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Governing AI in Nephrology: A Medical Ethics View (의료윤리 관점에서 AI 헬스케어)

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Artificial intelligence has moved from promise to presence in kidney care. Predictive models now flag acute kidney injury before clinical recognition, risk-stratify chronic kidney disease, and optimize dialysis and transplant matching; generative models increasingly draft clinical documentation and counsel patients. Yet the same systems have already encoded and propagated inequity, making nephrology an unusually clear case study in why the ethics of medical AI cannot be deferred. This lecture argues that the central question is not whether AI will replace the nephrologist, but how the nephrologist will govern AI. Three documented cases anchor the argument. First, estimated glomerular filtration rate (eGFR) equations long incorporated a Black-race coefficient that systematically overstated kidney function, delaying referral and transplant listing until the 2021 NKF–ASN task force endorsed a race-free CKD-EPI equation. Second, the downstream harm was acknowledged only retrospectively, when the OPTN modified waiting-time accrual for Black candidates disadvantaged by the prior calculation—an instance of distributed, largely invisible algorithmic harm requiring institutional remedy. Third, a state-of-the-art acute-kidney-injury prediction model trained predominantly on male data showed degraded performance across subgroups on external validation, illustrating that high aggregate accuracy is not fairness. Generative AI compounds these concerns with a qualitatively new risk profile: hallucination, decontextualization, agentic autonomy, clinician deskilling, and the over-persuasiveness of conversational systems. Using a patient's-journey framework, the lecture traces where AI intervenes along the kidney-care pathway—screening and eGFR, inpatient deterioration alerts and clinical decision support, ambient documentation, dialysis and transplant decisions, and automated insurance review—and identifies the ethical issues at each node. It contends that nephrology is distinctively exposed

because of its longitudinal therapeutic relationships, its scarce-resource allocation decisions, its data- and algorithm-dense practice, and its comorbid, often socioeconomically vulnerable populations. In response, the lecture presents a forthcoming, consensus-based research-ethics framework for healthcare generative AI, derived through a modified Delphi process and funded by the Korea Disease Control and Prevention Agency. The framework is organized into three domains—data, governance, and design-by-value—and eight value dimensions, accompanied by a lifecycle checklist spanning pre-development, development, and post-deployment stages. Expert consensus most strongly prioritized explainability where AI touches patients, diversity and representativeness of training data, and meaningful human-in-the-loop oversight. It is positioned as a sector-specific instrument under emerging regulation, including South Korea's Framework Act on AI, the EU AI Act, and WHO guidance, with institutional review boards and journals as practical adoption pathways. The lecture concludes with four obligations for the practicing nephrologist: clinical vigilance toward algorithmic and automation bias; resistance to deskilling through preserved independent judgment; cultivation of AI competency in training and continuing education; and active participation in governance, from professional-society standards to consent practices. Human-centered AI nephrology, it argues, will not emerge automatically; it requires nephrologists to act as clinicians, professionals, and stewards of the systems entering their practice.

Keywords: artificial intelligence, medical ethics, nephrology, algorithmic fairness, research-ethics governance