NAJBAR, Joanna Monika, CHMURA, Katarzyna, ZIMNOCH, Barbara Zimnocj, RENDASZKA, Katarzyna, KOWALSKA, Katarzyna, PYZIOŁEK, Marta, BONARSKA, Marta, KWAŚNIEWSKA, Paulina and STRÓŻNA, Małgorzata. Multimodal Pain Management and Challenges in Patients Undergoing Simultaneous Pancreas and Kidney Transplantation. Quality in Sport. 2025;48:66993. eISSN 2450-3118.
https://doi.org/10.12775/QS.2025.48.66993
https://apcz.umk.pl/QS/article/view/66993

The journal has been awarded 20 points in the parametric evaluation by the Ministry of Higher Education and Science of Poland. This is according to the Annex to the announcement of the Minister of Higher Education and Science dated 05.01.2024, No. 32553. The journal has a Unique Identifier: 201398. Scientific disciplines assigned: Economics and Finance (Field of Social Sciences); Management and Quality Sciences (Field of Social Sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398. Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).
The authors declare that there is no conflict of interest regarding the publication of this paper.
Received: 30.11.2025. Revised: 25.12.2025. Accepted: 25.12.2025. Published: 31.12.2025.

Short Article

Multimodal Pain Management and Challenges in Patients Undergoing Simultaneous Pancreas and Kidney Transplantation

Joanna Monika Najbar, ORCID: https://orcid.org/0009-0003-2667-5700
E-mail: najbarjm@gmail.com
School of Medicine, University of Warmia and Mazury in Olsztyn,
Aleja Warszawska 30, 10-900 Olsztyn, Poland

Katarzyna Chmura, ORCID: https://orcid.org/0009-0003-5254-0551
E-mail: k.chmura0@gmail.com
Independent Public Healthcare Institution in Myślenice, Szpitalna 2, 32-400 Myślenice, Poland

Barbara Zimnoch, ORCID: https://orcid.org/0009-0006-9367-5622
E-mail: bzimnoch0@gmail.com
Medical University of Bialystok, Jana Kilińskiego 1, 15-089 Białystok, Poland

Katarzyna Rendaszka, ORCID: https://orcid.org/0009-0003-0807-897X
E-mail: katarzynarendaszka@gmail.com
Szpital Praski pw. Przemienienia Pańskiego, Solidarności 67, 03-401 Warsaw, Poland

Katarzyna Kowalska, ORCID: https://orcid.org/0000-0001-6027-2620
E-mail: katarzyna.kowalska.lek@gmail.com
Wojewódzkie Wielospecjalistyczne Centrum Onkologii i Traumatologii im. M. Kopernika w Łodzi,
ul. Pabianicka 62, 93-513 Łódź, Poland

Marta Pyziołek, ORCID: https://orcid.org/0009-0007-5267-6060
E-mail: martapyziolek@gmail.com
Centralny Szpital Kliniczny w Łodzi, ul. Pomorska 251, 92-213 Łódź, Poland

Marta Bonarska, ORCID: https://orcid.org/0009-0008-7201-2082
E-mail: bonarskam99@gmail.com
Luxmed Sp. z o.o., ul. Szturmowa 2, 02-678 Warszawa, Poland

Paulina Kwaśniewska, ORCID: https://orcid.org/0009-0009-4677-3387
E-mail: paulinakwasniewska12@gmail.com
Szpital Kliniczny Dzieciątka Jezus UCK WUM,
ul. Williama Heerleina Lindleya 4, 02-005 Warszawa, Poland

Małgorzata Stróżna, ORCID: https://orcid.org/0009-0003-1346-965X
E-mail: malgorzatastrozna35@gmail.com
Wojskowa Specjalistyczna Przychodnia Lekarska SPZOZ,
aleja Żołnierza 37, 73-110 Stargard, Poland

Corresponding Author

Joanna Monika Najbar, E-mail: najbarjm@gmail.com

Abstract

Background. Diabetic foot syndrome is a severe complication of diabetes mellitus, often complicated by infection, impaired wound healing, and chronic pain. Management is particularly challenging in patients with a history of simultaneous pancreas–kidney transplantation (SPK) and reduced renal function.

Aim. To present a complex case of diabetic foot syndrome in a patient after SPK transplantation, highlighting the challenges of pain management and wound care in the context of opioid history and impaired kidney function.

Case Presentation. A 65-year-old patient was admitted to the diabetic ward due to worsening pain associated with left diabetic foot syndrome. Physical examination revealed swelling, redness, and purulent discharge. The wound was cleaned, limb offloading was applied, and VAC/NPWT (vacuum-assisted closure/negative pressure wound therapy) was initiated, but the patient continued to experience pain, tension, and discomfort around the wound. Laboratory tests demonstrated decreased estimated glomerular filtration rate (eGFR), and increased levels of uric acid, keratin, and leukocytes. The patient had undergone SPK transplantation 1.5 years prior without complications. History of opioid abuse and limited kidney function posed significant restrictions on analgesic therapy.

