Prevention of Contrast Media Associated Adverse Drug Events - Adult/Pediatric - Inpatient/Ambulatory
External Clinical Practice Guideline Endorsement

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Plan for Review:
All Clinical Practice Guidelines are reviewed at a minimum of every five years.

Introduction

Contrast media are an essential component of modern medical imaging. While the safety of contrast media use has improved over time, there remains a non-negligible degree of risk that is dependent on situation-specific factors; therefore, for each patient, practitioners must weigh the risk of contrast-associated adverse events against the potential benefit of enhanced imaging from the use of contrast media.

To ensure the optimal use of contrast media, UW Health endorses recommendations from the American College of Radiology (ACR) (ACR Manual on Contrast Media; [2020 Version 10.3])[1] and the National Kidney Foundation (Consensus Statements from the American College of Radiology and the National Kidney Foundation [*Radiology* 2020; 00:1-9]).[2] Additional UW Health-specific recommendations for the management of patients receiving interleukin-2 therapy, timing of hemodialysis, and management of hypertensive crisis are provided.

Scope

Intended Users

Physicians, Advanced Practice Providers, Registered Nurses, Radiologic Technologists, Pharmacists, Radiology support staff

Objective

To provide standardized, evidence-based, system-wide guidelines for the administration and care of patients receiving contrast media.

Target Population

Pediatric and adult patients requiring contrast media and presenting to Radiology or Medical Imaging departments.

Clinical Questions Considered

- Safe administration of contrast media
- Prevention of contrast-induced acute kidney injury
- Prevention and management of contrast media-associated reactions
- Prevention and management of contrast media extravasation

Definitions

Contrast-associated acute kidney injury (CA-AKI): Any AKI occurring within 48 hours after the administration of contrast media.[2] The term postcontrast acute kidney injury (PCAKI) is synonymous with CA-AKI and appears in radiology guidelines. Both terms imply correlative diagnosis, but neither term implies a causal relationship between contrast medium administration and an AKI event.

Contrast-induced acute kidney injury (CI-AKI): CI-AKI is the subset of CA-AKI that can be causally linked to contrast media administration.[2] CI-AKI implies a causal relationship between intravenous contrast media and the development of AKI (ie, contrast induced).

Recommendations

Prevention and management of contrast-induced acute kidney injury and adverse reactions

UW Health endorses recommendations from the American College of Radiology (ACR Manual on Contrast Media; [2020 Version 10.3])[1a] and the National Kidney Foundation (Consensus Statements from the American College of Radiology and the National Kidney Foundation [*Radiology* 2020; 00:1-9]).[2b]

Contrast media use in patients receiving interleukin-2 therapy

Patients who are currently receiving or were recently treated with IL-2 therapy may have an increased risk of delayed reactions.[3–5] Providers should provide education on the potential risk of delayed reactions and may consider observation of a patient who is currently receiving or was recently treated (eg, within 6 months) with IL-2 therapy for 30 minutes after administration of contrast media *(UW Health GRADE Moderate, conditional recommendation)*.

Timing of dialysis after contrast media administration in renal dialysis patients

For most patients with CKD, the initiation or rescheduling of acute dialysis or continuous renal replacement therapy is not required due solely to the administration of contrast media.[2] However, for patients established on dialysis, providers may consider adjustment of the dialysis schedule so that dialysis occurs within 24-48 hours after contrast administration with the goal to reduce intravascular load (*UW Health GRADE Strong, conditional recommendation)*. This recommendation is based on expert consensus and considers the theoretical risk of pulmonary edema and anasarca with potential osmotic overload.

Treatment of contrast reaction-associated hypertensive crisis in adults

Clonidine may be considered as an oral treatment option for patients with contrast reaction-associate hypertensive crisis who have a contraindication to nitrates (eg, nitroglycerin) or other standard anti-hypertensive therapies (UW Health GRADE Moderate, *conditional recommendation*).[6,7] Use of clonidine should be avoided in patients with heart failure, heart block, or hypertensive encephalopathy due to risks of sedation and neurological assessment interference.

Disclaimer

Clinical practice guidelines assist clinicians by providing a framework for the evaluation and treatment of patients. This guideline outlines the preferred approach for most patients. It is not intended to replace a clinician's judgment or to establish a protocol for all patients. It is

[a]Available at: https://www.acr.org/Clinical-Resources/Contrast-Manual
[b]Available at: https://pubs.rsna.org/doi/10.1148/radiol.2019192094

understood that some patients will not fit the clinical condition contemplated by a guideline and that a guideline will rarely establish the only appropriate approach to a problem.

Methodology

Development Process

Each guideline is reviewed and updated a minimum of every 3 years. All guidelines are developed using the guiding principles, standard processes, and styling outlined in the UW Health Clinical Practice Guideline Resource Guide. This includes expectations for workgroup composition and recruitment strategies, disclosure and management of conflict of interest for participating workgroup members, literature review techniques, evidence grading resources, required approval bodies, and suggestions for communication and implementation.

