

Representation of Patients with Renal Disease in Wound Healing Intervention Studies

Kirtana Sandepudi, MS¹; Krish V. Shah²; Bradley A. Melnick, BS¹; Kristin Huffman, BS¹; Robert D. Galiano, MD, FACS¹

¹Division of Plastic & Reconstructive Surgery, Northwestern University Feinberg School of Medicine, ²Case Western Reserve University School of Medicine, Cleveland, OH

Background

- Renal failure and chronic kidney disease leading to impaired wound healing due to various factors including nutritional imbalances, anemia, and neuropathy
- DFUs are one of the most common chronic wounds in this population
- Calciphylaxis is rare but highly morbid and most often associated with renal disease
- There are no clear guidelines on wound healing interventions that are effective for this patient population

Research Objectives

The purpose of this review is to:

1. Quantify the representation of patients with renal disease (PWRD) in literature discussing wound healing interventions for DFU and calciphylaxis
2. Compare efficacy of interventions in patients with and without renal disease

Methods

- Systematic review of wound healing literature for DFU and calciphylaxis from 2013-2023 was conducted on PubMed, Embase, Cochrane, MedLine, and Web of Science, following PRISMA guidelines
- Primary outcome: inclusion of patients with CKD or renal failure.
- Secondary outcomes: number of PWRD and specific wound healing parameters.

Figure 1. Overall representation in last 10 years

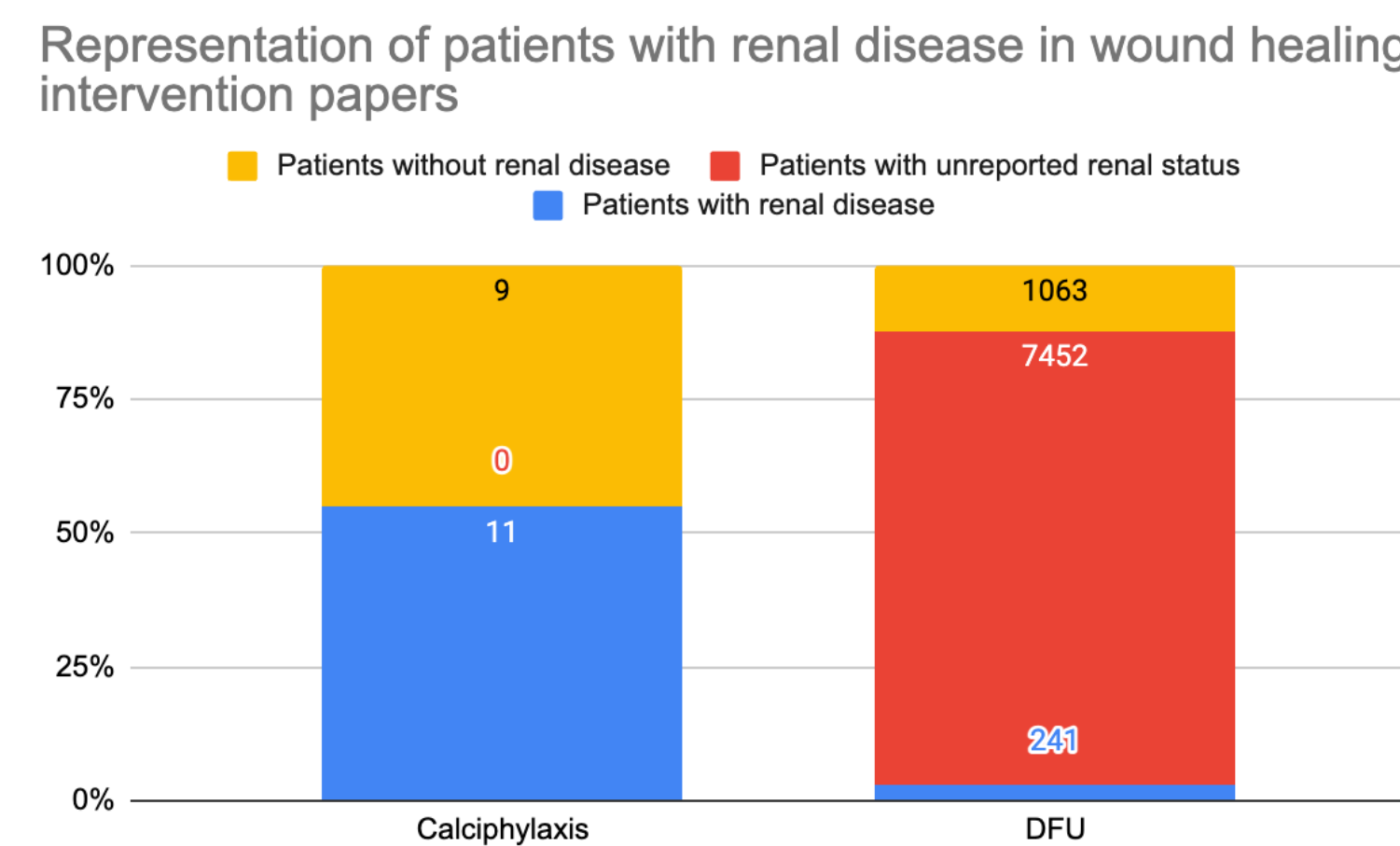


Figure 1. Proportion of patients with renal disease in papers investigating wound healing interventions for DFU and lower extremity calciphylaxis

