



Submission No.: PG09-9356

Session : Postgraduate Course 9 (Laboratory)

Date & Time, Place : November 16 (Thu), 13:00-14:30, Room 6F-2

Session Title : Transplant Immunology: Practical issues in HLA Eplets and Desensitization Monitoring

Laboratory Issues in Desensitization for ABO Incompatible Transplant

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The presence of ABO antibodies is an inherent characteristic of the human immune system and exhibits distinct characteristics compared to the well-established adaptive immune response. In contrast to immune antibodies, which undergo a transition from immunoglobulin M (IgM) to immunoglobulin G (IgG) upon encountering antigens, ABO antibodies typically remain in the form of IgM [1]. The majority of ABO antibodies of type A and type B are predominantly composed of immunoglobulin M (IgM). IgG antibodies are commonly detected in individuals with type O blood [2]. To effectively manage ABO antibodies in ABO-incompatible transplantation, it is imperative to precisely quantify the relevant antibodies. Blood group antibodies are conventionally measured as titers using the two-fold dilution method. Titration is a method wherein the amount of antibodies is indirectly expressed as the reciprocal of the endpoint titer obtained by serially diluting the serum. The titer endpoint that shows agglutination is interpreted as the isoagglutinin titer [3]. Two representative methods for the titration of anti-A and anti-B antibodies are the tube method and the column agglutination technique (CAT). Other methods include erythrocyte-magnetized technology, methods using flow cytometry, etc. There are two ways to perform the Tube method and the CAT method: manually and using automated equipment. To accurately measure IgG isoagglutinin, IgM must be separated. For this purpose, IgM is separated using DTT and then IgG is measured [4]. Depending on the measurement method used, the titer values for IgG isoagglutinin and IgM isoagglutinin may vary. There is a study that found that total isoagglutinin and IgG isoagglutinin were proportional and differed by about 2-fold [5] and that the titer of IgG isoagglutinin increased in the order of tube method, EMT, and CAT [6]. The higher the initial titer of isoagglutinin, the greater the number of plasmapheresis procedures required to remove it [7-8]. Accurate titration is necessary to plan and carry out desensitization of ABO-incompatible transplantation. References [1] Rawson AJ, Abelson NM. Studies of blood groups antibodies. III. Observations on the physicochemical properties of isohemagglutinins and isohemolysins. *J Immunol* 1960;85:636-9. [2] Brouwers HA, Overbeeke MA, Gemke RJ, Maas CJ, van Leeuwen EF, Engelfriet CP. Sensitive methods for determining subclasses of IgG anti-A and

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anti-B in sera of blood-group-O women with a blood-group-A or -B child. *Br J Haematol* 1987;66:267-70. [3] Chung Y, Ko D. Laboratory support of ABO antibody monitoring for ABO-incompatible solid organ transplantation. *Korean Journal of Transplantation* 2022;36:99-103 [4] Kim J, Shin JW, Lee DL, Park S, Kim J, Bang HI. Comparison of Total and IgG ABO Isoagglutinin Titers in ABO-Incompatible Organ Transplant Patients: Analysis of Data from a University Hospital Over the Last 5 Years. *KJBT* 2022;33:145-153 [5] Schneider D, Vicarioto M, Coluzzi S, Matteocci A, Revelli N, Foglieni B, Artusi P, Londero D, Quaglietta A, Barrotta G, Visceglie D, Portararo G, Gilsdorf J. ABO antibody titres: a multisite comparative study of equivalency and reproducibility for automated solid-phase and haemagglutination titration, and manual dilution with gel column agglutination technology. *Blood Transfus.* 2022;20:329-337. [6] Shim H, Hwang JH, Kang SJ, Seo HS, Park EY, Park KU, Kong SY. Comparison of ABO isoagglutinin titres by three different methods: tube haemagglutination, micro-column agglutination and automated immunohematology analyzer based on erythrocyte-magnetized technology. *Vox Sang.* 2020 ;115:233-240. [7] Baek CH, Kim H, Yang WS, Han DJ, Park SK. Clinical significance of isoagglutinin titre with the current desensitization protocol in ABO-incompatible kidney transplantation. *Nephrology.* 2019;24:654-660. [8] Cho H, Bae J, Yoon HK, Lee HJ, Yang SM, Choe SH, Jung CW, Suh KS, Kim WH. Perioperative ABO Blood Group Isoagglutinin Titer and the Risk of Acute Kidney Injury after ABO-Incompatible Living Donor Liver Transplantation. *J Clin Med.* 2021;10:1679