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Kidney transplantation in older patients: survival and quality of life. A systematic review

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ABSTRACT

Kidney transplantation in older patients: survival and quality of life. A systematic review

Introduction: Kidney transplantation offers improved survival and quality of life vs dialysis in patients with advanced chronic kidney disease. However, its use in older adults remains controversial due to factors such as comorbidity and reduced life expectancy.

Objectives: To identify and synthesise the available scientific evidence regarding outcomes of kidney transplantation in older patients with end-stage renal disease.

Methodology: We conducted a systematic review across searches in PubMed, Scopus, and Google Scholar. The following MeSH terms were used: kidney transplant, older adults, quality of life, survival. Articles published between 2014 and 2024 in English or Spanish were included.

Results: A total of 16 studies were selected, including 6 systematic reviews and 10 observational studies. Analysis showed that kidney transplantation in older adults is generally associated with greater survival and improved quality of life vs remaining on dialysis. However, outcomes vary depending on donor type, comorbidities, and pretransplant functional status.

Conclusions: Kidney transplantation is a valid therapeutic option for selected elderly patients, improving both survival and quality of life, and should not be excluded solely on the basis of age. Comprehensive and individualised assessment is essential to optimise outcomes in this population.

Keywords: kidney transplantation; older adults; survival; quality of life.

RESUMEN

Trasplante renal en pacientes de edad avanzada: supervivencia y calidad de vida. Una revisión sistemática

Introducción: El trasplante renal es una opción terapéutica que ofrece una mejora en la supervivencia y en la calidad de vida en comparación con la diálisis, en personas con insuficiencia renal crónica avanzada. Sin embargo, su uso en adultos mayores sigue siendo motivo de controversia debido a factores como la comorbilidad asociada y una menor esperanza de vida.

Objetivos: Conocer y sintetizar la evidencia científica existente sobre los resultados del trasplante renal en pacientes con insuficiencia renal terminal de edad avanzada.

Metodología: Se ha realizado una revisión sistemática a través de una búsqueda llevada a cabo en las bases de datos PubMed, Scopus y Google académico. Se utilizaron los términos MeSH: trasplante renal ("kidney transplant"), adultos mayores ("older adults"), calidad de vida ("quality of life"), supervivencia ("survival"). Se incluyeron artículos cuya publicación estuviese comprendida entre 2014 y 2024 en inglés y español.

Resultados: Se seleccionaron 16 artículos, entre ellos 6 revisiones sistemáticas y 10 estudios observacionales. El análisis

de estos trabajos evidenció que el trasplante renal en adultos mayores se asocia, en general, con una mayor supervivencia y una mejor calidad de vida en comparación con la permanencia en diálisis. No obstante, los resultados varían en función del tipo de donante, las comorbilidades y el estado funcional previo al trasplante.

Conclusiones: El trasplante renal es una alternativa válida en pacientes ancianos seleccionados, mejorando su supervivencia y calidad de vida, y no debe descartarse únicamente por la edad. Es fundamental realizar una valoración integral e individualizada para optimizar los resultados en esta población.

Palabra clave: trasplante renal; edad avanzada; supervivencia; calidad de vida.

INTRODUCTION

Chronic kidney disease represents a major public health challenge due to its high prevalence, treatment cost, and impact on quality of life. In advanced stages, patients require renal replacement therapy (RRT), with kidney transplantation (KT) being the preferred option over dialysis[1,2]. KT offers better outcomes, even in individuals older than 65 years of age, with survival rates of 90% at 1 year and 70% at 5 years[3,4].

Access to transplantation, however, remains limited by the shortage of organs, worsened by a decline in young donors due to demographic changes and decreased mortality from accidents. Despite Spain's leadership in donation, the waiting list continues to grow, reinforcing the need for innovative strategies[5,6].

In 2023, mortality rates among patients on hemodialysis and peritoneal dialysis were 13.3% and 8.6%, respectively, compared with 2.6% among patients with a functioning KT. Although 65% of patients on hemodialysis are over 65 years old, only 38% of these access KT[7].. This has prompted reconsideration of selection criteria, allowing the inclusion of older patients with good clinical status as transplant candidates[8].

The increasing number of transplants in this population raises questions about clinical outcomes. Although limiting factors such as comorbidities or postoperative complications exist[9], one-year patient survival in individuals over 60 years ranges from 89.7% to 91%, and graft survival adjusted for mortality reaches 96.4%[10]—figures comparable to those of younger recipients.

Given these results, strategies such as allocating older donors to older recipients and accepting living donors with expanded criteria have been implemented, improving outcomes and access to transplantation[11]. However, these decisions must be made cautiously, considering the clinical complexity of elderly patients, including diabetes, cardiovascular disease, or infections.

In this context, frailty—associated with poorer postoperative outcomes and higher mortality risk in dialysis—has become a key factor when evaluating KT candidacy[12]. To address these challenges, improvements are being developed in immunosuppressive protocols, perioperative management, and donation promotion[13,14].

Beyond survival, quality of life has gained particular importance and is now considered a fundamental aspect. Although data remain limited, KT has been shown to improve functional and social quality compared with dialysis, as well as reduce the burden of dietary restrictions[15,16].

For these reasons, it is necessary to adopt a broader perspective that considers not only survival rates but also complications, perceived quality of life, and comparisons with elderly patients undergoing dialysis[17]. In a context where the mean age of patients receiving RRT is increasing, this review is especially relevant.

Accordingly, our primary endpoint was to identify and synthesize the scientific evidence regarding survival and quality of life in older adults who undergo kidney transplantation, and our secondary endpoints were:

- To compare survival between older adults with KT and those receiving dialysis.
- To assess the influence of KT on quality of life in elderly patients with end-stage renal disease.

METHODOLOGY

Design

We conducted a systematic review of studies from health science databases according to the PRISMA statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)[18].

