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Absence of nephrogenic systemic fibrosis in patients with end-stage renal disease and prophylactic hemodialysis for protection against nephrogenic systemic fibrosis

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Objectives: Recommendations inform hospital policies that patients with end-stage renal disease (ESRD) must undergo hemodialysis to prevent gadolinium (Gd)-based contrast agent (GBCA)-induced nephrogenic systemic fibrosis (NSF) following a magnetic resonance imaging (MRI) study. However, the risk of NSF in ESRD patients on hemodialysis and the efficacy of prophylactic hemodialysis for protection against NSF are not well understood or summarized in the literature.

Methods: This retrospective observational cohort study identified all intravenous GBCA injections for MRI examinations performed at two tertiary referral hospitals between 2005 and 2020 to determine the risk for NSF related to frequency and duration per dialysis session, nature of Gd preparation, and Gd dosage.

Results: Overall, 1,129 ESRD patients (60.8% men; mean age 62.5 ± 13.2 years) had 1,461 Gd-MRI scans (41.5% gadoterate, 39.4% gadobutrol, 7.7% gadoxetate, and 6.7% gadopentetate); a total of 1030 (91.2%) patients had undergone hemodialysis on the day of the MRI study. In 57.4% of patients, frequent hemodialysis had been performed urgently and then twice more on consecutive days to prophylactically avoid NSF, and 12.5% of patients had undergone dialysis on the next scheduled procedure date. The time per dialysis session was 202.5 ± 39.8 mins, and the total dialysis time was 10.5 ± 2.8 hours within five days of the receipt of GBCA. No cases of NSF were founded over the follow-up period.

Conclusions: In this study, no patients developed NSF during follow-up, even after multiple Gd doses in some. Analysis failed to highlight statistically lower rates of NSF in the patients who undergo prompt and frequent prophylactic hemodialysis compared to patients undergoing dialysis as regularly scheduled. Our findings support a significant decrease in documented cases of NSF as the market share of group II GBCAs increased, and dialytic prophylaxis urgently within 4 hours of the receipt of GBCA is of no benefit.