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APPLICATION OF RADIONUCLIDE DIAGNOSTIC METHODS FOR MONITORING THE FUNCTIONAL CAPACITY OF A TRANSPLANTED KIDNEY: CASE SERIES

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ABSTRACT

Introduction. Kidney transplantation represents the optimal treatment for patients with irreversible end-stage renal disease; however, ensuring the long-term functional survival of the allograft remains a critical clinical priority due to the persistent risk of postoperative complications. The standard diagnostic algorithm, including creatinine monitoring and Doppler ultrasonography, often lacks sufficient sensitivity to detect subtle functional impairments at a subclinical stage, while structural imaging and biopsy are limited by the risks associated with contrast exposure, nephrotoxicity, and invasiveness. In this complex diagnostic setting, dynamic renal scintigraphy serves as a non-invasive tool for the physiological assessment of allograft perfusion, filtration, and excretory function.

Aim. To illustrate the capabilities of dynamic renal scintigraphy with 99mTc-DTPA for diagnosing and monitoring the functional status of transplanted kidneys through a series of clinical cases.

Methods. The study presents a case series of four patients aged 19, 23, 26, and 28 years who underwent dynamic renal scintigraphy with the radiopharmaceutical 99mTc-DTPA using a Mediso AnyScan SPECT/CT/PET system. Three patients underwent routine examination one month after transplantation, whereas one patient underwent an emergency examination two weeks after transplantation because of clinical signs of allograft dysfunction. The diagnostic protocol included radionuclide angiography to assess renal blood flow and dynamic renal scintigraphy to evaluate glomerular filtration and excretory function.

Results. The results demonstrated prolongation of the arterial and venous phases of the renangiogram in post-transplant patients, which may reflect physiological postoperative adaptation or mild perfusion impairment. The median estimated glomerular filtration rate was 57.8 mL/min/1.73 m² (range, 21.0-63.0 mL/min/1.73 m²), with a moderate delay in filtration and excretory processes. Notably, the symptomatic patient exhibited a marked deterioration in functional parameters, characterized by severe hypoperfusion and a plateau-shaped renogram curve. These findings prompted urgent allograft biopsy, which morphologically confirmed acute rejection and led to the initiation of targeted immunosuppressive therapy.

Conclusions. This limited case series illustrates that dynamic renal scintigraphy with 99mTc-DTPA can provide useful physiological information on graft perfusion, filtration, and excretion in selected clinical scenarios. Although it cannot replace histological verification or standard monitoring, it may help narrow the differential diagnosis and support clinical decision-making in ambiguous cases. Larger prospective studies are needed to determine its diagnostic accuracy and optimal role in routine allograft surveillance.

Keywords: kidney transplantation, dynamic renal scintigraphy, functional imaging, scintigraphy monitoring, diagnostic value, glomerular filtration rate, post-transplant complications.

INTRODUCTION

Kidney transplantation represents the optimal, life-saving treatment for patients with irreversible end-stage renal disease (ESRD), significantly improving survival and quality of life compared with long-term dialysis [1, 2]. With the continuous development of transplantation medicine and the steadily increasing number of procedures performed worldwide and nationally [3], ensuring long-term allograft function has emerged as a critical clinical

priority. Although successful transplantation restores renal function, recipients remain at risk of a variety of severe complications during both the early and late postoperative periods.

Despite decades of research, a broad range of potential complications remains relevant. These can be classified into surgical complications, including hemorrhage, vascular thrombosis, and wound infection; immune-mediated complications, including acute and chronic rejection; and pharmacological complications, including adverse effects of immunosuppressive therapy that may contribute to diabetes, osteoporosis, and hypertension. Other potential problems include infections related to immunosuppression, electrolyte disturbances, and recurrence of the underlying disease [4].

Therefore, considerable attention is devoted to methods for monitoring allograft function and preventing potential complications. Following discharge, the patient's overall condition, allograft function, and blood concentrations of immunosuppressive drugs are monitored at the local healthcare facility. Initially, monitoring is performed at least once a week during the first month, subsequently every 1-2 weeks for the following two months, then monthly throughout the first year after transplantation, and thereafter every 2-6 months [5]. Strict adherence to the prescribed medication regimen, together with monitoring of serum creatinine and other laboratory parameters, is essential for the early detection of complications and prevention of infections.

