Top 100 Most-Cited Studies in Pancreas Transplantation Research: A Comprehensive Review

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Abstract

Introduction: The number of citations is a useful metric to assess the academic influence and significance of publications in a particular research field. Despite the existence of numerous bibliometric studies in diverse medical fields, a focused, detailed analysis of highly cited articles in pancreatic transplantation is still lacking. The main goal of this research is to identify and evaluate the 100 most-cited articles in pancreatic transplantation.

Methods: A systematic search was conducted on the Scopus database for pancreas transplantation-related articles published until February 10,2025. The 100 most-cited articles out of 2,287 identified were chosen for bibliometric analysis. Examining key variables such as citation counts, publication years, trending topics, contributing authors, countries, and journals.

Results: The majority of the top 100 cited articles were authored by U.S.-based researchers and published in the journals "Transplantation," "Annals of Surgery," and "American Journal of Transplantation." The primary areas of research emphasis encompassed in the present research were graft rejection, graft survival, and insulin-dependent diabetes mellitus.

Conclusions: The present study serves as a valuable resource for researchers, identifying influential works in the field of pancreatic transplantation. The citation counts of these articles underscore their impact and contributions within the field, providing an excellent starting point for further research.

Introduction

Pancreatic transplant has undergone a transformative evolution since its experimental stages in the 1980s, securing its place as an essential therapeutic option in contemporary medical practice (1, 2). Current empirical evidence underscores consistent improvements in outcomes, highlighted by a significant decrease

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in mortality rates and marked enhancements in patient quality of life (3, 4). Immunosuppressive protocols, surgical techniques, and rigorous donor and recipient selection have led to these favorable outcomes (1, 4, 5). These advancements have been made possible through the pioneering research conducted by prominent transplant researchers and the invaluable data obtained from pivotal transplant centers. The number of citations received by an academic publication is a valuable metric for assessing its academic influence and significance within a particular research field (6-10). The citation count serves as both a quantitative measure of an article's rigorous scientific content and a means to determine the most prevalent topic paradigms within a specific medical specialization (10). In contemporary academic literature, there has been noticeable attention to bibliometric studies and other top cited publications within various medical fields (6, 11). These fields include a wide range, such as general surgery (12), organ transplantation field (13), kidney transplantation (14) heart transplantation (15) specifically, anesthesiology (16), emergency medicine (17), liver cancer (18), and nephrology (19). Notwithstanding the considerable number of bibliometric investigations conducted, there is a noticeable dearth of a thorough analysis pertaining to highly referenced works within the field of pancreatic transplantation. The purpose of the present study is to identify the top 100 publications with the highest citation count that have been published in medical journals exclusively focused on pancreatic transplantation. The papers have undeniably played a crucial role in advancing and enhancing the knowledge and comprehension of this field of medicine. Through this study, we hope to create a trustworthy and comprehensive collection of influential publications that will be a vital tool for researchers studying pancreatic transplantation. The identification of a collection of such content has the potential to offer researchers a thoroughly validated basis from which to initiate subsequent investigations, therefore contributing to the overall advancement of the field.

Methods

Data Collection and Retrieval Methods

On February 10, 2025, the Scopus database was systematically searched for phrases associated with pancreas transplantation, including: "pancreas," "kidney-pancreas," "transplant," and "allograft". Whereas "islet cell transplant" related items were excluded. The advanced search strategy was: TITLE (pancreas* AND transplant) OR TITLE (pancreas AND allograft) OR TITLE (pancrea* AND transplant) OR TITLE (pancrea* AND allograft) OR TITLE (kidney-pancreas AND transplant) OR TITLE (pancreas-kidney AND transplant) AND NOT TITLE-ABS-KEY (islet AND cell AND transplant). A total of 2,287 documents were identified from the previous search. All document types, such as articles, reviews and conference papers were included. To maintain our emphasis on pancreas transplantation, articles irrelevant to the field including those on pancreas islet cell transplantation were removed. A list of the top 100 cited articles was created. It is important to note that this research was exempt from gaining approval from the institutional review board because it was focused on bibliometric analysis and didn't involve the extraction of patients' data.

