# IMPLEMENTATION OF ABO INCOMPATIBLE HEART TRANSPLANT PROGRAM IN SPAIN

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*ABO incompatible heart transplantation ( ABOi HT ) initiated in Canada by the Toronto group led by Dr. Lori J West is currently a reality having proven a survival rate similar to compatible Heart Transplant (1). The impact of the implementation strategy in Canada prioritizing urgency over blood group compatibility has achieved a significant reduction in waiting list mortality in younger infants (2).*

*As you know Spain is the world leader in organ donation. However, in the period from 2010-2017 the probability of transplantation in children under one year of age was 55% and even lower (30%) in infants under 3 months of age with a wait list mortality rate of 30% according to data from The National Transplant Organization (NTO). The annual number of donors under one year of age was scarce (4 per year). Furthermore, from January 1, 2011 to December 31, 2014, 15 donors less than 15 kg and age < 3 y.o could not be accepted due to blood group incompatibility.*

*According to data from the Spanish Heart Transplant Registry, pediatric HT activity commencing in 1984, by 2017 456 pediatric HT had been performed, 30% in children ≤ 1 y.o with an average of 4 transplants per year.*

*Our center performs 50% of HT in infants for the whole country, therefore, due to the data, the decision was taken to implement an ABO incompatible HT program. Dr. Lori J West was invited to our Annual Meeting in Madrid in 2016 and she committed to guiding us. We also contacted Dr. JC Alejos and the UCLA Perfusion Team for the exanguinotransfusion technique.*

*The Pediatric HT Unit, the Transfusion Service and the Perfusion Team prepared a local protocol for ABO incompatible Heart Transplant (based on the Toronto protocol). The key points were:*

A. *FREE-ISOHEMAGLUTININ BLOOD TRANSFUSION POLICY*

1. *Begun from the moment of inclusion on waiting list : red blood cell concentrates of receptor blood group or 0 (non washed) , Plasma AB blood group and Platelets AB blood group (or washed ) to avoid passive isohemaglutinins. The transfusion Service created a patient transfusional report and a warning in the computer system to avoid errors.*

2. *The same transfusion policy was maintained during surgery (to increase safety and avoid errors) in ABOi HT.*

3. *In the case of incompatible donor, a blood sample from the donor was sent to our Transfusion Service where once verified the transfusion policy was modified postsurgery according to Toronto protocol.*

B. *ISOHEMAGLUTININS*

1. *For inclusion for ABO incompatible Heart Transplant isohemagglutinin titers should be ≤ 1:8*

2. *Titers ≤1:4 are safe to aortic cross clamp release.*

3. *In all cases of incompatible ABO Heart transplant (regardless of titers) a modified by pass circuit with additional reservoir is mounted.*

*C. IMMUNOSUPPRESSION was the same as in compatible Heart Transplant*

*The Pediatric Heart Transplant Unit carried out an in-hospital ABOi HT diffusion program prior to the year of implementation to offer information and safety especially focused on the special transfusion protocol.*
*Finally in November 2017 the program was initiated at our center and in January 2018 the first successful ABOi HT was performed in Spain in a 5 month , 5 kg infant with Hypoplastic Left Heart Syndrome and Hybrid procedure.*

*During the setup of the program several meetings were held with the other Pediatric HT groups in Spain, we shared our local protocol and worked together for implementation and designed a National ABOi HT protocol. Once all the groups were prepared, during the National Transplant Organization Annual Meeting criteria for organ distribution were modified by consensus in April 2018 : " Donors ≤ 15 kg will be offered prioritizing urgency over blood group compatibility "*

*The Initial impact of the ABO incompatible program in Spain after one year of implementation was analyzed and published (3) proving a significant reduction in waiting list mortality rates. Posteriorly according to data from the NTO, comparing the number of inclusions of infants < o = 1 year prior to implementation (2015-2017 ) with the post implementation period (2018-2010) a significant increase in number of transplants was observed ( 19 to 42) as well as a significant decrease in waiting list mortality ( 26% to 9.5% ).*

*We believe that the strategy of maintaining a isohemaglutinin-free transfusion policy from the moment of inclusion is possible and reduces the need for exanguinotransfusion at the moment of the surgery simplifying the procedure.*

*We think the use of AB column (4) during the bypass to eliminate isohemaglutinins (published by the Great Ormond group) may be an good alternative to exanguinotransfusion in patients with positive titers at the moment of surgery to reduce the quantity of blood products.*

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