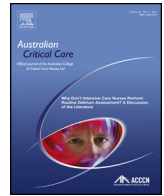




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Best nursing review paper

Contrast media induced nephropathy: A literature review of the available evidence and recommendations for practice



Hiba Deek RN, PhD Candidate^{a,*},
Phillip Newton RN, PhD^{b,1},
Noella Sheerin RN, PhD Candidate^a,
Samar Noureddine RN, PhD, FAHA^{c,2},
Patricia M. Davidson RN, PhD, FAHA^{d,3}

^a University of Technology, Sydney, Centre for Cardiovascular and Chronic Care, Australia

^b Centre for Cardiovascular and Chronic Care, Faculty of Health, Level 7, Building 10, City Campus, PO Box 123, Broadway, NSW 2007, Australia

^c Rafic Hariri School of Nursing, American University of Beirut, Lebanon

^d St Vincents Hospital, Sydney, Faculty of Nursing, Midwifery and Health, Level 7, Building 10, Jones Street, Broadway, NSW 2007, Australia

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ABSTRACT

Background: Contrast media induced nephropathy (CIN) is a sudden compromise of renal function 24–48 h after administering contrast medium during a CT scan or angiography. CIN accounts for 10% of hospital acquired renal failure and is ranked the third cause of acquiring this condition. Identifying patients at risk through proper screening can reduce the occurrence of this condition.

Purpose: This review paper aims to critique current evidence, provide a better understanding of CIN, inform nursing practice and make recommendations for bedside nurses and future research.

Method: An integrative review of the literature was made using the key terms: “contrast media”, “nephritis”, “nephropathy”, “contrast media induced nephropathy scores”, “acute kidney failure”, “acute renal failure” and “acute kidney injury”. MeSH key terms used in some databases were: “prevention and control”, “acute kidney failure” and “treatment”. Databases searched included Medline, CINAHL and Academic Search Complete, and references of relevant articles were also assessed. The search included all articles between the years 2000 and 2013.

Results: Sixty-seven articles were obtained as a result of the search, including RCTs, systematic reviews, and retrospective studies.

Conclusion: Contrast media induced nephropathy is an iatrogenic complication occurring secondary to diagnostic or therapeutic procedures. At times it is unavoidable but a systematic method of risk assessment should be adopted to identify high risk patients for tailored and targeted approaches to management interventions.

Clinical implications: As the use of contrast media is increasing for diagnostic purposes, it is important that nurses be aware of the risk factors for CIN, identify and monitor high risk patients to prevent deterioration in renal function when possible.

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* Corresponding author. Tel.: +61 403422585.

E-mail addresses: hiba.a.deek@student.uts.edu.au, hiba.deek@gmail.com

(H. Deek), phillip.newton@uts.edu.au (P. Newton),

Noella.J.Sheerin@student.uts.edu.au (N. Sheerin), sn00@aub.edu.lb (S. Noureddine),

patriciamary.davidson@uts.edu.au (P.M. Davidson).

¹ Tel.: +61 2 9514 2858; fax: +61 2 9514 4474; mobile: +61 0411 057 056.

² Tel.: +961 1350000x5966.

³ Tel.: +61 2 9514 7822; fax: +61 2 9514 7823.

Background

Diagnostic radiology using contrast media is an important part of the clinical management of many conditions, yet this is not without complications.¹ The complexity of clinical management increases with the growing burden of chronic illnesses and population ageing; thus, addressing preventable complications is of high importance. Contrast media induced nephropathy (CIN) is a sudden compromise of renal function 24–48 h² or up to 72 h³ after administering contrast medium during a CT scan or angiography.

This compromise is manifested by an increase in serum creatinine level of more than 25% of the baseline^{2,4} peaking at days 2–5⁵ and remaining high for up to 14 days before returning to the patient's baseline.⁶

