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Defining Cardio-renal-metabolic (CRM) Syndrome: A Targeted Literature Review

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Abstract

Background: The cardiovascular, renal, and metabolic systems are intricately linked. Diseases of these systems, such as type 2 diabetes (T2D), chronic kidney disease (CKD), atherosclerotic cardiovascular disease, and heart failure (HF), have overlapping etiologies and shared risk factors, and two or more of these conditions frequently occur in the same patient. The interplay between diseases of these systems has been termed cardio-renal-metabolic (CRM) syndrome.

Methods: A targeted literature review was conducted to identify contemporary definitions of CRM syndrome. The PubMed database and online media were searched for sources published in English between January 1, 2018 and June 1, 2023. Sources were included if they defined CRM syndrome holistically, rather than as individual conditions.

Results: Seventeen sources met the inclusion criteria and included a definition of CRM syndrome. Ten (58.8%) sources described treatment; five (29.4%) reported epidemiology; and three (17.7%) described pathophysiology. Sixteen (94.1%) definitions included kidney conditions defined by estimated glomerular filtration rate (eGFR), including CKD, end-stage renal disease, or decreased eGFR. T2D was the most frequently included metabolic condition (94.1%), with fewer sources including obesity (29.4%) or non-alcoholic fatty liver disease/non-alcoholic steatohepatitis (11.8%). There was greater variability in conditions included in cardiovascular definitions: HF was most common (82.4%), followed by myocardial infarction and stroke (each 41.2%).

Conclusion: Definitions of CRM syndrome were variable, but most definitions included renal impairment and T2D. Clinicians are increasingly called upon to adopt integrated care strategies to account for comorbidities and risk factors across all 3 systems, rather than isolated, individual conditions.

Key words: Cardiovascular, Renal, Metabolic, Diabetes, Heart Failure

Abbreviations: Cardio-renal-metabolic (CRM), type 2 diabetes (T2D), chronic kidney disease (CKD), heart failure (HF), estimated glomerular filtration rate (eGFR)

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Ethical approval: This literature review was not subject to ethical approval.