Currently, the diagnostic algorithm for allograft monitoring relies on a combination of laboratory and imaging methods. Serial monitoring of serum creatinine and Doppler ultrasonography (US) are standard first-line tools [7]. Although Doppler US is widely accessible and non-invasive and provides valuable information on vascular patency, including the resistive index, and gross graft morphology, it may lack sufficient sensitivity for detecting subtle functional impairments at a subclinical stage. High-resolution cross-sectional imaging modalities, such as computed tomography (CT) angiography and magnetic resonance imaging (MRI), provide detailed anatomical assessment of vascular and urological complications; however, their routine use may be limited by the potential nephrotoxicity of iodinated contrast agents, high costs, and limited availability.

Furthermore, percutaneous renal allograft biopsy remains the reference standard for the diagnosis of many forms of immune-mediated rejection. However, its invasive nature carries inherent risks, including hemorrhage and graft injury, while sampling error may also limit diagnostic accuracy, making biopsy unsuitable for frequent routine monitoring.

In this complex diagnostic setting, the potential of nuclear medicine, specifically dynamic renal scintigraphy with ^{99m}Tc-DTPA, remains relatively underutilized. Unlike structural imaging modalities, it provides a non-invasive physiological assessment of allograft perfusion, filtration, and excretory function. By providing quantitative estimates of glomerular filtration and dynamic renographic curves, dynamic renal scintigraphy may offer complementary information for the assessment of allograft function. It may assist clinicians in distinguishing vascular compromise from parenchymal dysfunction and in differentiating non-obstructive urinary stasis from mechanical urinary tract obstruction, without the use of iodinated contrast agents [7, 11]. These potential advantages highlight the need for further clinical investigation of its diagnostic utility.

AIM

To illustrate the clinical utility of dynamic renal scintigraphy in the diagnosis and functional monitoring of renal allografts through a case series.

MATERIALS AND METHODS

Between May and June 2026, four kidney transplant recipients were referred for dynamic renal scintigraphy. Only patients with complete clinical records and technically adequate scintigraphic examinations were included in the analysis. Patients were not eligible for inclusion if pregnancy or lactation was present, if adequate intravenous access for radiopharmaceutical administration could not be established, or if severe neurological, psychiatric, or motion-related factors prevented acquisition of diagnostic-quality images. No eligible patients were excluded during the study period. The ages of the four patients were 19, 23, 26, and 28 years. The male-to-female ratio was 1:1. Three patients underwent scheduled dynamic renoscintigraphy 1 month after transplantation, while one patient was examined on an emergency basis 2 weeks later due to the onset of clinical symptoms of allograft dysfunction (Table 1).

Dynamic renal scintigraphy with ^{99m}Tc-DTPA was performed to evaluate the perfusion and excretory function of the renal allograft. This radiopharmaceutical allows for the qualitative and quantitative assessment of renal blood flow, the overall filtration capacity of the entire kidney and its individual regions, and the calculation of the allograft's overall functional capacity.

Case series enrolled renal allograft recipients presenting with clinical or laboratory evidence of graft dysfunction, as well as those requiring routine functional assessment. All participants provided

Table 1. Clinical characteristics of the kidney transplant recipients

Clinical Characteristics	Patient No. 1	Patient No. 2	Patient No. 3	Patient No. 4
Age (years) / Sex	19 / Male	23 / Female	26 / Male	28 / Female
Cause of ESRD	Chronic glomerulonephritis	Reflux nephropathy	Polycystic kidney disease	Chronic glomerulonephritis
Donor type	Living related donor	Living related donor	Living related donor	Living related donor
Type of Anastomosis	End-to-side external iliac	End-to-side external iliac	End-to-side external iliac	End-to-side external iliac
Time from transplant to follow-up visit	1 month	1 month	1 month	2 weeks
Serum Creatinine (μmol/L)	105	92	118	385
Blood Urea (mmol/L)	6.5	5.8	7.2	21.4
Daily Urine Output (mL/day)	2100	1950	1800	450
Infectious/Urological Complications	None	None	None	Fever up to 38.2 °C, oliguria

written informed consent and were hemodynamically stable enough to tolerate a 35-minute supine scan. We excluded pregnant or lactating women, individuals lacking adequate venous access for a bolus injection, and patients with severe psychiatric or neurological conditions that precluded remaining motionless during image acquisition.