Conclusions. Diabetic foot syndrome in post-SPK patients presents a multifactorial clinical challenge, requiring careful management of infection, renal impairment, and pain. Individualized, interdisciplinary approaches are essential to optimize wound healing while minimizing opioid use and preventing further complications.

Key words: diabetic foot syndrome, simultaneous pancreas–kidney transplantation, pain management, renal impairment, VAC/NPWT

Content

1. Introduction

Simultaneous pancreas–kidney transplantation (SPK) remains a principal curative strategy for patients with type 1 diabetes mellitus (T1DM) complicated by end-stage renal disease (ESRD). This procedure offers durable insulin independence, restoration of normoglycemia, and superior long-term survival compared with dialysis or kidney transplantation alone. However, SPK cannot be regarded as universally optimal, given ongoing limitations related to donor availability, perioperative morbidity, and the increasing viability of alternatives such as pancreas-after-kidney (PAK) transplantation and advances in medical therapy. Recent literature (2020–2025) underscores the robust metabolic and cardiovascular benefits of SPK, with 10-year patient survival frequently exceeding 70–80% in well-selected cohorts, clearly surpassing outcomes observed among candidates remaining on the waitlist.

2. Case presenation

65-year-old patient was admitted to the diabetic ward due to worsening pain resulting from the left diabetic foot syndrome. Physical examination revealed swelling, redness, and purulent discharge. The wound was cleaned, the limb was relieved and VAC/NPWT (vacuum assisted closure/negative pressure wound therapy) were implemented, but the patient's pain still has persisted. The patient reported increasing tension, pain and discomfort around the wound. The laboratory tests showed a decreased GFR and an increased level of uric acid, keratin and leukocytes. (Table 1.)

The patient had undergone a simultaneous pancreas and kidney transplantation (SPK) 1.5 year earlier, during which no complications has occurred. In addition, he reported that he has a history of opioid abuse, which, combined with limited kidney function, has significantly limited the choice of painkiller.

Table 1. Laboratory test results with reference ranges and clinical interpretation.

Parameter	Patient Result	Reference Range	Clinical Significance
eGFR	52 ml/min/1.73m²	≥90 ml/min/1.73m²	Mildly reduced; stage 3A CKD
Serum Creatinine	132 µmol/L (1.5 mg/dL)	53–115 µmol/L (0.6–1.3 mg/dL)	Mild elevation from creatine metabolism; monitors renal graft
Uric Acid	7.8 mg/dL	3.5–7.2 mg/dL	Borderline high; monitor for gout
Leukocytes (WBC)	13.5 ×10⁹/L	4.0–11.0 ×10⁹/L	Mild leukocytosis; localized infection
Hemoglobin (Hb)	12.1 g/dL	13.5–17.5 g/dL (men)	Mild anemia; post-transplant norm
C-Reactive Protein (CRP)	32 mg/L	<5 mg/L	Mild inflammation
Fasting Glucose	135 mg/dL	70–99 mg/dL	Mild hyperglycemia; graft monitoring
Serum Amylase	145 U/L	30–110 U/L	Mild elevation; pancreatic stability
Urea	9.2 mmol/L	2.5–7.1 mmol/L	Mild azotemia

The table presents key laboratory parameters indicating impaired renal function, elevated inflammatory markers, and metabolic abnormalities. These findings collectively reflect the severity of the patient's diabetic foot infection and the complexity of clinical management.

3. Discussion

Simultaneous pancreas and kidney transplantation (SPK) is currently considered one of the best treatment options for patients with insulin-dependent diabetes and end-stage renal disease, offering significant benefits such as insulin independence, dialysis freedom, and improved survival compared to medical therapy alone. [1]SPK transplantation is regarded as a highly effective therapy for patients with type 1 diabetes combined with renal failure, achieving better glycemic control and longer patient survival than medical treatments or kidney transplantation alone. The procedure simultaneously addresses both the endocrine pancreas deficiency and kidney failure, eliminating the need for insulin therapy and dialysis. A comparative evaluation of therapeutic strategies for patients with T1DM and ESRD reveals important distinctions between simultaneous pancreas–kidney transplantation (SPK) and its alternatives.[2,3] These considerations, summarized in Table 2, highlight the superior long-term patient survival, favorable graft outcomes, and robust metabolic control associated with SPK. [2,4] Despite these benefits, the procedure is limited by declining volumes, surgical risks, and the metabolic consequences of immunosuppressive therapy. Viable alternatives, including pancreas-after-kidney (PAK) transplantation and intensive medical management with agents such as SGLT2 inhibitors or GLP-1 receptor agonists, may offer comparable results in appropriately selected

patients. [2]This comparison emphasizes the importance of individualized therapeutic decision-making based on patient risk profile, organ availability, and metabolic goals.

Table 2. Comparative overview of the advantages, limitations, and alternatives to simultaneous pancreas–kidney transplantation (SPK).

