N S Krishnan MBBS, FRCP, MD

Professor, The Center of Health & Communities, Coventry University, Associate Professor, University of Warwick, UK

Artificial Intelligence Assisted Risk Prediction Models in Organ Transplantation

End-Stage Renal Failure (ESRF) represents a significant global health burden, necessitating costly renal replacement therapy (RRT). Kidney transplantation is the preferred RRT, offering substantial survival advantages, improved quality of life, and long-term cost-effectiveness compared to dialysis. Despite growing efforts, the demand for kidneys continues to far exceed supply. The extensive waitlist for deceased donor organs underscores significant disparities in access, especially among socio-economically disadvantaged populations and ethnic minority groups.

Living Donor Kidney Transplantation (LDKT) offers several advantages over deceased donor transplants, including superior graft survival, better overall patient survival, lower incidence of complications such as delayed graft function, and the opportunity for pre-emptive transplantation. However, LDKT is often limited by immunological incompatibilities, which prevent LDKT in more than one-third of otherwise willing donor-recipient pairs.

The ability to predict future outcomes of deceased-donor and live-donor kidney transplantation improves allocation decision-making for transplant clinicians, and life expectancy and quality of life for potential recipients. However, capacity of current models to predict outcomes is limited. To improve the transplant selection process world-wide, we used novel AI algorithms to develop improved risk stratification.

Machine Learning offers promising avenues to address these limitations and enhance outcomes. Using anonymised registry data from UK and US transplant dataset, we have developed UK and US Transplant Outcome Prediction models. Strengths of these models are that they are trained on large volume of registry data. Leading to twenty percent improvement in prediction of graft survival over ten years. (C index: 0.75 vs. 0.55 (UK-KDRI), AUC: 0.72). Critically, these models have been implemented in a publicly accessible web-based application (https://organpredict.ai/), demonstrating a direct translational pathway to support clinical decision-making in donor acceptance.

doi.org/10.51219/URForum.2025.Nithya-Krishnan ISBN: 978-1-917892-34-6

Biography

Professor Krishnan is a physician with a national and international profile in various clinical, research and educational areas in nephrology and transplantation. She is leadership trained, including the Harvard Leading Innovations in Health Care & Education program, and has over 250 peer-reviewed academic outputs. Her main research interests include antibody incompatible transplantation, prediction models in transplantation using AI, long term outcomes of transplantation, live donation, nonadherence in young adults and health inequalities. She is particularly passionate about helping women around the world, to break the glass ceilings and fly off from glass cliffs.

As Consultant Transplant Nephrologist at UHCW she conceptualized and devised a formal partnership in Transplantation, between UHCW and Oxford, forming the COxTNet, which has pioneered the way for collaborative partnerships between other units in U.K.

As the Education Committee Co-chair of The Transplantation Society, she has been involved in setting up training programs in transplantation to benefit trainees globally. She has actively helped with the launch of the Commonwealth 'Tribute to life', a consortium in transplantation to enable organ donation and transplantation in developing countries.

As the first Professor of Clinical Health at Coventry University, she is leading the educational and research collaboration with MOHAN Foundation, India, and developing online training modules for nurses, coordinators and doctors in transplantation world-wide.

doi.org/10.51219/URForum.2025.Nithya-Krishnan ISBN: 978-1-917892-34-6