# Differing definitions of contrast-induced nephropathy

**To the editor:**

We read with great interest the original article by Mueller et al. [1]. They found that applying the combination of intravenous and oral volume supplementation results in a very low incidence of contrast-induced nephropathy (CIN).

Mueller et al. noted that the incidence of CIN is 1.4% and this incidence is lower than that previously reported in similar patient populations and supply 17 references to support this. When we looked at the references we found that the patient population in these references was not similar to that studied by Mueller et al. With one exception, all of the study patients in the references had impaired renal function. However, in the study by Mueller et al. the baseline serum creatinine was normal (0.91 mg/dl). Pre-existing renal insufficiency is the most important risk factor for CIN. The incidence of CIN is less than 2% in the general population with normal baseline creatinine value but it is more than 20% in patients with an increased baseline serum creatinine level [2]. Another important point in these 17 references was that only three of the referenced studies used the definition of CIN as a rise in serum creatinine of ≥0.5 mg/dl above the baseline value. The other studies used both a ≥25% and a ≥0.5 mg/dl rise in serum creatinine or a ≥25% increase in serum creatinine alone. CIN is commonly defined as a rise in serum creatinine of ≥25% or ≥0.5 mg/dl above the baseline value within 48 h after contrast administration [3]. The incidence rates of CIN are sensitive to the definition used. The incidence of CIN is considerably lower when the definition of at least a 0.5 mg/dl absolute increase is used. In their discussion, Mueller et al. noted that the incidence of CIN was 14.5% in a study by McCullough et al., but when we looked at the paper by McCullough et al. we found that they had used two different definitions for CIN [4]. The incidence of CIN is 14.5% when they take the definition of a ≥25% rise in serum creatinine and the incidence of CIN decreased to 3.9% when they use the definition of an increase in serum creatinine of at least 0.5 mg/dl within 48 hours after the PCI as Mueller et al. used in their study.

For this reason, the method used in the study by Mueller et al. does not permit a discussion on the effect of the combination of intravenous and oral volume supplementation on the development of CIN and they cannot conclude that their comprehensive hydration strategy is responsible for the low incidence of CIN.

*Correspondence:*
*Omer Toprak, MD*
*Department of Medicine*
*Division of Nephrology*
*Vanderbilt University School of Medicine*
*1161 21st Avenue South*
*and Garland, S-3223 MCN*
*Nashville, TN 37232–2372*
*USA*
*E-Mail: info@omertoprak.com*

## References

1 Mueller C, Seidensticker P, Buettner HJ, Perruchoud AP, Staub D, Christ A, Buerkle G. Incidence of contrast nephropathy in patients receiving comprehensive intravenous and oral hydration. Swiss Med Wkly 2005;135:286–90.
2 Toprak O, Cirit M, Bayata S, Yesil M. Review of the radiocontrast nephropathy risk profiles and risk stratification. Anadolu Kardiyol Derg 2004; 4:331–5.
3 Morcos SK, Thomsen HS; European Society of Urogenital Radiology. European Society of Urogenital Radiology guidelines on administering contrast media. Abdom Imaging 2003;28:187–90.
4 McCullough PA, Wolyn R, Rocher LL, Levin RN, O'Neill WW. Acute renal failure after coronary intervention: incidence, risk factors, and relationship to mortality. Am J Med 1997;103:368–75.

**Author's reply:**

We fully agree with Dr. Toprak that the incidence of contrast-induced nephropathy (CIN) is sensitive to the definition used. The definition of CIN applied in our study (increase in serum creatinine of at least 0.5 mg/dl within 48 hours) is very common. The incidence of CIN in our study (1.4%) was lower than reported in other studies applying an identical definition of CIN and including comparable patients [1–3]. Rates observed in these studies range from 3.3% to 18.9% [1, 3]. When evaluating studies regarding the incidence of CIN, it is important to note that besides baseline renal function, several other variables including acute myocardial infarction, contrast volume, and the frequency and completeness of serum creatinine measurements after the contrast procedure determine the rate of CIN [1]. However, we fully agree with Dr. Toprak that our results have to be seen in conjunction with the results of recent randomized controlled trials of volume supplementation in order to fully appreciate the importance of comprehensive intravenous and oral volume supplementation [3, 4].

