granted free of charge speaks to the commercial nature of some publications and reinforces that secondary publication is for the benefit of the scientific community, not the publisher. American and international copyright law must be followed.

The *JNM* Editor in Chief has already addressed the issue of authorship in the May editorial "Authorship: Rite, Right, or Write of Passage?" (*5*). As for the difference in the number of authors, only the lead author can authoritatively comment on that. However, the difference in the number of subjects in the study population probably necessitated the involvement of additional investigators.

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Deconvolution Analysis or Renal Outflow Efficiency?

TO THE EDITOR: In their article on renographic analysis, Fleming and Kemp (*1*) compared mean transit time (MTT), obtained by deconvolution, and renal outflow efficiency (ROE) and concluded that both are useful in quantifying transit but with their own limitations: MTT to its requirement of time invariance and ROE to its dependence to overall renal function. Although there is no doubt that these conclusions are valid, it might be interesting to compare the impact of these limitations in clinical practice.

As mentioned by the authors (*1*), 1 limitation of MTT is the assumption of time invariance. During a renographic study, this requirement is not entirely fulfilled because back pressure from bladder filling may change the renal emptying during the procedure; moreover renal emptying is not a continuous phenomenon but occurs by propagation of contraction waves. We agree however that these 2 factors will probably only slightly affect the deconvolution analysis. Unfortunately, the baseline renogram offers, in clinical situations such as hydronephrosis and suspicion of obstruction, only a limited contribution: a continuous ascending curve tells us only that there is an impairment of transit, and the quantification of this impairment constitutes only an intellectual exercise. In such a case, the logical step is to use a diuretic, which may help differentiate a simple renal stasis with good response to furosemide from a more complicated situation, in which the response is poor. If the furosemide is administered at the end of the renogram (the so-called F+20 test), the urinary flow is going to change abruptly in the minutes after the injection of the diuretic. As a consequence, the assumption of stationarity is violated and the deconvolution technique is not applicable anymore. The same is true when the diuretic is given at the moment of the tracer injection (F0 test) or at any time during the renographic acquisition, because the urinary flow is not identical at the beginning and end of the renogram. Only in case of early injection of furosemide (F-15 test) can one assume that a stable urinary flow will be attained at the time of the renographic acquisition. Even then—and this was emphasized by the authors as well—the value of maximal transit time should be shorter than the duration of the renographic acquisition. This is not true in many of the cases of possible obstruction, in which MTT underestimates the duration of renal transit.

Regarding ROE, the authors produced simulated curves that tend to demonstrate that, for same values of MTT, ROE may be different, depending on the level of overall renal function (*1*). The authors highlighted the fact that MTT strictly reflects the transit whereas ROE does not. However, the model they used is oversimplified: they assume that the kidney is a simple tube, therefore neglecting the existence of a wide spectrum of transit times and exaggerating the effect of renal clearance. In a recent study (*2*), we tested the influence of the renal clearance on ROE using several spectrums of transit times. Although there was obviously an influence of renal clearance on ROE, regardless of tracer type, this influence was minimal. In conclusion, it is not fair to bring to the same level the disadvantages of both methods. In the particular case of the dilated kidney with high suspicion of renal obstruction, MTT is of limited value, whereas ROE seems to be a promising parameter in evaluating the kidneys' true capacity for emptying.

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REPLY: We thank Piepsz and Ham for their interest in our recent article and note their essential agreement with our findings (*1*). Most of their comments are very reasonable and helpful. In particular, we agree that renal outflow efficiency (ROE) seems to be a natural parameter for quantifying a response to an intervention during a renographic study. However, we feel that their conclusions that mean transit time (MTT) is of no value and that the dependence of ROE on renal function can be ignored are not supported by the facts.

Piepsz and Ham correctly point out that quantitative values of MTT are only strictly valid using an F-15 protocol. However, in this situation, which is arguably the optimal way of carrying out renography, the MTT may be as good a parameter as ROE or possibly even better given its independence of renal function. In