Figure 2. Trends in Representation (2013-23)

Trend in representation of patients with renal disease from 2013-2023

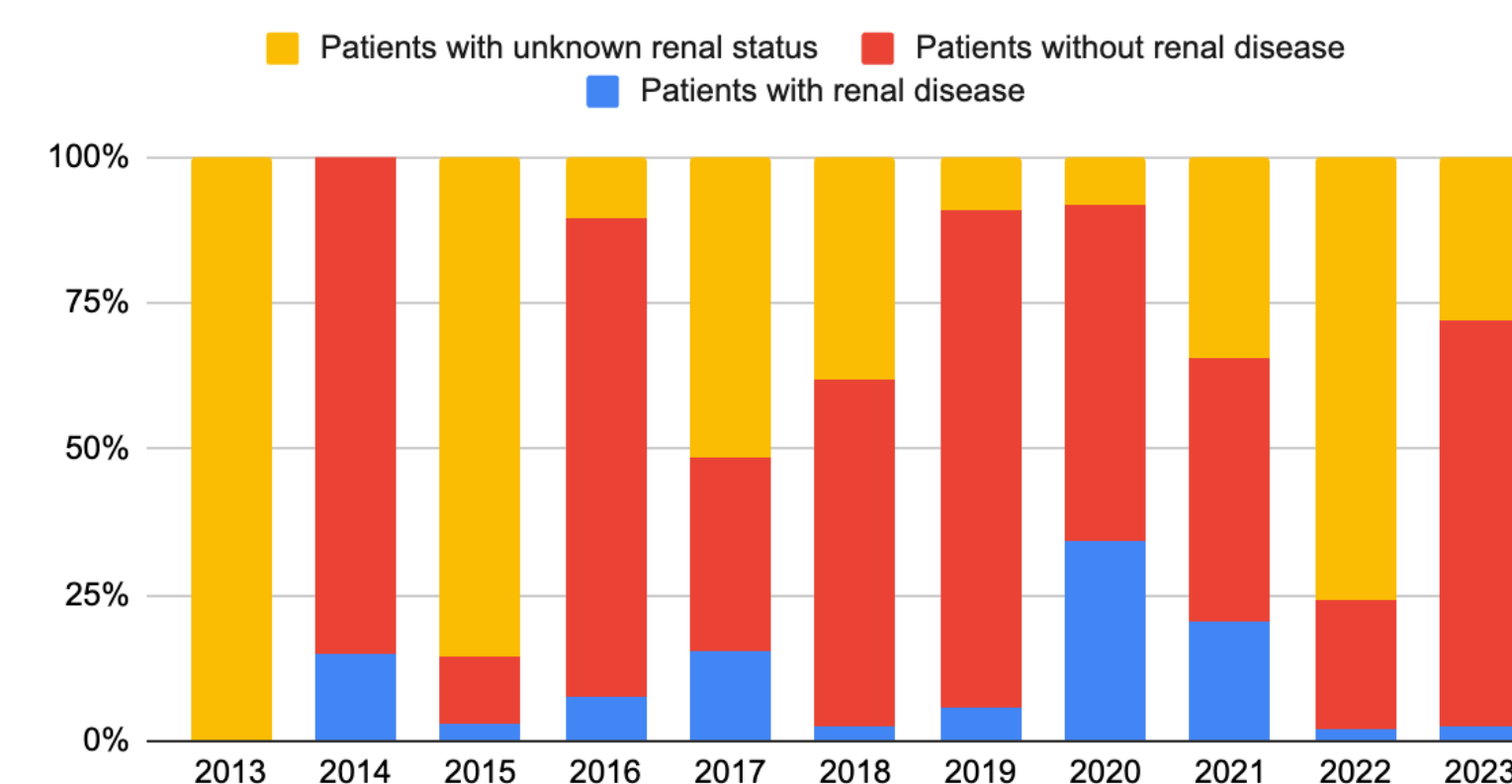


Figure 2. Proportion of patients with renal disease in wound healing intervention studies, stratified by year, from 2013-2023

Results - Representation

- After title/abstract and full text reviews, 82 papers were analyzed
- Only 37% of papers explicitly included PWRD. Of these, 63% included CKD 1-4 while 33% included ESRD (p<0.05)
- 40% explicitly excluded PWRD. The remaining papers did not report inclusion or exclusion of PWRD.
- 2.8% of patients in DFU papers were PWRD, 55% of patients in calciphylaxis papers were PWRD (p = 0.001, Figure 1)
- No significant difference in representation between 2013-2017 vs. 2018-2023 (Figure 2)

Results – Wound Healing Outcomes

- Only 4 DFU papers compared outcomes in patients with and without renal impairment – all reported worse outcomes in PWRD
 - Free flap transfers → higher failure rate among PWRD
 - Split thickness skin graft → slower healing ulcers among PWRD
 - Dakin’s solution → higher rate of amputation
 - US with microbubbles → increased time to complete healing

Limitations and Conclusions

- PWRD are severely underrepresented in wound healing literature. Representation has not increased over the last 10 years
- Wound healing interventions are less effective in PWRD
- There is a dire need for research geared toward wound healing in this patient population
- Limitations: lack of RCTs, many retrospective papers and case reports included. Lack of quantitative data focused on PWRD. Limited data on calciphylaxis.