

DISCHARGE SUMMARY

PATIENT NAME: SHRISHA KESHARWANI	AGE: 8 MONTHS & 2 DAYS, SEX: F
REGN: NO: 13524103	IPD NO: 233936/24/1201
DATE OF ADMISSION: 28/11/2024	DATE OF DISCHARGE: 10/11/2024
CONSULTANT: DR. K. S. IYER / DR. NEERAJ AWASTHY	

DISCHARGE DIAGNOSIS

- Congenital Cyanotic Heart Disease with decreased pulmonary blood flow
- Tetralogy of Fallot
- Large peri membranous ventricular septal defect
- Severe pulmonary stenosis (valvular + infundibular)
- Pulmonary valve tricuspid, stenotic
- Main pulmonary artery adequate
- Confluent and adequate branch Pulmonary arteries
- Right atrium dilated
- Right ventricle hypertrophied
- Patent foramen ovale
- Presented in cyanotic spell
- History of seizures

OPERATIVE PROCEDURE

Trans right atrial - Dacron patch closure of Perimembranous ventricular septal defect + Infundibular Muscle bundle resection + Pulmonary valvotomy + Direct closure of patent foramen ovale done on 29/11/2024

Right ventricular outflow tract and Main pulmonary artery accepted Hegar no 10 and branch Pulmonary arteries accepted Hegar no 6. Tricuspid Valve tested and found competent



RESUME OF HISTORY

Shrisha Kesharwani is a 8 months old female infant (date of birth: 28/03/2024) from Jabalpur who is a case of congenital heart disease. She is 2nd in birth order and is a product of full term normal vaginal delivery. Her birth weight was 3.3 kg. Maternal age is currently 27 years. Other sibling is apparently well.

She was apparently well till 2 months of age, when she had history of upper respiratory tract infection. She also had history of cyanosis for which she was shown to pediatrician. During evaluation, cardiac murmur was detected. Echo was done which revealed Congenital heart disease – Tetralogy of Fallot. She was on follow up. She had history of seizure and cyanotic spell. She was referred to Fortis Escorts Heart Institute, New Delhi for further management.

She was seen at FEHI, New Delhi on 23/11/2024. Her saturation at that time was 70% with weight of 5.9 Kg. Echo was done which revealed normal segmental analysis, patent foramen ovale (right to left shunt), laminar inflow, large malaligned perimembranous ventricular septal defect (right to left shunt), laminar LV outflow, severe infundibular + valvar Pulmonary stenosis, tiny antegrade flow, confluent branch Pulmonary arteries, right arch, laminar flow in arch, no Coarctation of aorta, no Patent ductus arteriosus, normal LVEF, no collection, Right pulmonary artery 4.5mm, Left pulmonary artery 3.7mm (Exp 6mm), PA annulus 6mm (Exp 8mm). She was advised CT angiography.

Now she is admitted at FEHI, New Delhi for further evaluation and management. On admission, her saturation was 40%, Her Hb 12.7g/dl and Hematocrit 51.2% on admission.

In view of her diagnosis, symptomatic status, echo findings she was advised early high risk surgery after detailed counselling of family members regarding possibility of prolonged stay as well as uncertain long term issues.

Weight on admission 6.6 kg, Height on admission 66 cm, Weight on discharge 6 kg

Her Weight on admission 6.6 kg. (3rd Percentile); Z score 0 to - 2 SD

Her blood Group O positive

Baby and her Mother SARS-COV-2 RNA was done which was negative.



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She was admitted with diagnosis of Congenital Cyanotic Heart Disease with decreased pulmonary blood flow, Tetralogy of Fallot and severe (valvular + infundibular) pulmonary stenosis with Cyanotic spell. Her saturation was 52% in room air. She was put on nasal CPAP.

Venous blood gas was done which showed pH 7.073, pCO₂ 47.8mmHg, pAO₂ 31.9mmHg, metabolic acidosis (BE -16.1mmol/L), Lactate acidosis (Lactate 6.75mmol/L) and bicarbonate 13.6mmol/L. This was managed with oxygen and with infusion midazolam and metoprolol.

