Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care
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Marginal and Extended Criteria Donors: Maximizing Organ Utilization

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Living-donor kidney transplantation offers the best survival, quality of life, and the opportunity for pre-emptive transplantation in end-stage kidney disease, yet living-donation activity has plateaued in many regions even as waiting lists lengthen. A substantial reservoir of willing donors is turned away by rigid eligibility criteria or lost to non-medical barriers. This lecture argues that the frontier for maximizing utilization is the safe, evidence-based inclusion of the marginal and complex living donor. Central to this reframing is the distinction between two paradigms of "marginal." For the extended-criteria deceased donor, risk is organ-centered and borne by the recipient graft. For the living donor, risk is donor-centered — borne by a healthy volunteer who derives no medical benefit — making evaluation fundamentally an exercise in donor protection rather than organ grading. Accordingly, selection has shifted from categorical cut-offs toward quantified, individualized risk assessment. Tools projecting a candidate's long-term and lifetime risk of end-stage renal disease in the absence of donation (Grams et al.), complemented by post-donation risk estimators, allow the incremental risk attributable to donation to be weighed transparently. The KDIGO 2017 Living Kidney Donor guideline operationalizes this approach, anchoring eligibility in projected lifetime risk judged against a center-defined acceptance threshold, coupled with rigorous informed consent and a commitment to lifelong follow-up. The lecture then examines complex medical phenotypes — older, obese, hypertensive, and dysglycemic candidates — and the donor with an isolated abnormality such as microscopic hematuria, nephrolithiasis, low-grade proteinuria, or GFR low-for-age. Contemporary evidence indicates that many such candidates can donate safely after structured evaluation, provided modifiable factors are addressed and surveillance is assured. Long-term cohort and registry data are broadly reassuring while underscoring that absolute risk, although low, is unequally distributed. Perioperative mortality has fallen

markedly over three decades with the transition to minimally invasive nephrectomy; robotic approaches show comparable donor safety with selected perioperative advantages, though no mortality benefit has been demonstrated. Genetic considerations — family history, APOL1 risk genotype, and screening for hereditary kidney disease — are increasingly integral to risk assessment, particularly in genetically related donation, while the physiology of nephron number and single-nephron filtration provides the mechanistic rationale for donor–recipient matching. Immunologic complexity represents a further reservoir: ABO- and HLA-incompatible pairs can be converted into transplants through desensitization or, preferably, kidney paired donation when a compatible swap exists. Finally, the lecture proposes an integrated framework — quantify baseline risk, characterize the complex feature, compare projected risk to a defined threshold, individualize consent, and commit to lifelong care — and surveys future directions, including biomarker- and machine-learning-assisted risk prediction, and imaging-based assessment of donor nephron mass. Maximizing living-donation utilization ultimately means expanding access while never compromising donor safety or the equity of the donation process.

Keywords: Living kidney donation, Complex living donor, post-donation risk assessment, Kidney paired donation