Additionally, following the PICO model, we defined the following research question: "Do elderly kidney transplant recipients have better survival and quality of life compared with patients of the same age on dialysis?"

According to this model:

- **P (Population):** elderly KT recipients.
- **I (Intervention):** not applicable.
- **C (Comparison):** elderly dialysis patients.
- **O (Outcomes):** comparison of results between both RRT modalities.

Search strategy

The databases used were PubMed, Google Scholar, and Scopus. Data collection occurred from November 2024 to March 2025.

The search strategy consisted of using descriptors or keywords according to MeSH terminology: *kidney transplant*,

older adults, *quality of life*, *survival*. These terms were combined using Boolean operators AND and/or OR as appropriate.

Eligibility criteria

– Inclusion criteria

- Original articles or systematic reviews addressing the study objectives.
- Studies analyzing KT survival outcomes in elderly populations.
- Original articles comparing mortality in elderly KT recipients versus elderly dialysis patients.
- Studies analyzing quality of life in elderly kidney transplant recipients.
- Original articles comparing quality of life in elderly KT recipients vs. elderly dialysis patients.
- Studies conducted in Europe.

– Exclusion criteria

- Studies analyzing these variables in populations younger than 60 years.
- Articles without full-text availability.

Quality assessment

To assess the quality of the included studies, the STROBE checklist[19] was used for observational and cross-sectional studies. The CASPE checklist[20] was used for systematic reviews.

Data extraction

The following variables were extracted from the selected articles: author, country, year, methodological design, sample, sample age, main results, and quality of the evidence.

Synthesis of results

A qualitative synthesis was performed to organize and interpret the information clearly and systematically. A thematic-categorical approach was adopted due to the heterogeneity of outcomes and variables among the studies reviewed.

RESULTS AND DISCUSSION

Search results

Once the search strategy had been established, the search process was conducted. The first search was performed without considering any inclusion or exclusion criteria, with the aim of identifying the volume of existing publications on the topic.

Using the combination of the previously mentioned MeSH terms, a total of 6,045 articles were obtained. Of these, 250 were preselected after applying the exclusion criteria, from which 26 were discarded due to duplication across databases.

After reviewing the titles and abstracts, 161 articles were excluded because they were not aligned with the topic addressed in this review. Two additional articles were excluded because no abstract was available.

Next, full-text access was obtained for the remaining 63 articles, and a screening process was conducted. A detailed reading was carried out to determine their suitability, resulting in 47 being excluded due to lack of conclusive data.

Ultimately, 16 articles were selected. This process is shown in the flowchart following PRISMA recommendations[18] **(figure 1)**.

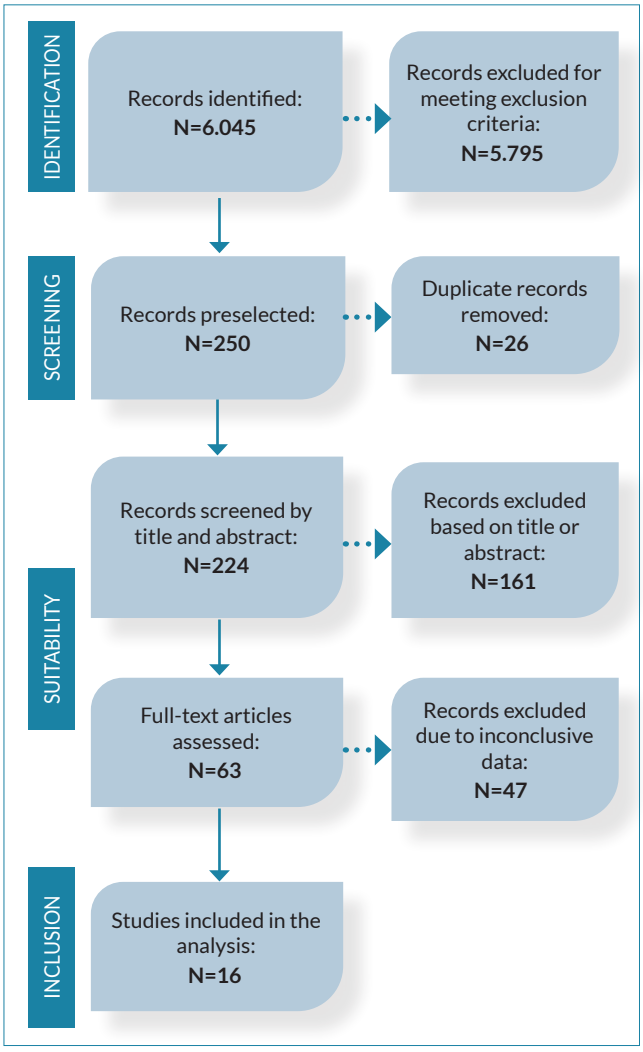

Figure 1. Flow diagram of the article search process.

The total number of articles obtained at each stage was as follows:

- **PubMed:** 21 articles were retrieved, of which 13 were removed after applying exclusion criteria. Among the

remaining 8, three were eliminated due to duplication. Ultimately, 2 articles were included after screening titles, abstracts, and full texts.

- **Scopus:** 3,142 articles were identified; 3,002 were excluded after applying criteria. From the 140 preselected articles, 10 were removed because they were duplicates, and 72 were excluded after reviewing titles, abstracts, and full texts. A total of 3 articles were retained.
- **Google Scholar:** 2,882 articles were found; 2,780 were excluded after applying criteria. Of the remaining 102, 13 duplicates were removed. After screening titles, abstracts, and full texts, 11 articles were included.

Characteristics of the results

Most of the studies included in this review were observational designs.

The main characteristics and relevant data of the selected articles are presented in **table 1** (author, country and year of publication, study design, sample size and age, main results, and quality assessment).

