Leukaemia Section
Short Communication

**der(15)t(1;15)(q11-12;p11-13) and der(15)t(1;15)(q21-25;p10-13)**

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**Abstract**

Unbalanced 1q translocations leading to complete or partial trisomies of the long arm of chromosome 1 have been widely reported in both lymphoid and myeloid neoplasms. Chromosomal translocations between the long arm of chromosome 1 and the acrocentric chromosome 15 are mostly secondary events representing clonal evolution.

**Keywords**
Gain of 1q, unbalanced translocations, acrocentric chromosomes, gene overexpression.

**Identity**
See figures below.

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![Figure 1. Partial karyotypes with der(15)t(1;15)(q11;p11-13).](image-url)
Clinics and pathology

Disease

Chronic and acute myeloid malignancies, B-cell acute lymphoblastic leukemia (ALL), multiple myeloma (MM) and lymphomas.

Phenotype/cell stem origin

Etiology

Patients with der(15)t(1;15)(q11-p11-13) were diagnosed mainly with myeloid malignancies (10 patients): 1 polycythemia vera (PV) (Sanford et al., 2015), 5 myelodysplastic syndromes (MDS) (Mecucci et al., 1986; Mascarelllo et al., 1989; Jotterand-Bellomo et al., 1990; Najfeld et al., 1995) and 5 patients were diagnosed with acute myeloid leukemia (AML) (Andrieux et al., 2006; Farag et al., 2006; Poppe et al., 2006; Liu et al., 2007; Manola et al., 2008). In addition, there was 1 female with non neoplastic disorder (aplastic anemia) (Kim et al., 2010). Acute lymphoblastic leukemia was diagnosed in 7 (Raimondi et al., 1990; Heerema et al., 1999; Rafi et al., 2000; Boomer et al., 2001; Wan et al., 2004; Wetzler et al., 2004; Coyaud et al., 2010) and multiple myeloma in 3 (Calasanz et al., 1997; Rajkumar et al., 1999; Smadja et al., 2001). 7 patients have various B-cell lymphomas: 1 mature B-cell neoplasm (MBCL), 3 follicular lymphoma (FL) (Horsman et al., 2001; Le Baccon et al., 2001; Narayan et al., 2013), 2 diffuse large B-cell lymphoma (DLBCL) (Fan & Rizkalla, 2003; Havelange et al., 2013) and 1 mantle cell lymphoma (MCL) (Fan Rizkalla, 2003) (Table 1).

Patients with der(15)t(1;15)(q21-25:p10-13) were diagnosed with lymphoproliferative malignancies (10 patients), among them acute lymphoblastic leukemia in 3 (Strefford et al., 2007; Schmiegelow et al., 2012; Safavi et al., 2015) and various, mainly B-cell lymphomas in 9: 1 adult T-cell lymphoma/leukemia (HTLV-1+) (ATLL) (Kamada et al., 1992), 4 diffuse large B-cell lymphomas (DLBCL) (Sandlund et al., 1994; Miura et al., 1996; Aamot et al., 2005; Zhang et al., 2009), 1 lymphoplasmacytic lymphoma (LPL) (Khokhar et al., 1995), 1 Burkitt lymphoma/leukemia (BL) (Silva et al., 2002) and 2 follicular lymphomas (FL) (Lestou et al., 2003; Keller et al., 2006). Sporadic cases of other malignancies: 1 acute myeloid leukemia (AML) (Olsson et al., 2016) and 1 multiple myeloma (MM) (Nakano et al., 2005).

Epidemiology

The centromeric 1q11-12 translocation was reported at least in 29 patients (10 males and 19 females aged 0 to 81 years; median 47 years); among them there was 1 infant and 3 pediatric patients aged 13 to 15 years. Patients with 1q21-25 were less frequent and have been reported in 9 males and 5 females aged 6 to 79 years (median 22 years), 5 of them were children aged 6 to 11 years (4 males and 1 female).

Prognosis

In patients with complex karyotypes the appearance of the abnormality is associated with advanced disease, therapy resistance and unfavorable prognosis.
der(15)t(1;15)(q11-12;p11-13) and der(15)t(1;15)(q21-25;p10-13)  

**Table 1.** Clinical and karyotypic data of patients with der(15)t(1;15)(q11-12;p11-13).

<table>
<thead>
<tr>
<th>Sex/Age</th>
<th>Disease</th>
<th>Karyotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>F/45</td>
<td>AA</td>
<td>46,XX,der(15)(q11-12;p11)</td>
</tr>
<tr>
<td>M/47</td>
<td>RARS</td>
<td>46,XY,der(15)(q21-13;p11)</td>
</tr>
<tr>
<td>M/33</td>
<td>RA</td>
<td>46,XY,der(15)(q11-12;p11)</td>
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<td>RA</td>
<td>46,XX,der(15)(q11-12;p11)</td>
</tr>
<tr>
<td>F/41</td>
<td>RA</td>
<td>46,XX,der(15)(q11-12;p11)</td>
</tr>
<tr>
<td>F/36</td>
<td>RAEB</td>
<td>47,XX,+t(1;12)(p11-13),+mar</td>
</tr>
<tr>
<td>F/67</td>
<td>PV</td>
<td>47,XX,+t(1;12)(q11-13),+mar</td>
</tr>
</tbody>
</table>

**ACUTE MYELOID LEUKAEMIA**

| 8 F/65 | AML-M2 | 46,XX,add(1;12)(q11-12;p11) |
| 9 F/62 | AML-M2 | 46,XX,der(15)(q11-12;p11) |

**ACUTE LYMPHOBLASTIC LEUKAEMIA**

| 10 F/74 | AML-M2 | 49,XX,-17q(24q33-24q23),+t(1;12)(p11-13),+mar |

**MULTIPLE MYELOMA**

| 20 F    | MM     | 46,XX,t(11;14)(q11-13),+mar |

**NON HODGKIN LYMPHOMA**

| 23 F/65 | MBCI   | 49,XY,t(12;21)(p11-13),+mar |

**References**

Zamecnikova A. Atlas Genet Cytogenet Oncol Haematol. 2019; 23(1).
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Result of the chromosomal anomaly

**Fusion protein**

**Oncogenesis**

Unbalanced 1q translocations with an acrocentric recipient chromosome 15 result in 1q trisomy. The main consequence of these rearrangements is genomic imbalance resulting from the presence of an extra copy of the long arm of chromosome 1, leading to overexpression of several genes, likely implicated in neoplastic processes by a gene dosage effect. They presumably occur as a secondary aberration in addition to well-known primary abnormalities, therefore representing clonal evolution preceding or accompanying disease progression.

**References**


Chromosome 5q deletion and epigenetic suppression of the gene encoding alpha-catenin (CTNNA1) in myeloid cell transformation Nat Med 2007 Jan;13(1):78-83


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