

MANAGING A NEWBORN WITH DI GEORGE SYNDROME

Poonam Joshi and Dabas H

Abstract

DiGeorge syndrome (DGS) is a chromosomal disorder having autosomal dominant inheritance, seen in newborns, which occurs due to microdeletion of chromosome 22q11.2, and less commonly 10p13. It is characterized by neonatal hypocalcemia which may present as tetany or seizures, due to hypoplasia of the parathyroid glands and susceptibility to infection due to a deficit of T cells. Newborn may have variety of cardiac malformations in particular those affecting the outflow tract along with learning disorders and developmental delay affect 70%-90% of children in later life.[1] A clinical approach to a baby with Di George is discussed in this article.

Key words: Di George Syndrome, Learning Disorders, Seizures, Developmental Delay

INTRODUCTION

DiGeorge syndrome (DGS) is one of the most common chromosomal disorders, with an estimated prevalence of 1 in 4000-6000 live births[1-2] It occurs due to microdeletion of chromosome 22q11.2, and less commonly 10p13. Most cases (93%) have a de novo deletion, whereas the remaining (7%) have inherited the deletion. Inheritance is in an autosomal dominant manner.[3] Familial cases have also been described. Di George syndrome (DGS) is characterized by neonatal hypocalcemia which may present as tetany or seizures, due to hypoplasia of the parathyroid glands and susceptibility to infection due to a deficit of T cells. A variety of cardiac malformations are also seen in particular those affecting the outflow tract. Learning disorders and developmental delay affect 70%-90% of individuals with DGS.[1] In most cases, the deletion (del22q11) eliminates 3 Mbp of DNA encoding for approximately 30 genes.[3] 22q11.2 deletion is detected by using fluorescence in situ hybridization (FISH) analysis. [4-6]

Case

A 3 kg single term, male, appropriate for date, product of non-consanguinity born in a Muslim family, at home through normal vaginal delivery to second gravida mother was admitted to our tertiary care facility. The delivery was conducted by a trained birth attendant. Baby cried immediately after birth. Baby was noticed to have difficulty in breathing, bluish discoloration and imperforate anal opening. Echocardiography done at the hospital suggested Tetralogy of Fallot (TOF) showing pulmonary atresia, overriding aorta, and a large (8.4mm)

perimembraneous ventricular septal defect (VSD) with right ventricular hypertrophy (RVH). The baby was initially admitted to a private hospital where he was put on oxygen via hood at 4 litres per minute, kept NPO. Anal proctectomy was done for imperforate anus. The baby passed stool after two days and put on antibiotic course (Zosyn, Amikacin) for 7 days in view of sepsis. He was discharged after 7 days of hospitalization. After discharge, diluted cow's milk (1:1 dilution) started for 2 days. On 8th day of life, baby again developed TET spell with multiple seizures. This time he was admitted to a government hospital and put on mechanical ventilation. Parents took baby and left against medical advice (LAMA). The baby was brought to the pediatric emergency department of our hospital on bag and tube ventilation with complaints of lethargy, seizures and cyanosis on day 15th of life.

At the time of admission, baby was found to be lethargic, opening eye to painful stimuli, flicky movement on painful stimuli. On examination, baby had the following findings; CVS- S1 S2 normal with extra systolic murmur, HR-140 bpm, weak pulse, RR 42 per minute, SPO2- 70% CFT more than 2 sec, BP-78/60 mm Hg. Syndromic association was noted in the baby (post axial tag, imperforated anus, TOF, hypophallus?). Laboratory investigations revealed Hb-16mg/dl, PCV-48,TLC-18100, Platelets-2.3 lakh/ mm3, decreased blood calcium 0.58 mmol/l (1.15-1.29), Na -126 mEq/L (135-145). ABG – PH-7.4, PaCO2-37, PO2-35, Ionized calcium-0.60, however VitD3 and PTH level of both mother and baby were found to be normal. Septic screen of the baby was positive. Lumbar puncture revealed CSF mainly a-cellular, sterile with normal glucose and protein value. The chest x-ray (AP view) showed boot shaped heart, decreased Qp, right ventricular hypertrophy.

