

# Incidence of metabolic and electrolyte disturbances caused by decrease of filter clearance during regional citrate anticoagulated continuous veno-venous hemodialysis (CVVHD)

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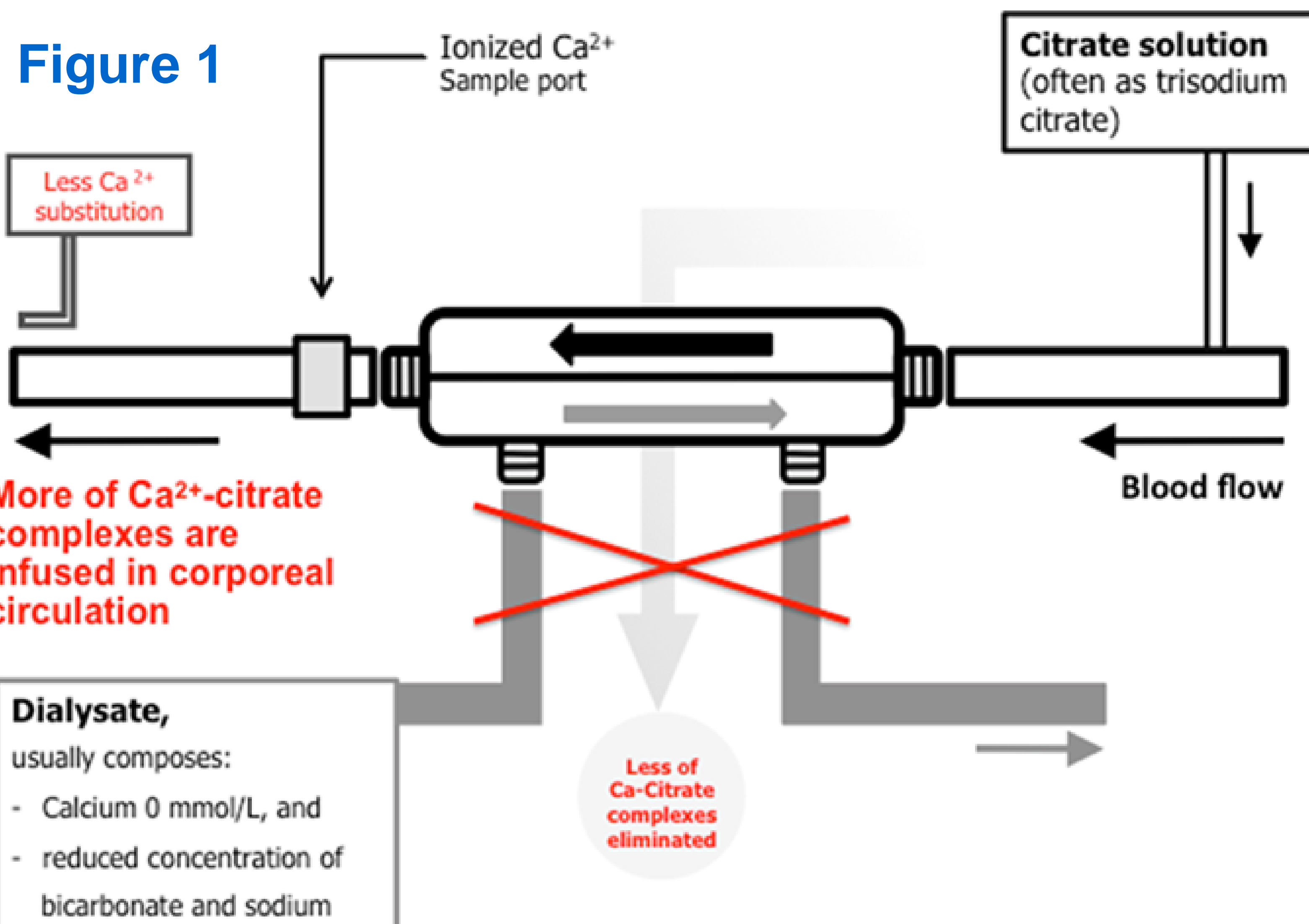
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**Background:** In all RCA protocols used for CRRT citrate is partially infused into patient and metabolized, thus leading to alkalization of blood and risk of metabolic alkalosis. When using trisodium citrate solution for RCA, protocol has to compensate for extra sodium, as well as for alkalization from metabolized citrate. In RCA-CVVHD using calcium-free, sodium-reduced, bicarbonate-reduced dialysate and calcium (Ca) substitution, filter clearance is essential to maintain bicarbonate (BIC) and electrolyte control. In consequence, loss of filter clearance may cause metabolic alkalosis, hypercalcemia, and hyponatremia resistant to per protocol adaptations (Fig 1 A).

