

Case report

Congenital B-Cell Acute Myeloid Leukemia Associated With Down's Syndrome

Dhan Raj Bagri^{1*}, Abha Mehta², Anshul Sharma², Sandhya Gulati³, Rakesh Bairwa², Nidhi Sharma¹ and Ashok Gupta¹

¹Assistant Professor, Sir Padampat Institute of Neonatal and Pediatric Health, J K Lone Hospital, SMS Medical College, Jaipur, India

²Senior Resident, SMS Medical College, Jaipur, Rajasthan, India

³Professor Pathology -SMS Medical College, Jaipur, Rajasthan, India

Abstract

Introduction- Congenital Leukemia (CL) is extremely rare with an incidence rate of fewer than five cases per 1 million live births in neonates; mostly non-lymphoblastic leukemia in contrast to the predominance of ALL found in later childhood. CL may be associated with Down's syndrome.

Case presentation: A female neonate presented with lethargy, poor feeding, mild hepatosplenomegaly, manifestations suggestive of sepsis, and a negative sepsis workup. Physical examination showed that the patient was febrile and pale, with a facial syndromic appearance suggestive of Down's syndrome. His peripheral blood smear showed severe leukocytosis, thrombocytopenia, and atypical cells. Peripheral blood film examination revealed increased myeloblasts but no nucleated RBC; Flow cytometry confirmed the diagnosis of congenital leukemia. Karyotyping indicated chromosome 21-trisomy. **Conclusions:** Congenital Leukemia should be considered as a differential diagnosis in neonates having syndromic features and leukocytosis, TMD should be ruled out by flow cytometry.

Keywords: Acute myeloblastic leukemia; Congenital; Chromosome 21; Down's syndrome

Introduction

Congenital Leukemia (CL) is an extraordinarily rare condition in newborns, which is typically diagnosed at birth or within the first

***Corresponding author:** Dhan Raj Bagri, Assistant Professor, Sir Padampat Institute of Neonatal and Pediatric Health, J K Lone Hospital, SMS Medical College, Jaipur, India. Email address: meena.drhdhanraj6@gmail.com

Citation: Bagri DR, Mehta A, Sharma A, Gulati S, Bairwa R, et al. (2024) Congenital B-Cell Acute Myeloid Leukemia Associated With Down's Syndrome. J Neonatol Clin Pediatr 11: 124.

Received: March 26, 2024; **Accepted:** May 01, 2024; **Published:** May 08, 2024

Copyright: © 2024 Witkowiak MM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

month of life. It makes a medical diagnostic challenge, as its clinical features are similar to prenatal/or natal sepsis. Most CLs are myeloid contrasting pediatric leukemia, which is frequently lymphoid in origin; prognosis is evenly poor [1,2]. The course of congenital leukemia ordinarily leads to rapid deterioration and expiry due to infection or hemorrhagic events. We introduce a neonate presenting with clinical manifestations of sepsis; however, the patient was then confirmed as CL.

Case Report

A full-term female child presented to the pediatric emergency department with complaints of a rash over her face and respiratory distress since birth. She was born out of a non-consanguineous marriage with a birth weight of 2.5 kg. Her 25-year-old primigravida mother had a normal antenatal course with normal routine tests including HIV & HBsAg, RPR test, TSH, urine microscopy, and ultrasound were normal. The maternal TORCH profile was normal. The baby had normal APGAR scores.

On examination, her craniofacial configuration was abnormal with a flattened round face, depressed bridge of the nose, upward slanting almond-shaped eyes, small low set ears, with skin folding on the pinna, short neck with skin folding, small hands with palmer crease, small fingers curved towards the thumb and small feet with bilateral wide spaced great toes and second toes - features suggestive of Down's syndrome. The baby had a macular rash with tiny red spots on the face (Figure 1). The anterior fontanelle bulged and the head circumference was 32 cm. The abdomen was mildly distended (abdominal girth – 38 cm) and hepatosplenomegaly on palpation with the liver 4 cm below the costal margin and spleen 3 cm below the costal margin. He was tachypneic with a respiratory rate of 70 per minute. Respiratory system examination revealed subcostal and intercostal retractions and central cyanosis. On auscultation, occasional crepitations were audible. Cardiovascular examination suggested abnormal heart sounds and murmur.



Figure 1: Down's Syndrome.

Blood investigations are depicted in table1. Complete blood counts suggested total leucocyte counts 78x10³/Cumm, Serum calcium was 7.3 mg/dl, phosphorus was 3.69 mg/dl, and serum uric acid levels were 7.0 mg/dl, LFT & RFT were normal. 25 LDH was elevated (5032 U/L). TSH was 4.331 micro-IU/ml with normal T3&T4. PT/PTTK INR (1.9) was abnormal (Table 1). Chest X-ray and 2D ECHO suggested a cyanotic congenital heart disease- PDA (3.7 mm, PG – 5.0 mmHg) with the left to right shunting and LALV enlarged.