The workgroup members agreed to adopt recommendations developed by external organizations and/or created recommendations internally via a consensus process using discussion of the literature and expert experience/opinion. If issues or controversies arose where consensus could not be reached, the topic was escalated appropriately per the guiding principles outlined in the UW Health Clinical Practice Guideline Resource Guide.

Methods Used to Collect/Select the Evidence

The following sources were used by the guideline authors and workgroup members to conduct electronic database searches for the collection of additional evidence. Searches were extended to reviews and studies conducted in humans and published in English between 1980 and 2020. Reference lists of relevant studies were also reviewed.

Literature Sources

- Electronic database search (e.g., MEDLINE)
- Databases of systematic reviews (e.g., Cochrane Library)
- Agency for Healthcare Research and Quality Reports

Search Terms Included

- Interleukin
- Contrast reaction
- Adverse reaction
- Recall reaction
- Delayed reaction
- Dialysis
- Hemodialysis
- Hemofiltration
- Contrast
- Iodinated contrast
- Gadolinium

Current resources from University of Wisconsin Department of Radiology and UW Health Hospitals & Clinics were also reviewed and reconciled with the ACR Manual on Contrast Media **See Collateral Tools and & Resources**.

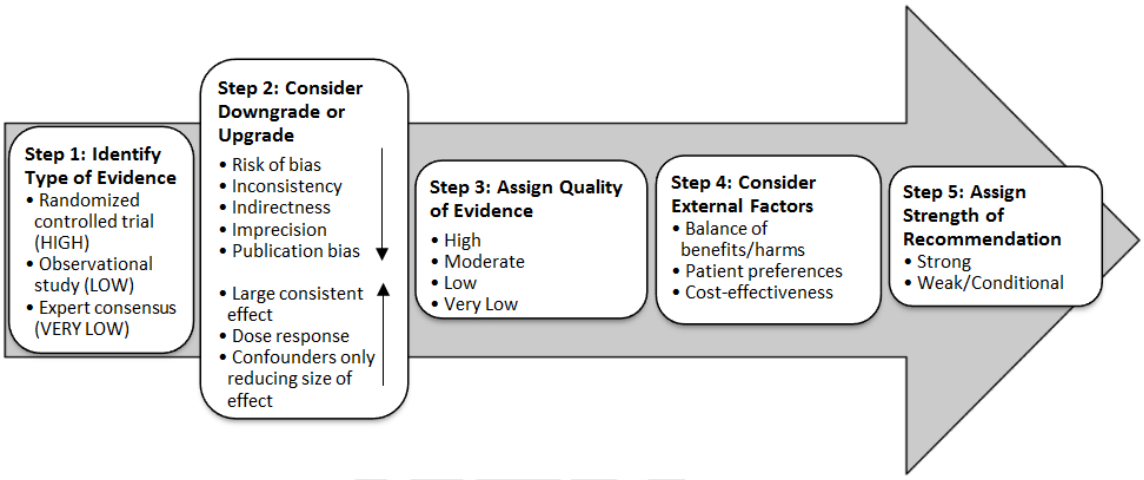
Methods Used to Assess the Quality of the Evidence/Strength of the Recommendations:

Recommendations developed by external organizations maintained the evidence grade assigned within the original source document and were adopted for use at UW Health.

Internally developed recommendations, or those adopted from external sources without an assigned evidence grade, were evaluated by the guideline workgroup using an algorithm adapted from the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology. **See Figure 1**.

Rating Scheme for the Strength of the Evidence/Recommendations

Figure 1. GRADE Methodology adapted by UW Health



GRADE Ranking of Evidence

High	We are confident that the effect in the study reflects the actual effect.
Moderate	We are quite confident that the effect in the study is close to the true effect, but it is also possible it is substantially different.
Low	The true effect may differ significantly from the estimate.
Very Low	The true effect is likely to be substantially different from the estimated effect.

GRADE Ratings for Recommendations for or Against Practice

Strong	The net benefit of the treatment is clear, patient values and circumstances are unlikely to affect the decision.
Conditional	Recommendation may be conditional upon patient values and preferences, the resources available, or the setting in which the intervention will be implemented.

Collateral Tools & Resources

The following collateral tools and resources support staff execution and performance of the evidence-based guideline recommendations in everyday clinical practice.

UW Health Hospitals & Clinics

Order Sets & Smart Sets (pending revision)

- IP- Contrast Induced Nephropathy Prophylaxis- Heart Failure
- IP- Contrast Induced Nephropathy Prophylaxis- Adult

Contrast Treatment Prophylaxis

Order Sets & Smart Sets

- IP- Intravenous Iodinated/Gadolinium Contrast Prophylaxis- Adult – Supplemental
- OP- Intravenous Iodinated/Gadolinium Contrast Prophylaxis- Adult – Supplemental
- ED/IP- Radiology Rapid Contrast Reaction Prophylaxis- Adult - Supplemental

Protocols

- OP - Delegation Protocol for Surgical Oncology – Adult

Contrast Reaction Treatment

Order Sets & Smart Sets

- IP/OP – Contrast Reaction Treatment – Adult
- IP/OP – Contrast Reaction Treatment – Pediatric

References

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