Repeat venous blood gas was done after 10 hours which showed pH 7.3, pCO₂ 34.1mmHg, pAO₂ 70.3mmHg, metabolic acidosis (BE -6.9mmol/L), Lactate acidosis (Lactate 1.52mmol/L) and bicarbonate 17.9.6mmol/L.

She was also stabilized with broad spectrum antibiotics (Amikacin and Cefuroxime) along with Levetiracetam in view of past history of seizures.

Once she was stabilized, she was taken up for high risk surgery after detailed counseling of family members regarding possibility of prolonged stay as well as uncertain long term issues.

All blood and urine culture were sterile.

INVESTIGATION:

ECHO

Done on 23/11/2024 revealed normal segmental analysis, patent foramen ovale (right to left shunt), laminar inflow, large malaligned perimembranous ventricular septal defect (right to left shunt), laminar LV outflow, severe infundibular + valvar Pulmonary stenosis, tiny antegrade flow, confluent branch Pulmonary arteries, right arch, laminar flow in arch, no Coarctation of aorta, no Patent ductus arteriosus, normal LVEF, no collection, Right pulmonary artery 4.5mm, Left pulmonary artery 3.7mm (Exp 6mm), PA annulus 6mm (Exp 8mm)

POST OP ECHO

Epicardial Echo done on 29/11/2024 revealed VSD patch in situ, No residual shunt. Well opened RVOT, RVOT max PG = 7 mmHg, good flow in branch Pas, mild TR, Laminar inflow and outflow, LVEF 45%



Done on 29/11/2024 (08:00 PM) revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 34mmHg, laminar LV outflow, well opened Right ventricular outflow tract max PG 11mmHG, good flow in branch Pulmonary arteries, mild right pleural collection, no left pleural or pericardial collection, LVEF 45%

Done on 30/11/2024 revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 35mmHg, laminar LV outflow, well opened Right ventricular outflow tract max PG 8mmHG, good flow in branch Pulmonary arteries, no collection, LVEF 45%

Done on 01/12/2024 (08:30 AM) revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 20mmHg, laminar LV outflow, well opened Right ventricular outflow tract max PG 5mmHg, good flow in branch Pulmonary arteries, no collection, LVEF 45%

Done on 01/12/2024 (08:00 PM) revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 42mmHg, 2 jets, mild mitral regurgitation, laminar LV outflow, laminar LV outflow, trace aortic regurgitation, well opened Right ventricular outflow tract max PG 8mmHG, LVEF 30-35%, trace right pleural collection, no pericardial collection

Done on 02/12/2024 revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 28mmHg, 2 jets, mild mitral regurgitation, laminar LV outflow, trace aortic regurgitation, well opened Right ventricular outflow tract max PG 6mmHG, good flow in branch Pulmonary arteries, LVEF 40%, no collection

Done on 02/12/2024 (12:30 PM) revealed two tiny collateral from left subclavian artery, LVEF 45%, no collection



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Done on 04/12/2024 revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 28mmHg, mild mitral regurgitation, laminar LV outflow, well opened Right ventricular outflow tract max 16mmHg, good flow in branch Pulmonary arteries, LVEF 45-50%, no collection

Done on 06/12/2024 revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild tricuspid regurgitation max PG 32mmHg, trace mitral regurgitation, well opened Right ventricular outflow tract max PG 9mmHg, trace pulmonary regurgitation max PG 16mmHg, good flow in branch Pulmonary arteries, suspicion of mass over aortic valve leaflet (LCC) with out of phase motion, trivial aortic regurgitation, bilateral mild pleural collection, no pericardial collection

Done on 07/12/2024 revealed no collection, LVEF 45-50%

Done on 09/12/2024 revealed ventricular septal defect patch in situ, no residual shunt, laminar inflow, mild + tricuspid regurgitation max PG 30mmHG, laminar LV outflow, well opened Right ventricular outflow tract max PG 10mmHg, trace pulmonary regurgitation, good flow in branch Pulmonary arteries, trivial aortic regurgitation, laminar flow in arch, no Coarctation of aorta, LVEF 45-50%, trace right pleural collection, no left pleural or pericardial collection

