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Editorial

Cell Therapy in Chronic Kidney Disease: Between Hope and Challenges

Jonny Jonny[1,2,3,4]

[1]Department of Internal Medicine, Gatot Soebroto Central Army Hospital, Jakarta, Indonesia
[2]Faculty of Military Medicine, Indonesia Defense University, Bogor, Indonesia
[3]Faculty of Medicine, Universitas Pembangunan Nasional "Veteran" Jakarta, Jakarta, Indonesia
[4]Faculty of Medicine, Universitas Prima, Medan, Indonesia

Corresponding Author:
Jonny Jonny, Department of Internal Medicine, Gatot Soebroto Central Army Hospital, Jakarta, Indonesia, jonnyunhan@idu.ac.id

Chronic kidney disease (CKD) continues to represent a major global health challenge, affecting hundreds of millions worldwide and contributing substantially to morbidity, mortality, and healthcare costs.[1] The number of CKD patients increases with rising prevalence due to aging populations and increasing rates of diabetes and hypertension. Despite advances in medical care, CKD is still incurable, and current therapies largely aim to slow progression rather than reverse damage. The disease is typically progressive, often culminating in end-stage kidney disease that necessitates dialysis or transplantation. While these interventions prolong life, they do not restore normal kidney function and carry significant limitations such as reduced quality of life, donor organ shortages, and high treatment costs. These constraints underscore the urgent need for novel therapeutic approaches capable of halting or reversing CKD progression.[2]

In recent years, cell-based therapies have emerged as promising candidates in regenerative nephrology.[2] Preclinical studies have shown that stem cells, particularly mesenchymal stem cells (MSCs) and induced pluripotent stem cells (iPSCs), possess potent immunomodulatory, anti-inflammatory, and anti-fibrotic properties that can create a renal microenvironment conducive to repair.[1,3] These properties have been linked to reduced renal fibrosis, enhanced tubular regeneration, and improved functional outcomes in experimental models of CKD.[2,3] Cell therapy for CKD is still in an investigational phase and has not yet become a standard treatment option. Clinical trials have shown promising safety profiles and some indications of benefit, such as reduced incidence of dialysis or death at one year with autologous CD34+ cell therapy in CKD patients. However, changes in kidney function parameters remain limited, and outcomes have been inconsistent across studies due to small sample sizes and short follow-up durations.

Early-phase clinical trials in humans have produced encouraging results, including improvements in estimated glomerular filtration rate (eGFR) and reductions in biomarkers of renal injury following MSC administration.[1,4] Nonetheless, significant barriers remain before these therapies can be widely implemented. Concerns include potential immune rejection, tumorigenic risk, high manufacturing costs, and a lack of standardized protocols to ensure consistent safety and efficacy.[4,5] In addition, ethical and regulatory frameworks require further refinement to address patient selection criteria, trial oversight, and equitable access.[2]

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From our perspective, cell therapy has the potential to redefine the management of CKD, provided that its development is guided by robust scientific evidence and validated through large, well-designed multicentre clinical trials.[4,5] Achieving this will require coordinated efforts from clinicians, researchers, biotechnological companies, and policymakers.[2]

Looking forward, the true value of cell therapy may lie not only in slowing disease progression but in restoring meaningful kidney function, shifting the paradigm from disease maintenance to genuine organ repair. Realizing this vision will demand sustained research funding, standardized methodologies, and a clear regulatory pathway to ensure these therapies are delivered safely, effectively, and equitably to the patients who need them most.[4] In summary, cell therapy in CKD is an emerging field with significant potential to transform treatment by going beyond symptom management toward organ regeneration and functional preservation. Continued research is needed to address technical and clinical challenges before widespread clinical application can be realized.

Declarations

Competing interest

The author declares no conflict of interest.

References

1. Wong CY. Current advances of stem cell-based therapy for kidney diseases. World J Stem Cells. 2021;13(7):914–33. doi:10.4252/wjsc.v13.i7.914
2. Morigi M, Benigni A. Mesenchymal stem cells and kidney repair. Nephrol Dial Transpl. 2013;28(4):788–93. doi:10.1093/ndt/gfs556
3. Osafune K. iPSC technology-based regenerative medicine for kidney diseases. Clin Exp Nephrol. 2021;25(6):574–84. doi:10.1007/s10157-021-02030-x
4. Lin W, Hong-Yan Li, Yang Q, Chen G, Lin S, Liao C, et al. Administration of mesenchymal stem cells in diabetic kidney disease: a systematic review and meta-analysis. Stem Cell Res Ther. 2021;12(1):43. doi:10.1186/s13287-020-02108-5
5. Papazova DA, Nynke R Oosterhuis, Gremmels H, Koppen A van, Joles JA, Verhaar MC. Cell-based therapies for experimental chronic kidney disease: a systematic review and meta-analysis. Dis Model Mech. 2015;8(3):281–93. doi:10.1242/dmm.017699