The study was conducted at the Nuclear medicine department of the State Non-Profit Enterprise "National Children's Specialized Hospital «Okhmatdyt» of the Ministry of Health of Ukraine" using a trimodality Mediso AnyScan SPECT/CT/PET system (2023, Hungary). The examination followed a standard protocol with the patient in a supine position and arms placed above the head. Data acquisition commenced immediately following the intravenous administration of the radiopharmaceutical (RP). The gamma camera detector was positioned posteriorly. Following a rapid bolus administration of ^{99m}Tc-DTPA via an antecubital vein, dynamic acquisition was initiated immediately.

Patient preparation included standardized oral hydration (500 mL of water consumed 30 to 45 minutes prior to the examination) and complete bladder voiding immediately before the scan. The administered activity of ^{99m}Tc-DTPA ranged from 100 to 150 MBq, calculated individually according to the European Association of Nuclear Medicine (EANM) guidelines. Data processing and glomerular filtration rate calculation were performed using the dedicated InterView software based on the Gates algorithm.

Background correction was performed using a C-shaped perirenal ROI. Given that standard depth-estimation algorithms are inapplicable to heterotopic renal allografts, the exact kidney depth (typically ranging between 4 and 5 cm) was determined individually for each patient using pre-procedural ultrasound to ensure precise attenuation correction and accurate GFR calculation. Kidney depth was defined as the perpendicular distance from the anterior skin surface to the center of the renal hilum on ultrasonography immediately before scintigraphy. To ensure consistency, all GFR values were normalized to a standard body surface area of 1.73 m² (normalized GFR). The term 'global GFR' in this context refers to the absolute functional capacity of the solitary allograft. The imaging protocol consisted of an initial perfusion phase (1 second per frame for 60 seconds) to evaluate radionuclide angiography, followed directly by a functional phase comprising 58 frames of 30 seconds each. The third delayed phase, starting at 80 minutes after tracer injection, was acquired over 180 seconds with a total of 600,000 counts. A delayed 80-minute static acquisition (acquired after the patient assumed an upright position and voided) was not performed routinely for all participants. It was conditionally indicated only for patients who exhibited significant pooling of the radiopharmaceutical in the pelvicalyceal system or ureter at the end of the standard 30-minute dynamic phase. The explicit clinical objective of this delayed imaging was to differentiate functional, non-obstructive stasis (commonly resulting from physiological post-transplant loss of ureteral tone or pelvic dilatation) from a true mechanical urodynamic obstruction (e.g., stenosis at the ureterovesical anastomosis). Following the complete acquisition, a qualitative visual analysis was performed to determine the area, size, and shape of the kidneys, the degree and uniformity of RP uptake, and the time of its arrival in the urinary bladder.

For the quantitative assessment of the acquired data, regions of interest (ROIs) were delineated

over the heart (blood pool), the renal allograft, and the urinary bladder. Regions of interest were manually drawn by an experienced nuclear medicine physician and independently verified by a second physician. Discrepancies were resolved by consensus. Subsequently, time-activity curves reflecting the radiopharmaceutical transit through the heart (blood pool curve) and the allograft (renogram) were generated. Using the standardized InterView XP software, these curves were processed to automatically calculate the key functional parameters: the glomerular filtration rate (GFR, derived from blood pool clearance), the time to peak radiopharmaceutical uptake (Tmax, reflecting cortical filtration capacity), and the excretory half-life (T½, reflecting excretory capacity). Absolute uptake was calculated as the percentage of injected activity accumulated within the graft ROI after background subtraction using the InterView software.