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Echocardiography was suggestive of TOF. Treatment initiated for the baby included Inj Betalog 0.3mg IV stat (0.1mg/kg), NS bolus 30ml (10ml/kg) over 30 minutes given twice, Inj calcium 6ml + 20ml 5% Dextrose over 20 minutes. Antibiotics cefotaxime 300 mg BD, Amikacin 45mg OD were started. After initial management, baby was shifted to neonatal intensive care unit (NICU). Blood sample for FISH for confirmation of Di George Syndrome, DNA analysis and Karyotyping were sent (reports awaited). In view of persistent TET spells baby was intubated and put on SIMV mode of ventilation. After 10 days, baby was successfully extubated and was put on H3FNC mode of ventilation with FiO₂ of 30% with flow of 3L/min with target saturation of 65 to 80%. Feed were started for the baby with 150 ml/kg formula and mother's milk. Baby was put on Tab Ciplar 4mg TDS(5mg/kg/tds), Syp phenobarbitone 12mg OD(4mg/kg) till the insertion of Blalock-Taussig (BT) shunt.

Finding related to Di George

The baby is suspected to have Di George syndrome, therefore needs to be investigated further. At present, no gross facial dysmorphism was observed, though requires further follow up to rule out mental retardation and learning disorders. Baby has hypocalcaemia and recurrent infections along with heart defects but no renal involvement.

DISCUSSION

DGS which affects approximately 1 in 4000 births, usually occurs sporadically. Provided both parents are phenotypically and genotypically normal, the recurrence risk in future siblings will be low. [7] The syndrome is associated with failure of development of the third and fourth branchial pouches.[8] Mølsted et al. suggested a failure of or aberrant migration of the neural crest during the fourth week of embryogenesis.[9] The defective migration of these cells leads to the syndrome which is associated with variable findings. These include congenital heart diseases (74%), palatal abnormalities (69%), learning difficulties (80%) [10] hypoplasia or aplasia of the parathyroid glands and thymus glands, which cause hypocalcemia (50%) and immune deficiency (70%). [11] Behavioral and psychiatric morbidity is also prevalent, with higher rates of attention deficit hyperactivity disorder (ADHD).

Age of presentation of the child depends on the severity and type of defects associated with the condition. Very early presentation in the neonatal period is usually due to presentation with cardiac disease or severe hypocalcemia.[3] In our case, the baby presented with hypocalcemia, seizures and TOF. Children with minimal facial features, recurrent infections, or mild cardiac disorders are diagnosed later on in childhood.

The syndrome can be detected prenatally, or during early development, which is of a great importance for all preventive and therapeutic measures. Death rate is very high during the first year of life, mainly due to congenital heart disease. These children should be put on low phosphorus diet in view of hypocalcemia and high phosphorus levels. They should not be considered for live vaccines due to recurrent infections.

Counseling a couple who have a child with DGS depends on whether either parent has a deletion. If any one of the parent has deletion, each subsequent child has a possibility of 50% inheritance of the deletion and having physical and developmental problems associated with this condition.[12] This case illustrates the need to check for parental chromosomes in cases of chromosomal anomalies as there may be implications for future siblings. Both conventional karyotyping and FISH methods play an important role in providing a complete picture as clearly, the reports are awaited in this case.[12]

CONCLUSION

With prompt diagnosis and treatment, this baby has shown good outcome during the hospital stay is likely to survive till adulthood. These are the children with special needs, hence require continuous care, supervision and follow up due to possible mental retardation, seizures, neurological and psychiatric disorders.

Contribution

Dabas Heena has the prime responsibility of data acquisition and draft preparation and review of literature. She is the first author for the paper. Dabas Heena and Joshi P did manuscript revision and editing. Poonam Joshi will act as guarantor for the paper.

Compliance with ethical standards

Written informed permission was obtained from the parents before data collection. Since it is a clinical case report, no ethical approval was required for the the article.

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