



**“Sleep apnoea is associated with major cardiac events in peripheral arterial disease.” Karri T. Utriainen, Juhani K. Airaksinen, Olli Polo, Ruut Laitio, Mikko J. Pietilä, Harry Scheinin, Tero Vahlberg, Kari A. Leino, Erkki S. Kentala, Jouko R. Jalonen, Harri Hakovirta, Riitta Parkkola, Sami Virtanen and Timo T. Laitio. *Eur Respir J* 2014; 43: 1652–1660.**

It has been brought to our attention that this article from the June 2014 issue of the *European Respiratory Journal* was originally published with an error in reporting the association of peripheral arterial disease (PAD) duration with major adverse cardiovascular and cerebrovascular events (MACCE), obstructive sleep apnoea (OSA), clinical coronary artery disease and decreased high-density lipoprotein (HDL) to total cholesterol ratio.

It was originally reported that a PAD duration of  $\geq 4$  years was associated with MACCE, along with OSA, clinical coronary artery disease and decreased HDL/total cholesterol ratio.

This was due to the misinterpretation of the statistician’s report regarding the effect of PAD duration. In truth, the association was *vice versa*; a PAD duration of  $< 4$  years was predictive of adverse outcome. In other words, a rapidly developed need for surgical intervention from the onset of clinical PAD was a significant risk factor, not one with a longer history.

In the regression models, the duration was handled as a categorical variable in the following way:

PAD\_year2, 1 = 0–1 years, 2 = 2–16 years

PAD\_year3, 1 = 0–2 years, 2 = 3–16 years

PAD\_year4, 1 = 0–3 years, 2 = 4–16 years

PAD\_year5, 1 = 0–4 years, 2 = 5–16 years

Of these, the last three (*i.e.* PAD duration of  $< 3$  years,  $< 4$  years or  $< 5$  years) were significant predictors (but not  $< 2$  years). The authors chose to include the 4-year threshold for PAD duration in the multivariate (Cox regression) because it had the most significant p-value and highest hazard ratio ( $p=0.030$ , HR 3.32, 95% CI 1.13–9.79) in the univariate analysis, compared to the alternatives. The authors also deemed the 4-year threshold clinically relevant. Consequently, it was reported that 4 years of PAD duration was a cut-off for increased risk. With the latter three categorisations being predictive, the authors simply misunderstood and stated that a longer PAD over the threshold of 4 or 5 years meant worse outcome. The logic of the direction of the association seemed so clear that the statistician was not consulted to confirm its correctness; however, this finding was not in the main focus of the article.

In the manuscript, PAD duration was reported as a categorical variable across groups with and without significant OSA. At that time, PAD duration was not compared as a continuous variable between patients with and without MACCE. The error came to light when further analyses of heart rate dynamics were performed from the same data, and PAD duration was statistically compared across groups with and without MACCE.

It has been confirmed that all other statistics in the manuscript, including p-values and hazard ratios of PAD duration regarding risk of MACCE, are correct. However, corrections to the article are needed to change the direction of association between PAD duration and MACCE, as outlined below.

In the abstract, the sentence

“Other significant predictors were a  $\geq 4$  year history of PAD (HR 3.8 (95% CI 1.3–11.5);  $p=0.02$ ) and decreasing high-density lipoprotein/total cholesterol ratio (HR 0.95 per percentage (95% CI 0.90–1.00);  $p=0.048$ ).”

should be amended to

“Other significant predictors were a  $< 4$  year history of PAD (HR 3.8 (95% CI 1.3–11.5);  $p=0.02$ ) and decreasing high-density lipoprotein/total cholesterol ratio (HR 0.95 per percentage (95% CI 0.90–1.00);  $p=0.048$ ).”

In the final paragraph of the results section, the sentence

“The risk of MACCE was also increased by a PAD history of  $\geq 4$  years (HR 3.8, 95% CI 1.3–11.5;  $p=0.02$ ) and a deteriorating HDL/total cholesterol ratio (HR 0.95 per 1% change, 95% CI 0.90–1.00;  $p=0.048$ ).”

should be amended to

“The risk of MACCE was also increased by a PAD history of <4 years (HR 3.8, 95% CI 1.3–11.5; p=0.02) and a deteriorating HDL/total cholesterol ratio (HR 0.95 per 1% change, 95% CI 0.90–1.00; p=0.048).”

The final sentence of the fourth paragraph in the discussion section

“According to the current results, patients with coronary artery disease, a PAD history of several years and impaired lipid metabolism may be a feasible group for screening and intervention.”

should be amended to

“According to the current results, patients with coronary artery disease, a rapidly developed need for surgical treatment from the clinical onset of PAD and impaired lipid metabolism may be a feasible group for screening and intervention.”

Table 1 should also be amended as follows:

TABLE 1 Baseline characteristics according to severity of obstructive sleep apnoea

	All patients	AHI# <20 events·h <sup>-1</sup>	AHI# ≥20 events·h <sup>-1</sup>
<b>Subjects</b>	84	45	39
<b>Age years</b>	67±9	65±8	70±8*
<b>Male</b>	52 (62)	24 (53)	28 (72)
<b>Smoker</b>	32 (38)	20 (44)	12 (31)
<b>Metabolic syndrome</b>	51 (61)	24 (55)	27 (69)
<b>BMI kg·m<sup>-2</sup></b>	26 [24–29]	26 [24–29]	27 [24–29]
<b>Diabetes</b>	36 (43)	21 (47)	15 (39)
<b>Arterial hypertension</b>	70 (83)	35 (78)	35 (90)
<b>Coronary artery disease</b>	31 (37)	15 (33)	16 (41)
<b>Stroke</b>	14 (17)	7 (16)	7 (18)
<b>LVEF %</b>	63±8	67±6	59±8 <sup>¶</sup>
<b>Cholesterol mmol·L<sup>-1</sup></b>	4.3±1.0	4.2±1.0	4.5±1.1
<b>LDL mmol·L<sup>-1</sup></b>	2.2±0.8	2.1±0.8	2.3±0.8
<b>HDL/cholesterol %</b>	34±10	36±10	32±9
<b>Triglycerides mmol·L<sup>-1</sup></b>	1.4 [1.0–2.2]	1.4 [0.8–1.9]	1.5 [1.1–1.5]
<b>Ankle-brachial index ratio</b>	0.55 [0.49–0.70]	0.58 [0.51–0.58]	0.53 [0.45–0.53]
<b>PAD history &lt;4 years</b>	53 (63)	29 (64)	24 (62)
<b>Critical ischaemia</b>	11 (13)	6 (13)	5 (13)

Data are presented as n, mean±SD, n (%) or median (interquartile range). AHI: apnoea/hypopnoea index; BMI: body mass index; LVEF: left ventricular ejection fraction; LDL: low-density lipoprotein; HDL/cholesterol: high-density lipoprotein/total cholesterol ratio; PAD: peripheral arterial disease. #: comparisons between the two groups were performed with the Student's t-test (normal distribution) or the Mann-Whitney U-test (skewed distribution) for continuous variables and the exact Fisher's exact test for categorical variables; <sup>¶</sup>: p<0.0001. \*: p<0.05.

In table 5, the entry “PAD history ≥4 years” should be corrected to “PAD history <4 years”; with this change, the accompanying data (hazard ratios and p-values) are correct as originally published.

Copyright ©ERS 2018