

Case Report Section

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Chromosomal translocation t(X;11)(q22;q23) involving the MLL gene

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Clinics

Age and sex

15 months old male patient.

Previous history

No preleukemia. No previous malignancy. No inborn condition of note.

Organomegaly

No hepatomegaly, no splenomegaly, no enlarged lymph nodes, no central nervous system involvement.

Blood

WBC : 50.2 (neutrophils 2%, lymphocytes 68%, probably blasts, monocytes 16%, atypical lymphocytes 14% undifferentiated cells) X 10⁹/l

HB : 10.2g/dl

Platelets : 191 X 10⁹/l

Blasts : 14%

Bone marrow : The bone marrow was hypercellular with more than 50% blasts that were positive for CD45, CD33, CD15, CD13, CD14 and HLA-DR.

Cyto-Pathology Classification

Cytology: AML M4

Immunophenotype: M4. CD13+, CD14+, CD15+, CD33+, CD45+, CD64+ and MPO.

Diagnosis: Acute myelomonocytic leukemia.

Survival

Date of diagnosis: 02-2010

Treatment: Chemotherapy (ADE)

Complete remission was obtained.

Treatment related death : no

Relapse : no

Status: Alive. Last follow up: 02-2011

Survival: 12 months

Karyotype

Sample: BM

Culture time: 24h

Banding: G-band

Karyotype at Relapse

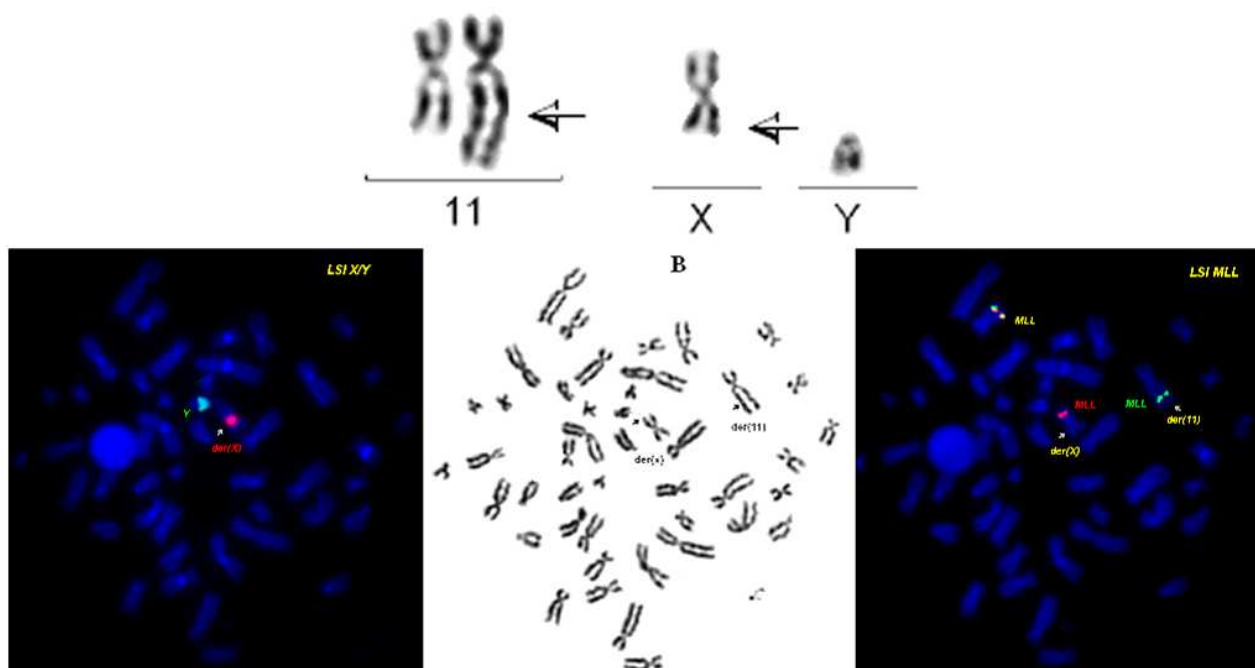
46,XY [5] / 46,Y,t(X;11)(q22;q23) [25]

Other molecular cytogenetics technics

Fluorescence in situ hybridization.

Other molecular cytogenetics results

MLL rearrangement was identified using the LSI MLL (11q23) Dual Color Break Apart Rearrangement probe (Abbott Molecular) revealing 80% of cells with MLL rearrangement. The rearrangement was confirmed in metaphases demonstrating that the distal part of the MLL gene was juxtaposed to the der(X) chromosome.



Top: partial karyotype of the patient. Bottom: fluorescence in situ studies were performed successively on G-banded slides prepared for chromosome analysis using a locus-specific, break-apart probe for MLL (green and red signals) and with centromeric X/Y probe (Vysis) (red and green signal). Hybridization on metaphase cells with the MLL probe detected one MLL signal on the normal chromosome 11 (red-green fusion signal) and signals on the der(11) (green signal) and the der(X), confirming MLL disruption. The red signal from MLL has moved to the derivative chromosome X, indicating that the breakpoint is in the 5' of the MLL gene. Arrows indicate derivative chromosomes, arrow heads are pointing to derivative chromosomes X and 11.

Comments

A previously healthy, 15 months-old boy presented with fever, and chest infection was diagnosed with acute myeloid leukemia FAB M4 in February 2010. His biochemistry was significant for GGT (8 IU/L; normal 9-40) and LDH 350 (normal 90-225). Chromosomal studies performed at diagnosis revealed the karyotype $46,Y,t(X;11)(q22;q23)$ in 25 out of 30 metaphases. Fluorescence in situ hybridization study showed rearrangement of the MLL gene in interphase and metaphase cells revealing that the break-apart 5'-MLL segment is translocated to the derivative X chromosome. The patient achieved a complete hematological remission with chemotherapy one month later. Chromosomal and FISH studies performed in April, June, August and December confirmed the complete cytogenetic response without rearrangement of the MLL gene. He remains disease free 1 year from diagnosis. Our case together with the few reported similar cases suggest that chromosomal band Xq22 is a recurring 11q23 chromosomal partner in a subgroup of infant leukemia patients with AML.

As the gene in Xq22 is yet unknown, it is therefore uncertain whether this translocation involve a new MLL partner. Due to the similar clinical features with patients with $t(X;11)(q13;q23)$ involving the

FOXO4/MLL genes, (such as occurrence in infants and young children diagnosed with acute myelomonocytic leukemia), the possibility of involvement of FOXO4 or FOXO related gene in our patient cannot be excluded. In addition as MLL rearrangements are frequently confirmed in cases with highly complex changes, complex and/or cryptic changes cannot be excluded.

References

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