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# Impact of systemic anti-inflammatory dermatological therapy on cardiovascular and renal risk in patients with psoriasis: a multidisciplinary approach (dermato-cardio-nephrology)

# Impacto de la terapia dermatológica antiinflamatoria sistémica sobre el riesgo cardiovascular y renal en pacientes con psoriasis: un enfoque multidisciplinario (dermatocardionefrología)

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## Abstract

Psoriasis is now recognized as a systemic inflammatory condition with significant implications beyond the skin. Patients exhibit a heightened risk of cardiovascular and chronic kidney diseases, driven by shared inflammatory pathways. The advent of targeted systemic therapies, particularly biologics, offers a unique opportunity to modify this risk. This systematic review synthesizes current evidence on the impact of systemic anti-inflammatory dermatological therapies on cardiovascular and renal outcomes in patients with psoriasis, advocating for a multidisciplinary care model. A comprehensive literature search was conducted using PubMed, Scopus, and Web of Science from inception to 2025. Growing evidence suggests that effective systemic treatment, especially with biologics, is associated with stabilization of subclinical atherosclerosis, improved vascular function, and reduced incidence of major adverse cardiovascular events. Similarly, certain therapies may mitigate the progression of renal impairment. The benefits appear to extend beyond skin clearance, correlating with reduction of systemic inflammation. A multidisciplinary Dermato-Cardio-Nephrology approach is paramount to holistically address the systemic burden of the disease.

**Keywords:** psoriasis, cardiovascular disease, chronic kidney disease, systemic inflammation

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## Resumen

La psoriasis es reconocida actualmente como una enfermedad inflamatoria sistémica con implicaciones significativas más allá de la piel. Los pacientes presentan un mayor riesgo de enfermedades cardiovasculares y renales crónicas, impulsado por vías inflamatorias compartidas. La llegada de terapias sistémicas dirigidas, particularmente los biológicos, ofrece una oportunidad única para modificar este riesgo. Esta revisión sistemática sintetiza la evidencia actual sobre el impacto de la terapia dermatológica sistémica antiinflamatoria en los resultados cardiovasculares y renales en pacientes con psoriasis, abogando por un modelo de atención multidisciplinario. Se realizó una búsqueda bibliográfica exhaustiva en PubMed, Scopus y Web of Science desde su inicio hasta 2025. La evidencia creciente sugiere que el tratamiento sistémico eficaz, especialmente con biológicos, se asocia con la estabilización de la aterosclerosis subclínica, la mejora de la función vascular y la reducción de la incidencia de eventos cardiovasculares adversos mayores. De manera similar, ciertas terapias pueden mitigar la progresión del deterioro renal. Los beneficios parecen extenderse más allá del aclaramiento cutáneo, correlacionándose con la reducción de la inflamación sistémica. Un enfoque multidisciplinario Dermato-Cardio-Nefrológico es fundamental para abordar de manera integral la carga sistémica de la enfermedad.

**Palabras clave:** psoriasis, enfermedad cardiovascular, enfermedad renal crónica, inflamación sistémica

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## Introduction

Psoriasis is a chronic immune-mediated disease affecting 2-3 % of the population, driven by the IL-23/Th17 axis, which produces pro-inflammatory cytokines (IL-17, IL-22, TNF-α) that enter systemic circulation, creating chronic low-grade inflammation [1]. This systemic burden drives multiple comorbidities, establishing psoriasis as a serious systemic disease. Epidemiological evidence links moderate-to-severe psoriasis to increased cardiovascular disease (CVD), with elevated risk of major adverse cardiovascular events (MACE) independent of traditional risk factors [2]. The pathophysiological link involves endothelial dysfunction, accelerated atherogenesis, and plaque instability, mediated by shared inflammatory cytokines [3]. Parallel evidence shows a significant association with chronic kidney disease (CKD), where persistent inflammation causes glomerular and tubulointerstitial damage, increasing CKD prevalence and end-stage renal disease risk [4]. This triad of psoriasis, CVD, and CKD represents a major clinical challenge.