Description of variables

– Donor and recipient age

Most of the reviewed studies analyzed the relationship between donor and recipient age[21,22,24,26,33,36]. Artiles et al.[21], in a sample of 293,501 patients, reported that the mean donor age for recipients >70 years was higher compared with recipients <70 years, demonstrating a tendency to allocate older donors to older recipients. Similarly, in a cohort study with 138 transplant recipients with a median age at transplant of 77.5 years, donor median age was also high, at 77 years, and 22.5% of donors were 80 years or older[22].

Lloveras et al.[24] analyzed 5,230 deceased-donor kidney transplants and found that 80.1% of kidneys from donors ≥65 years were transplanted into recipients ≥60 years, confirming the donor–recipient age correlation. Cuadrado-Payán et al.[26] compared recipients aged 60–65 years with those ≥75 years and found that donors for the ≥75 group were significantly older. Another study examining deceased-donor kidney recipients reported that recipients who received kidneys from donors ≥75 years had a mean age of 68.9 years, with most of these kidneys (93.6%) allocated to recipients ≥60 years[33].

Table 1. Characteristics of the studies included in the review.

Citation	Author (year), Country	Type of Study	Sample Size	Sample Age	Results	Quality Criterion
21	Artiles et al. (2023), Europe	Systematic review and meta-analysis	9 articles	≥70 years	The meta-analysis highlights that KT is an important treatment for end-stage renal disease in the elderly. However, the decision between dialysis and transplantation is complex, and improved recipient selection through geriatric assessments is recommended.	CASPE 9/11
22	Cabrera et al. (2020), Spain	Retrospective observational cohort study	138 patients	≥75 years	Outcomes of KT in patients aged >75 years who received kidneys from deceased donors of similar age were analyzed. Findings suggest that pre-transplant evaluation based on clinical and macroscopic characteristics is effective in ensuring good outcomes.	STROBE 18/22
23	Arcos et al. (2019), Spain	Retrospective observational cohort study	2,585 patients	≥75 years	Kidney transplants from donors >80 years were analyzed to determine the benefit threshold of transplantation in recipients >60 years. The study explores the feasibility of using elderly donors and outcomes in elderly recipients.	STROBE 20/22
24	Lloveras et al. (2015), Spain	Retrospective matched analysis study	915 patients	-	Transplanted patients were compared with dialysis patients, analyzing survival and other transplant-associated variables. The analysis provides a deeper understanding of factors influencing the success of KT.	STROBE 18/22

Citation	Author (year), Country	Type of Study	Sample Size	Sample Age	Results	Quality Criterion
25	Hernández et al. Spain (2018)	Systematic review	*11 artícles	≥65 years	This study examines mortality in elderly patients on the kidney transplant (KT) waiting list and compares it with mortality among transplant recipients. KT offers better survival than dialysis in older adults, but careful candidate selection is required. Risk factors for death on the waiting list are identified, and perioperative and post-transplant mortality are evaluated.	CASPE 10/11
26	Cuadrado Payán et al. Spain (2022)	Single-center, longitudinal, retrospective study	164 patients: • 106 (60–65 years) • 57 (≥75 years)	≥65 years	This study analyzes outcomes of KT in older recipients who received kidneys from older donors. Outcomes of recipients ≥75 years were compared with those aged 60–65 years, adjusting for donor and recipient covariates. The results provide valuable information regarding the viability of KT in elderly patients, increasingly relevant given population aging.	STROBE 17/22
27	Morales et al. Spain (2015)	Prospective, longitudinal observational study	52 patients	Mean age 74.3 years	The study investigates pre-dialysis KT in elderly recipients using kidneys discarded from very elderly donors. It is proposed as an alternative for older patients, offering an option for pre-dialysis KT.	STROBE 20/22
28	Mesnard et al. Spain (2023)	Systematic review	*27 artícles	≥70 years	This review analyzes KT from donors older than 70 years. Evidence on the outcomes of these transplants is limited. The systematic review examines available data to improve understanding of KT results with elderly donors.	CASPE 9/11
29	MacKinnon et al. United Kingdom (2018)	Systematic review	*29 artícles	≥65 years	This study examines the relationship between physical function and physical activity with clinical outcomes in patients with CKD not on dialysis and KT recipients. It reviews evidence on reduced physical function and activity in CKD and evaluates associations with mortality and other adverse outcomes.	CASPE 8/11
30	Barbachowska et al. Poland (2024)	Systematic review	*17 artícles	≥60 years	This review focuses on surgical and clinical complications of KT in elderly recipients. It aims to provide a detailed understanding of the challenges and risks associated with kidney transplantation in this population.	CASPE 10/11
31	Schoot et al. Netherlands (2022)	Systematic review	*16 artícles	≥60 years	This review compares dialysis and KT in older adults. It summarizes functional, psychological, and quality-of-life outcomes associated with each treatment. The choice between transplant and dialysis in the elderly is complex due to the high prevalence of comorbidities.	CASPE 10/11