ABDOMINAL USG

Done on 28/11/2024 revealed Liver is normal in size (6.0cm) & shape shows homogeneous & normal echopattern. Intrahepatic biliary radicles are not dilated. Hepatic veins & portal vein are normal. • Gall bladder shows normal anechoic pattern. G.B wall thickness is normal. • CBD is normal in course & caliber. • Pancreas is normal in shape, size & echopattern. • Spleen is normal in size (4.6cm) & echogenicity. • Both kidneys are normal in location, size, shape & echotexture. Cortical thickness & corticomedullary differentiation are well maintained. No dilatation of pelvicalyceal system is seen. • Right kidney measures – 4.6cm. • Left kidney measures- 4.8cm. • Urinary bladder is normal in contour & capacity. No calculi/filling defect seen. • No evidence of free fluid seen in abdomen.

USG BRAIN

Done on 29/11/2024 revealed Normal sulcal / gyral pattern. • No hydrocephalus is seen. • No intra / extraaxial collection is seen. • No evidence of PVL. • No midline shift is seen.



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USG BRAIN

Done on 02/12/2024 revealed Suboptimal study due to limited evaluation from anterior fontanelle • No obvious focal lesion seen in brain parenchyma. • No ventricular dilatation seen. • No midline shift seen.
Advice – CT brain and follow up scan

COURSE DURING STAY IN HOSPITAL (INCLUDING OPERATIVE PROCEDURE AND DATES)

Trans right atrial - Dacron patch closure of Perimembranous ventricular septal defect + Infundibular Muscle bundle resection + Pulmonary valvotomy + Direct closure of patent foramen ovale done on 29/11/2024

Right ventricular outflow tract and Main pulmonary artery accepted Hegar no 10 and branch Pulmonary arteries accepted Hegar no 6. Tricuspid Valve tested and found competent.

REMARKS: Diagnosis: - Echocardiography: Congenital Cyanotic Heart Disease with decreased pulmonary blood flow, Tetralogy of Fallot and severe (valvular + infundibular) pulmonary stenosis, Hypoplastic Main pulmonary artery and branch Pulmonary arteries, admitted with Cyanotic spell. Intra-operative: Adequate Main pulmonary artery and branch Pulmonary arteries. Operation:- Trans right atrial Dacron patch closure of Peri membranous ventricular septal defect, Infundibular Muscle bundle resection and pulmonary valvotomy + Direct closure of patent foramen ovale. Operative Findings: - Situs solitus, levocardia {S, D, S}, AV concordance, Thymus present, Pericardium normal, Innominate normal, Superior vena cava normal, Inferior vena cava normal, Pulmonary Veins normal, right atrium dilated, right ventricle hypertrophied, Main pulmonary artery adequate, Left pulmonary artery adequate size, Right pulmonary artery adequate size, Patent ductus arteriosus Absent, Aorta normal, Right aortic arch, interatrial septum patent foramen ovale +, ventricular septal defect large peri membranous ventricular septal defect, 50% Aortic override, Infundibulum hypertrophied fibro-muscular septal and parietal bands, pulmonary valve tricuspid, stenotic, tricuspid valve normal, Coronaries Normal pattern. Procedure: - Routine induction of General Anaesthesia and placement of monitoring lines. Median sternotomy. Thymus removed. Pericardial cradle created. Aorta and branch Pulmonary arteries dissected. Main pulmonary artery and branch Pulmonary arteries were assessed and found adequate. So decision for total correction instead of Right Modified Blalock Taussig Shunt was taken with detailed counselling and informed consent of the parents. Systemic heparinization (400 U/kg). On aortobicaval cannulation, went on Cardiopulmonary bypass. Cooled to 34°C. Aorta cross-clamped and heart arrested with cold blood cardioplegia delivered antegrade through the aortic root. Cavae snared. Right atrium opened parallel to the Atrioventricular groove. Left atrium vent put through



