

A new asymmetric cellulose triacetate membrane is efficient and safe in online post-dilution hemodiafiltration

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INTRODUCTION

The Cellulose TriAcetate (CTA) membrane has been recently reworked in order to obtain an asymmetric structure and to improve its hydraulic permeability. It could represent an alternative to polysulfone and derived synthetic membranes, such as polynephron, to realise efficient online post-dilution hemodiafiltration (OL POST-HDF) sessions. In this prospective study, depurative performances and biocompatibility of the new CTA membrane (SOLACEA-21H) were compared with polynephron membrane (ELISIO 210H).

PATIENTS AND METHODS

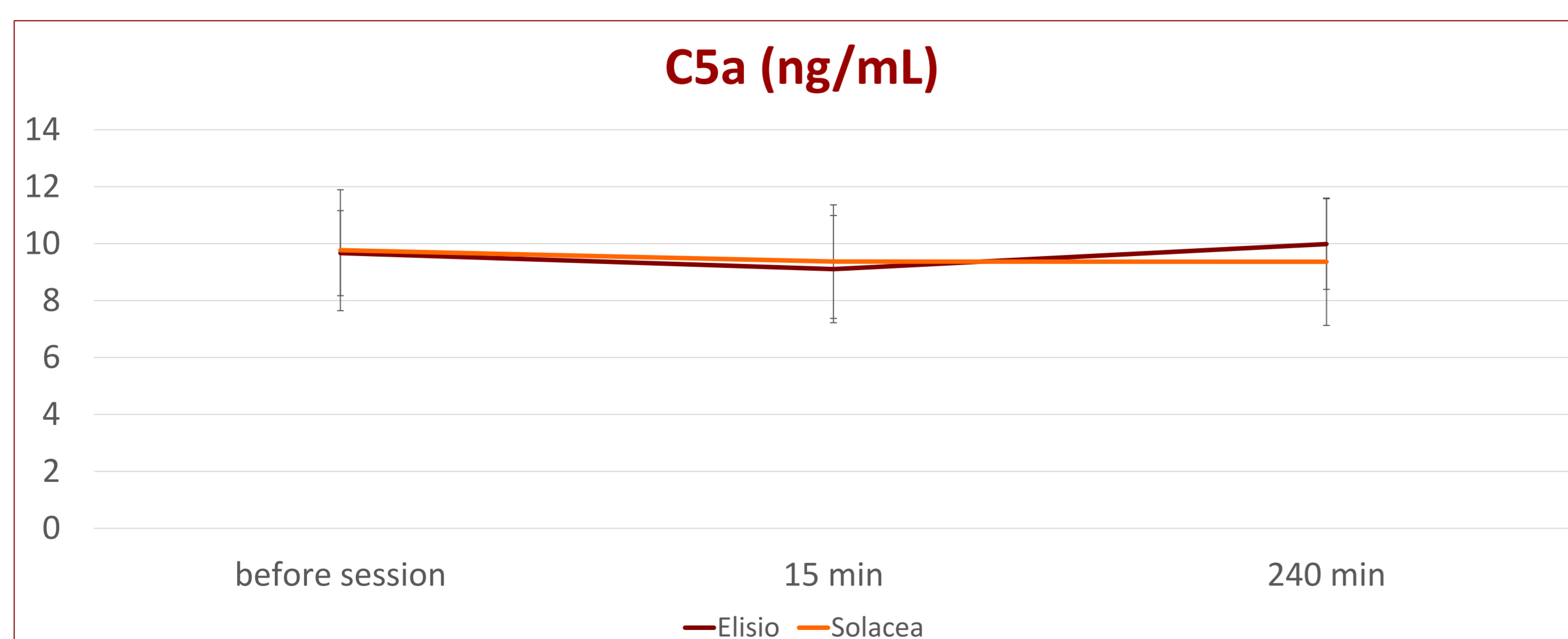
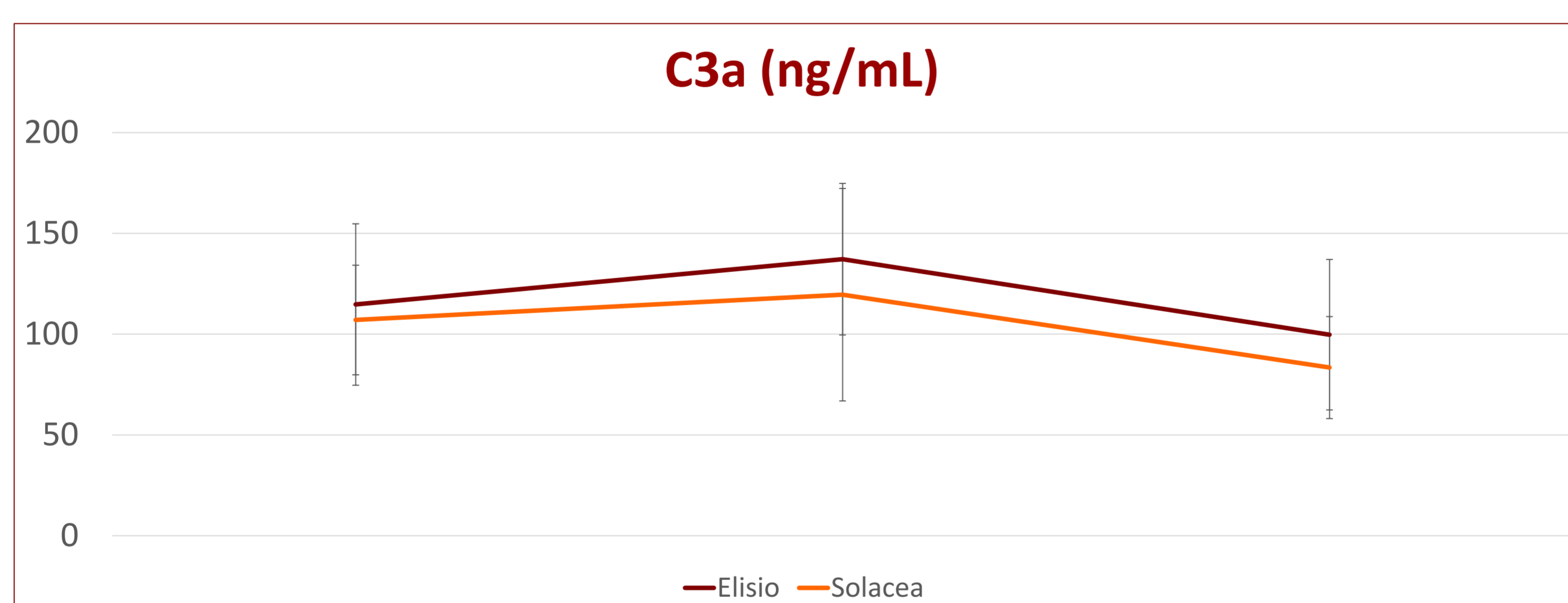
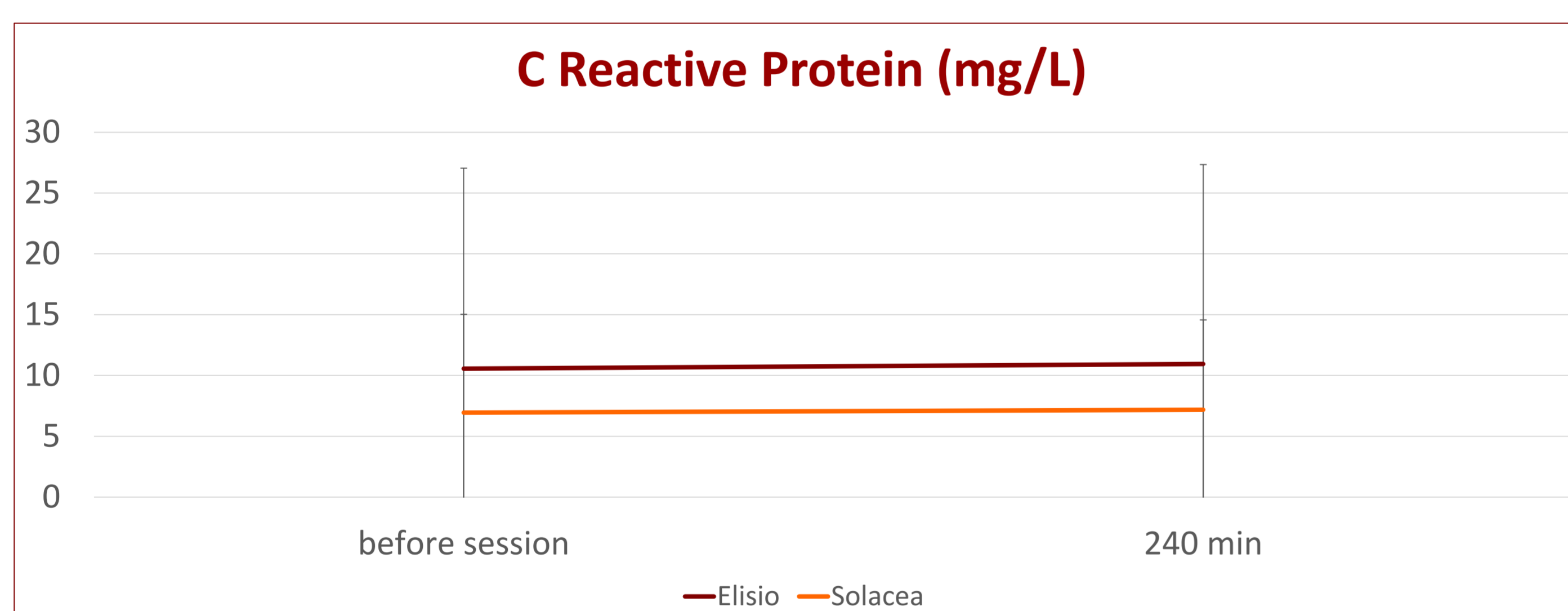
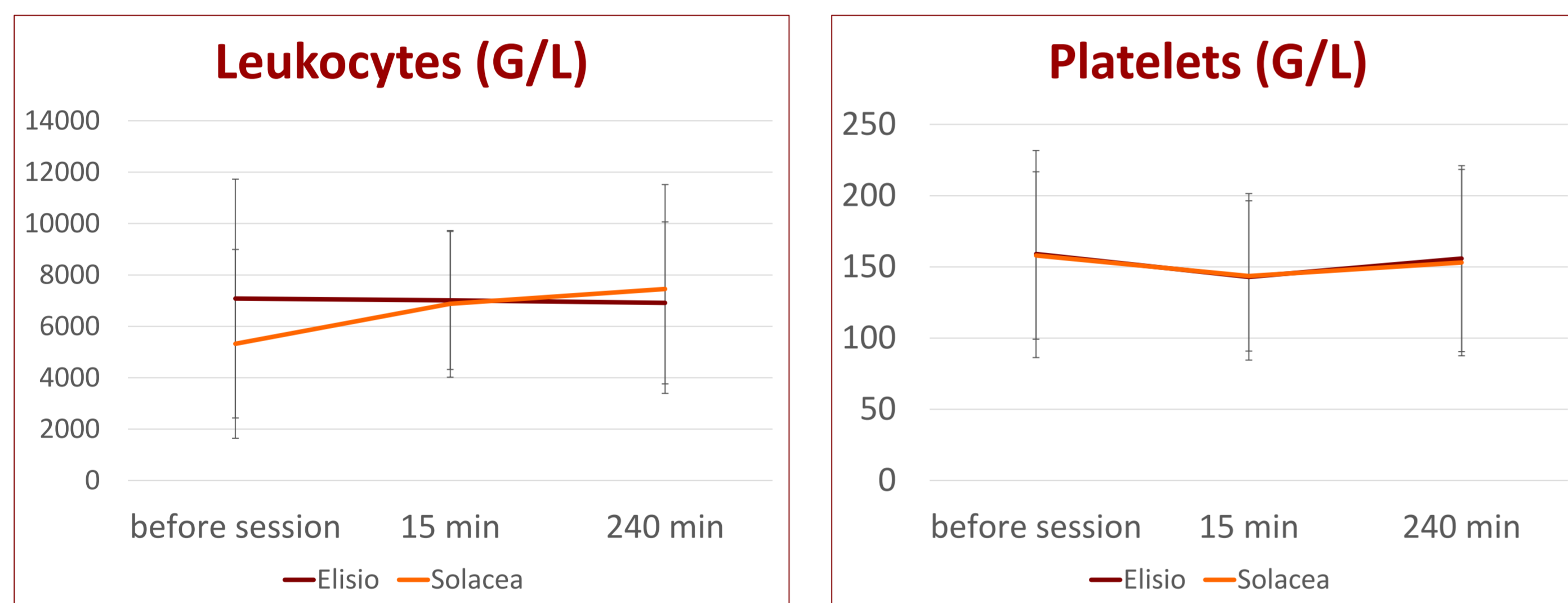
Stable and chronic patients treated with OL POST-HDF were randomly assigned in this prospective and cross-over study in 2 two dialysis units. Dialysis parameters were similar for all the sessions (3 sessions per week during 4 hours, blood flow rate 350ml/min on fistula, dialysate flow rate 600ml/min, total convective volume 26L, blood sampling during the midweek sessions). In the 1st part of the study, dedicated to the depurative performances, Kt/V or reduction ratio (RR) in the blood of small (urea and phosphate) and middle (β 2-microglobulin, myoglobin and orosomuroid) molecules as well as albumin loss in total spent dialysate were compared. In the 2nd part dedicated to the biocompatibility study, white blood cells and platelets counts, CRP and plasma level of complement factors C3a and C5a were detected at 0, 15 and 240 minutes. Statistical analysis were performed with the R-Studio software for windows. Non parametric tests for paired samples were applied.