The present work was designed as a descriptive educational case series rather than an observational cohort study. Therefore, statistical comparisons were not planned.

RESULTS

The individual functional parameters for each patient in the case series are summarized in Table 2. Radionuclide angiography (RNA) using ^{99m}Tc-DTPA demonstrated prolongation of the arterial and venous phases of the renangiogram in the allograft, ranging from 6.8 to 11.6 seconds and from 8.6 to 13.6 seconds, respectively. During dynamic renal scintigraphy (DRS), the median normalized glomerular filtration rate in this case series was 57.8 mL/min/1.73 m² (range, 21.0-63.0 mL/min/1.73 m²). In clinically stable patients (n=3), individual GFR values ranged from 56.0 to 63.0 mL/min/1.73 m², while filtration and excretory processes ranged from adequate to moderately delayed. Notably, the patient presenting with clinical signs of acute allograft dysfunction demonstrated a marked deterioration in functional parameters, with a GFR of 21.0 mL/min/1.73 m² representing a pronounced outlier. The renogram curve exhibited a plateau-shaped pattern, and absolute radiopharmaceutical uptake in the allograft was markedly reduced, consistent with severe impairment of graft perfusion and filtration. Radionuclide angiography in this patient demonstrated markedly reduced perfusion of the transplanted kidney. Given the acute functional deterioration, an urgent percutaneous core-needle biopsy of the allograft was performed, which morphologically confirmed acute cellular rejection. Consequently, prompt treatment with pulse immunosuppressive therapy was initiated, and surgical revision was not required.

DISCUSSION

The findings of this study illustrate that radionuclide imaging modalities, particularly dynamic renal scintigraphy (DRS), may provide clinically useful information for assessing the functional status of renal allografts. Unlike laboratory parameters and ultrasonography, which may not fully reflect early functional impairment, scintigraphy can provide complementary physiological information on allograft perfusion, filtration, and excretory function.

Although 99mTc-mercaptoacetyltriglycine (^{99m}Tc-MAG3) generally provides superior image quality in patients with impaired renal function because of its predominant tubular secretion, ^{99m}Tc-DTPA was selected in the present study because it permits quantitative estimation of glomerular filtration rate using the validated Gates method. As GFR assessment was one of the principal objectives of this case series, DTPA was considered the most appropriate radiopharmaceutical for the study.

According to the radionuclide angiography data, kidney transplant recipients demonstrated prolongation of the arterial and venous phases of allograft blood flow [8]. It is important to recognize that temporal perfusion parameters established for native kidneys cannot necessarily be applied directly to renal allografts. Some prolongation of vascular transit times may be expected because of the heterotopic placement of the graft in the iliac fossa and the altered vascular anatomy associated with the iliac vascular anastomosis.

However, such prolongation should not be interpreted as unequivocal evidence of impaired perfusion. In the early post-transplant period,

Table 2. Individual functional parameters of renal allografts (N=4)

Patient	Clinical Status	Arterial Phase (s)	Venous Phase (s)	Tmax (min)	T½ (min)	Time to Bladder (min)	GFR (mL/min /1.73m²)	Renogram Pattern
№1	Follow-up	6.8	8.6	4.5	16.5	7.0	56.0	Moderate delay
№2	Follow-up	7.1	8.8	4.8	18.0	7.5	59.6	Moderate delay
№3	Follow-up	7.3	9.0	3.5	12.5	5.0	63.0	Adequate function
№4	Symptomatic	11.6	13.6	30.0	>30.0	Not visualized	21.0	Plateau curve