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patent foramen ovale. Trans TV resection of the obstructive muscle bundle in infundibulum and pulmonary valvotomy done. Ventricular septal defect closed with Dacron patch using 5-0 pledgeted prolene continuous and interrupted sutures. Right ventricular outflow tract and Main pulmonary artery accepted Hegar no 10 and branch PAs accepted Hegar no 6. Tricuspid Valve tested and found competent. Patent foramen ovale closed directly with 5-0 prolene after adequate deairing. Rewarming and deairing done and Aortic cross clamp removed. normal sinus rhythm achieved. Right atrium closed with 5-0 Prolene continuously. Caval desnaring done. Epicardial pacing wires (2 atrial and 1 ventricular) placed. Weaned off Cardiopulmonary bypass with 5 µ/kg/min Dobutamine and Norepinephrine 0.05 mcg/kg/min. Hemostasis secured. Protamine given followed by decannulation. Right pleura opened and left pleurae intact. Routine sternal closure over drains.

Her post-operative course was prolonged due to need for re-intubation and suspected mass over left coronary cusp needing oral Aspirin therapy and close follow up. She was afebrile throughout.

She was ventilated with adequate analgesia and sedation for 42 hours in view of definitive repair of Tetralogy of Fallot and fluctuating mean arterial pressures.

She was extubated on 2nd POD. Following extubation she was supported with nasal CPAP in view of resting tachypnoea.

Following extubation, her arterial blood gas showed pH 7.44 pCO₂ 45mmHg, pAO₂ 76mmHg, BE 6.1mmol/L, Lactate 1.77mmol/L and bicarbonate 30.8mmol/L. She was put on nasal CPAP.

Repeat arterial blood gas showed pH 7.48 pCO₂ 46mmHg, pAO₂ 60mmHg, BE 9.3mmol/L, Lactate 1.13mmol/L and bicarbonate 32.9mmol/L.

She was re-intubated on 2nd POD (7 hours after extubation) due to due to worsening respiratory distress and poor gas exchange.

Repeat arterial blood gas done after re-intubation which showed pH 7.62, pCO₂ 24mmHg, pAO₂ 88mmHg, BE 4mmol/L, Lactate 2.2mmol/L and bicarbonate 24.3mmol/L.

She was again ventilated with adequate analgesia and sedation for another 44 hours with PEEP of 9mm.

She was finally extubated on 4th POD. Post extubation chest x-ray revealed bilateral mild patchy atelectasis. This was managed with chest physiotherapy, nebulization and suctioning



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She was shifted to ward on 6th POD. She was weaned from oxygen to air by 8th POD.

She was electively supported with dobutamine (0 – 6th POD → 5mcg/kg/min @ 2 ml/hr) in view of definitive repair of Tetralogy of Fallot.

She was also started with milrinone 2nd (2nd – 7th POD → 0.8mcg/kg/min @ 1.6 ml/hr) due to tachycardia (HR 154/min), impaired mixed venous oxygenation (MVO₂ 66%) and left ventricular dysfunction (LVEF 30%)

She was also started with Norepinephrine intraoperatively (0 – 2nd POD → 0.05mcg/kg/min @ 2ml/hr) for systemic hypotension (MAP 38 mmHg) unresponsive to maximized inotropic support.

She also received inj. hydrocortisone from 0 POD in view of vasopressor resistance hypotension (MAP 38mmHg).

She was also started on vasopressin on 1st POD → (0.3ml/hr) i.e. 0.000303 U/Kg/min which was increased to (0.6ml/hr) i.e. 0.00060 U/Kg/min to persisting Mean arterial pressure (45 mmHg) till 3rd POD.

Decongestive therapy was given in the form of lasix (boluses & infusion) and aldactone.

On 7th POD, Echo was done which revealed suspicion of mass over aortic valve leaflet left coronary cusp / (? artifact) with out of phase motion. This was managed with oral Aspirin therapy and close follow up

Pacing wire was removed on 10th POD.

