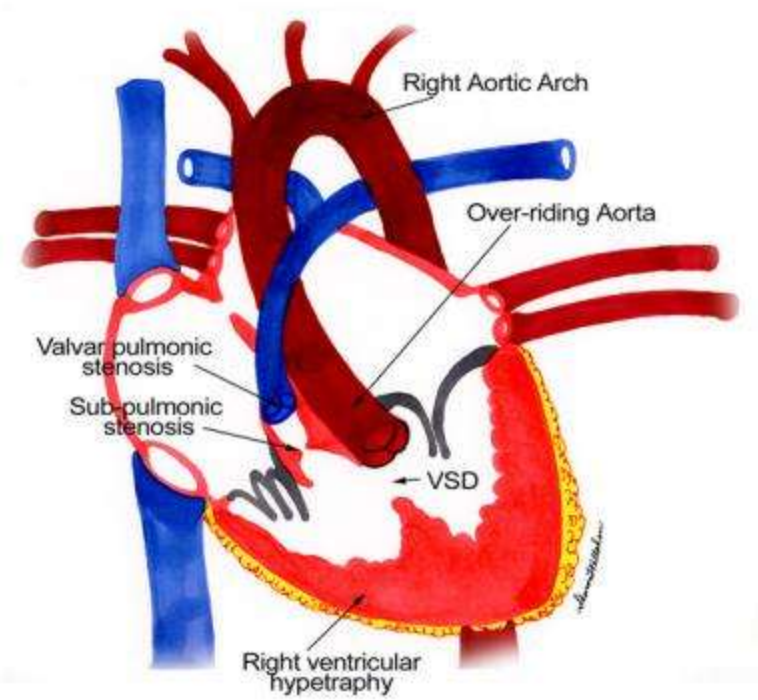


Case report:-

- 13years old, male child weighing 24 kg came with complain of severe breathlessness since 4 to 5 years mild in nature gradually progressive at present patient is bed ridden & unable to talk & walk, asso with anxiety, up rolling of eyes, protrusion of tongue, central cyanosis and generalized, bluish discoloration of nail bed palms and soles , clubbing grade IV and child maintaining saturation of 40% @5lit O2 /min on ventimask with previously diagnosed congenital cyanotic heart disease (tetralogy of fallot), posted for tof repair that is total intracardiac repair.

Aims & Objectives:-

- To induce patient smoothly with severe uncorrected tetralogy of fallot, while maintaining oxygen saturation and blood pressure, secure and manage airway by endotracheal intubation in an anticipated difficult induction.
- To increase the pulmonary blood flow by maintaining systemic vascular resistance.

General Physical Examination:-

patient conscious & oriented

Vitals :

Temp – Afebrile
Pulse- 96/min.
BP- 102/60 mm hg

R.R.-24/min.
SPO2- 40 @ 5lit/min

- General examination :

Pallor :- ve
Icterus : -ve
Clubbin:g : Grade IV
Cyanosis : +++
Peripheral Oedema: -ve
Lymphadenopathy: -ve

- Systemic examination :

R/S – A/E B/L equal / no added sounds.
CVS – S_1 & S_2 heard, pansystolic murmur present
CNS – conscious & oriented NAD
P/A – soft non tender, bowel sounds resent

Airway and Spine Assessment:

- Mouth opening – 3 fingers
- All teeth intact
- MPG – Grade I
- Neck movement – normal extension & flexion
- Back & Spine - Normal

Blood Report	**Patient Values**
Hb	**18.8 gm%**
TLC	**6,200 / cu mm**
DLC P/L/M/E	**50/43/3/4 %**
Plt	**80,000cells per cu mm**
Bld. Urea	**32 mg/dl**
Sr. Creat	**1mg/dl**
S. Bil.	**T- 0.5 mg/dl** **D - 0.4 mg/dl** **ID – 0.1. mg/dl**
SGOT/ SGPT	**35/ 40 U/L**
RBS	**102 mg/d**
PT T **C**	**14 sec** **14 sec**
INR	**2.4**
APTT T **C**	**26.4 sec** **26.4 sec**

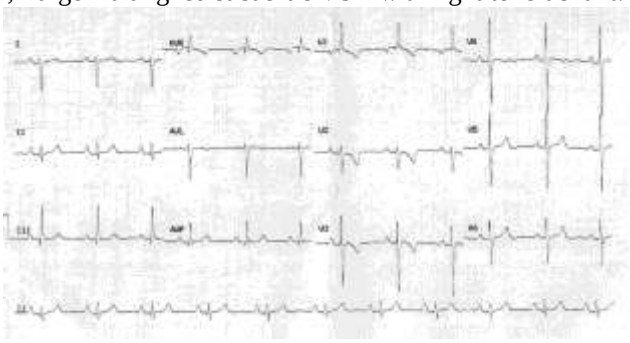
- Chest X-ray
- classical appearance of

- ‘boot shaped heart’ due to
  - Pulmonary oligemia (oligemic lung)

- Upturned cardiac apex
- lt aortic arch

- ECG -Signs of right ventricular hypertrophy and right axis deviation.