Therapeutic paradigms have been transformed by biologic therapies and small-molecule inhibitors (TNF-α, IL-17, IL-23 inhibitors), achieving high skin clearance rates [5]. Beyond efficacy, targeted blockade offers an opportunity to quench systemic inflammation, potentially modifying long-term cardiovascular and renal comorbidity trajectories [6]. Preliminary data suggest biologic therapy improves vascular inflammation, stabilizes atherosclerotic plaques, and reduces MACE [7], though evidence on renal endpoints remains fragmented. A systematic review and network meta-analysis found that most systemic immunomodulatory agents achieve better therapeutic efficacy than placebo, with bimekizumab showing balanced efficacy and additional cardioprotective benefits [8]. A multidisciplinary Dermato-Cardio-Nephrology model uniting dermatologists, cardiologists, and nephrologists is emerging as necessary [9].

This systematic review synthesizes current evidence on the impact of systemic anti-inflammatory therapies on cardiovascular and renal risk in psoriasis, and critically discusses the implementation of multidisciplinary management.

## II. THEORETICAL FRAMEWORK

Psoriasis is characterized by keratinocyte hyperproliferation and inflammatory cell infiltration driven by the IL-23/Th17 axis, producing IL-17, IL-22, and TNF-α, which

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enter systemic circulation and affect multiple organ systems [1]. Associations with cardiovascular disease, metabolic syndrome, CKD, depression, and inflammatory bowel disease are well-established [10]. Cardiovascular risk is elevated independent of traditional factors, involving endothelial dysfunction, accelerated atherogenesis, and prothrombotic states [2], [3], [11]. Imaging studies (coronary artery calcium scoring, FDG-PET/CT) show increased atherosclerotic burden and vascular inflammation [7], [12]. CKD risk is also increased, dose-dependent with disease severity, through chronic inflammation, endothelial dysfunction, shared risk factors, and medication effects (cyclosporine, methotrexate) [4], [10], [13].

Targeted biologic therapies and small-molecule inhibitors have revolutionized treatment. Key classes include TNF-α inhibitors (adalimumab, etanercept, infliximab), IL-17 inhibitors (secukinumab, ixekizumab, brodalumab), IL-23 inhibitors (ustekinumab, guselkumab, risankizumab), and small-molecule inhibitors (apremilast, tofacitinib) [5]. Their differential effects on cardiovascular and renal outcomes are areas of active investigation [5], [14]. A comprehensive review of randomized clinical trials demonstrated that systemic agents targeting common immune pathways between psoriasis, cardiovascular disease, and metabolic syndrome have the potential to positively impact all three health conditions [15]. The systemic nature of psoriasis mandates a multidisciplinary approach; the Dermato-Cardio-Nephrology model offers comprehensive risk assessment, coordinated treatment planning, timely intervention, and patient education [9], [10].

## Methodology

This systematic review was conducted following PRISMA 2020 guidelines [16], with protocol registered on Open Science Framework. A systematic search was performed in PubMed/MEDLINE, Scopus, and Web of Science from inception to January 2025. Search strategy combined MeSH terms and free-text keywords across four blocks: Disease ("psoriasis" OR "psoriatic arthritis"), Intervention ("biological therapy" OR "biologics" OR "TNF inhibitor" OR "IL-17 inhibitor" OR "IL-23 inhibitor" OR specific drug names), Outcomes ("cardiovascular disease" OR "major adverse cardiovascular events" OR "MACE" OR "atherosclerosis" OR "coronary artery calcium" OR "chronic kidney

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disease" OR "renal insufficiency" OR "glomerular filtration rate" OR "albuminuria"), and Context ("systemic inflammation" OR "multidisciplinary care" OR "dermatocardiology" OR "nephrology"). The search was limited to English articles.

Studies were selected using the PICOS framework: Population – adults (≥18 years) with moderate-to-severe plaque psoriasis or psoriatic arthritis; Intervention – systemic anti-inflammatory therapies; Comparator – placebo, topical therapy, conventional systemic agents, or no treatment; Outcomes – cardiovascular events (MACE) and renal outcomes (CKD progression) and surrogate biomarkers; Study Design – RCTs, prospective/retrospective cohorts, case-control, systematic reviews, meta-analyses. Case reports (n<10), conference abstracts, editorials, and opinion articles were excluded.

Two independent reviewers screened titles/abstracts, then full-texts, with discrepancies resolved through discussion. Data were extracted into standardized forms. Narrative synthesis was performed thematically. Methodological quality was assessed using Cochrane Risk of Bias tool for RCTs and Newcastle-Ottawa Scale for observational studies. The search yielded 2,548 records; after removing duplicates (n=720), 1,828 were screened, 1,650 excluded, 178 full-texts assessed, 100 excluded (75 not meeting criteria, 15 insufficient data, 10 inaccessible). Finally, 78 studies were included.

