Anti-D in a D-positive patient: autoantibody or alloantibody?

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The D antigen of the Rh blood system is the most important red blood cell antigen determined by a protein, because D-negative individuals are easily anti-D immunised[1]. Individuals, whose cells have a qualitative variation of the D antigen (partial D) lacking one or more components of the D antigen, are said to have a partial-D phenotype. D-positive individuals harbouring a "partial" D antigen may produce an allo-anti-D. In fact, subjects with partial-D have altered RhD proteins that differ sufficiently from normal RhD to allow allo-anti-D production.

We tested a para 1 with a history of breast cancer, who had been previously typed D-positive; her cells gave a normal agglutination pattern with monoclonal anti-D reagents and the patient was again typed as DCcee. Surprisingly, her serum, tested for irregular antibodies against a selected panel of untreated and ficin-treated red cells, showed the presence of an IgG antibody with anti-D specificity. The combination of D-positive red cells with anti-D reactivity in the patient's serum suggested the presence of either an autoantibody or an alloantibody in a partial-D individual. The direct antiglobulin test (DAT) and the agglutination test of the patient's serum with her own red blood cells were negative. All tests indicated the presence of an allo-anti-D in woman's serum. The D-antigen was, therefore, tested using the "ID-Partial RhD Typing Set" (DiaMed, Cressier sur Morat, Switzerland) which identified a DBT phenotype[2-4]. The DBT status was confirmed by *RHD* and *RHCE* genotyping carried out on DNA samples from the recipient with PCR-SSP (Inno-Train Diagnostik GmbH, Kronberg im Taunus, Germany). Genomic DNA analysis confirmed that the woman was D^{DBT}Ccee.

An accurate D-antigen identification is essential for pre-transfusion and antenatal evaluation in order to prevent anti-D allo-immunisation, and a partial-D variant might be suspected when typing for the D antigen shows weaker-than-normal reactions. Even if haemolytic disease of the newborn is a rare occurrence in women with genetic variants of the D antigen, the management of women with a weak reaction of D antigen needs to be changed. Our results show that the D-typing strategy is not yet sufficiently controlled: our patient, erroneously typed D-positive, became alloimmunised during the pregnancy. The successful production of a large number of monoclonal antibodies has provided more reliable tools for the characterization of partial-D phenotypes, and routine RhD typing with two different monoclonal antibodies has revealed that D variants are more common than had been previously thought; however, this case emphasizes that some partial-D variants are likely to be missed, when using routine serological tests[5].

References

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