Citation	Author (year), Country	Type of Study	Sample Size	Sample Age	Results	Quality Criterion
32	Heldal et al. Norway (2019)	Observational, longitudinal, retrospective study with a cost-utility analysis	289 patients	≥65 years	This study analysed the health and economic impact of kidney transplantation (KT) in individuals older than 65 years. One year after transplantation (performed in 71% of the 289 patients, with a mean wait time of 14.6 months and 24 months on dialysis), there was a significant improvement in quality of life and QALYs. However, the cost per QALY was higher in the first post-transplant year (€88,100 vs. €76,495 on the waiting list), with a high ICER (€419,792/QALY). Although the initial cost is higher, transplantation may be cost-effective in the long term, and longer follow-up is recommended.	STROBE 18/22
33	Pérez-Sáez et al. Spain (2019)	Retrospective observational cohort study	5.886 patients	Stratified into 3 groups: <65 years, 65–69 years, ≥70 years	This study examined the survival benefit of KT using kidneys from deceased donors older than 75 years. Survival of patients who received kidneys from donors ≥75 years was compared with that of dialysis patients who were transplant candidates. The findings contribute to understanding the benefits of KT in recipients receiving organs from elderly donors.	STROBE 20/22
34	Zompolas et al. Germany (2021)	Retrospective clinical study	85 patients	≥65 years	This study analysed the outcomes of deceased-donor KT in the Eurotransplant Programme, with a specific focus on recipients aged 75 years or older. Trends and outcomes were evaluated, including patient and graft survival. The study provides valuable information on the effectiveness and challenges of KT in elderly recipients within the Eurotransplant framework.	STROBE 18/22
35	Tsarpali et al. Norway (2021)	Prospective cohort study	192 patients	Mean age 72.1 years	This study investigated how comorbidity and physical status before transplantation influence survival in elderly KT recipients. Higher comorbidity and lower physical function were significantly associated with poorer post-transplant survival.	STROBE 19/22
36	Lønning et al. Norway (2015)	Single-centre retrospective study	47 patients	>80 years	The study included transplant recipients between 1983 and 2015. Patients transplanted before 2000 showed lower survival, with a median of 2.5 years, compared with those transplanted after 2000, whose mean survival was 5.0 years. Death-censored graft survival at five years was similar between the ≥79 and 70–79 age groups (89% in both). Analyses also showed that donor age and timing of KT were significant factors influencing survival outcomes.	STROBE 17/22

*: number of articles. **KT:** Kidney transplantation. **QALY:** Quality-Adjusted Life Years. **ICER:** Incremental Cost-Effectiveness Ratio.

Similarly, Lønning et al.[36] analyzed transplants in patients older than 79 years and found that donor median age increased significantly in transplants performed after the year 2000 compared with earlier transplants.

These findings reflect a common practice in elderly kidney transplantation, where donor age tends to be higher and, in most cases, expanded-criteria donors are used for older recipients.

Survival

Recipient survival

Advanced recipient age is generally associated with lower survival after kidney transplant. A systematic review found that in the short term (1–3 years), survival rates are similar between younger and older patients, but at 5 years, differences widen: among recipients >70 years, survival ranges between 51.0% and 93.1%, compared with 68.0% to 94.0% in younger recipients[21].

In one study with patients of mean age 77 years, survival was 82.1% at 1 year and 60.1% at 5 years, with cumulative mortality of 45.6% at 3 years[22]. Similarly, a cohort of recipients of donors >65 years reported survival rates at 1, 5, 10, and 15 years of 91.8%, 74.9%, 54.3%, and 37.6%, respectively—lower than those receiving kidneys from younger donors (96.4%, 89.7%, 77.1%, and 64.8%)[24]. Comparable results were found in recipients ≥75 years, with 1- and 5-year survival rates of 91% and 74%, whereas the 60–65 group reached 95–97% and 82–85%, respectively[26]. However, Lønning et al.[36] found no direct association between advanced age and higher mortality when comparing recipients >79 years with those aged 70–79 years.

Another study observed greater survival among patients who received preemptive kidney transplant (before starting dialysis), with survival rates of 92% at 1 year and 78% at 3 and 5 years, compared with 83% at the same intervals among those who began dialysis prior to transplant[27].

A systematic review reported survival rates for recipients of donors >70 years of 90.88% at 1 year and 71.29% at 5 years, consistent with recent series[28]. Another study noted that transplantation from donors ≥75 years resulted in survival rates of 90% at 1 year, 70% at 5 years, 50% at 10 years, and 26% at 15 years, lower than those receiving kidneys from donors <75 years[34]. In another study involving adults >60 years, higher early infection rates negatively affected survival[30].

From a survival perspective, these findings reinforce the feasibility of kidney transplantation in older adults, with results comparable to recent cohorts of recipients from octogenarian donors, in whom improved survival was noted beginning at 12 months post-transplant[37].

Graft survival

In older patients, renal graft survival is generally comparable to, or even more favorable than, that of younger recipients. According to a systematic review, graft loss is similar between recipients older and younger than 70 years, and was even lower in older adults. No relevant differences were found regarding delayed graft function, estimated glomerular filtration rate, or final creatinine levels[12]. Another study reported graft-survival rates of 95.6% at one year and 93.1% at five years, excluding deaths[22], while another cohort of recipients of donors older than 65 years showed graft-survival rates at 1, 5, 10, and 15 years of 84.4%, 61.0%, 40.1%, and 27.4%, respectively—lower than those observed with younger donors (90.1%, 77.6%, 58.9%, 42.7%)[23]. Survival improves when donors are between 60 and 79 years (93% at one year; 83% at five years) compared with very elderly donors, where survival drops to 86% and 64% at the same time points[23]. In another study, although graft survival in recipients ≥75 years reached 96% at one year and 83% at five years, compared with 99% and 89% in the 60–65-year group, no statistically significant differences were found[26]. In transplants performed before the initiation of dialysis, graft survival reached 96% at one, three, and five years; meanwhile, in those who began dialysis before transplant, survival decreased to 76%–68%–68%, respectively, with significant differences[27]. There was also a higher prevalence of delayed graft function among those who had initiated dialysis before surgery (34.6%) compared with those transplanted pre-emptively (3.8%). Immediate graft function was also more common in the pre-emptive group (92% vs. 53%)[27].

Other national registries in recipients of donors >70 years reported graft-survival rates of 92% at one year and 81.5% at five years, similar to other international series. No relevant differences were observed in glomerular filtration rate, creatinine, or the rate of acute rejection (16%)[28].

Graft survival from donors >75 years is 78% at one year, 55% at five years, 38% at ten years, and 15% at fifteen years, lower than survival from donors <75 years (90%, 75%, 56%, 40% at the same time points). However, in grafts from donors >75 years, survival excluding recipient death can reach 68% at 10 years. Other factors shown to negatively affect survival include viral infections, diabetes, early graft dysfunction, and female recipient sex[33].