She was continued on oral anticonvulsant therapy (Levetiracetam) in view of past history of seizure. There were no seizure or seizure equivalents post operatively. She was fully conscious all through.

She had no fever but had leucopenia with thrombocytopenia. Her TLC was 3,680/cmm and platelets 0.69 lacs/cmm on 0 POD. This was managed with GMCSF (FILGRASTIM one dose).

She was thoroughly investigated for the same. She was started on empiric broad spectrum antibiotics including (Meropenem and Fluconazole) anti staphylococcal cover (started on 0 POD) in view of sick state and fluctuating mean arterial pressures.



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The antibiotics were stopped once all cultures were sterile. She was clinically well later and afebrile all through. Her predischarge TLC was 12,770/cmm and platelets were 1.93 lacs/cmm.

Her pre-operative renal function showed (S. creatinine 0.46 mg/dl, Blood urea nitrogen 20 mg/dl)

Her post-operative renal function showed (S. creatinine 0.34 mg/dl, Blood urea nitrogen 15 mg/dl) on 3rd POD

Her pre-discharge renal function showed (S. creatinine 0.28 mg/dl, Blood urea nitrogen 13 mg/dl)

Her pre-operative liver functions showed (SGOT/SGPT = 35/12 IU/L, S. bilirubin total 0.23 mg/dl, direct 0.09 mg/dl, Total protein 5.5 g/dl, S. Albumin 3.4 g/dl, S. Globulin 2.1 g/dl Alkaline phosphatase 209 U/L, S. Gamma Glutamyl Transferase (GGT) 27 U/L and LDH 347 U/L).

She had mildly deranged liver functions on 1st POD (SGOT/SGPT = 107/29 IU/L, S. bilirubin total 0.80 mg/dl & direct 0.20 mg/dl and S. Albumin 3.9 g/dl). This was managed with avoidance of hepatotoxic drug and continued preload optimization, inotropy and after load reduction. Her liver function test gradually improved. Her other organ parameters were normal all through.

Her predischarge liver function test are SGOT/SGPT = 19/24 U/L, S. bilirubin total 0.50 mg/dl, direct 0.17 mg/dl, Total protein 7 g/dl, S. Albumin 4.5 g/dl, S. Globulin 2.5 g/dl Alkaline phosphatase 121 U/L, S. Gamma Glutamyl Transferase (GGT) 62 U/L and LDH 478 U/L).

Thyroid function test done on 29/12/2024 which revealed was normal → Thyroid function test showed T3 3.10 pg/ml (normal range – 2.15 – 5.83 pg/ml), T4 1.52 ng/dl (normal range 0.92 - 1.99 ng/dl), TSH 1.260 µIU/ml (normal range – 0.730 – 8.350 µIU/ml).

Repeat Thyroid function test done on 02/12/2024 which revealed T3 1.09 pg/ml (normal range – 2.15 – 5.83 pg/ml), T4 1.15 ng/dl (normal range 0.92 - 1.99 ng/dl), TSH 0.279 µIU/ml (normal range – 0.730 – 8.350 µIU/ml) for which Tab. Thyroxine was started.

Repeat Thyroid function test done on 09/12/2024 which revealed T3 1.96 pg/ml (normal range – 2.15 – 5.83 pg/ml), T4 2.04 ng/dl (normal range 0.92 - 1.99 ng/dl), TSH 2.370 µIU/ml (normal range – 0.730 – 8.350 µIU/ml).

Minimal enteral feeds were started on 4th POD and cautiously and gradually advanced to full feeds by 6th POD. Oral feeds were started on 7th POD.



CONDITION AT DISCHARGE

Her general condition at the time of discharge was satisfactory. Incision line healed by primary union. No sternal instability. HR 130/min, normal sinus rhythm. Chest x-ray revealed bilateral clear lung fields. Saturation in air is 100%. **Her predischarge x-ray done on 09/12/2024**

In view of congenital heart disease in this patient her mother is advised to undergo fetal echo at 18 weeks of gestation in future planned pregnancies.

She was fully conscious with normal behavioral state and no focal deficit or seizures.