**Aim of study** was to evaluate the incidence of metabolic/electrolyte disturbances consistent with loss of filter clearance and outcome of disturbances after filter change.

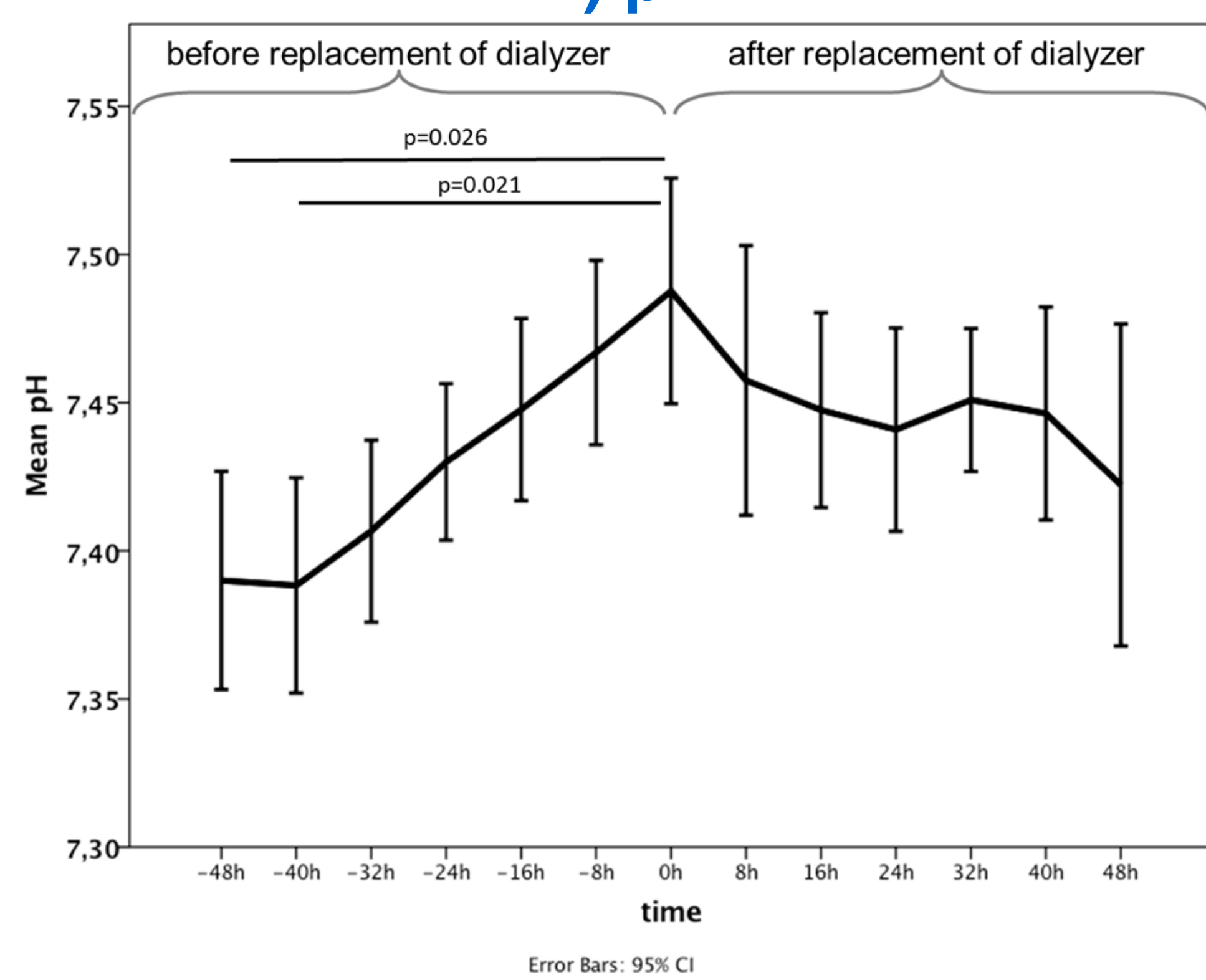
**Methods:** During a 6 months period 191 consecutive patients were treated with RCA-CVVHD on 6 ICUs of a university hospital and prospectively observed for disturbances consistent with loss of filter clearance.



