Dear Sir:

We read with great interest the article by Yamada et al (1), entitled “Simplified nutritional screening tools for patients on maintenance hemodialysis.” In view of the high prevalence of malnutrition in hemodialysis patients and the important prognostic implications of nutritional management in such a population (2–4), the authors tested the accuracy of several nutritional screening tools (all those proposed between 1985 and 2005) to validate the potential application of at least one of them in routine evaluation. Of these, the geriatric nutritional risk index (GNRI) showed the highest accuracy according to the malnutrition-inflammation score (MIS), and a cutoff of <91.2 has been proposed (1). This article might have interesting implications in clinical practice; therefore, we believe that additional focus should be provided.

Reliable evaluation of nutritional status unfortunately still requires a multidisciplinary approach. In this respect, simple, feasible, and alternative assessment tools have been proposed to overcome limitations, such as time consumption, laborious measurements, costs, and the need for specific skills. In agreement with Yamada et al, we support the efforts of those seeking to validate such instruments. However, a common problem is the choice of reference standard to use, and in this case the MIS was used because of its better predictivity in hemodialysis patients (1).

With the exception of the initial study by Bouillanne et al (5), no validation study of GNRI as a screening tool has been conducted; its use has only been suggested, particularly when observing the significant association with a wide range of anthropometric and biochemical variables (6). In fact, the GNRI was introduced, and subsequently investigated, as a “nutrition-related” risk index and not as an index of malnutrition for elderly patients. This means that the GNRI can be used to classify patients according to a risk of complications in relation to pathologies often associated with malnutrition (5–10). This highlights clearly the prognostic meaning of this instrument. On the other hand, in math of nutrition, finding a tool that reliably describes both nutritional status and risk of complications is a key task (6). In this scenario, the study by Yamada et al represents the first attempt to validate GNRI as a screening instrument. Unfortunately, the authors tested its accuracy in an age-mixed population. Thus, its use, as well as that of the identified cutoff (GNRI < 91.2), should be suggested and applied with caution. Interestingly, patients scored as being at risk (MIS ≥ 6 and GNRI ≤ 91.2) were significantly older than those scored as normal (MIS ≤ 5 and GNRI > 91.2). Moreover, with particular regard to the cutoff proposed, some issues should be considered. We agree with Yamada et al when they discuss the usual lower threshold values of albumin (<35 g/L) and body mass index (<18.5 kg/m²) for the elderly than for the general population. Also, body weight decreases gradually with age in both sexes (≈0.6 kg/y in men and ≈0.5 kg/y in women). Moreover, because of the increased frailty of elderly patients and the general tendency to lose more lean body mass than adipose tissue with aging, the BMI cutoff has been set to a higher level (22–23 kg/m²) for the elderly than for the general population (<18.5 kg/m²) (12). Accordingly, we report 2 important considerations. First, the proposed cutoff (GNRI < 91.2) obviously fits to an all-age (middle + elderly) cohort of patients, and we hypothesize that in hemodialysis patients aged >65 y the threshold value might be lower. Second, it would be of interest to test the GNRI in a population in which the age effect seems to be avoided a priori when structuring the formula. We cannot exclude that this would result in improved accuracy and thus a more efficient index, at least for elderly hemodialysis patients.

Finally, we also want to strengthen the results produced by Yamada et al by additionally facing the main limitation highlighted in the discussion. We recognize that the lack of examination of GNRI on the basis of the outcomes did not allow a full validation of this instrument as a screening tool, particularly when it is considered the aim for which the index was proposed. In this respect, we report that further demonstrations of the prognostic value of the GNRI were provided (7–10) after the initial submission by Yamada et al. Particularly, significant associations have been shown with mortality, infections, bedsores, and muscle dysfunction by handgrip strength evaluation, which in turn have been shown to be independently correlated with all-cause and cardiovascular disease mortality in a similar series of patients (4). Unfortunately, most of our studies have been performed in institutionalized patients; only one study was conducted in acutely hospitalized elderly patients. The validation of screening tools is usually done in the general population, but it is nevertheless important that the validation of these tools also be conducted in select populations. Preliminary data on the GNRI appear promising but setting- and population-specific studies and cross-validations with different reference standards are clearly suggested to propose the routine use in clinical settings. Finally, nutrition intervention studies in those screened as at risk would probably allow full confirmation of the usefulness of the GNRI.

The authors certify that there were no affiliations with or involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed herein.