*Christian Mueller, MD, FESC*
*University Hospital Basel*
*Petersgraben 4*
*CH-4031 Basel*
*E-Mail: chmueller@uhbs.ch*

## References

1 Rihal CS, Textor SC, Grill DE, et al. Incidence and prognostic importance of acute renal failure after percutaneous coronary intervention. Circulation 2002;105:2259–64.
2 Mueller C, Seidensticker P, Buettner HJ, et al. Incidence of contrast nephropathy in patients receiving comprehensive intravenous and oral volume supplementation. Swiss Med Wkly 2005; 135:286–90.
3 Trivedi HS, Moore H, Nasr S, et al. A randomized prospective trial to assess the role of saline hydration on the development of contrast nephropathy. Nephron Clin Pract 2003;93:c29–c34.
4 Bader BD, Berger ED, Heede MB, et al. What is the best hydration regimen to prevent contrast media-induced nephrotoxicity? Clin Nephrol 2004;62:1–7.

Swiss
Medical Weekly

Official journal of
the Swiss Society of Infectious disease
the Swiss Society of Internal Medicine
the Swiss Respiratory Society

## The many reasons why you should choose SMW to publish your research

*What Swiss Medical Weekly has to offer:*

- SMW's impact factor has been steadily rising, to the current 1.537
- Open access to the publication via the Internet, therefore wide audience and impact
- Rapid listing in Medline
- LinkOut-button from PubMed with link to the full text website http://www.smw.ch (direct link from each SMW record in PubMed)

- No-nonsense submission – you submit a single copy of your manuscript by e-mail attachment
- Peer review based on a broad spectrum of international academic referees
- Assistance of our professional statistician for every article with statistical analyses

- Fast peer review, by e-mail exchange with the referees
- Prompt decisions based on weekly conferences of the Editorial Board
- Prompt notification on the status of your manuscript by e-mail
- Professional English copy editing
- No page charges and attractive colour offprints at no extra cost

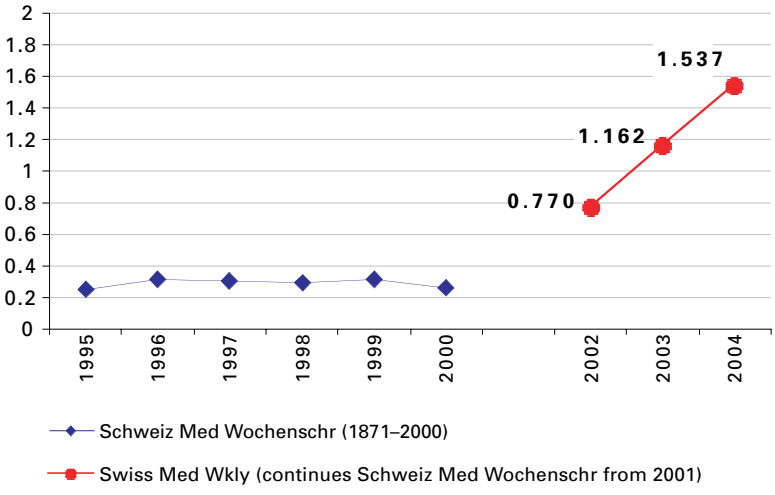


We evaluate manuscripts of broad clinical interest from all specialities, including experimental medicine and clinical investigation.

We look forward to receiving your paper!

Guidelines for authors:
http://www.smw.ch/set_authors.html

**Impact factor Swiss Medical Weekly**




EMH FMH Schwabe
Editores Medicorum Helveticorum

*All manuscripts should be sent in electronic form, to:*

EMH Swiss Medical Publishers Ltd.
SMW Editorial Secretariat
Farnsburgerstrasse 8
CH-4132 Muttenz

Manuscripts: submission@smw.ch
Letters to the editor: letters@smw.ch
Editorial Board: red@smw.ch
Internet: http://www.smw.ch