Quality of Life

Quality of life (QoL) is a key indicator of the success of kidney transplantation (KT) in elderly patients. A systematic review shows a significant improvement in overall QoL as early as two months after transplantation, which is maintained or even increases up to one year, with general-health scores rising from 56 to 67 at two months and to 70 at six months. Validated tools such as the SF-36 and the EuroQol-5D support this positive trend at one year post-transplant[31].

In contrast, older patients starting dialysis do not show a clear improvement in QoL. Some studies report no significant changes at six months, and others show only partial improvements after one year, though with methodological limitations and a lack of robust statistical analysis. A single-center study suggested a slight improvement in cognitive function after starting dialysis, although with a small sample and no statistical testing[31].

More recent studies, such as Humar et al.[38] indicate a QoL comparable to that of the general population of the same age group. These findings reinforce that elderly recipients obtain substantial benefits from KT, even when the organ comes from donors of a similar age. In this regard, our findings align with those of Alegre et al.[37], who reported that one-third of older patients experienced a considerable improvement in their health compared with the year prior to transplantation.

Other studies, such as the one conducted by Cornella et al.[40] noted certain limitations in specific QoL domains, suggesting that improvements may not be uniform. However, the overall impact on daily functioning and subjective well-being remains positive. In this study, everyday activities such as walking, dressing, and personal hygiene scored high after transplantation—findings consistent with those of Alegre et al.[37]. Moreover, the incorporation of adapted physical-exercise programs, such as hydrotherapy described by Pechter et al.[41], may play an important role in prolonging survival and improving functional status.

Comparison of Quality of Life and Survival Between Dialysis and Kidney Transplantation

According to Schoot et al.[31], older transplant recipients show better health-related QoL than those remaining on dialysis. Dialysis patients have poorer physical function and a higher incidence of serious falls. Additionally, mortality in dialysis is 10 to 20 times higher than in the general population, whereas after transplantation this rate decreases, although the risk remains elevated due to the burden of advanced kidney disease.

To evaluate the survival benefit of KT using very elderly deceased donors, Arcos et al.[23] studied a cohort of patients ≥60 years who initiated renal replacement therapy. Their analysis showed that transplantation with donors aged 60–79 yearsprovided a survival advantage beginning at 12 months post-transplant in all patient subgroups, regardless of age or comorbidities. When analyzing donors ≥80 years, the overall reduction in mortality reached 85%.

Barbachowska et al.[30] reviewed studies in recipients>70 years and highlighted that although mortality may be higher immediately after transplantation vs dialysis, survival markedly improves after the first year: 80% at 5 years vs. 53% in dialysis, and 53% at 10 years vs. 17% in dialysis. Similarly, a cohort study showed that recipients of kidneys from donors ≥75 years had lower mortality risk than those who remained on the dialysis waiting list, with a survival benefit evident from the first month post-transplant[33].

Therefore, our findings align with studies summarized in a systematic review of 110 works[42] and the UNOS (United Network for Organ Sharing) registry[43], which conclude that KT is associated with lower mortality, fewer cardiovascular events, and better health-related QoL vs dialysis.

Immunosuppression

Several studies have analyzed immunosuppression in kidney transplant (KT) recipients from elderly donors. In the study by Pérez-Sáez et al.[23], recipients of donors ≥80 years received tacrolimus more frequently (82.0%) and thymoglobulin (34.4%) compared with donors aged 60–79 years (tacrolimus 60.1%, thymoglobulin 25.1%), while cyclosporine was used less often in donors ≥80 years. The use of mycophenolate and steroids was high and similar in both groups. Primary use of tacrolimus during the first 6 weeks was associated with improved graft survival and a higher proportion of functioning grafts, thanks to tacrolimus- and basiliximab-based protocols. Another study including 5,886 deceased-donor KT recipients showed that tacrolimus use increased with donor age, reaching 64.8% in recipients of donors ≥75 years. In multivariable analysis, its use was associated with lower risk of death, lower risk of graft loss, and lower risk of death-censored graft loss[33].

According to Lønning et al.[36], the introduction of mycophenolate mofetil and basiliximab improved post-transplant outcomes. It has been suggested that recipients >80 years may tolerate lower trough levels of calcineurin inhibitors.

Regarding biopsy-proven acute rejection, results are mixed: some studies report lower rejection rates in older patients, whereas others find no meaningful differences. In a study comparing recipients aged 60–65 and ≥75 years, the rate of biopsy-proven acute rejection at one year was similar (16% in both groups), although there was a tendency toward T-cell–mediated rejection in younger recipients and antibody-mediated rejection in older ones[30].

Immunosuppression remains an area of uncertainty in this population. Although there is a growing trend toward using tacrolimus, anti-IL2R agents, or thymoglobulin, no specific recommendations exist for older adults. The findings suggest the need for individualized protocols, as proposed by the British Transplant Society[44], considering the risk of adverse effects, the limited likelihood of re-transplantation, and the risk of allosensitization in case of graft failure.

Post-transplant complications and mortality

A meta-analysis of 19 studies found that the risk of early complications (delayed graft function, graft loss, or acute rejection) was similar between recipients ≥70 years and <70 years: the incidence of delayed graft function was 26.4% in older recipients vs. 23.5% in younger ones[21]. In another study of 138 older recipients, early complications included primary graft failure (6.5%), delayed graft function (53.6%), surgical complications (37%), acute rejection (15.2%), and infections (70.3%). Mortality reached 45.6% during follow-up, with infections and cardiovascular events as the main causes[22].

In transplants from donors ≥80 years, there was a higher risk of graft loss and lower graft survival at 1 and 5 years, as well as higher early post-transplant mortality, especially among recipients with diabetic nephropathy; mortality risk increased with age[23]. Delayed graft function was also associated with higher mortality and reduced survival in large studies[24].

According to Mesnard et al.[28], the incidence of delayed graft function was 41.8% and primary graft failure 4.7% in recipients of elderly-donor kidneys, with major postoperative complications in 48% and vascular complications in 9%.