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References


The use of the Geriatric Nutritional Risk Index (GNRI) as a simplified nutritional screening tool

Dear Sir:

With age, seen with aging (11, 12). In fact, albumin possibly decreases slightly and chemical variables (6). In fact, the GNRI was introduced, and subsequently investigated, as a “nutrition-related” risk index and not as an index of malnutrition for elderly patients. This means that the GNRI can be used to classify patients according to a risk of complications in relation to pathologies often associated with malnutrition (5–10). This highlights clearly the prognostic meaning of this instrument. On the other hand, in math of nutrition, finding a tool that reliably describes both nutritional status and risk of complications is a key task (6). In this scenario, the study by Yamada et al represents the first attempt to validate GNRI as a screening instrument. Unfortunately, the authors tested its accuracy in an age-mixed population. Thus, its use, as well as that of the identified cutoff (GNRI < 91.2), should be suggested and applied with caution. Interestingly, patients scored as being at risk (MIS ≥ 6 and GNRI ≤ 91.2) were significantly older than those scored as normal (MIS ≤ 5 and GNRI > 91.2). Moreover, with particular regard to the cutoff proposed, some issues should be considered. We agree with Yamada et al when they discuss the usual lower threshold values of albumin (<35 g/L) and body mass index (<18.5 kg/m²) for the elderly than for the general population. Moreover, because of the increased frailty of elderly patients and the general tendency to lose more lean body mass than adipose tissue with aging, the BMI cutoff has been set to a higher level (22–23 kg/m²) for the elderly than for the general population (<18.5 kg/m²) (12). Accordingly, we report 2 important considerations. First, the proposed cutoff (GNRI < 91.2) obviously fits to an all-age (middle + elderly) cohort of patients, and we hypothesize that in hemodialysis patients aged >65 y the threshold value might be lower. Second, it would be of interest to test the GNRI in a population in which the age effect seems to be avoided a priori when structuring the formula. We cannot exclude that this would result in improved accuracy and thus a more efficient index, at least for elderly hemodialysis patients.

Finally, we also want to strengthen the results produced by Yamada et al by additionally facing the main limitation highlighted in the discussion. We recognize that the lack of examination of GNRI on the basis of the outcomes did not allow a full validation of this instrument as a screening tool, particularly when it is considered the aim for which the index was proposed. In this respect, we report that further demonstrations of the prognostic value of the GNRI were provided (7–10) after the initial submission by Yamada et al. Particularly, significant associations have been shown with mortality, infections, bedsores, and muscle dysfunction by handgrip strength evaluation, which in turn have been shown to be independently correlated with all-cause and cardiovascular disease mortality in a similar series of patients (4). Unfortunately, most of our studies have been performed in institutionalized patients; only one study was conducted in acutely hospitalized elderly patients. The validation of screening tools is usually done in the general population, but it is nevertheless important that the validation of these tools also be conducted in select populations. Preliminary data on the GNRI appear promising but setting- and population-specific studies and cross-validations with different reference standards are clearly suggested to propose the routine use in clinical settings. Finally, nutrition intervention studies in those screened as at risk would probably allow full confirmation of the usefulness of the GNRI.

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Reply to E Cereda and C Pedrollo

Dear Sir:

We are grateful for the comments of Cereda et al on our article published recently in the Journal (1). We agree with the authors that the cutoff value for the geriatric nutritional risk index (GNRI) for identifying elderly hemodialysis patients at nutritional risk might be different from that for our age-mixed patients because of the progression of hypoaalbuminemia and body-composition changes with aging. In our previous study, we reported an association between age and the decrease in thigh muscle mass in nondiabetic hemodialysis patients as well as an increase in visceral fat mass as measured by computed tomography (2). Because the size of these body compartments continuously changes with aging, the GNRI cutoff value might have to be revised with every decade of age. However, we presume that such a complicated method would be inappropriate for a screening tool. Alternatively, this problem might be resolved by incorporating age in a revised GNRI formula.

Another comment made by Cereda et al was that the validation of the GNRI was not fully examined on the basis of the risk of mortality in our study. We respond here with data concerning the mortality rate during a 30-mo follow-up after the initial GNRI determination. Of the 301 patients enrolled in the follow-up study, 9 patients withdrew because they either moved away from the study area (n = 7) or underwent transplantation (n = 2). Fifty patients died during the 30-mo period from cerebrovascular diseases (n = 8), heart failure (n = 7), cardiac infarction (n = 7), neoplasms (n = 6), infectious diseases (n = 3), gastrointestinal bleeding (n = 3), or others (n = 16). When the patients were classified into 2 groups according to the GNRI cutoff of 91.2, 20 patients who had died were the high-GNRI group (GNRI > 91.2, n = 194; mortality rate = 10.3%) and 30 patients who had died were in the low-GNRI group (GNRI ≤ 91.2, n = 98; mortality rate = 30.6%). There was a significant difference in the cumulative survival rate between the high- and low-GNRI groups by a Kaplan-Meier survival analysis (log-rank test, P < 0.001). A Cox proportional hazard model showed GNRI to be a significant predictor of mortality after either no adjustment or after adjustment for sex, age, duration of dialysis, prevalence of diabetes, BMI, and C-reactive protein concentration. The risk of mortality (odds ratio) was 1.84 (95% CI: 1.39, 2.46) for the patients at high nutritional risk (GNRI > 91.2) when compared with those at low nutritional risk (GNRI < 91.2). These results support the findings in our published article and suggest that GNRI can be justified as a superior nutrition-related risk index in hemodialysis patients.

None of the authors had a personal or financial conflict of interest.

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