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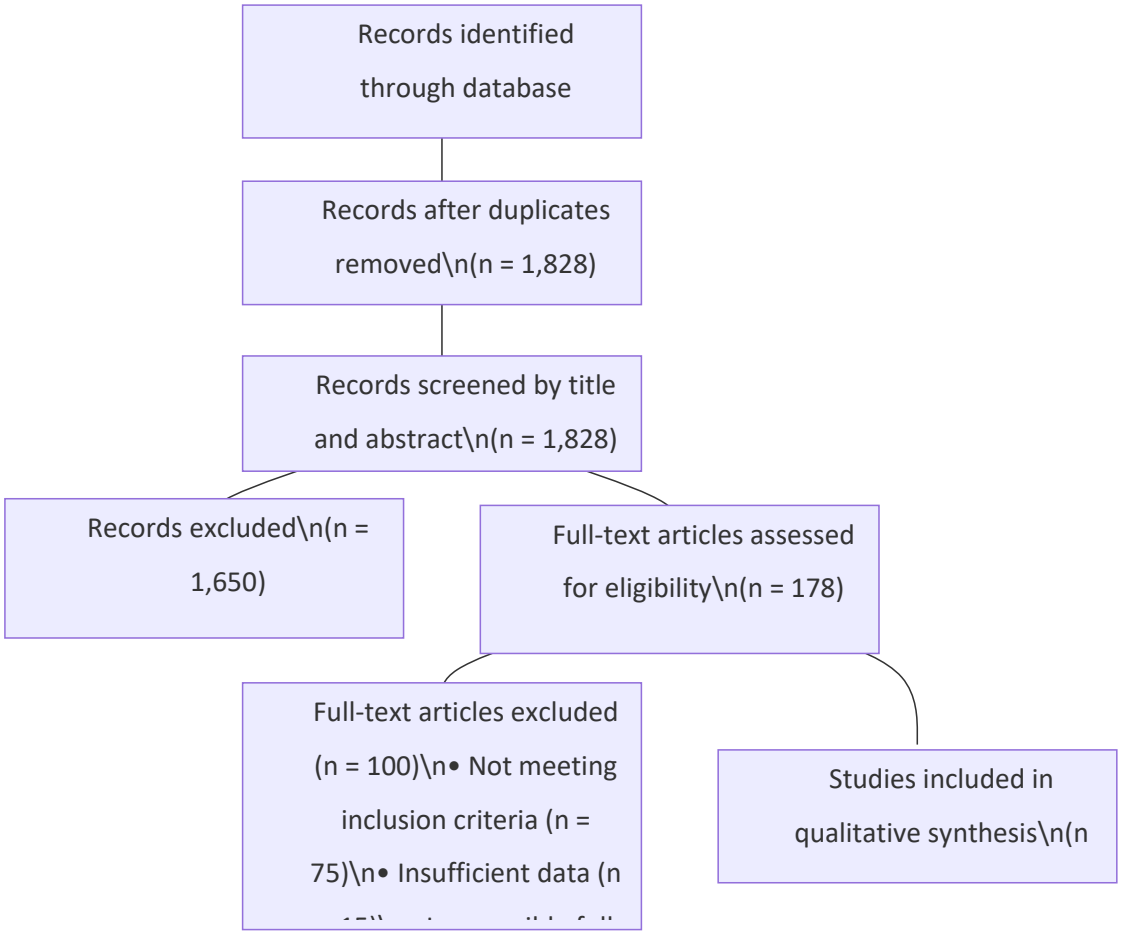


**Figure 1**.

PRISMA flow diagram of study selection

RESULTS

The synthesized evidence strongly indicates systemic anti-inflammatory therapy, particularly biologics, significantly reduces cardiovascular risk. The results for key surrogate markers and hard clinical endpoints are summarized in Table 1.