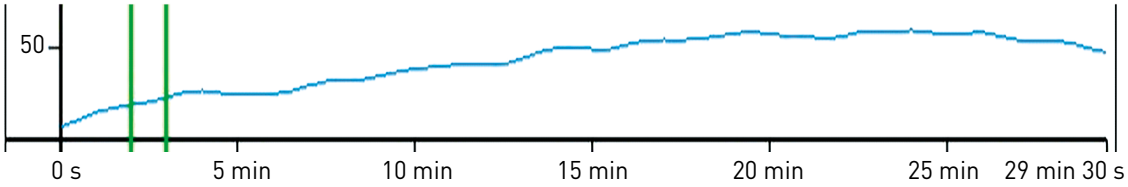

Fig. 1. Time-activity curve (renogram) generated from the whole-graft region of interest in the symptomatic patient (Patient No. 4). The x-axis represents the dynamic acquisition time (total duration 30 min). The y-axis represents the measured absolute radioactivity (counts). The vertical green markers typically denote the expected normal temporal limits for the radiopharmaceutical perfusion peak (Tmax). The graph demonstrates a severely flattened (plateau) parenchymal transit curve with critically depressed tracer uptake and an absent excretory phase, reflecting profound allograft ischemia. The definitive diagnosis of acute cellular rejection was subsequently confirmed by an urgent percutaneous core needle biopsy.

these hemodynamic parameters may be influenced by multiple non-pathological factors, including systemic hemodynamics, postoperative tissue edema, the configuration of the vascular anastomosis, immunosuppressive therapy, including calcineurin inhibitor-associated vasoconstriction, and technical acquisition variables. Therefore, mild prolongation of vascular phases should be interpreted cautiously, with greater concern warranted when pronounced functional abnormalities are accompanied by relevant clinical findings, as observed in the symptomatic patient in this series. Importantly, perfusion abnormalities may not always be accompanied by an immediate increase in serum creatinine, highlighting the potential complementary value of radionuclide imaging in postoperative allograft monitoring [7-10].

The reduction in estimated glomerular filtration rate observed on dynamic renal scintigraphy indicated impaired functional performance of the transplanted kidney. Heterogeneous radiopharmaceutical uptake and moderate delays in filtration and excretory function may represent unfavorable functional findings warranting close clinical monitoring.

The findings were particularly informative in a patient who developed clinical signs of acute allograft dysfunction two weeks after transplantation. At presentation, the patient had a fever of up to 38 °C and decreased daily urine output.

In this patient, the renogram demonstrated a plateau-shaped pattern consistent with severe impairment of allograft function (Fig. 1). Quantitative analysis showed a Tmax of 30 minutes, absence of a distinct excretory phase, a GFR of 21.0 mL/min/1.73 m^2, and markedly reduced graft uptake (3.5%), indicating severe functional impairment. These pronounced scintigraphic abnormalities, together with the clinical findings, prompted urgent biopsy of the allograft. Histological examination confirmed acute cellular rejection, allowing timely intensification of immunosuppressive therapy.

In addition, dynamic renal scintigraphy may serve as a complementary tool in selected scenarios in the differential diagnosis of post-transplant complications. Delayed clearance of the radiopharmaceutical and its prolonged transit to the bladder raise suspicion of urodynamic abnormalities, whereas heterogeneous accumulation of the radiopharmaceutical in the allograft parenchyma may indicate occult inflammatory changes. The diagnostic value of the delayed phase was clearly illustrated in our case series. In two clinically stable patients, prolonged transit of the radiopharmaceutical to the urinary bladder and its retention in the collecting system during the initial 30-minute dynamic phase raised suspicion of an early urodynamic impairment. However, the subsequent 80-minute delayed static imaging, performed after gravity-assisted drainage, revealed adequate clearance of the retained tracer. This crucial scintigraphic finding definitively ruled out mechanical obstruction, confirming a functional non-obstructive dilatation. Consequently, this non-invasive differentiation directly influenced clinical decision-making, allowing clinicians to avoid unwarranted invasive urological interventions and continue conservative monitoring. This noninvasive approach helps determine the nature and severity of graft dysfunction, narrowing the differential diagnosis and guiding targeted therapeutic interventions. [9-12].

Dynamic renal scintigraphy provides essential functional data that can effectively complement standard post-transplant assessment in selected clinical situations. Its use can help detect functional abnormalities in the allograft at an early stage, facilitates the assessment of treatment effectiveness, and helps prevent serious complications [13, 14]. However, while early scintigraphic parameters may logically have implications for long-term graft survival, establishing the true prognostic value of DRS requires extensive longitudinal follow-up and survival analysis. Because our case series focuses exclusively on the early post-transplant period, assessing long-term prognostic outcomes was beyond the scope of this study.