- 2DECHO s/o congenital cyanotic heart disease, tetralogy of fallot with severe pulmonary stenosis, Left aortic arch, mild AR, Large malaligned subaortic VSD with right to left shunt.



- PRE -OPERATIVE PREPARATION
- Informed & written consent(ASA III) for anaesthesia was taken.
- Patient was kept NBM over night.
- Pre operatively patient was on inj propranolol & adequate IV fluids for maintainance.
- The patient was shifted to the OT from recovery room.
- After securing an IV line with 18 G IV cannula in the left upper limb , CVP line in rt IJV and arterial line in right femoral line, standard monitors [ECG, pulse oximeter, invasive blood pressure (IBP), end-tidal carbon dioxide (ETCO2)] were attached and the baseline vitals recorded.
  - Blood pressure - 104/60 mmHg,
  - Heart rate-98 beats/min
  - SpO2-40% @ 5lit/min
  - The patient was pre oxygenated with 100% oxygen for 5 minutes,

INTRA OP MONITORING

PREMEDICATION

- Inj.Glycopyrrolate 0.004mg/kg iv
- Inj.midazolam 0.02- 0.05mg/kg iv
- Inj ondensatron 2mg.

INDUCTION

- Inj .fentanyl 5mcg/kg
- Ketamine 1-2 mg/kg
- A pressor agent (phenyephrine) would be given to the patient accordingly to maintain BP.
- Inj. Succinylcholine 2mg/kg IV
- Minimum PPV were given.
- Oral intubation done with cuffed Endo Tracheal tube no.6.5mm I.D
- ET tube position was confirmed clinically by chest auscultation and capnography and tube fixed.
- Avoid PEEP or minimum PEEP

- INTRA OP monitoring

MAINTENANCE OF ANAESTHESIA

- It will be connected to anaesthesia machine. Patient will be ventilated with 100% oxygen along with inhalation agent sevoflurane 1-2% and intravenous inj vecuronium. 0.1 mg/kg
- After intubation vitals are
  - SPO2- 78% (on 100% oxygen)
  - BP- 120/70mmhg
  - PR-92/min
- Hemodynamic parameters were stable throughout the operation.
- Totally, he received 60 -80ml/kg/hr RL and had 250 mL of urine output.

REVERSAL

- Inj.Glycopyrolate 0.008mg/kg IV and Neostigmine 0.05mg/kg IV

- Pt was extubated after adequate recovery
- DISCUSSION AND ANAESTHESIA CONCERN

Our purpose of choosing certain specific things are to increase pulmonary blood flow and improve oxygen saturation.

- **Perioperative concerns**
  - Increase in PVR or decrease in SVR leading to Right to Left shunt
  - Tet Spells pre induction (crying/anxiety)
  - Polycythemia and bleeding
  - Air embolus
  - RV failure
- GOAL = ↑ SVR and ↓ PVR → ↓ R –L shunt

KETAMINE

- Sympathomimetic effects help maintain HR, SVR, MAP and contractility..
- Infusion of minimum dose of Nor Adr was started from the beginning of induction to increase SVR.

B-blocker

- Pre operatively patient was on inj propranolol & adequate IV fluids for maintainance.

Discussion And Anaesthesia Concern:-

- Expecting a difficult induction in this case as the patient is maintaining O2 saturation of 40% with O2 @5lit/min via venti mask & the risk of fall in BP extensively; we kept patient in head down position, started 100 % O2 & kept the emergency cart ready.
- 100% oxygen reduces PVR (pulmonary vasodilator action).
- Trendelenburg position to improve venous return and avoids TET spell.
- Minimum PPV to maintain PVR.
- Phenylephrine (alphaα 1 adrenergic agonist) its vasoconstriction effect increases SVR.
- IV fluid according to the weight of patient.
- No PEEP or minimum PEEP helps maintain adequate PVR on ventilator settings.

Conclusion:-

- We concluded that, patient with severe uncorrected TOF, with O2 saturation of 40% @ 5lit O2 via venti mask was induced & conducted uneventfully with digilent pre-operative preparations and well planned anaesthetic technique.

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