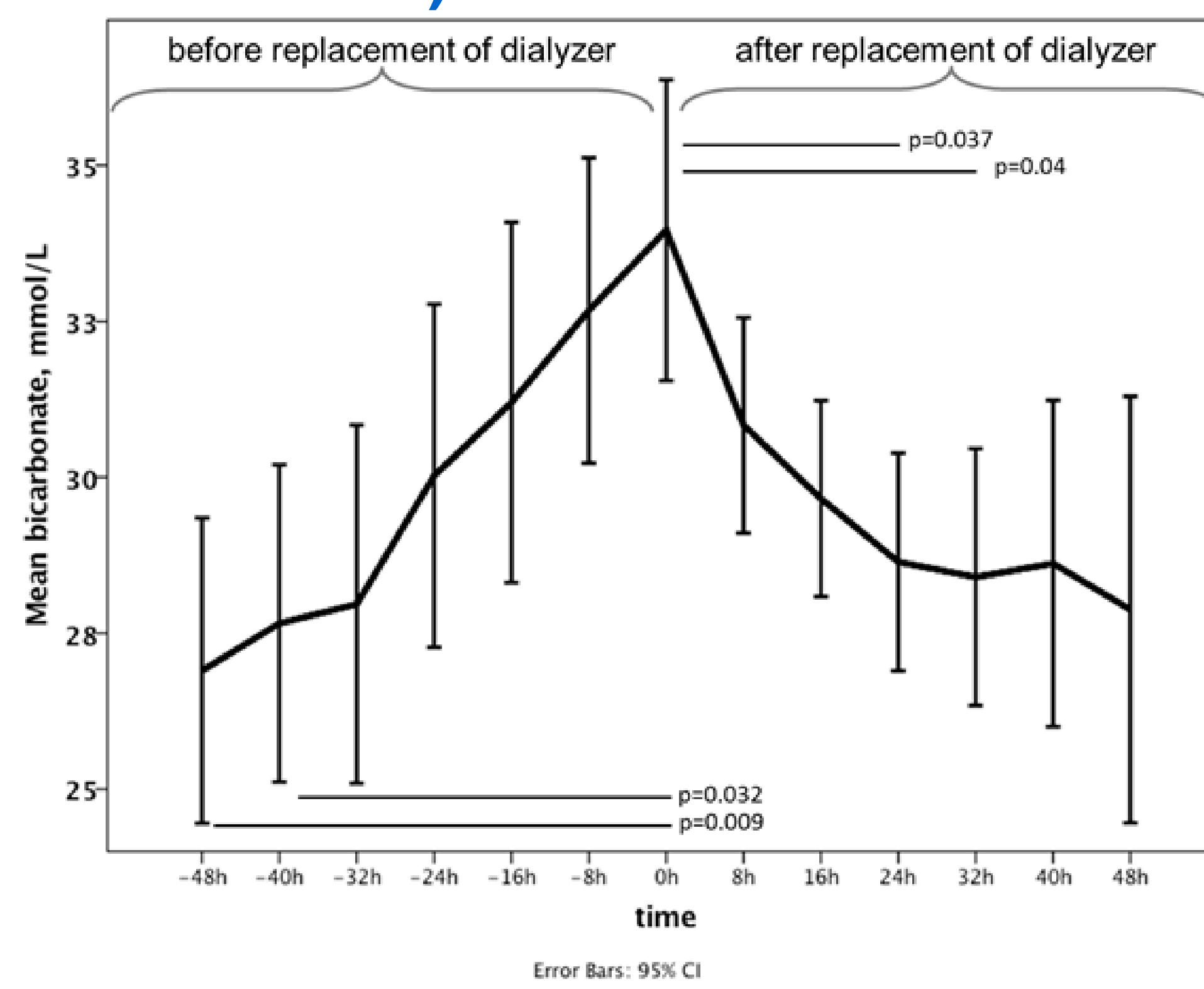
**Results:** From 191 patients, 13 (6.8%) showed at least one episode of metabolic alkalosis with hyponatremia and hypercalcemia, resistant to per protocol adaptations. None of the circuits showed pressure alarm. Filter was replaced after detection of disturbance. Median filter run-time until change was 63 h (range: 8 to 72). Median pH, bicarbonate, BE, ionized calcium and sodium showed significant increase at time of filter replacement as well as significant decrease afterwards (Fig. 2 A-E)

