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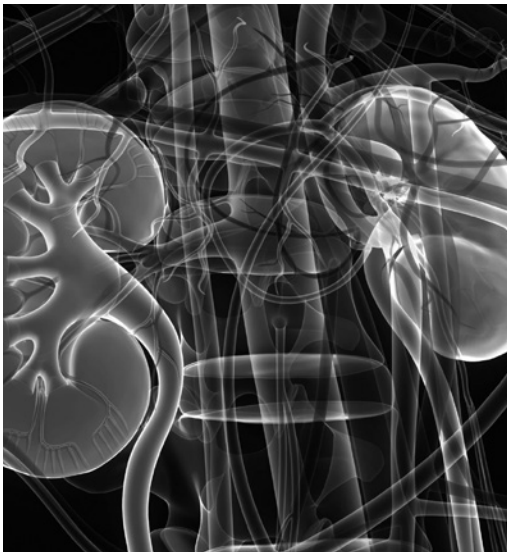
Chronic Kidney Disease (CKD) Edition

Central hemodynamics and arterial health research insights

672 papers and abstracts
published between 2008-2024*

Here are some of the highlights.



Preventing kidney dysfunction in youth | October 2021

Pulse Wave Velocity, Central Haemodynamic Parameters, and Markers of Kidney Function in Children

Močnik and team aimed to assess the relationship between markers for kidney disease (serum cystatin C, creatinine, and microalbuminuria) with arterial stiffening (pulse wave velocity (PWV)) in children at risk of subclinical kidney damage. The results demonnstrate a significant correlations between serum creatinine and PWV in children and adolescents at greater risk of subclinical kidney damage, especially in those with multiple cardiovascular risk factors, indicating both their cardiovascular and renal risk. This suggests maintaining lower PWV could be utilised as a preventative marker in paediatric nephrology for children both at risk or have subclinical kidney dysfunction.

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Central Blood Pressure a | August 2021
more sensitive and specific risk parameter

Association of central arterial blood pressure and left ventricular hypertrophy in patients with chronic kidney disease

Left ventricular hypertrophy (LVH) is a common cardiovascular complication of chronic kidney disease (CKD), closely associated with increased cardiovascular morbidity and mortality. Ruyi Cai and colleagues demonstrated that even within a CKD population, Central pulse pressure exhibited higher sensitivity and specificity compared to brachial pulse pressure for determining LVH. The study's findings indicate that CBP serves as a superior predictor of LVH risk. Advocating for early identification and treatment of elevated CBP mitigates the risk of LVH and subsequent cardiovascular complications in CKD patients.

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Identifying Risk Phenotypes of | April 2022
organ damage

Comparison of Risk of Target Organ Damage in Different Phenotypes of Arterial Stiffness and Central Aortic Blood Pressure

Zuo's team investigated the correlation of various vascular phenotypes, such as arterial stiffness and blood pressure status, and target organ damage. The results found that patients exhibiting both elevated pulse wave velocity (PWV) and central blood pressure (CBP) face heightened risks of chronic kidney disease (CKD). Notably, individuals with solely elevated CBP display an increased risk of abnormal albumin-to-creatinine ratio (ACR), signifying early stages of renal impairment. This suggests that elevation of central aortic blood pressure, distinct from PWV, may serve as an early indicator of renal impairment.

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*As of March 2024, results from PubMed Central using "SphygmoCor" as the search term.

CONNEQT Health

Pulse wave analysis | November 2018 **enhancing hemodialysis treatment**

Impact of hemodialysis on cardiovascular system assessed by pulse wave analysis

In individuals with severely dysfunction kidneys, hemodialysis enables filtration of blood but in turn it significantly increases cardiovascular burden. Debowska and colleagues found that pulse wave analysis features (systolic, augmented and pulse pressure) were significantly different at the end of dialysis. The subendocardial viability ratio (SEVR) was strongly correlated with hydration levels during hemodialysis. The estimation of SEVR from the aortic waveform specifically helps inform fluid management during treatment to maintain cardiac function. Pulse-wave analysis parameters are easily measurable and accessible which monitor sudden cardiovascular changes which can help prevent overhydration during hemodialysis treatment.

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Cognitive decline | September 2018 **identified by vascular changes**

Arterial damage and cognitive decline in chronic kidney disease patients

The team led by Laurent investigated the correlation between vascular function and cognitive decline in chronic kidney disease (CKD) patients. The findings suggest that both arterial stiffness (cf-PWV), and central pulse pressure are elevated in CKD patients with known cognitive decline, as assessed by the Mini-Mental State Examination (MMSE). The observed correlation of vascular health with both brain function and CKD proposes that patients may experience parallel deterioration. Early detection of elevated central pulse pressure and arterial stiffening could help not only identify risk of CKD but also help mitigate cognitive decline and improve overall outcomes.

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Vascular function treatment in renal disease | February 2020

Pharmacologic Therapies for Aortic Stiffness in End-Stage Renal Disease: A Systematic Review and Meta-Analysis

Most pharmacologic interventions that target aortic stiffness in renal disease are associated with mixed effects to vascular function. A team led by Agharazii conducted a meta-analysis to determine which targeted aortic stiffness therapies improve PWV and SBP measures. Multiple therapies, vitamin D and renin angiotensin system inhibitors, did not show any added benefit than placebo groups. However, calcium channel blockers showed a controlled decrease of both PWV and SBP beyond standard care. This indicates that incorporating this therapy could have reduced cardiovascular burden within renal affected cohorts.

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Meta-analysis: Vitamin D | February 2019 **supplementation reducing arterial stiffness**

Vitamin D supplementation for the improvement of vascular function in patients with chronic kidney disease: a meta-analysis of randomized controlled trials

Vitamin D deficiency is linked to chronic kidney disease (CKD) progression and vascular dysfunction. Dou and colleagues conducted a meta-analysis of seven randomized controlled trials involving 429 CKD patients. Results showed that Vitamin D treatment correlated with a significant decrease in pulse wave velocity, indicating reduced arterial stiffness. Interestingly, no significant differences in blood pressure were observed. Therefore, these findings suggest that vitamin D supplementation may improve vascular health by reducing arterial stiffness, independent of blood pressure changes.

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