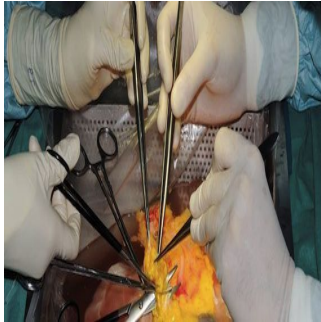## New Proposal for Improved Allocation of Liver Transplant Donations

Based on the experience of close to 1,500 transplant donations registered in units in Spain and the United Kingdom, researchers at Spain's University of Cordoba have developed a mathematical system capable of measuring compatibility between donors and the most serious receivers in liver transplants.

Spain is considered the global transplant leader and serves as an example, the allocation criteria for organs in that country are set according to territorial and clinical aspects that guarantee altruism in donations and equality of access.

Nevertheless, according to a study conducted by the research team of the University of Cordoba, there are still some aspects of the allocation of organs that could be improved.

Factors taken into account in the case of liver transplants are the properties of the owner, such as the blood group (which must match that of the receiver), and the seriousness of the patient, measured with the so-called Model for End Stage Liver Disease (MELD). The result is a number obtained from the patient's bilirubin, creatinine and prothrombin time figures, which serves to prioritise the waiting list according to the risk of mortality in the following three months.
María Pérez Ortiz, one of the authors, noted that this donor/receiver assessment does not address other variables that would optimise the compatibility between them and that could be a decisive factor in the results of the transplant.

The findings therefore suggest a threefold improvement, one which favours the principles of justice for the receiver and of utility of the transplant, one which matches the waiting times to the mortality risk on the active list and one which improves survival.

The team, which includes researchers in the University and the Reina Sofía Hospital in Cordoba, has specifically developed an allocation model that would allocate each organ to each of the most serious receivers from whom the one with the maximum survival probability is chosen. The details of this model are published in the journal 'Applied Soft Computing'.
As explained by the team of scientists, this system respects the principle of urgency required by the MELD model and discriminates between receivers on a waiting list who theoretically would have a better prognosis but who, transplanted with a specific liver, would benefit from a better survival. They further added that the interactions set up in the transplant procedure were more complex than those arising simply from matching a good donor with a very serious receiver.

Based on 38 variables that include age, gender, body mass index, existence of diabetes, arterial hypertension, and other factors taken from almost 1,500 donor/receiver pairs in seven Spanish transplant units and one in King's College Hospital, London, the application is an area of computing which imitates the brain when it comes to learning from experience and from known data, and it was created by using automated learning techniques.

Together with the survival time of the transplanted liver, these 38 variables serve to train the model which is then used to match donor/receiver pairs with a given survival time, specifically, whether the transplant survives for 15 days after the operation, for three months, for a year or more, so that it is very useful to assess the suitability of the allocations made.

Source: AlphaGalileo

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