Gadolinium-Based Contrast Agent-Enhanced Magnetic Resonance Imaging in Patients with Renal Dysfunction: **Clinical Decision Support Tool**

Canadian Society of Cardiovascular MRI | Société Canadienne de l'IRM Cardiovasculaire

Low Risk of Nephrogenic Systemic Fibrosis (NSF)

Estimated glomerular filtration rate (eGFR) > 30mL/min/1.73m²
AND
No history of renal transplantation
AND
No previous dialysis or hospitalization for acute kidney injury (AKI)

↓

No eGFR lab test needed

↓

Macrocyclic or newer linear agents are *safe*.

Increased Risk of NSF

Admitted to hospital with significant/decompensated cardiac disease
OR
AKI in the past month
OR
eGFR of < 30mL/min/1.73m² in the past 6 months

↓

eGFR lab test recommended prior to GBCA administration:

eGFR: _____

↓

eGFR = 30 – 90mL/min/1.73m²

↓

Macrocyclic or newer linear agents are *safe*.

↓

Severe or acutely unstable renal function (AKI, eGFR < 30mL/min/1.73m², or on dialysis)

↓

Older linear agents are contraindicated.

Macrocyclic or newer linear agents may be considered if:

- There is no alternative diagnostic imaging test
- The benefit of a GBCA-enhanced MRI outweighs the risk associated with not performing the GBCA-enhanced MRI
- The patient provides informed consent

Ensure post-scan follow-up and monitoring:

Dialysis patients: ensure dialysis within 24 hours post GBCA MRI, ideally within 2 hours post GBCA MRI

Primary care provider: continue screening for NSF post-exposure for two years

Decision

- ☐ Severe or acutely unstable renal function (AKI, eGFR < 30mL/min/1.73m², or on dialysis): Case-by-case decision, if decision to proceed consider GBCA-enhanced MRI using a newer linear or macrocyclic agent
- ☐ eGFR between 30 and 90mL/min/1.73m²: Proceed with GBCA-enhanced MRI using a newer linear or macrocyclic agent
- ☐ Low risk of NSF: Proceed with GBCA-enhanced MRI

Classification of Gadolinium-Based Contrast Agents (GBCAs): Recommended Use in Patients with Renal Dysfunction

Group	Agent	Indication
Group I (Older linear agents) • Agents associated with the greatest number of NSF cases	Gadodiamide (Omniscan®) Gadopentetate dimeglumine (Magnevist®) Gadoversetamide (OptiMARK®)	Contraindicated for patients with eGFR < 30mL/min/1.73m^2
Group II (Newer linear and macrocyclic agents) • Agents associated with few, if any, unconfounded NSF cases	Gadobenate dimeglumine (MultiHance®) Gadobutrol (Gadovist®, Gadavist®) Gadoterate acid (Dotarem®) Gadoteridol (ProHance®)	Safe for patients with eGFR between 30-90 mL/min/1.73m^2
Group III • Agents for which data remains limited regarding NSF risk, but for which few, if any unconfounded NSF cases have been reported	Gadoxetate disodium (Primovist®, Eovist®)	Consider on case-by-case basis for patients with acutely unstable renal function, AKI, eGFR <30 mL/min/1.73m^2 and/or on dialysis

The 2021 CCS/CSCMR/CHRS Joint Statement on Safety of Magnetic Resonance Imaging recommends use of macrocyclic or newer linear gadolinium-based contrast agents (GBCAs) in preference to older GBCAs when indicated for certain Magnetic Resonance Imaging (MRI) scans. Newer GCBAs are safer than older agents for patients with increased risk risk of nephrogenic systemic fibrosis (NSF).

Pre-read the MRI Safety Joint Statement and engage the health care team plus hospital administration to implement this clinical decision support tool into your institution. This tool features information from the: Joint Statement CCS/CSCMR/CHRS Safety of Magnetic Resonance Imaging Position Statement. CJC, 2021, 37(6), pp.835-847. The information presented is based on the best available evidence in September 2022 and may change in the future.

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