



FLUID STATUS ASSESSMENT IN CHRONIC HEMODIALYSIS PATIENTS AND COMPARISON OF NEWER TECHNIQUES

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INTRODUCTION and AIMS

Hydration status control is an important constituent of an adequate and efficient hemodialysis (HD) treatment, while there are not precise clinical indices, to early recognize small changes in fluid status of patients undergoing chronic hemodialysis therapy. Recently, newer methods have been developed to evaluate overhydration before and after HD, while the ultrasound (US) lung comet score (ULCs), offered a suitable new technique.

The aim of this study was to evaluate and compare the accuracy of newer available techniques for the estimation of the hydration status of patients undergoing hemodialysis; the Inferior Vena Cava diameter (IVCD), the Bioelectrical Impedance Analysis (BIA), the Continuous blood volume monitoring (CRIT-LINE) and Ultrasound Lung Comet score (ULCs).

METHODS

A total of 53 patients (age 63.4 ± 14.4 years, dialysis duration 6.9 ± 8.3 years) undergoing chronic hemodialysis thrice weekly were included in the study (Table 1). The evaluation of hydration status methods was applied thrice weekly before and after HD. For the assessment of the inferior vena cava diameter (IVCD) M-mode method with Vivid 3 ultrasound unit was applied while a 2D display technique with Vivid 3 ultrasound unit was applied for the Ultrasound Lung Comet score (ULCs). Over hydration was estimated by BIA method with BCM-Body Composition Monitor (Fresenius Medical Care (FMC) Deutschland GmbH) and Continuous blood volume monitoring with the CRIT-LINE III System (FMC).

RESULTS

Comparison of methods was performed with ROC curve analysis. For overhydration (Figure 1), both BIA and CRIT-LINE had higher sensitivity than ULCs, but much lower specificity. For the hypohydration status (Figure 2) the AUC of ULCs was significantly higher than the AUC of BIA and had higher sensitivity and specificity than BIA and CRIT-LINE. Thus, no difference could be demonstrated between IVCD and ULCs in evaluating the fluid status of HD patients, while comparing BIA to CRIT-LINE, BIA appeared to be more dependable method.

Table 1: Anthropometric and clinical parameters

n=53 patients (M 34 & 19 F)	Mean value \pm SD
Age (y)	63.4 (14.4)
SBP before HD (mm Hg)	133.1 (26.9)
DBP before HD (mm Hg)	72.7 (15.4)
SBP after HD (mm Hg)	124.9 (26.7)
DBP after HD (mm Hg)	72.1()
BMI before (kg/m ²)	26.8(4.2)
BMI after (kg/m ²)	25.8 (4.1)
Dialysis Duration (y)	6.9 (8.3)
HD (h)	4 (0.27)
DW (kg)	73.28 (16.51)
BSA(m ²)	1.77 (0.2)