RESULTS

Biocompatibility

5 patients from one dialysis unit were included in order to study the biocompatibility of both membranes. It was designed as a cross over study. 1 session per patient and per membrane was realised (n=10).

No significant differences were highlighted between polynephron and new CTA membranes at different times and particularly at 15 minutes on white blood cells (7010 +/- 2687 cells per mm³ vs 6876 +/- 2853 cells per mm³), C3a (137.2 ng/l +/- 37.6) and C5a (9.11 ng/l +/- 1.88 vs 9.37 ng/l +/- 1.99) and at 240 minutes on CRP (10.9 mg/l +/- 16.4 vs 7.2mg/l +/- 7.4).

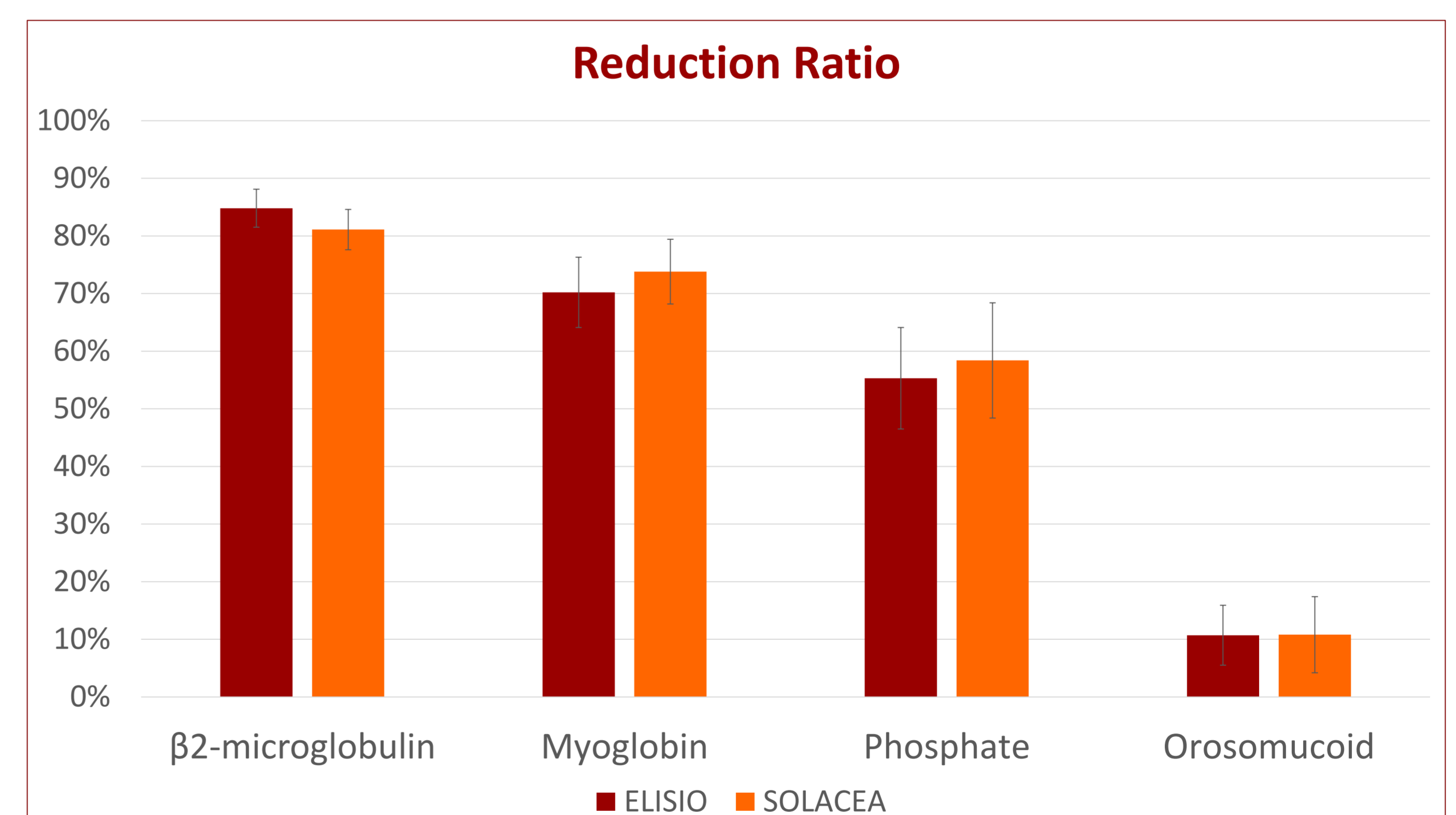
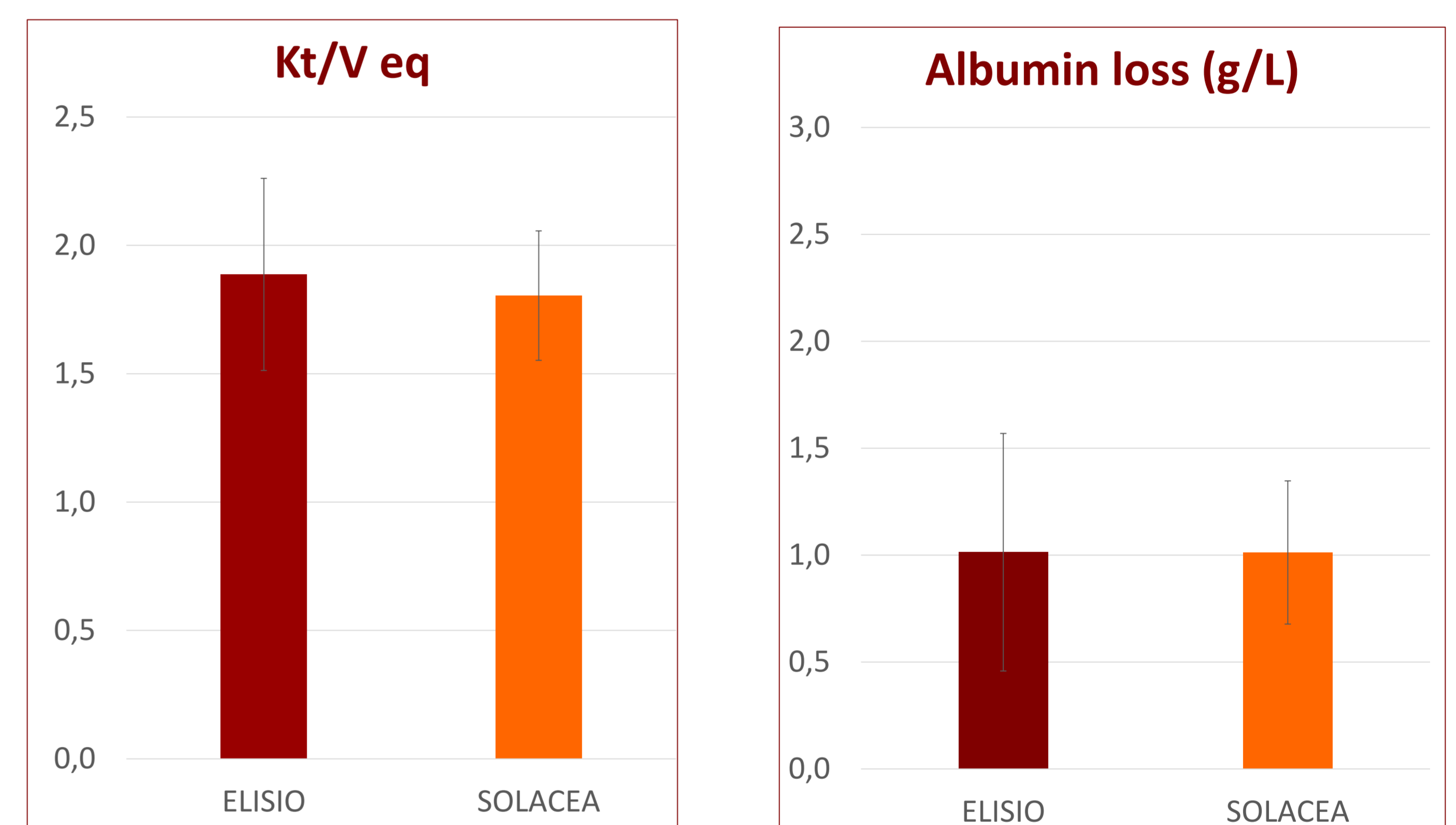


Depurative performances

6 patients from a second dialysis unit were included in the depurative part of the cross-over study. 2 sessions per patient and per membrane were realised (n=24 sessions).

The mean ultrafiltration rate was similar with polynephron (2,2L +/- 0,9L) and with CTA (1,9L +/- 0,6L), as well as total convective volume: 25,9L +/- 0,2L with polynephron vs 26,0L +/- 0,1L with CTA.

No significant differences were observed between polynephron and new CTA membranes concerning: urea Kt/V (2.06 +/- 0.34 vs 2.09 +/- 0.30), RR phosphate (55.3% +/- 8.8% vs 58.4% +/- 10.0%), RR β 2-microglobulin (84.8% +/- 3.3% vs 81.2% +/- 3.5%), RR myoglobin (70.2% +/- 6.1% vs 73.8% +/- 5.6%), RR orosomuroid (10.7% +/- 5.3% vs 10.8% +/- 6.6%) and albumin loss (1.01g +/- 0.56g vs 1.01g +/- 0.33g).



CONCLUSION

The new CTA membrane can be considered as an effective alternative to polynephron membrane in terms of small and middle molecules removal, with a safety profile similar to synthetic materials.