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Emerging threat: *De Novo* malignancies post kidney transplantation

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SUMMARY

De novo malignancies following kidney transplantation pose a growing concern in clinical practice. While advancements in immunosuppressive regimens have improved graft survival, they also heighten the risk of malignancy development. This review summarizes the epidemiology, risk factors, pathogenesis and management strategies for ***de novo*** malignancies post kidney transplantation. Understanding these factors is crucial for optimizing long-term outcomes in transplant recipients.

Keywords: Kidney transplantation; Life-saving procedure; Renal disease; Long-term graft; Patient survival

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INTRODUCTION

Kidney transplantation stands as a life-saving intervention for individuals suffering from end-stage renal disease (ESRD), offering the promise of improved quality of life and longevity. Despite advancements in surgical techniques, immunosuppressive therapies and post-transplant care, the management of transplant recipients continues to pose significant challenges. Among these challenges, the emergence of *de novo* malignancies following kidney transplantation has garnered increasing attention in recent years.

The immunosuppressive regimen essential for preventing allograft rejection inadvertently compromises the immune system's ability to surveil and eradicate malignant cells, thereby heightening the risk of cancer development in transplant recipients. *De novo* malignancies post kidney transplantation represent a multifaceted issue, encompassing various factors such as the interplay between immunosuppression and oncogenesis, the impact of pre-existing comorbidities and the influence of environmental and genetic factors.

Understanding the epidemiology, pathogenesis and clinical characteristics of *de novo* malignancies in kidney transplant recipients is paramount for devising effective prevention strategies and optimizing long-term outcomes. Moreover, advancements in early detection modalities and tailored cancer surveillance protocols are imperative for timely intervention and improved prognosis [1].

This review endeavors to explore the current landscape of *de novo* malignancies post kidney transplantation, highlighting key risk factors, oncogenic mechanisms and evolving strategies for prevention and management. By elucidating the complexities surrounding this emerging threat, we aim to foster a deeper understanding of the challenges faced by clinicians and researchers in mitigating the burden of cancer in the transplant population.

LITERATURE REVIEW

The immune suppression required to prevent graft rejection in kidney transplant recipients plays a pivotal role in the development of *de novo* malignancies. Immunosuppressive agents such as calcineurin inhibitors, antimetabolites and corticosteroids not only suppress the immune system's response to the transplanted organ but also impair its ability to recognize and eradicate cancerous cells. Consequently, transplant recipients have a two

to four-fold increased risk of developing malignancies compared to the general population.

A wide spectrum of malignancies can occur post-kidney transplantation, including skin cancers (squamous cell carcinoma, basal cell carcinoma and melanoma), post-transplant lymphoproliferative disorders (PTLD) and solid organ malignancies (such as renal cell carcinoma, lung cancer and colorectal cancer). PTLD, often associated with Epstein-Barr virus infection, constitutes a significant proportion of malignancies in transplant recipients and can manifest as lymphomas of varying aggressiveness [2].

Several factors contribute to the heightened risk of *de novo* malignancies in kidney transplant recipients. Prolonged exposure to immunosuppressive agents, particularly calcineurin inhibitors, is a major risk factor. Additionally, older age at transplantation, male gender, Caucasian ethnicity, prior history of skin cancer and viral infections such as Epstein-Barr virus and human papillomavirus further increase susceptibility. Environmental factors such as ultraviolet radiation exposure and tobacco use also play a role in the development of certain malignancies [3].

Early detection through regular screening is paramount in managing *de novo* malignancies in kidney transplant recipients. Dermatological surveillance for skin cancers, including comprehensive skin examinations and patient education on sun protection measures, is essential. For solid organ malignancies, age-appropriate cancer screening guidelines should be followed diligently. Moreover, vaccination against oncogenic viruses such as human papillomavirus and hepatitis B virus is recommended to reduce the risk of associated malignancies [4].

The management of *de novo* malignancies in kidney transplant recipients requires a multidisciplinary approach involving transplant physicians, oncologists, surgeons and dermatologists. Treatment modalities vary depending on the type and stage of malignancy but may include surgical resection, radiation therapy, chemotherapy, immunotherapy, or reduction of immunosuppression. Balancing the need for immunosuppression to prevent graft rejection with the risk of malignancy is crucial in optimizing outcomes [5,6].

DISCUSSION

The emergence of *de novo* malignancies post kidney transplantation poses a significant concern in the medical community. While kidney transplantation offers a life-saving treatment for end-stage renal disease (ESRD) patients, the use of immunosuppressive therapy to prevent graft rejection can predispose recipients to an increased risk of developing malignancies.

Several factors contribute to this heightened risk, including the long-term use of immunosuppressive drugs, chronic inflammation and the presence of oncogenic viruses such as Epstein-Barr virus and human papillomavirus. These factors disrupt the body's immune surveillance system, allowing abnormal cells to proliferate unchecked.

The most common *de novo* malignancies post kidney transplantation include skin cancers (such as squamous cell carcinoma and basal cell carcinoma), lymphoproliferative disorders and solid organ tumors (such as renal cell carcinoma and colorectal cancer).

Early detection and management of these malignancies are crucial to improving patient outcomes. Regular screening protocols tailored to the individual's risk factors, including periodic skin examinations, imaging studies and laboratory tests, can aid in the early detection of malignancies. Additionally, optimizing immunosuppressive regimens to minimize the risk of malignancy while maintaining graft function is an ongoing challenge for transplant physicians.

The development of *de novo* malignancies post kidney transplantation underscores the importance of comprehensive long-term surveillance and management strategies. By addressing both the immunosuppressive burden and individual risk factors, clinicians can strive to mitigate the impact of these malignancies on transplant recipients' overall health and well-being.

CONCLUSION

De novo malignancies pose a significant and evolving challenge in the care of kidney transplant recipients. While advances in immunosuppressive regimens have improved graft survival rates, they have also heightened the risk of malignancy development. Vigilant screening, preventive measures and early intervention are essential in mitigating this risk and improving long-term outcomes. Continued research into the mechanisms underlying malignancy development post-transplantation and the development of targeted therapies will further enhance the management of this emerging threat.

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CONFLICT OF INTEREST

None.

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