Ultrasound brain suggested immature parenchyma with increased echogenicity of the gangliothalamic region suggestive of HIE. Ultrasound abdomen suggested enlarged liver of 74 mm with sludge in the gall bladder with peri gall bladder fluid and portal vein diameter of 4.3 mm. bilateral kidneys were bright with peri renal edema and ascites. Ultrasound chest reported that the Right basal region showed consolidation and air bronchogram, left lobe also showed peripheral consolidation. TORCH (toxoplasmosis, other infections, rubella, cytomegalovirus infection, and herpes simplex) infections were ruled out based on a negative TORCH screen.

A karyotype done to rule out chromosomal abnormalities on the blood sample by stimulated peripheral blood lymphocyte culture revealed 47, XX, +21[20] [ISCN 2020] & presence of an additional copy of chromosome 21, suggestive of trisomy 21, indicative of female child with down syndrome (figure 2).

Parameter	LIVE DAY 1	Re-sult-LIVE DAY 3	Live day 8	Unit	Reference Interval
RBC	3.68	4.27	4.47	10 ⁶	(M) 4.5-5.5(F) 3.8-4.8
Hemoglobin	14.8	15.8	16.2	g/dL	(M) 13-17(F) 12-15
HCT	39.4	45.3	45.7	%	(M) 36-51(F) 36-46
MCV	107.4	106.1	102.2	fL	(M) 70-99(F) 83-101
MCH	40.2	37	36.2	Pg	(M) 24-35(F) 27-32
MCHC	37.6	34.9	35.4	g/dL	(M) 33-37(F) 32-35
RDW-SD	28	25.9	26.1	fL	(M) 40-57(F) 40-57
RDW-CV				%	(M)11.6-14(F)11.6-14
WBC	78	55.87	45.09	10 ³ μL	(M)4.5-11.5(F)4-11
NEUTROPHIL		30%	57	%	(M)36-72(F)40-80
LYMPHOCYTES		27%	13	%	(M)18-48(F)20-40
MONOCYTES		2%	1	%	(M)2-11(F)2-10
Atypical cells		35%	24	%	(M)1-6 (F)1-6
Myelo		3%	2	%	(M)0-2(F)1-2
Metamyelo		3%	2	%	
NRBC		35/100WBC	1/100WBC	%	
PLATELETS	69	70	65	10 ³	(M) (F)150-400
RETICULOCYTE COUNTS		10.05		%	(M)0.9-2.2(F)0.76-2.21

Table 1: Hla & Advanced Hematology Lab Report.

Peripheral Blood Film examination reported normocytic normochromic red cells with moderate anisocytosis & adequate density. 30 n-RBC / 100 WBC were noted. White Blood Cell examination suggested leukocytosis with differentials as – blast + promyelocytes -18%, myelocytes -4%, metamyelocytes 3%, band+ neutrophils -28%, lymphocytes 41 %, monocytes 5% and eosinophils 1%. Platelets were reduced in number.

Peripheral Blood Film examination by an Advanced hematology lab suggested abnormal pathologic features including leukocytosis, lymphocytosis anisocytosis, monocytosis, basophilia, reticulocytosis, blasts, and giant platelets.

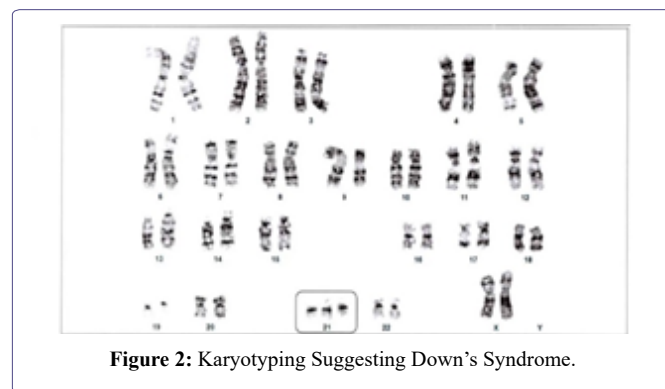


Figure 2: Karyotyping Suggesting Down's Syndrome.

Supportive care was restricted to intravenous fluids and antibacterial therapy. Flow cytometric immunophenotyping further confirmed congenital B-Cell ALL (figure 3).

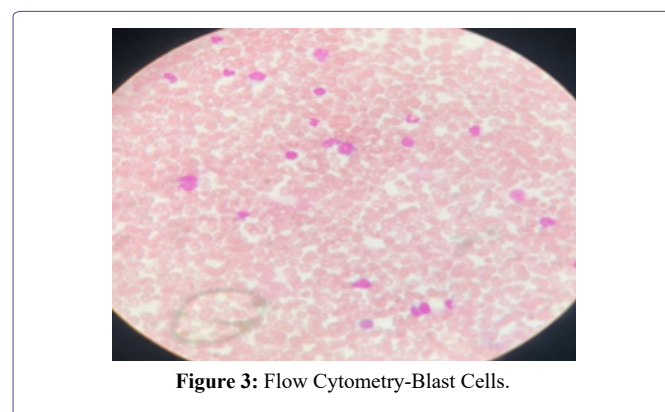


Figure 3: Flow Cytometry-Blast Cells.