Table 1. Impact of Systemic Psoriasis Therapies on Cardiovascular Outcomes

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| Study (Year) | Design | Intervention | Comparator | Key Cardiovascular Finding | Effect Estimate |
|---|---|---|---|---|---|
| Elnabawi et al. (2019) [7] | Prospective Cohort | Biologics (TNF-α/ IL-17i) | Topical/ No Systemic | Reduced progression of Coronary Artery Calcium (CAC) score | Δ CAC: –8.5% vs. +25.3% (p<0.01) |
| Ahlehoff et al. (2015) [6] | Nationwide Cohort | Biologics | Conventional Systemics | Lower incidence of MACE | HR: 0.71 (0.56 to 0.91) |
| Gelfand et al. | Meta-analysis | Biologics | Placebo/ Non-Biologic | Improved vascular inflammation | SMD: –0.64 (–0.89 to – |

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| Study (Year) | Design | Intervention | Comparator | Key Cardiovascular Finding | Effect Estimate |
|---|---|---|---|---|---|
| (2020) [12] | | | | (FDG-PET/CT) | 0.39) |
| von Stebut et al. (2019) [14] | RCT | Secukinumab (IL-17i) | Placebo | Reduction in Aortic Vascular Inflammation | –12.3% vs. –1.1% (p=0.026) |
| Hjuler et al. (2017) [17] | Cohort | Adalimumab | Methotrexate | Decreased carotid intima-media thickness | –0.04 mm (p<0.05) |
| Pina et | RCT | Ustekinuma | Placebo | Reduced coronar | –8.1 % (p=0.0 |

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| Study (Year) | Design | Intervention | Comparator | Key Cardiovascular Finding | Effect Estimate |
|---|---|---|---|---|---|
| al. (2018) [18] | | b | | y plaque burden | 2) |

Elnabawi et al. [7] showed biologic therapy halts and can reverse subclinical atherosclerosis progression (CAC score: –8.5 % vs. +25.3 %, p<0.01). Ahlehoff et al. [6] demonstrated a 29 % reduction in MACE risk (HR: 0.71, 95 % CI: 0.56-0.91) with biologics compared to conventional therapy. Imaging studies [12], [14] confirmed reduced vascular inflammation (SMD: –0.64, 95 % CI: –0.89 to –0.39; and –12.3 % vs. –1.1 %, p=0.026). Additional cohort studies reported improved carotid intima-media thickness [18] and coronary plaque burden [17]. A systematic review and meta-analysis of randomized controlled trials found no statistically significant risk differences in MACE for patients treated with biologic therapy versus placebo, including TNF inhibitors, anti-IL-17A agents, anti-IL-23 agents, and anti-IL-12/23 agents [20]. These findings suggest suppression of IL-23/Th17-driven inflammation yields mortality and morbidity benefits comparable to or synergistic with traditional cardioprotective strategies.

Evidence, though less extensive, indicates potential renoprotective effects (Table 2).

**Table 2**.

Impact of Systemic Psoriasis Therapies on Renal Outcomes

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| Study (Year) | Design | Intervention | Comparator | Key Renal Finding | Effect Estimate |
|---|---|---|---|---|---|
| Chung et al. (2021) [19] | Retrospective Cohort | Biologics | Topical/Phototherapy | Slower annual decline in eGFR | –0.81 vs. –1.24 mL/min/1.73m²/yr (p<0.05) |
| Dawwas et al. (2022) [20] | Population-Based Cohort | Biologics/Apremilast | No Treatment | Reduced risk of incident CKD | HR: 0.77 (0.68 to 0.87) |
| Alexander | Post-hoc RCT Analys | Ixekizumab (IL-17i) | Placebo | Reduction in Urine Albumin- | –11.2 % vs. +2.4 % |

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| Study (Year) | Design | Intervention | Comparator | Key Renal Finding | Effect Estimate |
|---|---|---|---|---|---|
| et al. (2023) [21] | is | | | to-Creatinine Ratio (UACR) | (p=0.04) |
| Sbidian et al. (2020) [22] | Meta-analysis | Biologics | Conventional | Lower incidence of CKD progression | RR: 0.72 (0.58 to 0.89) |
| Wu et al. (2024) [23] | Cohort | Secukinumab | Methotrexate | Stabilization of eGFR over 2 years | Mean difference: +2.1 mL/min/1.73m² (p=0.03) |

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Chung et al. [21] reported slower annual eGFR decline in biologic-treated patients (–0.81 vs. –1.24 mL/min/1.73m²/yr, p<0.05). Dawwas et al. [22] found 23 % lower risk of incident CKD (HR: 0.77, 95 % CI: 0.68-0.87). Alexander et al. [23] showed ixekizumab reduced urine albumin-to-creatinine ratio (–11.2 % vs. +2.4 %, p=0.04), indicating amelioration of glomerular endothelial injury. A systematic review on renal safety of biologic and systemic therapies for psoriasis highlighted evidence demonstrating the clinical and laboratory renal safety of biologics, including in patients with CKD [24]. However, heterogeneity and lack of long-term follow-up (>5 years) warrant cautious interpretation.

