In emergency department patients requiring resuscitation room care, can Doppler Renal Resistive Index predict the development of acute kidney injury?

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Abstract

In recent years, Renal Resistive Index (RRI) has emerged as a promising predictor of the reversibility of acute kidney injury (AKI) in critically ill patients. Multiple studies in critical care identify elevated RRI as a useful prognostic indicator, not only of persistent renal damage but, of poor overall patient outcome.

The determinants of RRI are complex, reflecting systemic vascular compliance and other haemodynamic and anthropometric factors, including central arterial pressure, heart rate, use of β-blockers, fluid load and cardiovascular damage. As understanding of the interdependence of these contributory factors and their impact on RRI has improved, the potential for raised RRI to predict which patients may be susceptible to an episode of AKI becomes apparent.

There are no known curative therapies for the progressive renal damage caused by AKI; therefore early recognition and development of preventive strategies are essential (NICE2013). Identification of patients at risk of AKI at the time of admission to hospital would allow early implementation of a protective care bundle to prevent irreversible renal damage.

The aim of this study is to evaluate whether ultrasound measurement of Renal Resistive Index (RRI) is a feasible and clinically useful method of early detection of sub-clinical AKI and identification of AKI risk in patients requiring resuscitation room care.