Figure 1: Overhydration Status

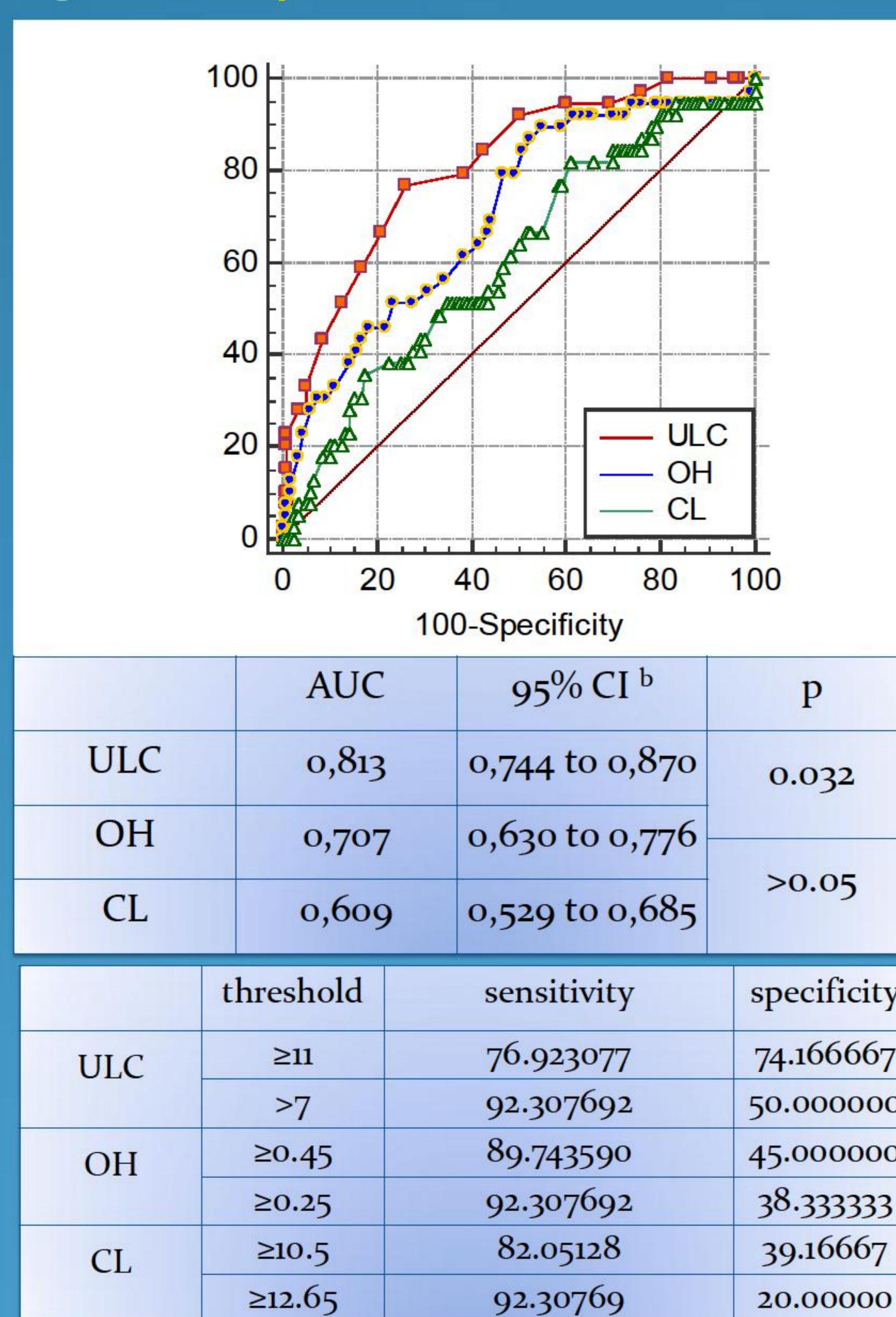
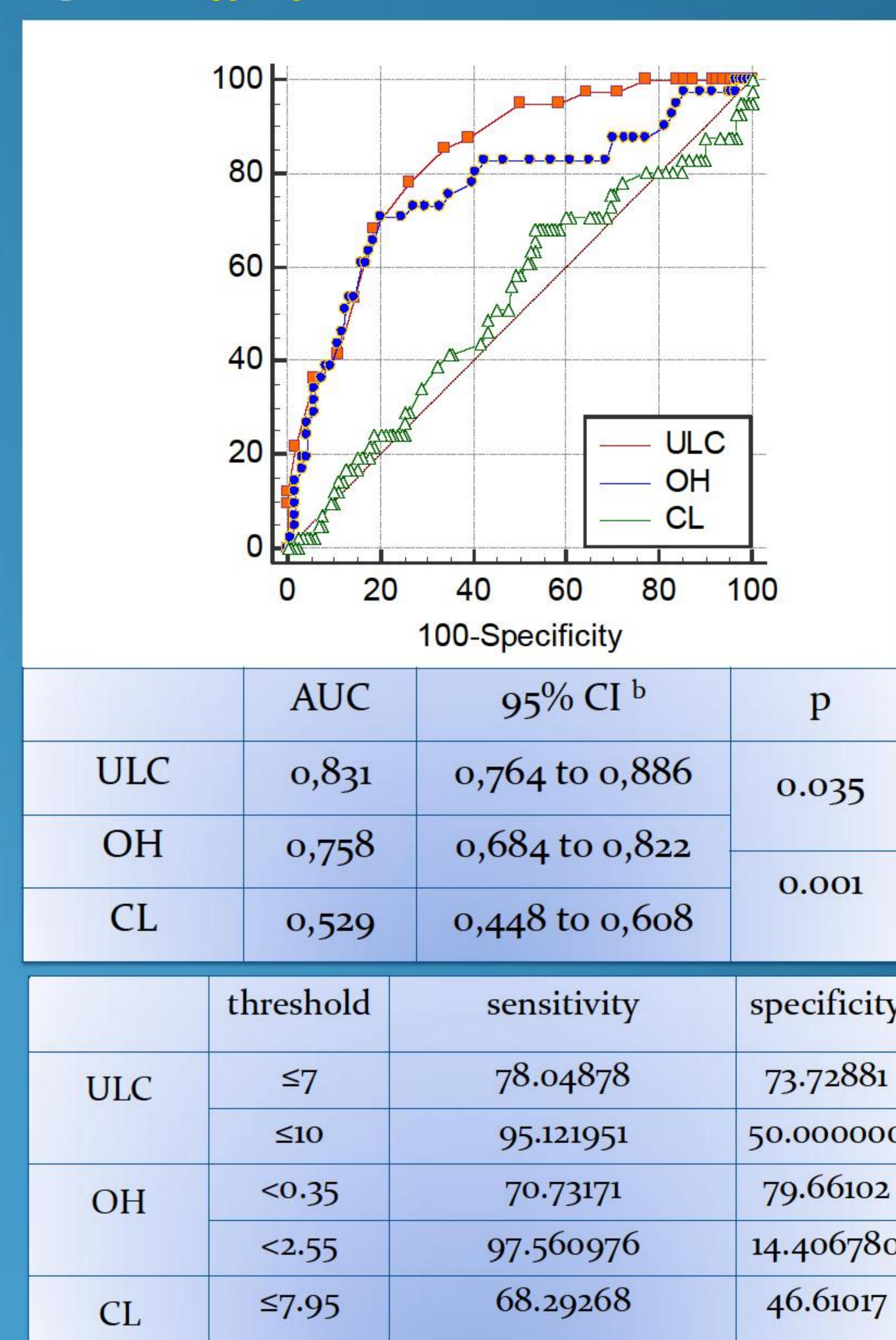


Figure 2: Hypohydration Status



CONCLUSIONS

These findings indicate that ULCs is a valuable and easily performed newer technique for the accurate evaluation of dry weight and fluid status in ESRD patients undergoing chronic HD, that might help to recognize an asymptomatic lung congestion in these patients.