Data Analysis

After identifying the 100 most cited articles in pancreas transplantation field using the search strategy described above. This bibliometric analysis encompassed a range of pivotal bibliometric variables, comprising the articles themselves along with their corresponding citation counts, number of publications per year, countries, authors, journals, and the prevalence of co-occurred keywords. The bibliographic information of the selected articles

was analyzed using the "bibliometrix" library in R statistical language (version 4.2.2) and Microsoft Excel Office 365.

To create visual representations of the data, VOSviewer (version 1.6.20) was used, which was developed in the Java programming language by Van Eck and Waltman from Leiden University in 2010 (20). Its proficiency lies in rendering intricate bibliometric networks more comprehensible through visually engaging maps.

Results

Included studies and citation counts

The above search strategy yielded 2,287 documents. The top 100 cited articles in pancreas transplantation were identified, 88 were articles, five were conference papers, five reviews, one letter, and one note. The 100 documents have cited a total of 10,985 citations. The top 100 cited articles were identified between 1983 and 2019, 1992 had the highest number of publications (n = 8). 1985 stands out for the highest number of citations (n = 356). It's worth noting that several specific years, while having fewer publications, showed substantial citations. These years include 2001,1989, and 2016, with mean total citations per article of (n = 318.5, 223.5 and 187, respectively).

Authors

Table 1 (Supplementary Material) shows the most cited authors and their number of publications. David E.R Sutherland had the highest number of citations (n = 2,064 citations, n = 12 publications). Followed by Angelika C. Gruessner (n = 2,050 citations, n = 13 publications),and both Hans W. Sollinger and Anthony M. D'Alessandro with (n =932 citations, n = 6 publications).

Countries

The first authors' institutes were assessed, United States had the highest number of scientific publications and citations (n = 86 publications, n = 9,830 citations). Followed by France (n = 4 publications, n = 549 citations) and Italy (n = 4 publications, n = 372 citations). Table 2 (Supplementary Material) presents the top contributed countries and their citations. Figure 1 presents a network visualization illustrating the countries that have engaged in the highest levels of collaboration and connectivity. According to the indicator calculated by VOSviewer, Sweden, Japan, Taiwan, Denmark and Austria exhibited a total link strength of zero. This metric serves as an indication of the level of connectivity and strength of associations between authors, affiliations, or countries. Therefore, they did not appear on the map.

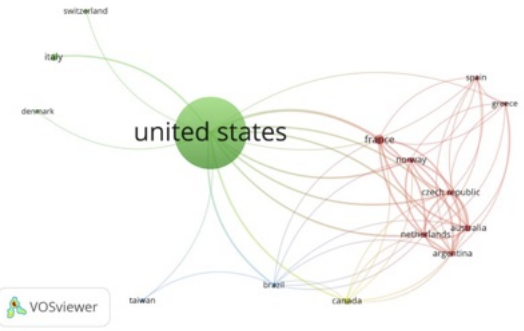

Figure 1: Network visualization of the top-contributing countries and their connections, grouped in three clusters. Countries included in the same cluster are displayed in the same color. Larger circles indicate that the country had more publications. The distance between the two circles shows the degree of connection between two countries.

Journals

Of 33 contributed journals, the most frequently published and highest citations journals were Transplantation (n = 25, 2,207), Annals of Surgery (n = 12, 1,875), and the American Journal of Transplantation (n = 14, 1,672). Table 3 (Supplementary Material) represents the top 10 cited journals and their number of publications. Figure 2 presents a vi-

sualization of the journals with the highest degree of connectivity. Transplantation and Surgery journals exhibited a relatively low total link strength of one. Transplant international, American Journal of Kidney Diseases, and Clinical Infectious Diseases journals had a total link strength of zero. Consequently, the network visualization does not include these journals.

