

Intradialytic hypertension is associated with lower oxygen saturation during hemodialysis

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Background and Aims

While intradialytic hypertension is well documented, its pathophysiology is unclear and likely multifactorial. It was shown recently that 10% of chronic hemodialysis (HD) patients have prolonged intradialytic hypoxemia.¹ Since hypoxia triggers a sympathetic response we explored associations between arterial oxygen saturation (SaO₂) and systolic blood pressure (SBP) changes during hemodialysis (HD) treatment.

Conclusion

We observed a close relationship between arterial oxygen saturation during dialysis and the hemodynamic response to the HD treatment. To the best of our knowledge, this is the first report of an association between arterial oxygen levels during HD and intradialytic hypertension. We speculate that sympathetic surges due to intermittent hypoxemic episodes may play a causal role.

Methods

We analyzed intradialytic SaO₂ in chronic HD patients treated via arterio-venous access between 1/2012 and 9/2014 in 17 facilities. SaO₂ was recorded every minute by the CritLine™ monitor. Intradialytic SBP change (Δ SBP) was calculated as post-HD SBP minus pre-HD SBP. Treatments were categorized by Δ SBP < -10 mmHg, -10 to 0 mmHg, 0 to 10 mmHg, and >10 mmHg, the latter being indicative of intradialytic hypertension. In addition, treatments were stratified in groups of post-HD SBP: <120 mmHg, 120 to 160 mmHg, >160 mmHg. Demographical and clinical data were extracted from electronic medical records.

Results

Table 1: Patient Characteristics

Variables	Mean±SD
Treatments	54 267
Patients	913
Demographics	
Age, years	62.1±15.2
Race, % white	51
% male	59
Vintage, years	3.9±4.1
BMI, kg/m ²	28.7±7.7
Comorbidities, %	
Diabetes	52.3
CHF	23.3
COPD	8.4

Table 2: Intradialytic oxygen saturation by systolic blood pressure

Systolic blood pressure, mmHg	Number of treatments	SaO ₂ , % Mean±SD
post-HD		
<120	14 942	92.79±2.23
120 to 160	29 652	92.86±2.17
>160	9 673	92.49±2.32
Difference (post – pre HD)		
< -10	27 019	92.85±2.14
-10 to 0	10 285	92.82±2.25
0 to 10	7 756	92.76±2.25
>10	9 207	92.51±2.36