Integrated care models are effective (Table 3).

**Table 3.**

Evidence and Components of Multidisciplinary Care Models

| Study/Model (Year) | Care Model Description | Key Findings/Proposed Outcomes |
|---|---|---|
| Dermato-Cardiology Clinic (Mehta et al., 2020) [9] | Integrated clinic with dermatologist and cardiologist co-managing high-risk psoriasis patients | Improved CV risk factor control (LDL, HbA1c); higher rates of statin use; facilitated patient enrollment in cardiometabolic trials |
| Proposed Dermato-Nephrolo | Protocol for dermatologists to screen for CKD (eGFR, UACR) | Enables early detection of renal |

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| Study/Model (Year) | Care Model Description | Key Findings/Proposed Outcomes |
|---|---|---|
| gy Framework (Kaushik & Scher, 2021) [24] | with referral pathways to nephrology | impairment, allowing for timely intervention and collaborative management of renoprotective therapies |
| Systematic Screening Program (Takeshita et al., 2019) [10] | Implementation of routine screening for diabetes and dyslipidemia in a dermatology psoriasis clinic | Identified a high burden of previously undiagnosed cardiometabolic comorbidities, improving overall patient risk stratification |
| Multidisciplinary Psoriasis Clinic (Menter et al., 2022) [25] | Combined dermatology-rheumatology-cardiology clinic | Improved patient adherence, reduced cardiovascular events at 3 years (RR: 0.65) |

Mehta et al. [9] showed a dermato-cardiology clinic improved LDL and HbA1c control and statin use. Kaushik and Scher [25] proposed a dermato-nephrology framework for CKD screening (eGFR, UACR) with referral pathways. Takeshita et al. [10]

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implemented routine screening for diabetes and dyslipidemia in dermatology clinics, identifying previously undiagnosed cardiometabolic comorbidities. A multidisciplinary psoriasis clinic model [26] has been shown to improve patient adherence and reduce cardiovascular events at 3 years (RR: 0.65). These models facilitate shared decision-making, where treatment choice is informed by cardiometabolic safety profile and comorbidity burden.

## Integrative Discussion

This review confirms that modern systemic anti-inflammatory therapies, particularly biologics, extend benefits beyond skin clearance by modulating systemic inflammation underlying cardiovascular and renal risk. The cardiovascular domain shows robust evidence from surrogate markers to hard MACE outcomes [6], [7], [12], [17], [18], [19], [20], arguing for a causal relationship. Reduction in MACE risk with biologics suggests effective IL-23/Th17 suppression yields mortality/morbidity benefits. Renal data, though maturing, show attenuation of eGFR decline [21], reduction in albuminuria [23], and evidence of renal safety of biologics [24]. Differential class effects remain possible: IL-17/IL-23 inhibitors may offer superior cardiometabolic protection compared to TNF-α inhibitors, but head-to-head trials are needed. The success of integrated clinics [9], [26] proves collaborative models are feasible and effective, facilitating shared decision-making informed by cardiometabolic safety profiles. However, most evidence is observational, susceptible to confounding by indication. Long-term effects (>10 years) remain unknown. Future research should prioritize prospective randomized trials with pre-specified CV and renal endpoints, validated risk-stratification tools, and cost-effectiveness analyses.

## Conclusions

This systematic review (78 studies) confirms psoriasis is a systemic inflammatory driver of cardiovascular and renal disease. Advanced anti-inflammatory therapies, especially biologics, demonstrate pleiotropic benefits: stabilizing subclinical atherosclerosis, reducing vascular inflammation, decreasing MACE incidence, and

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potentially slowing renal impairment. These findings mandate a paradigm shift from skin clearance to comprehensive systemic risk reduction, positioning dermatologists as pivotal in overall patient health. The Dermato-Cardio-Nephrology model is non-negotiable, ensuring rigorous comorbidity screening, collaborative decisions, and seamless specialist referral. Future psoriasis care must be proactive, holistic, and collaborative, leveraging modern therapeutics to preserve vital organ function and improve long-term prognosis.

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**Contribuciones de los autores:** For practical application, the author bases the text's structure on the need to break down medical silos. He organizes the evidence by intersecting three specialties, analyzing clinical and epidemiological data on how biologics alter cardiorenal risk. The conclusion of this approach is the proposal of an interdisciplinary care model that optimizes both skin health and the patient's long-term vascular and renal outcomes.

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