Infectious complications—especially urinary tract infections—were the most frequent and severe among older recipients[29]. In another study comparing patients aged 60–65 and ≥75 years, infection was the leading cause of death in both groups, but markedly more common in those ≥75.26 Additionally, higher age, delayed graft function, and longer dialysis duration were associated with increased risk of postoperative complications[34,35].

Regarding complications overall, the data highlight a high frequency of infections and cardiovascular events as the main causes of mortality, consistent with other studies such as Orlandi et al.[45]. Although some research reports similar acute rejection rates across age groups, others—such as Doucet et al.[46]—show a lower incidence of acute rejection in older living-donor recipients. In this review, the rate of acute rejection was similar across age groups, but differences in rejection type were noted: more cellular rejection in younger patients and more antibody-mediated rejection in older ones, as also described by Cuadrado-Payán et al.[26].

Costs

Heldal et al.[32] analyzed the costs associated with KT. The estimated cost of the first year post-transplant was €62,551 compared with €52,476 for patients on the waiting list. The study also evaluated Quality-Adjusted Life Years (QALYs): 0.710 in transplant recipients vs. 0.686 in waiting-list patients during the first year. The cost per QALY was €88,100 in transplant recipients and €76,495 in waiting-list patients, with an Incremental Cost-Effectiveness Ratio (ICER) of €419,792/QALY during the first year.

Costs associated with KT also support its use in older patients. As mentioned in this review and aligned with data from the Spanish National Transplant Organization[44], KT involves a similar initial investment to dialysis but yields a marked cost reduction in subsequent years. These findings support its long-term economic advantage, also noted by Jarl et al.[44], with annual savings of up to €41,000 after the second post-transplant year.

Function and physical activity

A recent systematic review[29] showed that poorer physical function and lower physical activity are associated with higher mortality in patients with CKD. Worse performance on objective tests such as the Short Physical Performance Battery, the timed-up-and-go test (TUG), the 6-minute walk test (6MWT), and gait speed were independently associated with higher mortality risk. Each additional second on the TUG increased mortality risk by 8%, and a decrease of 0.1 m/s in gait speed increased risk by 26%. Better performance on the 2-minute step test and in the number of chair rises within 29 seconds was linked to lower cardiovascular risk, hospitalization, and need for dialysis[29].

Regarding physical activity, accelerometry and questionnaires showed that longer and more intense walking was associated with better health. Merely meeting recommendations (>150 min/week of moderate-to-vigorous activity) reduced mortality risk. Replacing sedentary time with light activity lowered mortality risk, whereas increasing to moderate/vigorous levels did not add extra benefit. Increasing physical activity by 60 min/week reduced risk of end-stage renal disease, with the greatest reduction seen beyond 150 min/week. Falling below these levels increased mortality[29].

Finally, Tsarpali et al.[35] found that higher pre-transplant physical function (PF) scores were associated with greater survival: at 5 years, survival was 77% with PF >60 vs. 55% with PF ≤60. A PF ≤60 doubled mortality risk.

Study limitations

This systematic review has several limitations that must be considered. First, the heterogeneity in study methodologies, inclusion criteria, and analyzed variables (survival, quality of life, donor type, graft function) complicates direct comparison. Additionally, some studies had short follow-up periods or small sample sizes, which may limit the robustness of long-term survival data.

Furthermore, not all studies used standardized tools to assess quality of life, limiting rigorous qualitative synthesis. Restricting the review to studies published in English and Spanish introduces the possibility of publication bias by excluding relevant literature in other languages.

Practical considerations

Advanced age should not be an exclusion criterion for KT. Individualized patient assessment is essential, considering functional status, comorbidities, social support, and life expectancy. Donor selection should focus on risk–benefit analysis aimed at optimizing waiting time and graft quality.

From a nursing perspective, it is important to foster hope regarding KT among older patients during their long periods on dialysis, and to support this strategy because—based on these results—transitioning to transplantation, when possible, provides not only better survival and quality of life but also liberation from the burden of dialysis therapy, whether center-based or at home.

Based on these findings, kidney transplantation in individuals >65 years is consolidating as an effective therapeutic option compared with dialysis, offering advantages in both survival

and quality of life. Thanks to advances in surgical techniques, immunosuppressive management, and careful candidate selection, clinical outcomes in this age group are comparable—and in some cases superior—to those of younger patients.

Compared with older adults on dialysis, KT clearly offers better survival from the first year onward. This difference becomes increasingly pronounced with time, reflecting not only greater longevity but also superior quality of life, including improved autonomy, emotional well-being, reduced physical limitations, and enhanced social integration.

Despite age-related considerations such as frailty or comorbidities, the benefits of KT outweigh the risks in appropriately selected patients. Moreover, KT represents a more cost-effective long-term strategy than chronic dialysis, with meaningful implications for healthcare systems.

