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Short Communication

del (5q) solely in Myelodysplastic syndrome

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Abstract

Review on Myelodysplastic syndrome with isolated deletion of 5q

Keywords
Myelodysplastic syndrome; chromosome 5; deletion 5q

Identity

del (5q) solely in Myelodysplastic syndrome

Other names
Myelodysplastic syndrome with isolated deletion of 5q

Clinics and pathology

Disease

Myelodysplastic syndrome (MDS) with isolated deletion of chromosome 5q is part of a group of clonal disorders in myeloid stem cells with ineffective hematopoiesis which is manifested by morphologic dysplasia in hematopoietic cells and single or bilineage cytopenia(s). It is the only MDS subtype defined cytogenetically in the World Health Organization classification system.

Phenotype/cell stem origin

Myeloid stem cell.

Epidemiology

MDS with isolated del(5q) is present in <5% of MDS cases (Mallo et al., 2011). It occurs more often in women than in men, male:female ratio 7:3, with a median age of diagnosis at 65 to 70 years.

Clinics

Patients suffering from MDS with isolated del(5q) present with a macrocytic anemia, normal or increased platelet count and absence of significant neutropenia in their peripheral blood. The incidence of bleeding and infections is therefore low in these patients because of the absence of significant neutropenia and thrombocytopenia. Blood transfusion dependency is seen in patients with severe anemia at diagnosis but also can develop in other patients (Germing et al., 2012). According to the Revised International Prognostic Scoring System (IPSS-R), MDS with isolated del(5q) are defined as Low- or Intermediate -1- risk subtypes and usually have an indolent course.

Pathology

The bone marrow is characterized by an increase in the number of small megakaryocytes with monolobulated and bilobulated nuclei. There are less than 1% blasts in the peripheral blood and less than 5% blasts in the bone marrow and Auer Rods are absent (Arber et al., 2016).

Treatment

MDS patients with isolated del(5q) have a favorable prognosis and the majority of patients respond well to treatment with lenalidomide.

Prognosis

This subtype of MDS has a favorable prognosis. The exception is when this disease is associated with mutations in TP53.

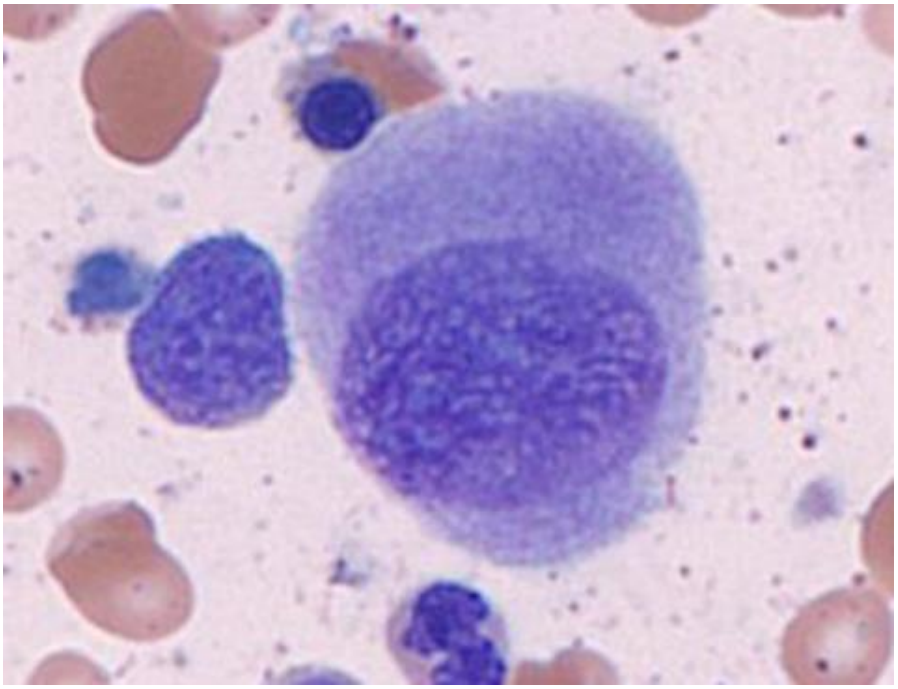

Figure 1: An example of a typical hypolobated micromegakaryocyte in a bone marrow aspirate smear. (Wright-Giemsa)