CONCLUSIONS

This limited case series highlights the potential clinical utility of dynamic renal scintigraphy as an informative, non-invasive functional imaging modality in the early post-transplant period. Our observations suggest that DRS may serve as a useful diagnostic adjunct, particularly in clinical scenarios in which the cause of allograft dysfunction is uncertain and additional functional information may assist clinical decision-making. It may be particularly useful when structural imaging with iodinated contrast agents is undesirable or when invasive diagnostic procedures should be avoided unless clinically indicated. Although DRS cannot replace histological verification when biopsy is required, it provided complementary physiological information on graft perfusion, cortical filtration, and excretory function in the patients presented. Given the small sample size and descriptive design, these findings should be considered hypothesis-generating rather than confirmatory. Nevertheless, this case series illustrates the potential value of dynamic renal scintigraphy as a complementary functional imaging technique during early renal allograft surveillance. Larger prospective studies are needed to determine its diagnostic accuracy, clinical utility, and prognostic significance.

Article Declarations

Prospects for further research. The promising findings of this initial case series highlight the necessity for transitioning from descriptive observations to robust analytical study designs. Future research should focus on conducting large-scale, prospective, multicenter cohort studies with standardized protocols to statistically validate the diagnostic accuracy (sensitivity, specificity, positive and negative predictive values) of dynamic renal scintigraphy in the early post-transplant period. Furthermore, integrating DRS parameters with novel biomarkers and deploying artificial intelligence algorithms for automated renogram curve analysis could substantially refine the precision of non-invasive allograft monitoring. A critical future objective will also be the implementation of long-term longitudinal tracking to definitively ascertain whether early scintigraphic perfusion and filtration parameters can serve as independent predictive models for overall long-term graft survival.

Study limitations. The authors acknowledge several inherent limitations of this study. Primarily, it is a single-center retrospective case series with a critically small sample size (n=4) and lacks a control group, which inherently limits the generalizability of the findings. Furthermore, there was heterogeneity in the timing of the scintigraphic examinations, ranging from two weeks to one month post-transplantation. Although histological verification was obtained for the symptomatic patient, routine biopsy was not systematically performed for the clinically stable cohort. Consequently, the ability to definitively calculate the diagnostic sensitivity and specificity of the method remains limited. Finally, the absence of long-term longitudinal follow-up precludes any definitive conclusions regarding the prognostic value of the early scintigraphic parameters on long-term allograft survival.

Primary data and materials. All primary datasets and clinical materials analyzed during the preparation of this manuscript are securely preserved within the institutional archive. Access to these data can be provided by the corresponding author upon a reasonable, formally justified academic request.

Research ethics. According to the institutional policies and national regulations, formal ethical committee approval is not strictly required for retrospective case series involving a limited number of patients (n≤4), provided there is no experimental intervention and strict data anonymization is maintained. Consequently, a formal institutional review board exemption number is not applicable to this report. However, all ethical standards according to the Declaration of Helsinki were strictly followed, and written informed consent was obtained from all patients for the publication of this case report and accompanying images.

Declaration of AI use. The authors utilized the generative artificial intelligence tool Gemini strictly for the purpose of language editing and improving the overall readability of the English text. The authors explicitly state and guarantee that artificial intelligence was not employed for the analysis of any clinical data, the interpretation of scintigraphic images, or the formulation of any diagnostic conclusions and scientific concepts. The human authors have carefully reviewed the edited manuscript and take full, unconditional responsibility for the integrity of all clinical content, data analysis, and the final conclusions presented in this study.

