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Leukaemia Section

Mini Review

Plasma cell leukemia (PCL)

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Clinics and pathology

Disease

Plasma cell dyscrasia; called primary PCL when it is diagnosed in the leukemic phase, and secondary PCL when there is leukemic transformation of a previously recognized multiple myeloma.

Phenotype / cell stem origin

Proliferation involving plasma cell expressing cytoplasmic immunoglobulin, CD38, plasma cell antigene 1; a minority of cells express CD10, HLA-DR, and CD20; the nature of the clonogenic cell in multiple myeloma is unknown; the presence of multiple hematopoietic surface antigenes on malignant plasma cells suggests its origin from a pluripotent stem cell.

Epidemiology

Rare disorder; approximately 60% of patients have the primary form; affects patients of more than 40 years of age; patients with primary PCL are younger than patients with the secondary PCL; slightly more frequent in men than in women.

Clinics

Patients with primary PCL have a greater incidence of hepatosplenomegaly and lymphadenopathy, and fewer lytic bone lesions.
Blood data: these data are similar to those of multiple myeloma, except that there are circulating plasma cells; patients with PCL have more than 20% plasma cells in their peripheral blood and an absolute plasma cell count equal or above 2000/mm^3; additionnally, patients with primary PCL have higher platelets counts and smaller M components compared to patients with secondary PCL.

Prognosis

Evolution: this disease is usually progressive; secondary PCL rarely responds to chemotherapy because patients already received alkylating agents and became resistant to them; in the primary form, responses have been observed with melphalan and prednisone; the response rate seems to be higher with combination therapy than with single alkylating agents; prognosis: the overall survival is short (few months).

Cytogenetics

Cytogenetics, morphological

Cytogenetic aberrations are detected more frequently in PCL than in multiple myeloma; the percentage of abnormal cases varies in different series but seems to be more than 50%; the overall pattern of cytogenetic changes is very similar to the pattern observed in multiple myeloma; numerical changes and/or structural aberrations have been described; in large series, hyperdiploidy is observed in 61 to 68% of cases, where as pseudodiploidy and hypodiploidy occur in 9 to 20 and 10 to 30% of patients, respectively; monosomy 13 and trisomy 9 are the most frequent numerical abnormalities; hypodiploidy is more common in PCL than in myeloma. Apart from chromosome 9, gains also involve chromosomes 3, 5, 7, 11, 15, and 19, whereas losses also involve chromosome X and Y; structural aberrations mainly involve chromosome 14, with 14q+ resulting from translocation t(11;14)(q13;q32) or other changes (e.g. Burkitt's translocations); chromosomes 16(p or q), 1(p or q), 19(p or q), 6q, 17q, 2p and 7q might also be involved.

Cytogenetics, molecular

Chromosomal changes are detectable by conventional cytogenetic techniques or by FISH; in addition, comparative genomic hybridization showed to be a useful tool in PCL, allowing assessment of regions showing copy number changes.

Genes involved and Proteins

Note: Analysis of DNA content of plasma cells demonstrates abnormalities in almost all patients; in addition, rearrangements and amplification of the

proto-oncogene C-MYC have been reported, as well as point mutations of NRAS and KRAS genes; molecular rearrangements or point mutations of the tumour suppressor genes RB1 and P53 have been reported; the molecular breakpoint of the translocation t(11;14)(q13;q32) involved the PRAD1 gene in 2 cases.

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