t(1;14)(q21;q32), t(1;22)(q21;q11)

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Clinics and pathology

Disease
Non Hodgkin lymphoma and acute lymphoblastic lymphoma.

Phenotype/cell stem origin
23 cases to date: follicular lymphomas (FL, n=9), diffuse large B-cell lymphomas (DLBCL, n=5), marginal zone lymphoma (n=1), other B-cell non Hodgkin lymphomas, not otherwise specified (NHL NOS, n=4), pre-B acute lymphoblastic leukaemia (B-ALL, n=1), B-cell clonal hyperplasia without any sign of malignant transformation (n=1), and a myeloma cell line (Koduru et al., 1987; Oscier et al., 1996; Pinkerton et al., 1992; Willis et al., 1998; Callanan et al., 2000; Dyomin et al., 2000; Gilles et al., 2000; Chen et al., 2001; Hatzivassiliou et al., 2001; Le Baccon et al., 2001; Mohamed et al., 2001; Sato et al., 2001; Bosga-Bouwer et al., 2003; Sonoki et al., 2004; Keller et al., 2006; Johnson et al., 2009).

Also a case of T-cell angioimmunoblastic lymphoma was described with this translocation, but it is likely that IgH was not involved in the cancer process in the latter case (Kanda-Akano et al., 2004).

Epidemiology
There were 9 male and 5 female patients. Median age was 56-57 years (range 30-81 years, data from 14 patients).

Prognosis
Insufficient data.

Cytogenetics

Cytogenetics morphological

The t(1;14)(q21;q32) was found in 12 of 23 cases, and the t(1;22)(q21;q11) was found in 11 of 23 cases, a much higher percentage than for the variant translocations of the t(8;14)(q24;q32), or those of the t(14;18)(q32;q21). No case with t(1;2)(q21;p11) has so far been described.

Surprisingly also was that out of 11 well documented cases of t(1;14), there was no one case with a t(14;18), whereas out 8 well documented cases of t(1;22), 100% of the cases also had a t(14;18).

Additional anomalies

Out of 16 cases with complete data on the karyotype, the translocation was found as the sole anomaly in 2 cases, and complex karyotypes were found in 13 cases. Accompanying anomalies were the following there was a t(14;18)(q32;q21) in 8 cases, only found in FL or in "NHL-NOS" cases, +7 in 5 cases, the rare t(8;9)(q24;p13) was found in 3 instances, +18 in 3 cases, +X, +12, +18, a q27 rearrangement, a del(6q), a del(7q), and/or a del(13q) in 2 cases each, +3, +8, +9, +17, a t(2;12)(p11;p13), a t(8;14)(q24;q32), a t(18;22)(q21;q11), and/or an i(6p) in one case each.

Genes involved and proteins

Note
In 14q32 sits IgH, and IgL in 22q11.

The translocation t(1;14 or 22)(q21;q32 or q11) is heterogeneous, since different cases have shown different genes in 1q21 deregulated by the translocation:
- BCL9 (Willis et al., 1998). BCL9 binds to CTNNB1 (beta-catenin) and is required for Wnt signal transduction (Kramps et al., 2002). BCL9 starts at 145479806 and ends at 145564639 bp from pter. - MUC1 (Dyomin et al., 2000; the same case was independently reported in Gilles et al., 2000). MUC1 is a membrane bound mucin expressed on the surface of epithelial cells to protect epithelia (Carson, 2008). MUC1 starts at 153429424 and ends at 153429324 bp from pter. - FCRL4 and/or FCRL5 (Hatzivassiliou et al., 2001; Sonoki et al., 2004). FCRL4 is a cell surface receptor related to the Fc receptor, inhibitory receptor superfamily, and cell adhesion molecule (CAM) families (Falini et al., 2003). FCRL4 starts at 155810163 and ends at 155834494 bp from pter. - FCGR2B (Callanan et al., 2000; Chen et al., 2001). FCGR2B is a Low affinity IgG Fc receptor (Callanan and Leroux, 2002). FCGR2B starts at 159899564 and ends at 159914575 bp from pter. As a matter of fact, these translocations span 1q21 to 1q23. Also, many other genes of interest are in the area delimited by BCL9 and FCGR2B (see http://atlasgeneticsoncology.org/Indexbychrom/idxa_1.html "Ordered by Location"). From the very short sample of cases for each partner gene, it is impossible to delineate different entities with different epidemiologies and prognoses. They are therefore needed, for clinical goals.

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