FETAL PERICARDIAL EFFUSION

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Baby Krishnaraj
D.O.B-07/05/2010

- 45 days old male child
- Antenatally diagnosed pericardial effusion on follow up
- Admitted on 24/06/2010, with massive pericardial effusion
- On admission child was alert / afebrile and vitals were stable
- Child was on breast feeds
ANTENATAL HISTORY

• 31 Years old primi
• Conceived 5 yrs after marriage
• Euthyroid
• H/o taking OCP treatment +
• On tab. Clomiphene citrate for 2 months before conception
• No H/o any other drug intake
• No H/o PIH/ GDM/ exanthematous fever/ Jaundice
ANTENATAL HISTORY ..contd

- Registered and immunised in KGH
- I trimester – uneventful
- II trimester USG - Discrepancy in GA of 4 weeks, no other abnormalities detected
- Admitted in KGH on 4/5/2010- one day prior to EDD (based on LMP)
- Cardiac abnormality suspected on USG
- Referred to GH, where USG showed symmetric IUGR and pericardial effusion
- Second opinion was sought from Mediscan
Mediscan- USG
On 06/05/2010

- Single IU gestation of GA 37 wks 5 days
- Liquor- Hydramnios(AFI-16.5)
- Femur length at 5 th centile for 37 weeks of gestation
- Fetal activity normal
- Doppler of middle cerebral and umbilical art. Normal

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• FHR-141 bpm
• Moderate to severe Pericardial effusion
• *Rate and Rhythm normal*
• Cardiac contractility normal
• *No intrinsic cardiac anomaly seen*
• Face, Thorax, Abdomen, KUB, head, neck, spine, extremities – normal
• Suggested --- To plan early delivery and postnatal management explaining the risk and benefits to the patient.
BIRTH HISTORY

• LSCS done on 07/05/2010
• Birth wt- 2.3 kg
• Cried immediately after birth
• APGAR at birth 7/10 & 8/10
• H/o NICU admission for 3 days for pericardial effusion
X ray taken at birth (07/05/2010) showed cardiomegaly.

X Ray after 1 week (14/05/2010) showed cardiomegaly suggesting pericardial effusion.
• ECHO ON 4\textsuperscript{TH} DAY (11/05/2010):
  • Mild pericardial effusion
  • No e/o tamponade
  • Good biventricular function

• Advised to follow up with ECHO after 1 week
• ECHO ON 13\textsuperscript{TH} DAY (19/05/2010)
  – Pericardial effusion (mild to moderate)
  – Fluid depth – 4mm
  – Clear fluid
  – Structurally normal heart
  – No e/o tamponade

• ECHO ON 18\textsuperscript{TH} DAY (24/05/2010)
  - Mild pericardial effusion
  - Depth – 2.5 mm
  - NO e/o tamponade
  - Suggested repeat ECHO after 1 month
• ECHO after 1 month (24/06/2010) - 48 days
  – Massive pericardial effusion
  – Depth 20 mm surrounding heart in all surfaces
  – Structurally normal heart
  – No e/o tamponade
  – Clear fluid
• X Ray on the same day showed massive pericardial effusion
• Admitted in the medical ward
• Clinically stable and vitals were normal
• No signs of resp distress or shock
• On breast feeds
• No dysmorphic facies or any other features associated with chromosomal abnormalities
APPROACH FOR FINDING A CAUSE

- No isoimmunisation (both O+ve)
- Mother - VDRL / HIV / HBsAg negative
- Echo - No features of structural anomaly of the heart
- No features of CCF
- Hematological work up : NORMAL
- Karyotyping : NORMAL
- Viral studies - not done
  - Other routine investigations - Normal
BABY’S THYROID PROFILE

• 5\textsuperscript{th} day:
  – Free T4 – 1.60 ng/dl (low for age)
  – 3\textsuperscript{rd} Gen TSH – 0.659 mIU/ml (low for age)

• 45\textsuperscript{th} day:
  – Total T3 – 283.40 ng/dl
  – Total T4 – 17.87 microg/dl
  – 3\textsuperscript{rd} Gen TSH – 6.010 mIU/ml

T3 & T4 slightly High & TSH within normal limits
Plan: to repeat during next follow up
• ECHO repeated on 28/07/2010
  – Massive pericardial effusion
  – Features suggestive of cardiac tamponade
  – There is no parietal pericardial thickening
  – No pericardial strands
  – Pericardial fluid not turbid

• Advised emergency pericardial window
Features of Cardiac Tamponade

• Large volume pericardial effusion
• RA and/or RV diastolic collapse
WINDOW PERICARDECTOMY
SURGERY ON 28/06/2010