Contrast induced nephropathy accounts for 10% of hospital acquired acute renal failure,² and is ranked third after dehydration and administration of nephrotoxic drugs.⁷ In Canada it is reported that 11–14.5% of acute renal failure cases are due to the administration of contrast in diagnostic studies.⁸ In the United States (US), more than 1 million radiology studies are done using contrast agents where 150,000 (15%) of these cases developed CIN.² Although a reversible condition,⁶ CIN will be responsible for one in six patients in intensive care units experiencing either decreased kidney function, increased length of hospital stay or need for dialysis after the administration of a contrast agent.⁹ Acute renal failure or what is now named acute kidney injury is the increase in creatinine level of more than 0.3 mg/dl (27 μ mol/l) within 48 h, increase of more than 50% of the baseline creatinine level within 7 days or oliguria lasting for more than 6 h.¹⁰ This condition in critically ill patients is of multiple causes such as antibiotic usage, sepsis, hypovolemia and hypotension.⁹ However, the potential iatrogenic consequences highlight the importance of identifying individuals at risk. Critically ill patients are at much higher risk of acquiring acute kidney injury than their more stable counterparts. These patients have higher incidences of morbid conditions such as sepsis, anaemia, use of mechanical ventilation and inotropes administration, and are subjected to more invasive procedures and catheterisations.¹¹ When assessing ICU patients in a regression model for the impact of their medical history on severity of their kidney function status, they were found to be at higher risk for reaching class F on the RIFLE (Risk, Injury, Failure, Loss, End stage renal disease) classification. This finding was accurate if they had higher scores on severity indexes such as APACHE (Acute Physiology and Chronic Health Evaluation) III and SOFA (Sequential Organ Failure Assessment score) scores, older aged, had a history of some degree of chronic insufficiency, and previous hospital admission.¹² Further, the level of damage varies across different

types and generations of contrast media. Decisions on which contrast agent to use are based on diagnostic tests, patient population and what is expected to be outlined in the diagnostic test. Cardiovascular and critical care nurses who are monitoring and caring for individuals undergoing diagnostic radiology play a critical role in preventing complication, if they have an understanding of the risks for CIN and the available prevention strategies.¹³ This paper aims to review and critique the current evidence, identify the incidence and risk factors for acquiring contrast-induced nephropathy, provide an understanding of its pathophysiology, inform nursing practice and identify strategies for preventing CIN in critically ill patients.

Method

An integrative review¹⁴ was undertaken. This method allows for all, experimental and non-experimental studies to be included in the analysis thus enhancing a comprehensive output of evidence based resources. The key terms used for this search included: “contrast media”, “nephritis”, “nephropathy”, “contrast media induced nephropathy scores”, “acute kidney failure”, “acute renal failure”, “acute kidney injury”, “critically ill”, “prevention and control” and “treatment”. Databases searched included Medline, CINAHL, UpToDate, and Academic Search Complete. Search limits were human research, English language, and adults; data search included articles between the years 2000 and 2013. This search strategy (outlined in Fig. 1) was supervised by a health librarian.

Results

This search came back with 67 articles; 33 papers were intervention studies with the majority being randomised control trials (28). These studies have shown a range of controversial results in the recommendation of practices to prevent CIN. Eight articles addressed retrospective studies; twenty-five articles addressed high risk patients who were undergoing cardiac catheterisation

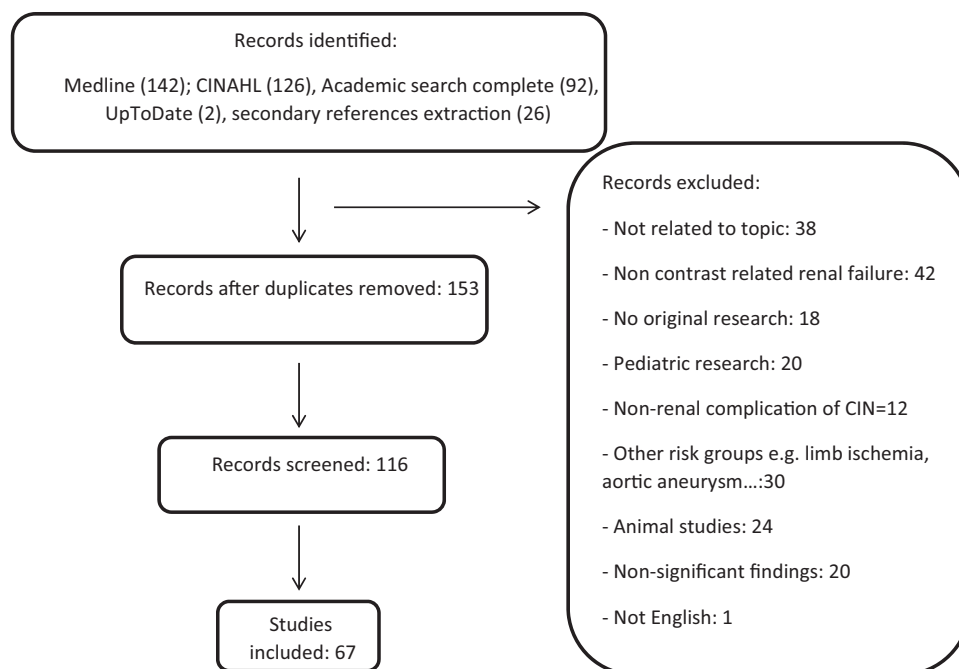


Fig. 1. Study flow diagram.

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