availability in HD patients receiving rHuEPO therapy by comparing the different parameters of iron status.

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The impact of haemoglobin on the quality of sleep in haemodialysis patients: which is the truth?

Sir,

We were surprised by the presence of a significant negative correlation between the PSQI of the patients and their haemoglobin (Hb) values, since in our previous study [2], in which 694 patients were surveyed on insomnia through a different questionnaire [4], we failed to find any correlation between Hb values and sleep disorders. On this basis, we have tried to verify the existence of such a relationship on a larger cohort of HD patients (n = 249, from 10 units of our geographical area, enrolled for a different study) surveyed through the same Pittsburgh Questionnaire. The inclusion criteria of our patients were similar to those requested in the study by Iliescu et al., i.e. age > 18 years and time on dialysis > 6 months; moreover, we did not consider patients with cancer or chronic debilitating diseases (connective tissue and chronic respiratory diseases, congestive heart failure).

Both the demographic data and the PSQI of our patients strictly overlapped those reported by Iliescu. The mean age of our patients was in fact 60.5 ± 13.8 years (compared with 60.1 ± 16.8 in Iliescu’s study), nor there were differences in their time on dialysis (50.8 ± 53 vs 49.4 ± 48.1 months, respectively) and in the prevalence of males vs females (62 and 66%); conversely, a slight difference was detected in Hb values, lower in our patients (10.9 ± 1.4 vs 11.6 ± 1.2 g/dl, respectively). Last, the PSQI of our patients averaged 8.5 ± 4.5, a value comparable with the one reported by Iliescu (8.7 ± 4.5).

As in Iliescu’s study, we first performed a bivariate correlation, but no relationship could be detected between PSQI and Hb (r = 0.09, P = 0.17; Spearman coefficient), nor between PSQI and the time on dialysis (r = 0.063, P = 0.3). The second step of our analysis was the logistic regression (adjusted for gender and HD units), so the patients were divided into two categories, according to the distribution of PSQI values [1,3]: ‘good sleepers’ (i.e. patients with PSQI ≤ 5, n = 78) and ‘poor sleepers’ (patients with PSQI > 5, n = 171). Among the several tested variables, however, a significant association was detected only for age as a predictor of PSQI in ‘poor sleepers’ older than 50 years (OR 2.1, 95% CI 1.1–3.9), whereas Hb values did not influence the quality of sleep, although it was higher in ‘good sleepers’ than in ‘poor sleepers’ (11.14 ± 1.21 vs 10.65 ± 1.60 g/dl, P < 0.02).

Which is the truth?

Several factors may explain the differences in the data. One could be the small number of patients in the study by Iliescu et al., coming from a limited number of units: this could have determined a bias in the selection of patients. The bivariate analysis is a poor predictor of the relationship between sleep quality and Hb, resulting in inappropriate in these kind of studies. Sleep quality, in fact, represents a complex phenomenon influenced both by demographic factors, like gender, age, time on dialysis, dialysis shift, as well as by clinical problems like the levels of blood pressure, with the use of anti-hypertensive drugs, the existence of cardiovascular diseases or the presence of secondary hyperparathyroidism associated with variable degrees of bone pain and pruritus; all these factors may condition the onset of sleep disorders [2], but have not been taken into account in both studies. This explains why no relationship between Hb and sleep quality could be demonstrated even when a more accurate analysis was performed. A third possible confounding factor is the different baseline level of Hb between our patients and those in the study by Iliescu et al.: the difference in absolute values and in their distribution (a similar standard deviation despite the numerical difference of the two populations, i.e. a largely different standard error) is not trivial, and could have influenced...
the analysis of the data. It is interesting to note, however, that also in our study ‘good sleepers’ have Hb values significantly higher than the ‘poor sleepers’, even if they do not reach the values obtained by Iliescu et al.: this confirms that a clinical trend to a better sleep quality exists by raising Hb levels.

In summary, although the data of statistical analysis must be clearly kept in mind, to raise Hb levels above our reported values remains a possible way to challenge the bad quality of sleep and to diminish the clinical risks associated with sleep disorders [2].

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Reply

Sir,

Thank you for the opportunity to comment on the letter of Sabbatini et al. in the current issue of the Journal, regarding the association between haemoglobin level and quality of sleep in hemodialysis patients. The authors measured haemoglobin level and quality of sleep using the Pittsburgh Sleep Quality Index (PSQI) in a cross-sectional study of 249 prevalent haemodialysis patients. The authors compare the results to those of our study of 89 prevalent haemodialysis patients [1], and seek to explain the differences. In both studies the mean haemoglobin level was higher in subjects with PSQI ≤5 (good sleep) compared with those with PSQI >5 (poor sleep). In our study the haemoglobin level was weakly but significantly correlated with PSQI (Spearman r = −0.27, P < 0.01). In the Sabbatini study this correlation was weak, and did not reach statistical significance (r = −0.09, P = 0.17). Sabbatini et al. found that haemoglobin was not an independent predictor of PSQI (≤5 vs >5) in multiple logistic regression adjusting for dialysis unit and age.

In bivariate analysis, the comparison of mean haemoglobin among categories of PSQI (≤5 vs >5) is superior to the comparison of continuous variables by correlation because the PSQI is primarily intended as a categorical instrument to identify ‘poor sleepers’ [2], and because PSQI may not be normally distributed. In the categorical analysis the two studies have very similar results. In regards to the multivariate analysis, we agree with the authors that both studies were underpowered to examine the independent influence of haemoglobin on quality of sleep while controlling for the large number of possible confounding variables.

We conclude that the results of the two studies are similar. They support the hypothesis that haemoglobin influences quality of sleep. While there is evidence for biological plausibility [3], this association clearly does not satisfy the criteria for causation at this time. Inclusion of the PSQI and polysomnography as outcome variables in prospective studies that randomize patients to different levels of haemoglobin would bring us closer to the ‘truth’.

The similarity in the prevalence of poor sleep observed in the two studies, despite two culturally different populations, is remarkable and speaks to the validity of the PSQI as a tool for comparing sleep quality among different populations.

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Primary care management of chronic dialysis patients: emerging challenges

Sir,

The article by Zimmerman et al. [1] on the diverging attitudes of patients towards their own primary care from their physicians adequately describes the challenges faced by the physician in an era of scientific uncertainty, with increasing need to see additional patients, delivering evidence-based health care, while being responsive to patients’ individual concerns. However, there could be several additional reasons to explain the variable pattern of physician behaviour (nephrologist vs family physicians) in delivering primary care to dialysis patients.

The widely variable rates of colon and breast cancer screening in patients, among nephrologists and family physicians (table 1) highlights the need for complementary efforts on the part of both group of physicians when it comes to taking care of these patients. Redelmeier et al. [2] have reported that clinicians often overestimate the risks of adverse drug reactions but may underestimate the risks of systemic disorders, and often fail to treat unrelated disorders in patients with chronic disease. There is also a difference in the