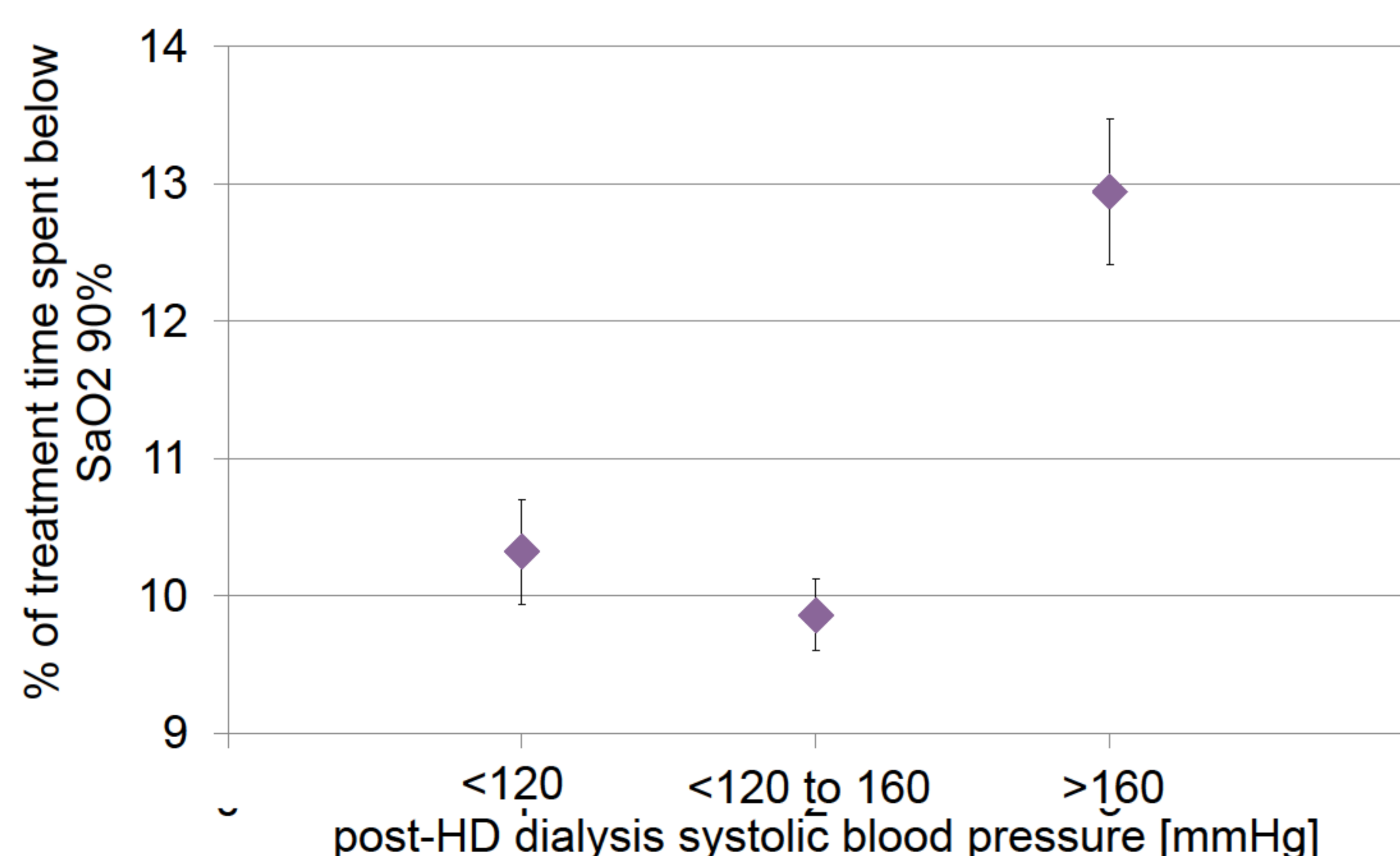


Figure 1: Intradialytic oxygen saturation and systolic blood pressure after the dialysis treatment. Mean and 95% confidence interval

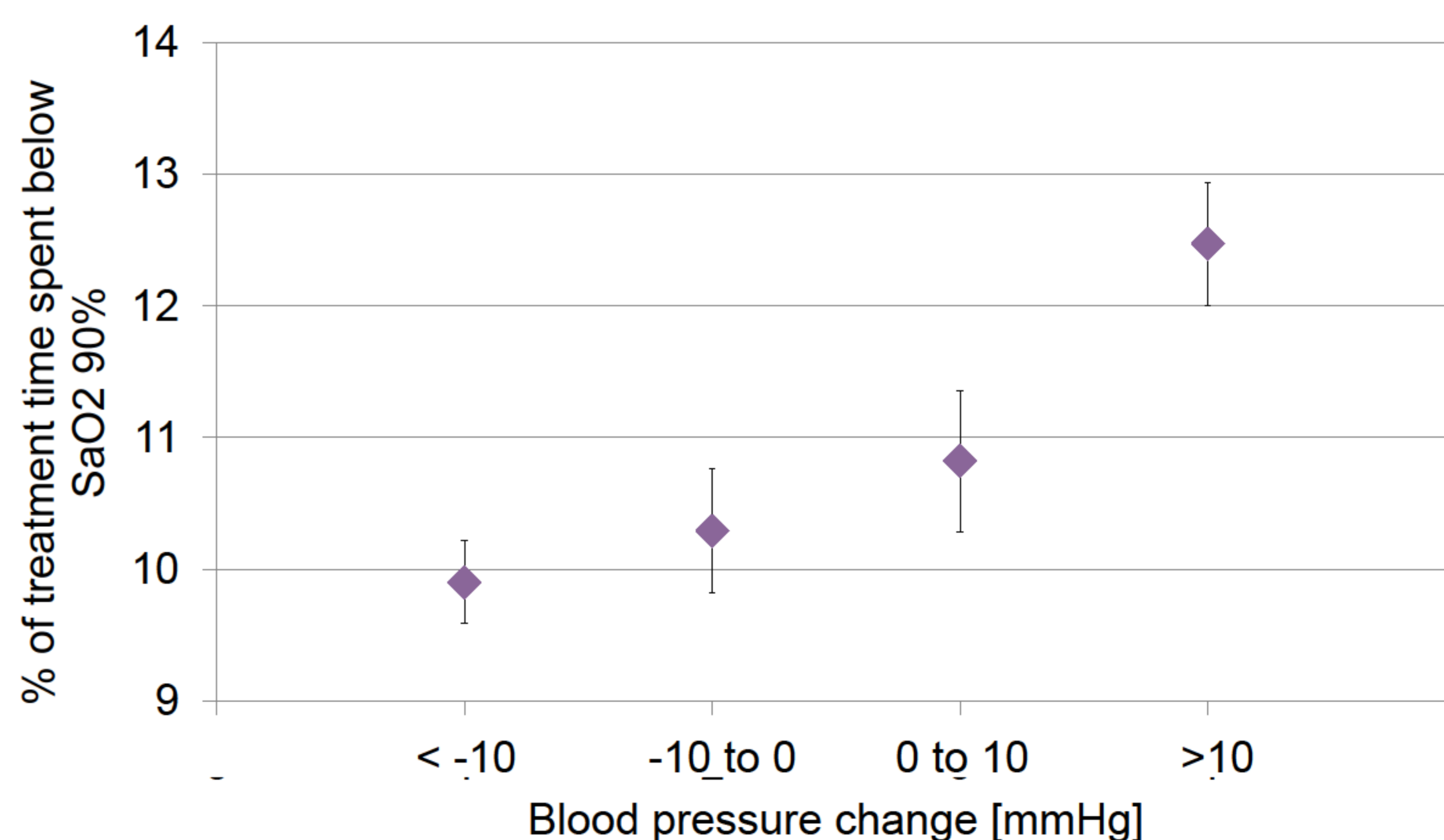


Figure 2: Intradialytic oxygen saturation and blood pressure change during dialysis. Mean and 95% confidence interval

References

- Meyring-Wösten A, Zhang H, Ye X, Fuertinger DH, Chan L, Kappel F, Artemyev M, Ginsberg N, Wang Y, Thijssen S, and Kotanko P. *Intradialytic Hypoxemia and Clinical Outcomes in Patients on Hemodialysis*. Clin J Am Soc Nephrol, 2016

