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INPLASY

Waiting for the creatinine: kidney function–based gating of contrast-enhanced imaging and time to care in the emergency department. A systematic review

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ADMINISTRATIVE INFORMATION

Support - No support.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 31 August 2026 and was last updated on 8 November 2026.

INTRODUCTION

Review question / Objective (1) In adults in the emergency department (ED) who need contrast-enhanced CT or CT angiography, does gating contrast on kidney function (waiting for a creatinine or eGFR result, thresholds for withholding or modifying contrast, or point-of-care testing to speed the decision) prolong time to imaging or ED length of stay? (2) Are policies that relax gating associated with contrast-associated acute kidney injury, dialysis or death? A third question on eGFR-stratified contrast versus non-contrast cohorts was removed before screening and reserved for a separate review.

Rationale Many EDs require a creatinine or eGFR result before contrast-enhanced CT and withhold or modify contrast below a threshold. Consensus guidance and observational studies indicate that the kidney risk of intravenous contrast has been overstated, whereas the time cost of waiting for kidney function (delay to imaging and longer ED stays) has not been synthesized for emergency care; a health technology assessment of point-of-care creatinine addressed outpatients only.

Condition being studied Adults needing contrast-enhanced CT or CT angiography in the emergency department (suspected stroke, pulmonary embolism, aortic syndromes, abdominal emergencies); contrast-associated acute kidney injury.

METHODS

Search strategy Four concept blocks combined with AND: (1) emergency department OR emergency room; (2) contrast OR CT angiography OR computed tomography angiography OR CTA; (3) creatinine OR eGFR OR glomerular filtration OR renal function OR kidney function; (4) delay OR door-to OR time to OR length of stay OR turnaround OR threshold OR screening OR point-of-care OR contrast-induced OR contrast-associated OR acute kidney injury OR contrast nephropathy. Translated with MeSH and Emtree terms and database syntax for PubMed, Embase,

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Web of Science and Scopus; searched 7 November 2026 without date or language limits. Full strategies are reported in the review supplement.

Participant or population Adults in the emergency department or emergency care setting who need or receive iodinated contrast-enhanced CT or CT angiography.

Intervention Kidney function-based gating of contrast: waiting for a creatinine or eGFR result before contrast; thresholds or screening protocols for withholding or modifying contrast; point-of-care creatinine testing to speed the decision; or explicit policies of not waiting for kidney function (relaxed gating).

Comparator No gating, a different threshold or strategy, faster (point-of-care) testing, or the period before a policy change. Single-arm studies of explicit no-wait policies are retained as non-comparative safety evidence.

Study designs to be included Primary studies of any design: randomized trials, non-randomized comparative studies, before-and-after and quality improvement studies, cohort studies, root-cause analyses of imaging delay, and single-arm cohorts of explicit no-wait policies; conference abstracts eligible. Excluded: reviews, editorials, case reports, analytical validation studies of creatinine analyzers, and studies of contrast exposure without a gating policy.

Eligibility criteria Adults in the ED needing contrast CT or CT angiography in whom kidney function gating was applied, modified or deliberately not applied, reporting a process or kidney outcome. No date or language restrictions. At title and abstract screening a record was excluded only if a criterion was clearly not met.

Information sources PubMed (four strategies, NCBI E-utilities), Embase, Web of Science Core Collection and Scopus, searched 7 November 2026 without date or language limits; Cochrane CENTRAL (33 trial records) screened manually. Scopus and Embase result pages were read directly because exports were unavailable. Linked journal reports of conference abstracts were identified by author search.

Main outcome(s) Process: time to imaging, CT turnaround, ED length of stay, and delay attributable to kidney function testing. Safety (co-primary): contrast-associated acute kidney injury as defined by each study, dialysis and mortality.

Additional outcome(s) Proportion of patients in whom contrast was withheld or modified because of kidney function.

Data management Records were deduplicated by DOI and normalized title. Two blinded instances of a large language model (Claude, Anthropic) screened titles and abstracts, assessed eligibility and extracted data, recording each value as printed with its source location; a consensus pass resolved disagreements against the source text. The authors reviewed and verified all decisions and extracted values.

Quality assessment / Risk of bias analysis RoB 2 (randomized trials) and ROBINS-I (non-randomized studies) were planned. Because several included studies were available only as abstracts, domain-level ratings were not completed; design-level threats to validity are reported instead. Certainty of evidence was rated by outcome with GRADE and adopted by the authors.

Strategy of data synthesis Included studies differed in design, population, exposure and outcome definitions, and only one small trial was randomized; no meta-analysis was performed. Findings are synthesized without meta-analysis following the SWiM guideline, grouped by outcome domain (delay attribution, process times, kidney outcomes).

Subgroup analysis None performed; studies are grouped by outcome domain and imaging indication is described for each study.

Sensitivity analysis Because no pooling was performed, the planned leave-one-out and risk-of-bias sensitivity analyses were not applicable; findings were instead examined after restricting attention to studies read in full text.

Language restriction: No language restrictions.

Keywords emergency department; contrast media; computed tomography angiography; creatinine; point-of-care testing; acute kidney injury; time-to-treatment; length of stay.

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