ATAGC histology regression equations and reference standard

TCMR regression equation (1)

Based on our data set, the probability of a positive TCMR score can be estimated by the equation $p(TCMR >0.1) = 1 / (1 + e^{-Z})$ where $z = -5.66 + 0.72t + 0.88i + 0.90v + 2.93TxBx - 0.76(TxBx^2)$. The values i, t and v are the histologic lesion scores. TxBx is log10 (time of biopsy after transplant [in days]), and e is the base of the natural logarithm.

ABMR regression equations (2)

Based on our data set in Population 1 (n=616) (2), the probability of a positive ABMR score can be estimated by the equation $p(ABMR >0.2) = 1 / (1 + e^{-Z})$ where $z = -5.41 +0.35i + 0.40g +0.71ptc + 0.33cg +0.27ci + 0.85TxBx +1.65C4d$. TxBx is log10 (time of biopsy after transplant [in days]), and e is the base of the natural logarithm. C4d refers to whether C4d staining was positive(1) or negative(0).

Based on our data set in Population 2 (n=523) (2) when DSA measurements are available, the probability of a positive ABMR score can be estimated by the equation $p(ABMR >0.2) = 1 / (1 + e^{-Z})$ where $z = -5.69 + 0.40i + 0.62ptc +0.53cg + 0.90TxBx +1.34C4d + 1.26DSA$. TxBx is log10 (time of biopsy after transplant [in days]), and e is the base of the natural logarithm. C4d refers to whether C4d staining was positive (1) or negative(0). DSA refers to whether DSA was positive(1) or negative(0).

Based on our data set in Population 2 (n=523) (2) when DSA measurements are not available, the probability of a positive ABMR score can be estimated by the equation $p(ABMR >0.2) = 1 / (1 + e^{-Z})$ in which $z = -5.55 + 0.38i + 0.83ptc +0.52cg + 1.01TxBx +1.67C4d$. TxBx is log10 (time of biopsy after transplant [in days]), and e is the base of the natural logarithm. C4d refers to whether C4d staining was positive (1) or negative (0).

The ATAGC Reference Standard classification for kidney transplant biopsies

The referred standard represents a modification of the 2008 Banff classification (3). These changes have now been incorporated into Banff (4)

This classification had to be modified in order to incorporate criteria for C4d-negative antibody-mediated rejection (ABMR) (5;6).

C4d-negative ABMR was defined by donor specific antibody (DSA), lack of diffuse C4d staining, and at least one microcirculation lesion: peritubular capillaritis (ptc>1); glomerulitis (g>0); transplant glomerulopathy (cg>0).

The criteria for C4d-positive ABMR remain unchanged. The existing histologic classification allows for two methods for C4d staining. The C4d staining method is either immunofluorescence or deparaffinised immunoperoxidase. C4d positivity was determined following the published guidelines (3): diffuse staining by immunofluorescence (grade 3), diffuse/focal staining by immunoperoxidase (grades 2 and 3). For the present purposes, slides which were not deemed to be C4d-positive were considered C4d-negative.

The criteria for T cell-mediated rejection (TCMR) remained unchanged. Mixed rejection was diagnosed when both ABMR and TCMR were present.

Using the ATAGC Reference Standard classification as the basis for histologic diagnosis, we developed molecular tests for TCMR (7) and ABMR (8). These tests assign a molecular score of TCMR and ABMR to each biopsy and express the degree of certainty in the molecular diagnosis of TCMR and ABMR.

Reference List

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