Int Angiol. 2020 Nov 25. doi: 10.23736/S0392-9590.20.04538-1. Online ahead of print.

Cardiovascular disease and stroke risk assessment in patients with chronic kidney disease using integration of estimated glomerular filtration rate, ultrasonic image phenotypes, and artificial intelligence: a narrative review

Ankush D Jamthikar [1], Anudeep Puvvula [2], Deep Gupta [1], Amer M Johri [3], Vijay Nambi [4], Narendra N Khanna [5], Luca Saba [6], Sophie Mavrogeni [7], John R Laird [8], Gyan Pareek [9], Martin Miner [10], Petros Sfikakis [11], Athanasios Protogerou [12], George D Kitas [13], Andrew Nicolaides [14], Aditya M Sharma [15], Vijay Viswanathan [16], Vijay S Rathore [17], Raghu Kolluri [18], Deepak L Bhatt [19], Jasjit S Suri [20]

Affiliations

PMID: 33236868 DOI: 10.23736/S0392-9590.20.04538-1

Abstract

Chronic kidney disease (CKD) and cardiovascular disease (CVD) together result in an enormous burden on global healthcare. The estimated glomerular filtration rate (eGFR) is a well-established biomarker of CKD and is associated with adverse cardiac events. This review highlights the link between eGFR reduction and that of atherosclerosis progression, which increases the risk of adverse cardiovascular events. In general, CVD risk assessments are performed using conventional risk prediction models. However, since these conventional models were developed for a specific cohort with a unique risk profile and further these models do not consider atherosclerotic plaque-based phenotypes, therefore, such models can either underestimate or overestimate the risk of CVD events. This review examines the approaches used for CVD risk assessments in CKD patients using the concept of integrated risk factors. An integrated risk factor approach is one that combines the effect of conventional risk predictors and noninvasive carotid ultrasound image-based phenotypes. Furthermore, this review provides insights into novel artificial intelligence methods, such as machine learning and deep learning algorithms, to carry out accurate and automated CVD risk assessments and survival analyses in patients with CKD.

Related information

MedGen

LinkOut – more resources

Full Text Sources

Minerva Medica

Research Materials

NCI CPTC Antibody Characterization Program

Miscellaneous

NCI CPTAC Assay Portal