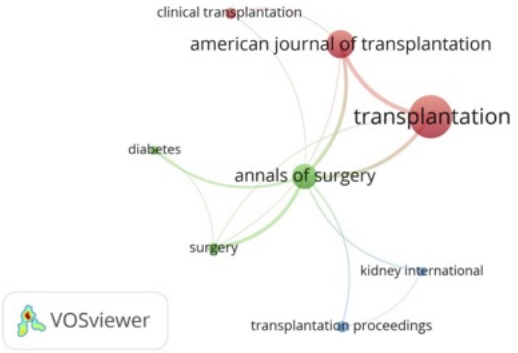

Figure 2: Network visualization of the top-contributing journals. Journals included in the same cluster are displayed in the same color. Larger circles indicate that the journals had more publications. The distance between the two circles shows the degree of connection between two journals.

Research focus

The most frequently encountered keywords were ”Graft Survival” (n = 56), ”Graft Rejection ” (n = 56), “immunosuppressive treatment” (n=35), “Prednisone” (n=28), and “Insulin Dependent Diabetes Mellitus” (n = 27). We analyzed the top occurred keywords to visualize the research focus. Our analysis revealed three clusters, primary focus was on graft outcomes (survival or rejection), immunosuppressive treatment and insulin dependent diabetes. Figure (3) shows the top occurring keywords in a network visualization as 3 clusters.

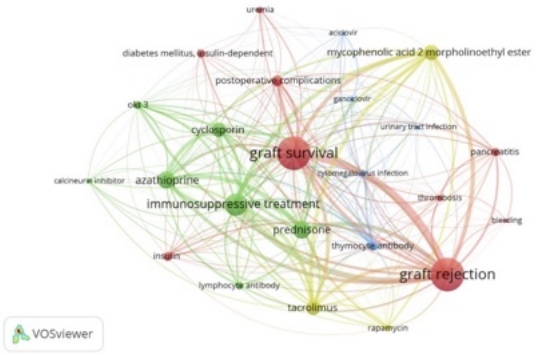

Figure 3: Network visualization of the top-occurred keywords in the top 100 cited documents in pancreas transplantation field, and their interconnections, grouped in three clusters, each color represents a cluster of related items. Larger circles indicate that the keyword appears more frequently. The distance between the two circles shows the degree of connection between two keywords.

Top cited articles

The top 100 cited documents in the pancreas transplantation field are shown in table 4 (Supplementary Material). “Lessons learned from more than 1,000 pancreas transplants at a single institution” published by Sutherland D.E.R. et al. (4) in the Annals of Surgery, was the most cited article (n = 577), followed by “Pancreas transplant outcomes for United States (US) and non- US cases as reported to the United Network for Organ Sharing (UNOS) and the International Pancreas Transplant Registry (IPTR) as of June 2004” review published by Gruessner A.C. et al in Clinical Transplantation (n = 434).

Discussion

Bibliometric studies employ statistical methodologies to assess the influence of publications through the analysis of citation patterns and various indicators (7, 21-24). These studies provide valuable insights on the significance and influence of scientific studies within academic fields (7, 8, 24). In