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ЗАСТОСУВАННЯ РАДІОНУКЛІДНИХ МЕТОДІВ ДІАГНОСТИКИ У КОНТРОЛІ ФУНКЦІОНАЛЬНОЇ ЗДАТНОСТІ ТРАНСПЛАНТОВАНОЇ НИРКИ: СЕРІЯ КЛІНІЧНИХ ВИПАДКІВ

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РЕЗЮМЕ

Вступ. Трансплантація нирки є оптимальним методом лікування пацієнтів із незворотною термінальною стадією ниркової недостатності, проте забезпечення довготривалого функціонування алотрансплантата залишається критичним клінічним пріоритетом через постійний ризик післяопераційних ускладнень. Стандартний діагностичний алгоритм (моніторинг рівня креатиніну та доплерографія) не завжди має достатню чутливість для виявлення ранніх функціональних порушень, тоді як застосування методів структурної візуалізації з йодовмісними контрастними препаратами або проведення біопсії пов'язане з відповідними ризиками та обмеженнями. У цьому складному діагностичному контексті динамічна реносцинтиграфія може бути корисним неінвазивним методом функціональної оцінки перфузії, кіркової фільтрації та екскреторної функції трансплантата.

Мета. Проілюструвати можливості динамічної реносцинтиграфії з ^{99m}Tc-DTPA для оцінювання та моніторингу функціонального стану трансплантованих нирок на прикладі серії клінічних випадків.

Матеріали та методи. У дослідженні представлено серію з 4 клінічних випадків пацієнтів віком 19, 23, 26 та 28 років, яким було проведено динамічну реносцинтиграфію з радіофармацевтичним препаратом ^{99m}Tc-DTPA на системі Mediso AnyScan SPECT/CT/PET. Троє пацієнтів пройшли планове обстеження через 1 місяць після трансплантації, тоді як одному пацієнту було проведено ургентне дослідження через 2 тижні після трансплантації у зв'язку з клінічними ознаками дисфункції алотрансплантата. Діагностичний протокол включав радіонуклідну ангіографію для оцінювання кровотоку та реносцинтиграфію для визначення швидкості клубочкової фільтрації та видільної функції.

Результати. Результати продемонстрували подовження артеріальної та венозної фаз ренангіограми у пацієнтів після трансплантації, що може відображати як фізіологічні післяопераційні зміни, так і помірне порушення перфузії. Медіана швидкості клубочкової фільтрації становила 57,8 мл/хв/1,73 м² (діапазон: 21,0-63,0 мл/хв/1,73 м²), із помірним уповільненням фільтраційно-екскреторних процесів. У симптомного пацієнта спостерігалося різке погіршення функціональних параметрів, що характеризувалося вираженим зниженням перфузії та платоподібною ренографічною кривою. Ці виражені сцинтиграфічні зміни разом із клінічними проявами стали підставою для проведення ургентної біопсії алотрансплантата, яка морфологічно підтвердила гостре клітинне відторгнення. Це дозволило своєчасно розпочати інтенсифікацію імуносупресивної терапії.

Висновки. Ця обмежена серія клінічних випадків демонструє потенційну клінічну цінність динамічної реносцинтиграфії з ^{99m}Tc-DTPA як інформативного неінвазивного методу функціональної візуалізації у ранньому післятрансплантаційному періоді. Динамічна реносцинтиграфія може бути корисним додатковим методом, особливо в клінічних ситуаціях, коли причина дисфункції алотрансплантата залишається невизначеною та додаткова функціональна інформація може сприяти прийняттю клінічних рішень. Вона не може замінити гістологічну верифікацію у випадках, коли необхідне проведення біопсії, проте може надати додаткову фізіологічну інформацію щодо перфузії, кіркової фільтрації та екскреторної функції трансплантата. З огляду на малий обсяг вибірки та описовий дизайн дослідження отримані результати слід розглядати як такі, що генерують гіпотези, а не як підтверджувальні. Необхідні масштабніші проспективні дослідження для визначення діагностичної точності, клінічної цінності та прогностичного значення динамічної реносцинтиграфії.

Ключові слова: трансплантація нирки, динамічна реносцинтиграфія, функціональна візуалізація, сцинтиграфічний моніторинг, діагностична цінність, швидкість клубочкової фільтрації, післятрансплантаційні ускладнення.

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