Figure 2

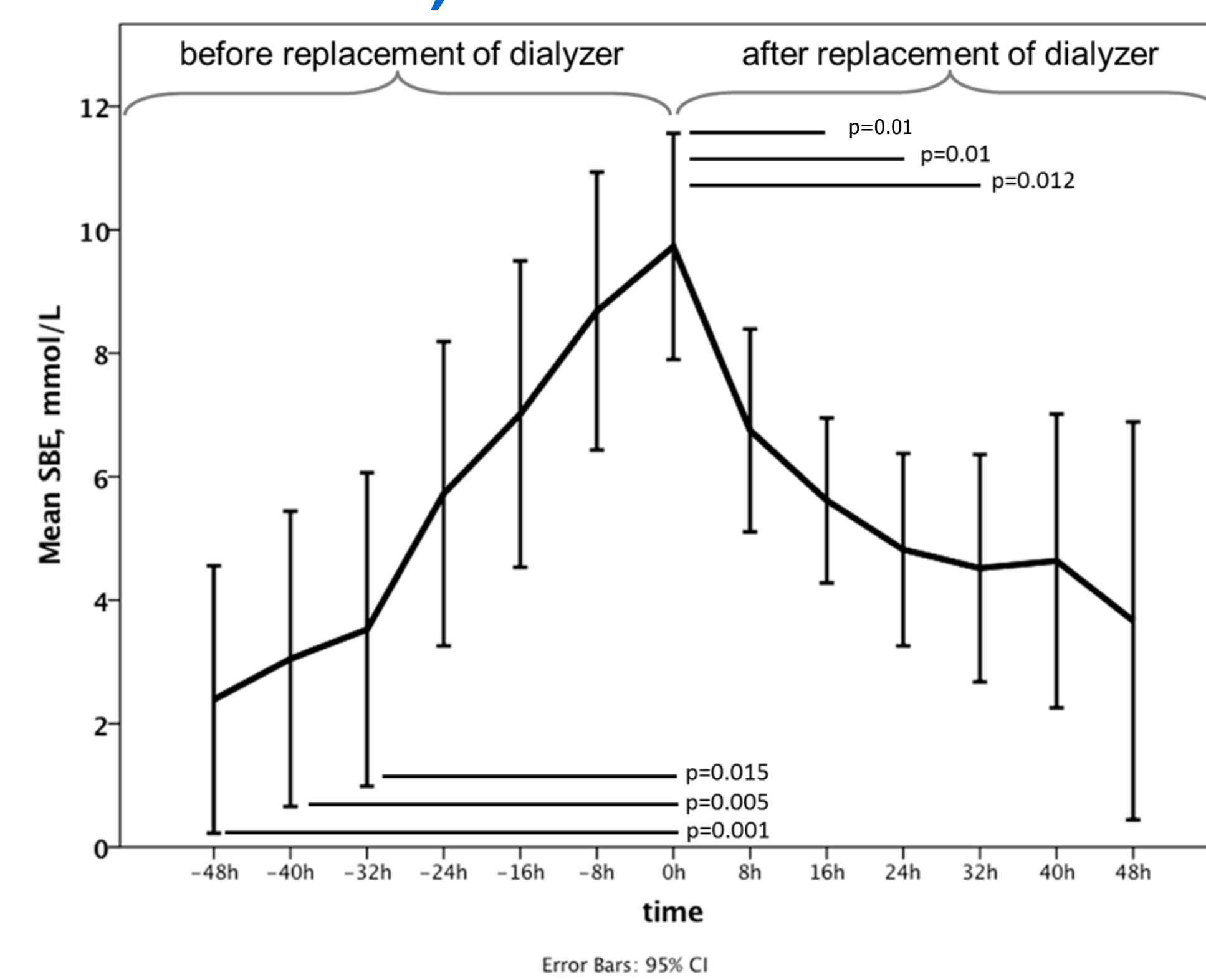
A) pH



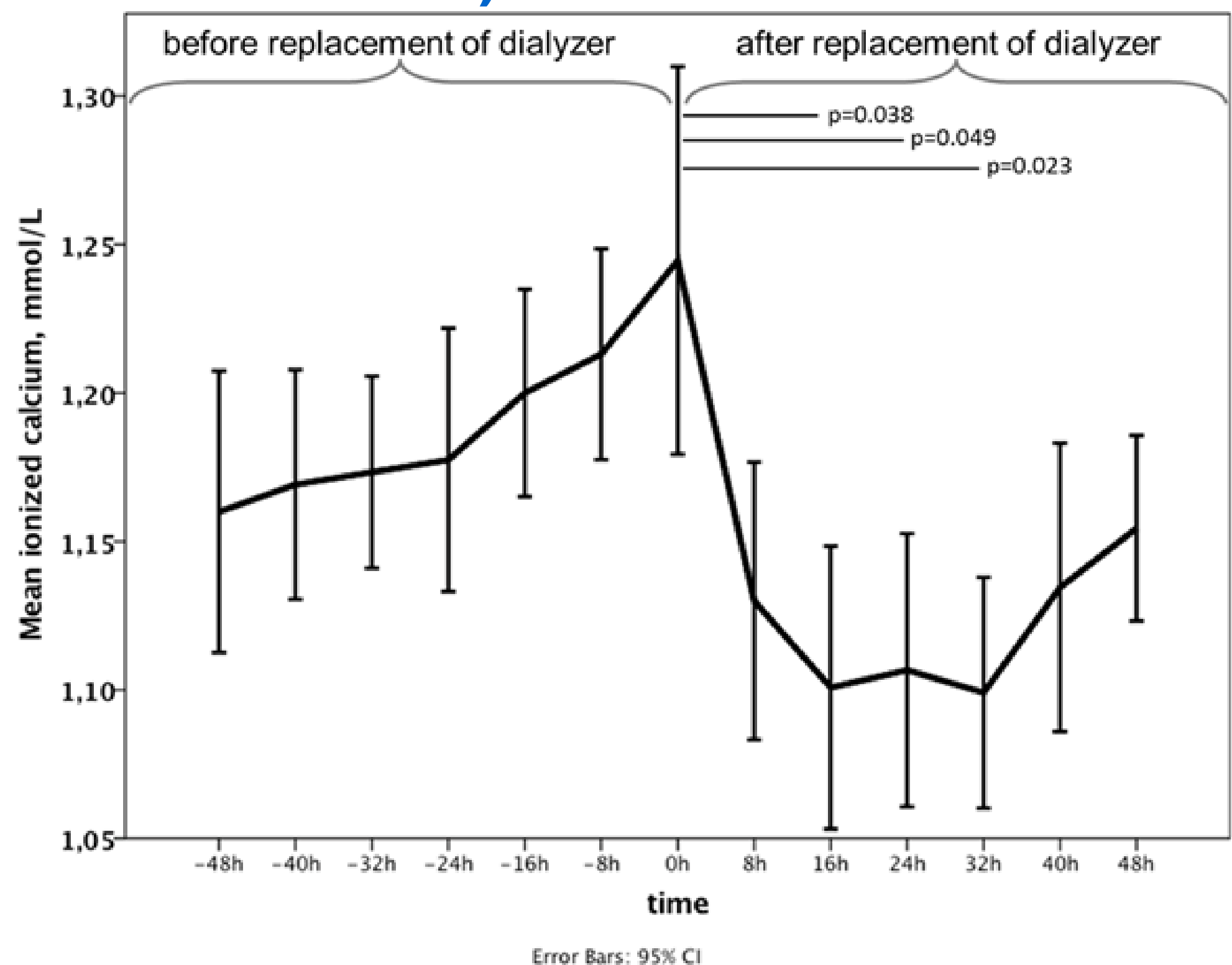
B) bicarbonate



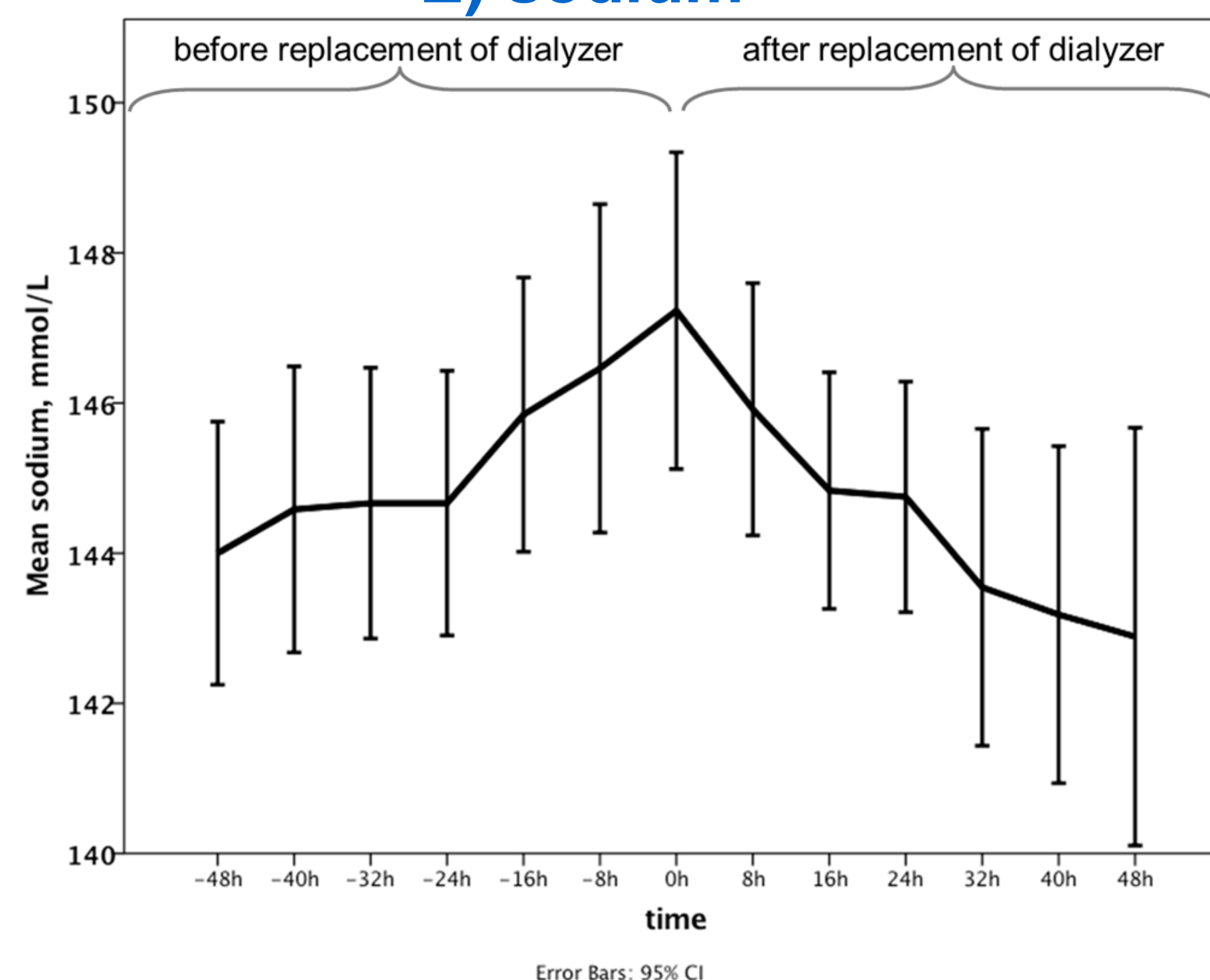
C) base excess



D) ionized Ca



E) sodium



**Conclusions:** During RCA-CVVHD using calcium-free, sodium- and bicarbonate-reduced dialysate the incidence of metabolic and electrolyte disturbances consistent with reduced filter clearance is high and can occur after short filter run-time. Caution must be taken unless metabolic alkalosis can be severe and immediate filter replacement is mandatory to correct disturbances. Further analysis is necessary to understand causes of early reduced filter clearance.