Cytogenetics

Cytogenetics morphological

As its name implies, in this entity there is interstitial deletion of part of the long arm of chromosome 5 involving 5q31-5q33. MDS with isolated del(5q) can still be diagnosed if there is 1 additional cytogenetic abnormality besides del(5q) if there is no adverse effect of that abnormality, as such, this excludes {CC: TXT:monosomy 7 or del 7(q) ID:} for instance (Arber et al., 2016).

Cytogenetics molecular

The gene specific for the defect seen in MDS with isolated del(5q) has been identified by RNA interference screening to be RPS14 (Pellagatti et al., 2008).

In addition, while patients with MDS with isolated del(5q) classically have a favorable prognosis, the presence of a TP53 mutation is of particular importance, this mutation predicts for poorer prognosis and higher risk of transformation to AML (Mallo et al.,2013).

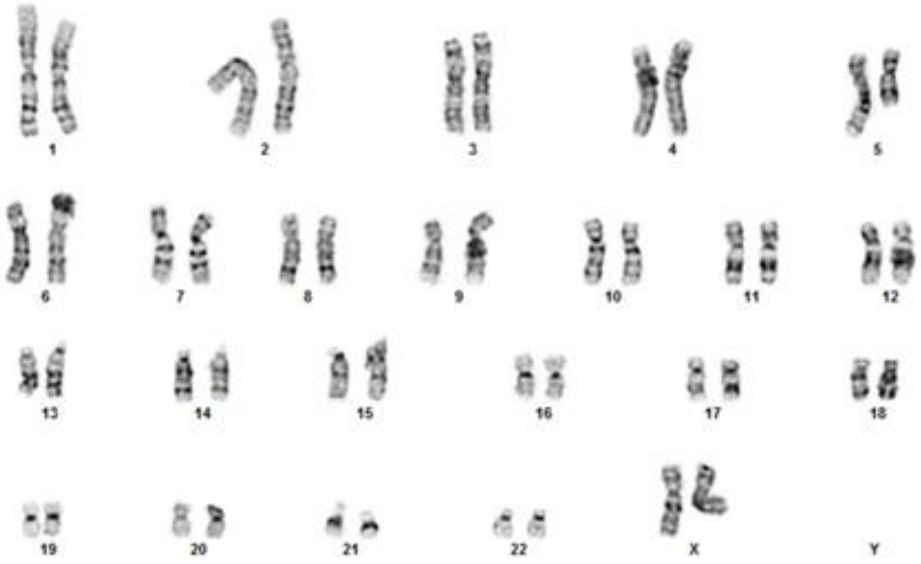

Figure 2: The karyotype in a case of MDS with isolated del(5q) showing 46,XX,del(5)(q22q35). Image courtesy of Dana Bangs, CG(ASCP), Stanford University.

Genes involved and proteins

RPS14 (ribosomal protein S14)

Location

5q33.1

Protein

RPS14 is a ribosomal gene located in commonly deleted region (CDR) of 5q. It encodes for a protein required for maturation of 40S ribosomal subunits. Patients with MDS with del(5q) are haploinsufficient for RPS14 which leads to impairment of ribosome biogenesis and subsequent reduction of protein translation.

TP53 (Tumour protein p53 (Li-Fraumeni syndrome))

Location

17p13.1

Protein

The TP53 gene encodes for the tumor suppressor protein p53. In the presence of DNA -damage p53 may be activated to fix the damage, or if the damage cannot be repaired p53 prevents the cell from dividing and signals the cell to undergo apoptosis.

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