• Procedure – Pericardial window
• Under GA Left anterolateral thoracotomy made through 5<sup>th</sup> intercostal space
• Bulged out pericardium seen which is tensely filled with fluid
• Pericardiocentesis done – 75 ml of straw coloured fluid aspirated
• Pericardial window created and fluid drained out completely
• ICD(12 Fr malecot ) placed
• Fluid sent for examination
POST OP ECHO

- No pericardial effusion
- Good biventricular function
- PFO L→R Shunt
SUMMARY OF THE CASE

- Diagnosis - 3rd trimester antenatal USG
  - No effusion into other cavities
  - No evidence of any structural anomalies of heart, CCF, chromosomal abnormalities etc
- Newborn period – ECHO follow up
- Work up – could not find any etiology
- Viral studies were not performed
- Cardiac tamponade appeared on 52nd day - emergency pericardial window done
- Pericardial fluid culture – No Growth
- Post op period – Uneventful
- Follow up – Child is doing well
DISCUSSION

based on FETAL CARDIOLOGY - 2ND Edition, By Simcha Yagel, Ulrich Gembruch

• Small amount of pericardial fluid during prenatal ultrasound – common -in 44% of fetuses.
• May be a part of the fully manifested hydrops fetalis or an isolated finding
Associations of fetal pericardial effusions are:-

• Fetal Hydrops
  – Poor prognosis
• Virus infections (commonly parvovirus B19)
• Arrhythmias (SVT)
• Structural abnormalities:
  – Ventricular diverticulum
  – Rupture of Ventricular aneurysm
  – Constriction of ductus arteriosus d/t maternal indomethacin administration
  – Idiopathic arterial calcification, an autosomally recessive disease
• Pericardial teratoma, cystic lymphangioma, atrial hemangioma, pericardial rhabdomyoma, epicardial angiofibroma
DIAGNOSIS

• FETAL ECHOCARDIOGRAPHY:
  – An anechoic lesion larger than 2mm separating the pericardial layers
  – Usually pericardial effusion is observed close to an atrioventricular valve or at the length of a ventricle, rarely around the whole heart
  – Difficulty in pericardial fluid characterisation arises when the myocardial periphery is confused with pericardial fluid, because of the presence of circular fibres giving this region an anechoic effect
MONITORING

• An isolated fetal pericardial effusion upto 7 mm - neonatal outcome is good
• Attentive fetal monitoring throughout pregnancy and obstetric ultrasound evaluation
• Detection of a heart defect or other serous effusions (pleural, ascites) - an indication for fetal karyotyping
TREATMENT

• In Low Risk gestations
  – Assisted delivery in the presence of neonatologist and pediatric cardiologist and treatment in the neonatal period

• Prenatal therapeutic approach:
  – SVT
  – Rh isoimmunisation,
  – cardiac tamponade (fetal pericardiocentesis may be life saving)
• Therapeutic fetal invasive procedures
  – Fetal dilatation of severely stenotic aortic valves,
  – Creation of interatrial communications in restrictive atrial septa
  – Percutaneous implantation of ventricular pacemaker

▪ Pericardial effusion in cardiac diverticulum cases appear in 1st trimester -- fetal pericardiocentesis should be considered
OUTCOME

FETAL PERICARDIAL EFFUSION

- ISOLATED PE & SIZE – 2 mm TO 7mm
  - GOOD OUTCOME

- ASSOCIATION WITH STRUCTURAL ANOMALIES/CCF OR CHR. ANOMALIES
  - LARGE EFFUSION AND POOR PROGNOSIS

- HYDROPS OR EXTRACARDIAC MANIFESTATION
  - OUTCOME - DEATH
STATISTICS IN ICH – 2000--2010

• In newborn period – 3 cases & 2 death
  – multiple congenital anomalies with effusion into all cavities - death
  – A late onset sepsis with PE with tamponade- death
  – None was diagnosed in the antenatal period
• In the age group less than 18 months – 19 cases
• Antenatal cause may be present in the following 6 cases
  – Cong heart disease – 2 cases
    • PDA/Aortic interruption/CCF /PE &HOCM/CCF/PE – Both died
  – Viral pericarditis is suspected – 3 cases
    • 2 resolved spontaneously and 1 improved after ECHO guided pericardial fluid aspiration
  – Congenital lymphedema & chylous ascites had mild PE with dilated RA/RV and paradoxical IVS motion- no Rx for PE
Worldwide Reported Etiologies

• 52 cases- 26% had trisomy 21, 31% some chromosomal anomaly---- indication for fetal karyotyping (London)
• 3 cases--- 1 had trisomy 21 with myeloproliferative disorder, 1 had idiopathic arterial calcification and 1 cause unknown (Paris)
• 4 cases - maternal parvovirus B19 infection (Chicago, USA)
• 1 case - maternal hypertension and HIV infection (Birmingham, UK)
• 1 case - restrictive cardiomyopathy in the fetus (Canada)