NSF vs. CIN: Aggregated Screening, Safety, and Protocol Tools for Contrast Imaging in the Setting of Renal Insufficiency

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Published online: 25 October 2016
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App Specs

App icon URL: <https://lh3.googleusercontent.com/srQPrxNtigavrVQuMJeuDvC9iBHaLpAlzKGhbtCGkjH885lcGYBEqVuFRJJgCQBJFQ=w300-rw>

App name: Contrast Media: NSF vs CIN

App developer: Sandro Fenelon

App developer website: <https://www.google.com/url?q=http://nsfvscin.blogspot.com&sa=D&usg=AFQjCNE6hwNCYi80bRBTRljzaS9fBwXr2w>

App price: \$0.99 retail; sponsored app review

Apple App Store URL: <https://itunes.apple.com/us/app/nephrogenic-systemic-fibrosis/id1105665081?mt=8>

Google Play Store URL: <https://play.google.com/store/apps/details?id=br.com.nsf>

Category: educational, reference, clinical

Tags: clinical, reference, educational, paid, contrast, nephropathy, NSF, CIN

Works offline: Y

FDA approval: N

Promotion code: 3XHQRERG1WWDXS1MCU3K624

Quick Review

(1 star: lowest/5 stars: highest)

Overall rating (1–5): 3.5

Content (1–5): 3

Usability (1–5): 4

This app aggregates multiple eGFR calculators into a single app and integrates text-based contrast imaging protocol decision support. Data for both CIN and NSF for respective contrast media subclasses are conveniently centralized and summarized, with tailored presentation of evidence-based risk estimates and suggested protocol guidance for a given eGFR. This can facilitate protocolling decisions for patients with borderline renal function by providing a single reference for both MR and CT contrast agents, which is unique among app-based eGFR calculators.

Cons: Unclear or not explicitly stated what risk prediction model is implemented for estimation of NSF and CIN risk for a given eGFR. Although targeted to all “healthcare professionals in their daily practices, including nurses, radiology technologists, medical students, interns, residents, clinicians, surgeons, oncologists, nephrologists, urologists, gastroenterologists, radiologists and other medical specialists,” the potential beneficiaries of this app are primarily the radiologist and technologist involved in study protocolling, and for these users, the cost of the app may be justified.

At a glance: Convenient aggregation of multiple eGFR calculators, integrated with a risk prediction model for NSF and CIN and text-based decision support for guidance in choosing between subclasses of contrast media. Although targeted to all healthcare professionals, the potential beneficiaries of this app are primarily the radiologist and technologist involved in study protocolling, and for these users, the cost of the app may be justified.

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← MDRD

mg/dL umol/L

SCr

Age

Gender ☐ ☐

African American ☐ ☐

This equation is valid only in persons between 18 and 70 years old.

eGFR
mL/min/1.73 m²

NSF vs. CIN risk →

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Fig. 1 eGFR calculation by MDRD equation

Full Review

Intro: Contrast-associated kidney injury is a well-described and controversial clinical entity which remains without an accepted mechanism of injury. Numerous clinical definitions have been established based on strict laboratory criteria for contrast-induced nephropathy (CIN), in part as an effort to build accurate risk prediction models. Accurate estimates of the risk of CIN and the rare case of nephrogenic systemic fibrosis (NSF) are essential to imaging patients with contrast-enhancement safely and appropriately, especially in the setting of existing renal impairment.

Purpose/features/content: This app provides a convenient aggregation of multiple resources relevant and useful for screening and protocolling of patients ordered for contrast-enhanced imaging. As contrast-associated injury is an active area of clinical research, a single-app access to multiple commonly cited eGFR calculators is potentially a convenient feature for research imaging protocols and chart review. Calculated eGFR can then be used to generate risk estimates for NSF (with gadolinium contrast subclass-specific guidelines) and CIN (with iodinated

contrast subclass-specific guidelines). App content in general is well cited from reputable sources and recognized domain experts.

Usability: Content is well organized and easily accessible in real-time when protocol questions arise from technologists and/or referrers. Where appropriate, relevant evidence-based statements are provided as a reference to contextualize recommendations. In many cases, other considerations including the sensitivity and specificity of a particular imaging modality or practical limitations such as MRI access at night supercede contrast-specific considerations. Nonetheless, ready access to subclass-specific contrast recommendations is potentially useful in borderline cases.

Good: This app is easy to use, is relatively inexpensive, and seems to be informed by a reliable evidence base.

Room for improvement: Unclear or not specifically stated what risk prediction model is being used for NSF and CIN risk estimates. On a similar note, although a list of references is provided, evidence-based contrast guidance statements provided for a given eGFR are themselves not cited. Given the controversy associated with CIN in the literature including variability in how it is defined, it would be additionally helpful to contextualize

← NSF vs. CIN

Contrast Media (intravenous)

Gadolinium-based contrast media

Caution.

The estimated risk of NSF is 1% to 7%.

Consult/discuss with nephrologist and/or referring physician.

Avoid group I agents. Strongly consider low-risk, macrocyclic agents such as gadoterate meglumine, gadoteridol and gadobutrol or ionic linear gadobenate dimeglumine. See table 1.

Clear documentation of date, dose and name of the contrast material, and rationale behind using the agent.

Patient consent should be obtained.

Or
A diagnostic non-contrast enhanced MRI/MRA

Or
Consider alternative imaging modalities

Physicians should consider the risks and benefits of using GBCAs and the diagnostic accuracy of different imaging modalities in each clinical setting.

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Fig. 2 NSF and CIN risk estimates for calculated eGFR

Fig. 3 Contrast media subclass-specific risk

recommendations if these citations were explicitly provided along with some commentary on the strength of evidence.

Fig. 4 Aggregated eGFR calculators

Screenshots (minimum of two)

Figures 1, 2, 3, and 4