Aspect	SPK Advantages	Limitations/Challenges	Alternatives
Patient Survival (10y)	71-79%; superior to dialysis	Declining volumes in US; surgical risks	PAK + living donor kidney
Graft Survival	Pancreas > PAK; kidney half-life 38y (preemptive)	Weight gain, immunosuppression effects	Kidney transplant + SGLT2i/GLP-1RA
Metabolic Control	Insulin independence; better lipids	Potential diabetogenic drugs	Intensive medical therapy (less curative)

Portugal has gained international recognition for its SPK transplantation program, especially at the Centro Hospitalar do Porto, which began its SPK program in 1998 and has accumulated extensive experience over more than two decades. [5,6]This center has conducted over 100 SPK transplants, demonstrating durable graft survival and significant improvements in patient quality of life. The Portuguese program exemplifies the successful implementation and outcomes of SPK as a standard method for treating selected patients with type 1 diabetes and kidney failure.[5]

Simultaneous pancreas-kidney (SPK) transplant recipients commonly experience perioperative and postoperative pain due to surgical trauma, potential complications like graft thrombosis or pancreatitis, and immunosuppression effects, requiring a multimodal pain management strategy to minimize opioid use and support graft function.[7] A multimodal approach is recommended, starting with paracetamol (acetaminophen) as the foundational agent, combined with neuraxial techniques such as epidural anesthesia when feasible and without contraindications like hypocoagulability. Epidural analgesia using low-dose opioids and local anesthetics reduces systemic opioid requirements, accelerates bowel function recovery, and provides superior pain control in the post-anesthesia care unit (PACU). Transversus abdominis plane (TAP) blocks with liposomal bupivacaine offer additional benefits, lowering opioid needs and hastening gastrointestinal recovery post-surgery.[7] Postoperatively, standard opioids remain effective for acute pain but should be minimized to avoid complications like gastroparesis or delayed recovery, which can occur even with good graft function in long-standing diabetes cases. Patient-reported experiences highlight persistent abdominal pain or bodily pain as factors influencing quality of life, underscoring the need for tailored analgesia alongside monitoring for rejection or infection.[8] Long-term, factors like

physical functioning and vitality improve with effective pain control. Pain management in patients after simultaneous pancreas–kidney transplantation with a history of opioid misuse requires a comprehensive and cautious approach, emphasizing opioid minimization, careful monitoring for complications, and close interdisciplinary collaboration to ensure both effective and safe treatment.

5. Conclusions

Simultaneous pancreas-kidney transplantation (SPK) is currently the most effective method of treatment, ensuring stable and long-term normoglycaemia, in patients with type 1 diabetes and renal failure. Currently, the 5-year survival time of patients reaches up to 97%. However, patients after SPK are burdened with complications characteristic for either the group of kidney and pancreatic recipients. The management of diabetic foot syndrome in a patients after SPK requires a comprehensive and interdisciplinary approach. Patients with diabetic foot syndrome existing before the surgery are particularly exposed to secondary complications of diabetes, including cardiovascular complications, which are a result of taking immunosuppressive drugs that favor the development of infection within foot. In addition, for patients with limited renal function, the options for analgesic treatment are significantly limited.

Disclossure

Supplementary Materials

No supplementary materials were provided for this study. Relevant datasets and analysis scripts are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization: JMN, MB, PK, MS

Methodology: JMN, MB, PK, MS

Resources: KC, BZ, KR, MP

Writing – Original Draft: JMN, KC, BZ, KR, MP

Writing – Review & Editing: JMN

Supervision: JMN

All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Acknowledgements

Not applicable.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Yang KH, Ryu JH, Shim JR *et al.* The Pancreas After Kidney Transplant is a Competitive Option, Comparable to the Simultaneous Pancreas and Kidney Transplant. Transplant Proc 2024; 56: 1347–1352.
2. Huber S, Fridell JA. Simultaneous pancreas and kidney transplant vs. pancreas after kidney transplantation: is one better? Curr Opin Organ Transplant 2025; 30: 273–278.
3. Choksi H, Pleass H, Robertson P, Au E, Rogers N. Long-term Metabolic Outcomes Post-Simultaneous Pancreas-Kidney Transplantation in Recipients With Type 1 Diabetes. Transplantation 2025; 109: 1222–1229.
4. Choksi H, Pleass H, Robertson P, Au E, Rogers N. Long-term Metabolic Outcomes Post-Simultaneous Pancreas-Kidney Transplantation in Recipients With Type 1 Diabetes. Transplantation 2025; 109: 1222–1229.
5. Dias BF, Marques RC, Cardoso C *et al.* Surgical complications and technical failure of simultaneous pancreas-kidney transplantation: A 22-year experience from a single center. Clin Transplant 2024; 38: e15339.
6. Martins L, Henriques AC, Dias L *et al.* One hundred eleven simultaneous pancreas-kidney transplantations: 10-year experience from a single center in Portugal. Transplant Proc 2011; 43: 205–208.
7. Ullah AP, Trostler MS, Abuelkasem E, Planinsic RM. Perioperative management of isolated pancreas and simultaneous pancreas kidney transplantation. BJA Educ 2023; 23: 488.
8. Ventura-Aguiar P, Bayés-Genís B, Amor AJ *et al.* Patient Experience in Pancreas-Kidney Transplantation—A Methodological Approach Towards Innovation in an Established Program. Transplant International 2022; 35: 10223.