Other siblings are advised detailed cardiology review.

PLAN FOR CONTINUED CARE:

DIET : Semisolids / Fluid restricted diet as advised

Normal vaccination (After 6 weeks from date of surgery)

ACTIVITY: Symptoms limited.

FOLLOW UP:

Long term cardiology follow- up in view of:-

1. Possibility of recurrence of Right ventricular outflow tract obstruction
2. Mild + tricuspid regurgitation

Review on 11/12/2024 in 5th floor at 09:30 AM for wound review

Repeat Echo after 6 - 9 months after telephonic appointment

Repeat Thyroid function test after 3 – 4 months

Ongoing review with neurologist in view of past history of seizures.



PROPHYLAXIS :

Infective endocarditis prophylaxis prior to any invasive procedure

MEDICATION:

1. Syp. Paracetamol 100 mg PO 6 hourly x one week
2. Tab. Pantoprazole 5 mg PO twice daily x one week
3. Tab. Fluconazole 40 mg PO once daily x one week
4. Syp. Lasix 5 mg PO twice daily till next review
5. Tab. Aldactone 4.5 mg PO thrice daily till next review
6. Tab. Colsprin 30 mg PO once with feed till x 3 months
7. Tab. Thyroxine 12.5mcg PO once daily x 3 months and then repeat Thyroid function test (Empty Stomach)
8. Syp. Levetiracetam, 75 mg PO twice daily (till further review with neurologist)
9. Syp. Shelcal 2.5ml twice daily X 3 months

➤ All medications will be continued till next review except the medicines against which particular advice has been given.

**Review at FEHI, New Delhi after 6 – 9 months after telephonic appointment
In between Ongoing review with Pediatrician**

Sutures to be removed on 13/12/2024; Till then wash below waist with free flowing water

4th hrly temperature charting - Bring own your thermometer

- Frequent hand washing every 2 hours
- Daily bath after suture removal with soap and water from 14/12/2024

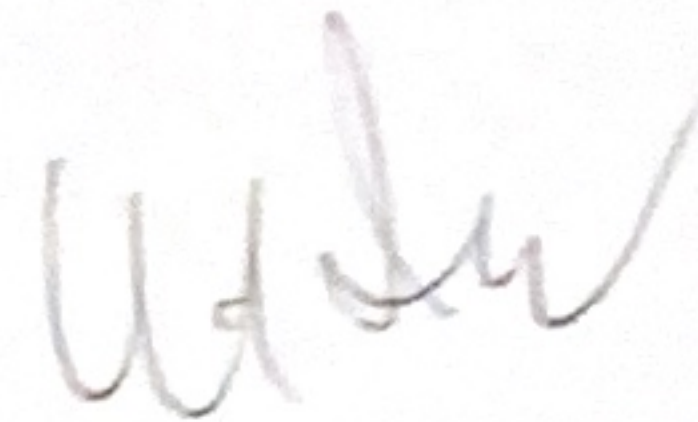
Telephonic review with Dr. Parvathi Iyer (Mob. No. 9810640050) / Dr. K. S. IYER (Mob No. 9810025815) if any problems like fever, poor feeding, fast breathing



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(DR. KEERTHI AKKALA)
(ASSOCIATE CONSULTANT
PEDIATRIC CARDIAC SURGERY)



(DR. K.S. IYER)
(EXECUTIVE DIRECTOR
PEDIATRIC CARDIAC SURGERY)

Please confirm your appointment from (Direct 011-47134540, 47134541, 47134500/47134536)

- Poonam Chawla Mob. No. 9891188872
- Treesa Abraham Mob. No. 9818158272
- Gulshan Sharma Mob. No. 9910844814
- To take appointment between 09:30 AM - 01:30 PM in the afternoon on working days

OPD DAYS: MONDAY – FRIDAY 09:00 A.M

In case of fever, wound discharge, breathing difficulty, chest pain, bleeding from any site call
47134500/47134536/47134534/47134533

Patient is advised to come for review with the discharge summary. Patient is also advised to
visit the referring doctor with the discharge summary.



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