REFERENCES

1. Enfermedad crónica del riñón [Internet]. 2025 [cited 23 Apr 2025]. Available from: https://www.paho.org/es/temas/enfermedad-cronica-rinon
2. Trasplante de riñón [Internet]. 2025 [cited 23 Apr 2025]. Available from: https://www.mayoclinic.org/es/tests-procedures/kidney-transplant/about/pac-20384777
3. Tenezaca Sari ÁX, Zlatkova-Zlatkova M, Evangelio-Sequí MJ, Shin-Kang JY, Bellmunt-Montoya S. Revisión sistemática de los resultados del trasplante renal en pacientes con cirugía de revascularización aortoilíaca. Angiología. [Internet]. 2022. [cited 23 Apr 2025 Available from: http://dx.doi.org/10.20960/angiologia.00365
4. Talbot-Wright R, Carretero P, Cofán F, Torregrosa JV, Oppenheimer F, Campistol JM, et al. Trasplante renal en pacientes de edad avanzada. Nefrología. 1998;18:42-9.
5. Fernández-Lorente L, Cruzado-Garrit JM. Trasplante renal en personas mayores. Rev Esp Geriatr Gerontol. 2012;47(4):137-8.
6. González-Posada JM, Barril G. El trasplante renal en el tratamiento de la insuficiencia renal terminal en el anciano en España. Nefrología. 1998;18(S4).
7. Registro Español de Diálisis y Trasplante. Sociedad Española de Nefrología [Internet]. Senefro.org. [cited 2025 Apr 23]. Available from: https://www.senefro.org/modules.php?name=webstructure&idwebstructure=29
8. Sanchez-Avila Y, Patiño-Jaramillo N, Garcia Lopez A, Giron-Luque F. Sobrevida del paciente adulto mayor y del inyector en trasplante renal. Arch Clin Nefrol. 2021;8(2):16.
9. García PK, Cano CA, González CA, García RL, Arroyave M. Trasplante renal en mayores de 60 años en un hospital de Colombia. Rev Esp Geriatr Gerontol. 2014;49(3):125-8.
10. Domínguez Rodríguez NM, Castillo Morocho SM. Percepción de la calidad de vida en pacientes con trasplante renal. Rev Vive. 2023;6(18).
11. Frutos MÁ, Crespo M, Valentín M de la O, Alonso-Melgar Á, Alonso J, Fernández C, et al. Recomendaciones para el trasplante renal de donante vivo. Nefrología. 2022;42:1-128.
12. Alfieri C, Malvica S, Cesari M, Vettoretti S, Benedetti M, Cicero E, et al. Frailty in kidney transplantation: a review on its evaluation, variation and long-term impact. Clin Kidney J. 2022;15(11):2020-6.
13. Hospital de Clínicas-Centro de Nefrología. Protocolos de inmunosupresión en trasplante renal [Internet]. 2006 [cited 23 Apr 2025]. Available from: https://www.nefrologia.hc.edu.uy/images/inmunosupresion.pdf
14. Biohope presenta su innovador Immunobiogram® para trasplante renal en el Congreso de la SAN en Sevilla [Internet]. AseBio. [cited 23 Apr de 2025]. Available from: https://www.asebio.com/actualidad/noticias/biohope-presenta-immunobiogramr-trasplante-renal
15. Durán-Muñoz MI, Lope-Andrea T, Pino-Jurado MR del, Chicharro-Chicharro MC, Matilla-Villar E. Percepción de la calidad de vida referida por el paciente adulto con trasplante renal. Enferm Nefrol. 2014;17(1):45-50.
16. Romero-Reyes MS, Moreno-Egea A, Gómez-López VE, Alcántara-Crespo M, Crespo-Montero R. Análisis comparativo entre la calidad de vida del paciente trasplantado renal y el paciente en hemodiálisis. Enferm Nefrol. 2021;24(2):129-38.
17. Europa Press. Los ancianos que reciben trasplante de riñón también pueden permanecer sin diálisis el resto de su vida, según estudio [Internet]. 2020 [cited 23 Apr 2025]. Available from: https://www.infosalus.com/mayores/noticia-ancianos-reciben-trasplante-rinon-tambien-pueden-permanecer-dialisis-resto-vida-estudio-20200226185913.html
18. Yepes-Nuñez JJ, Urrútia G, Romero-García M, Alonso-Fernández S. Declaración PRISMA 2020: una guía actualizada para la publicación de revisiones sistemáticas. Rev Esp Cardiol. 2021;74(9):790-9.
19. Vandenbroucke J, von Elm E, Altman D, Gøtzsche P, Mulrow C, Pocock S, et al. Mejorar la comunicación de estudios observacionales en epidemiología (STROBE): explicación y elaboración. Gac Sanit. 2009;23(2):1–28. https://doi.org/10.1016/j.gaceta.2008.12.001
20. Cabello JB. Plantilla para ayudarte a entender una Revisión Sistemática. En: Guías CASPe de Lectura Crítica de la Literatura Médica. Alicante: CASPe; 2005. Cuaderno I. p.13–17.
21. Artiles A, Domínguez A, Subiela JD, Boissier R, Campi R, Prudhomme T, et al. Kidney transplant outcomes in elderly population: A systematic review and meta-analysis. Eur Urol Open Sci. 2023;51:13-25.

22. Cabrera J, Fernández-Ruiz M, Trujillo H, González E, Molina M, Polanco N, et al. Kidney transplantation in the extremely elderly from extremely aged deceased donors: a kidney for each age. Nephrol Dial Transplant. 2020;35(4):687-96.

23. Arcos E, Pérez-Sáez MJ, Comas J, Lloveras J, Tort J, Pascual J; Catalan Renal Registry*. Assessing the Limits in Kidney Transplantation: Use of Extremely Elderly Donors and Outcomes in Elderly Recipients. Transplantation. 2020;104(1):176-83.

24. Lloveras J, Emma J, Jordi M, Pascual J. Un análisis de supervivencia pareado que compara la hemodiálisis y el trasplante de riñón de donantes ancianos fallecidos mayores de 65 años. Transplantation. 2015;99(5):991-6.

25. Hernández D, Alonso-Titos J, Armas-Padrón AM, Ruiz-Esteban P, Cabello M, López V, et al. Mortality in elderly waiting-list patients versus age-matched kidney transplant recipients: Where is the risk? Kidney Blood Press Res. 2018;43(1):256-75.

26. Cuadrado-Payán E, Montagud-Marrahi E, Casals-Urquiza J, Del Risco-Zevallos J, Rodríguez-Espinosa D, Cacho J, et al. Outcomes in older kidney recipients from older donors: A propensity score analysis. Front Nephrol. 2022;2:1034182.

27. Morales E, Gutiérrez E, Hernández A, Rojas-Rivera J, Gonzalez E, Hernández E, et al. Preemptive kidney transplantation in elderly recipients with kidneys discarded of very old donors: A good alternative. Nefrología. 2015;35(3):246-55.