this study, bibliometric analysis was used to determine the top 100 cited articles in the pancreas transplantation field. Of these articles, the earliest ones were published in 1983 (25, 26) and the last one in 2019 (27). The top cited articles offer a glimpse into the field's most influential and significant research. The results show that the most cited article was a review published in 2001 by the Annals of surgery: Lessons learned from more than 1,000 pancreas transplants at a single institution (4). Given the substantial informational content and its distinction as the most frequently referenced publication in the field, accumulating a notable 577 citations, we have chosen to emphasize the outcomes of this landmark publication. This study examined the 33-year rates of pancreatic transplants for diabetes patients at a single institution. The study included a total of 1,194 pancreatic transplants, conducted during five distinct eras marked by notable improvements in surgical techniques and immunosuppressive treatments. The transplants were classified into many categories, namely simultaneous pancreas-kidney, pancreas-after-kidney, and pancreas transplants alone. The study revealed significant improvements in graft survival rates and patient outcomes over time, which were primarily attributable to advances in surgical techniques and immunosuppressive therapies. It was observed that vascular disease negatively affected survival rates, especially for simultaneous pancreas-kidney transplants. Living donor segmental pancreas transplants were associated with higher graft survival rates, and many transplant recipients experienced a reduction in diabetic complications and an improvement in quality of life. The research firmly supports pancreas transplants as a viable treatment option for all stages of diabetes. The study concluded that early transplants are preferred for patients with labile diabetes, but patients with severe complications can also benefit (4). The primary focus of the majority of the top ten articles pertaining to pancreatic transplantation was predominantly centered on the examination and analysis of outcomes (28-31). These focused on lessons learned from the most prominent medical centers performing the transplants, with a wide range of information from the United States and beyond was collected (31-33). When narrowing down on the specifics of the procedure, the debate and comparison between bladder and enteric drainage stood out as a central discussion in the top 100 articles concerning pancreas transplant (34, 35). Similarly, systemic and portal pancreatic drainage have been thoroughly investigated and extensively documented in the literature, attesting to their importance in pancreas transplant surgery (36, 37). The sequence and timing of pancreas and kidney transplants also constituted a recurring topic, with the research community keenly exploring and deliberating on the optimal strategies for these procedures (38-41). Additionally, technical issues discussing failure pancreas transplantation were a significant area of focus in the research community (42). This was underscored by the 205 citations in the paper by Humar et al., published in 2004, which tackled the complexities and challenges of technical failures in the procedure (43). Further exploration of post-operative issues revealed that the identification of rejection, particularly using biopsy tools, was regularly emphasized in high-quality scholarly studies (44-48). Simultaneously, there was a vigorous debate on the selection of immunosuppressants to be prescribed after transplantation, with a focus on identifying the most efficacious medications or approaches for patients (49, 50). The broader implications of transplantation, including the post-operative quality of life experienced by recipients, were recurring topics, emphasizing the importance of the long-term well-being of patients (51, 52). Finally, the relevance of both donor and recipient obesity was brought to the fore in two of the top cited articles, highlighting its importance in the context of pancreas transplantation and its potential impact on outcomes (53, 54). The topic of infection post pancreatic transplant was also present

in many articles included in the top 100 pancreas transplant research list (35, 55). In a previous study, a comprehensive analysis of pancreas transplantation trends and scientific productivity was conducted (56). It assessed pancreas transplantation rates between 1997 and 2016, accounting for population changes, and examined scientific publications using data from reputable sources such as UNOS, Euro-transplant, UK transplant registry, and the Web of Science database. In contrast to this review that primarily focused on analyzing pancreas transplantation rates and scientific output within specific regions, our current study takes a broader perspective by delving into a comprehensive review of the top 100 cited articles encompassing the entire spectrum of pancreas transplantation research and employs the Scopus database. While the previous study highlighted a decline in transplantation rates and its impact on scientific publications, our research contributes a more nuanced understanding by taking a closer look at the most important articles, authors, countries, and journals in pancreas transplantation. By carefully analyzing these aspects, we gained a more detailed and precise understanding of how this field has developed over time. Our findings indicate that the United States had the highest number of publications and citations among the lists. Signifying its leading role in advancing research in this area. The most frequently cited first author being David E.R Sutherland. The top journals with the highest number of citations were the Transplantation, Annals of Surgery, and the American Journal of Transplantation, which suggests that these journals serve as primary platforms for sharing groundbreaking findings related to pancreas transplantation. Our study had some limitations. It focused solely on the examination of documents that were readily available within the Scopus database. Although the utilization of Scopus as the technique for this study may have resulted in the exclusion of influential research papers published in other databases, we believe that Scopus provides extensive coverage of medical journals, hence establishing its credibility as a dependable resource for our analysis. Our study specifically focused on the top 100 publications that have received the highest number of citations. While this approach provides a valuable viewpoint on extensively cited works, it may inadvertently overlook other significant contributions that have not garnered as much citation recognition. In conclusion, our bibliometric analysis of the top 100 cited articles in pancreas transplantation has provided a comprehensive overview of the field's evolution and significance. Our study not only enriches the understanding of pancreas transplantation but also serves as a valuable resource for researchers, clinicians, and policymakers seeking to shape the future of this field.

Conflict of Interest

The authors declare that they have no competing interests.

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