Flow Cytometry

Peripheral blood smear shows 40% Blasts. On CD 45 gating the Blasts show the antigenic expression suggestive of Acute myeloid leukemia with megakaryocytic differentiation and aberrant CD 7 (Table 2).

Discussion

Congenital leukemia (CL) has an incidence of 4.3 - 8.6 per million live births [2,3]. Intrauterine environmental insults, infections, exposure to radiation during pregnancy, and chromosomal derangements are among the etiologies of congenital leukemias. CL is found

POSITIVE FOR	NEGATIVE FOR
	CD 10
CD 13	CD 19
CD 33	CD 20
VILA DR	CD 3
CD 117	
CD 61	GlyA
CD 34	CD 79a
MPO	cCD 3
	CD 14

Table 2: Flow Cytometry.

associated with Down's syndrome, Turner syndrome, Klippel-Feil syndrome, and Ellis-van Creveld syndrome [4,5]; CL was accompanied by Down's syndrome with dysmorphic clinical presentations in our case. Clinical features of leukemia might be apparent at birth with hepatosplenomegaly, ecchymosis, and petechial lesions. About 25-30% of newborns suffering from CL present specific cutaneous infiltrates named leukemia cutis looking like firm red or blue nodules 'Blueberry Muffin' [6,7] Unlike the current case. Most CLs are of the myeloid lineage, unlike pediatric leukemia, which is usually lymphoid in origin (1-3, and 8-11). About half of congenital AMLs are of M4 or M5 in terms of morphology; there is the translocation of the MLL gene at band 11q23 and positive CD14 in these cases. The t (9; 11) translocation is the next common genetic defect detected followed by the t (11; 19) translocation [8, 9].

The differential diagnosis of CL comprises mainly sepsis and intra-uterine infections termed TORCH; other possible reasons consist of hemolytic disease of the newborn (HDN) and transient myeloproliferative disease (TMD) [1-3]. Infections were excluded through serology and culture in our present case, numerous erythrocyte precursors were not detected in the peripheral smear in this current case, unlike HDN. TMD of neonates is seen typically linked with Down's syndrome. They often have associated transient polycythemia and/or thrombocytosis, but hematological abnormalities persisted in our case [10]. The prognosis is poor, with merely 23% of cases surviving at 24 months [11, 12].

Conclusion

We are reporting a newborn with congenital B-cell -AML. Congenital leukemia should be considered in the differential diagnosis of neonates having syndromic features and peculiar blood abnormalities. TMD may be excluded appropriately by flow cytometric analysis.

Declarations

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of interest/Competing interests

None

References

- Perkins SL (2007) Hematopoietic system. In: Gilbert Barnes E (Ed). *Potter's pathology of the fetus, infant, and child*. 2nd ed. Elsevier 1453-1514.
- Bajwa RP, Skinner R, Windebank KP, Reid MM (2004) A demographic study of leukemia presenting within the first three months of life in the northern health region of England. *J Clin Pathol* 57: 186-188.
- McCoy JP Jr, Overton WR (1995) Immunophenotyping of congenital leukemia. *Cytometry* 22: 85-88.
- Warrier RP, Emami A, Ravindranath Y, Inoue S, Kaplan J (1983) Perinatal leukemia: the surface antigens, cytochemistry, and cytogenetic features. *Indian Pediatr* 20: 325333.
- Duru C, Pughikumo C, Adeyemi O (2013) Acute myeloblastic-leukemia in a patient with Down syndrome and sickle cell anemia: a case report. *Pediatr Ther* 3: 167.
- Pui CH, Kalwinsky DK, Schell MJ, Mason CA, Mirro J, et al. (1988) Acute non lymphoblastic leukemia in infants: clinical presentation and outcome. *J Clin Oncol* 6: 10081013.
- Resnick KS, Brod BB (1993) Leukemia cutis in congenital leukemia: analysis and review of the world literature with a report of an additional case. *Arch Dermatol* 129: 1301-1306.
- Badhe PB, Sane SY (1992) Congenital leukemia – Organ involvement in six autopsy cases. *J Postgrad Med* 38: 127.
- Felix CA, Lange BJ (1999) Leukemia in infants. *Oncologist* 4: 225-240.
- Zipursky A (2003) Transient leukaemia-a benign form of leukemia in newborn infants with trisomy 21. *Br J Hematol* 120: 930-938.
- Bresters D, Reus AC, Veerman AJ, van Wering ER, van der Does-van den Berg, et al. (2002) Congenital leukemia the Dutch experience and review of the literature. *Br J Hematol* 117: 513-524.
- Isaacs H Jr (2003) Fetal and neonatal leukemia. *J Pediatr Hematol Oncol* 25: 348-361.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>