28. Mesnard B, Territo A, Campi R, Hevia V, Andras I, Piana A, et al. Kidney transplantation from elderly donors (>70 years): a systematic review. World J Urol. 2023;41(3):695-707.

29. MacKinnon HJ, Wilkinson TJ, Clarke AL, Gould DW, O'Sullivan TF, Xenophontos S, et al. The association of physical function and physical activity with all-cause mortality and adverse clinical outcomes in nondialysis chronic kidney disease: a systematic review. Ther Adv Chronic Dis. 2018;9(11):209-26.

30. Barbachowska A, Gozdowska J, Durlik M. Kidney transplantation in older recipients regarding surgical and clinical complications, outcomes, and survival: A literature review. Geriatrics (Basel). 2024;9(6).

31. Schoot TS, Goto NA, van Marum RJ, et al. ¿Diálisis o trasplante de riñón en adultos mayores? Una revisión sistemática que resume los resultados funcionales, psicológicos y relacionados con la calidad de vida después del inicio de la terapia de reemplazo renal. Int Urol Nephrol. 2022;54:2891-900.

32. Heldal K, Midtvedt K, Lønning K, Iversen T, Hernæs KH, Tsarpali V, et al. Kidney transplantation: an attractive and cost-effective alternative for older patients? A cost–utility study. Clin Kidney J. 2019;12(6):888-94.

33. Pérez-Sáez MJ, Arcos E, Comas J, Crespo M, Lloveras J, Pascual J, et al. Survival benefit from kidney transplantation using kidneys from deceased donors aged ≥75 years: A time-dependent analysis. Am J Transplant. 2016;16(9):2724-33.

34. Zompolas I, Peters R, Liefeldt L, Lehner LJ, Budde K, Ralla B, et al. Outcomes of deceased donor kidney transplantation in the Eurotransplant Senior Program with a focus on recipients ≥75 years. J Clin Med. 2021;10(23):5633.

35. Tsarpali V, Midtvedt K, Lønning K, Bernklev T, Åsberg A, Fawad H, et al. A comorbidity index and pretransplant physical status predict survival in older kidney transplant recipients: A national prospective study. Transplant Direct. 2022;8(4):e1307.

36. Lønning K, Midtvedt K, Leivestad T, Reisæter AV, Line P-D, Hartmann A, et al. Are octogenarians with end-stage renal disease candidates for renal transplantation? Transplantation. 2016;100(12):2705-9.

37. Constantes y Vitales. El trasplante renal de donantes mayores de 80 años aumenta la supervivencia frente a la diálisis [Internet]. 2019 [cited 23 Apr 2025]. Available from: https://www.lasexta.com/constantes-vitales/noticias/trasplante-renal-donantes-mayores-anos-aumenta-supervivencia-frente-dialisis_201908065d4992310cf264a1665e052c.html

38. Humar A, Denny R, Matas AJ, Najarian JS. Resultados del injerto y la calidad de vida en receptores mayores de un trasplante de riñón. Exp Clin Transplant. 2003;1:69-72.

39. Alegre C, Fuenmayor Díaz A, Izquierdo S, Torres B, et al. Calidad de vida y trasplante renal en mayores de 65 años. Rev Soc Esp Enferm Nefrol. 2025;12(1):26–30.

40. Cornella C, Brustia M, Lazzarich E, Cofano F, Ceruso A, Barbé MC, et al. Calidad de vida en pacientes trasplantados renales mayores de 60 años. Transplant Proc. 2008;40:1865–6.

41. Pechter Ü, Raag M, Ots-Rosenberg M. Regular aquatic exercise for chronic kidney disease patients: a 10-year follow-up study. Int J Rehabil Res. 2014;37(3):251–5.

42. Tonelli M, Wiebe N, Knoll G, Bello A, Browne S, Jadhav D, et al. Systematic review: kidney transplantation compared with dialysis in clinically relevant outcomes. Am J Transplant. [Internet]. 2011 [cited 25 Apr 2025];11(10):2093–109. Available from: http://dx.doi.org/10.1111/j.1600-6143.2011.03686.x

43. Wolfe RA, Ashby VB, Milford EL, Ojo AO, Ettenger RE, Agodoa LY, et al. Comparison of mortality in all patients on dialysis, patients on dialysis awaiting transplantation, and recipients of a first cadaveric transplant. N Engl J Med. [Internet]. 1999 [cited 25 Apr 2025];341(23):1725–30. Available from: http://dx.doi.org/10.1056/NEJM199912023412303

44. Maintenance of immunosuppression in a patient with late renal transplant failure [Internet]. 2022 [cited 23 Apr 2025]. Available from: https://www.murciasalud.es/preevid/24740

45. Orlandi PF, Cristelli MP, Aldworth CAR, Freitas TVS, Felipe CR, Silva Junior HT, et al. Long-term outcomes of elderly kidney transplant recipients. J Bras Nefrol. 2015;37(2):212–20.

46. Doucet BP, Cho Y, Campbell SB, Johnson DW, Hawley CM, Teixeira-Pinto ARM, et al. Kidney transplant outcomes in elderly recipients: An Australia and New Zealand dialysis and transplant (ANZDATA) registry study. Transplant Proc. 2021;53(6):1915–26.

47. Organización Nacional de Trasplantes: Plan estratégico en donación y Trasplante de órganos 2018-2022. Sistema Español de Donación y Trasplante. [Internet]. 2025 [cited 25 Apr 2025] Available from: https://www.ont.es/wp-content/uploads/2023/06/PLAN-ESTRATEGICO-DONACION-Y-TRASPLANTE-DE-ORGANOS-2018-2022.pdf

48. Jarl J, Desatnik P, Peetz Hansson U, Prütz KG, Gerdtham UG. Do kidney transplantations save money? A study using a before-after design and multiple register-based data from Sweden. Clin Kidney J. 2018;11(2):283–8.