

# Incidence of Nephrogenic Systemic Fibrosis at Chinese PLA General Hospital

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**Methods: MRI database** The total number of patients receiving gadolinium for MRI or MRA was obtained from our PACS database which includes data dating back to in March, 2005. Type and amount of GBCA administered was determined based upon the hospital formulary and practice patterns as follows: each inpatient received Gd:DTPA (Magnevist, Bayer Schering Pharma AG, Berlin, Germany) and each outpatient received Gd-DTPA (Beijing Beilu Pharmaceutical Company, Beijing, China). Gadobenate Dimeglumine (MultiHance, Bracco, Milan, Italy) was used at a dose of 15ml for complex liver cases. By clinical routine, the dose was 15ml for head, neck and spine examinations including carotid artery examinations, or up to 20ml in patients weighing more than 80kg, and 20ml for thorax (mediastinum and breast), abdomen, pelvis and musculoskeletal examinations, and up to 30ml for vascular examinations. The dose for myocardial perfusion and viability MR examination was body-weight based double dose (0.2 mmol/kg). For all pediatric patients, the dose was also based upon weight at 0.1mmol/kg. **Dermatopathology** records were search for cases of NSF and entities that can have a similar histopathological appearance including lipodermatosclerosis, scleroderma, morphea, scleromyxedema and eosinophilic fasciitis. Those cases were then reassessed based upon the current criteria for NSF<sup>(1-4)</sup>. **Clinical Database** was searched for patients carrying the diagnosis of chronic kidney disease (CKD) (in stage 4-5 of CKD) or acute renal failure and the dialysis patients who received GBCA, the clinical notes were examined to determine if any rashes developed in the 3-months period following GBCA administration.

**Results:** 29,315 (male 17,673, female 11,642) patients received GBCA for MRI or MRA during the 3 years 8 months period of investigation. Review of the Dermatology and Dermatopathology database identified 17 outpatients who were diagnosed with scleroderma (n=12), morphea (n=3) or scleromyxedema (n=2). None of these outpatients had renal dysfunction. Five inpatients diagnosed as scleroderma had renal failure. Re-review of their clinical notes and histological slides by dermatopathologists showed that none of these patients had NSF. For the 4727 renal failure patients, 118 had GBCA enhanced MR examinations (2.5%), and for the 1244 dialysis patients, 33 had GBCA enhanced MR examination (2.7%). None of these 151 patients developed NSF. Table 1 shows the result of renal failure patient number and GBCA MR examination type in this group.

**Discussion:** The association between GBCA and NSF reported in the western literature has not been observed as frequently in China. Our data involving 29,315 GBCA injections of Gd-DTPA and gadobenate dimeglumine at doses slightly exceeding 0.1mmol/kg and without screening for renal function as well as rigorous review of histological sections of similar skin conditions shows that actually there are no cases of NSF in our military hospital, the largest in China. This raises the possibility that NSF is less common in China. Possible explanations for the reduced incidence of NSF in our hospital could include: (1) we used ionic linear GBCA not non-ionic linear GBCA, so that our patients were not exposed to the low stability agents<sup>(5,6)</sup>. (2) A lower ratio of renal failure and hemodialysis in our data and fewer patients with renal transplants. (3)GBCA was used from standard dose to double dose, while ultra high dose has never been applied. Another reason is a widespread, albeit incorrect, belief among Chinese physicians that MR contrast agents have similar pharmacokinetics to iodinated contrast agents and may carry a similar risk of nephrotoxicity. This likely explains why GBCA enhanced MRI was performed in only 2.5% of renal failure patients and 2.7% of dialysis patients and the overwhelming majority of renal failure and dialysis patients did not receive GBCA. Even though we have not yet any cases of NSF, we are increasingly careful in the use of GBCA in the renal failure patients<sup>(7)</sup>.

## References:

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**Table 1.** MRI performed in CKD patients with renal failure and on hemodialysis

Examination type Patients	Head, neck and spine	Abdomen, pelvic	Renal MRA
Chronic renal failure	28	49	15
Acute renal failure	16	9	1
Hemodialysis	16	14	3