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Promoting Sustainable Kidney Health: The Asia-Pacific and Beyond

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Bedside Lung Ultrasound for the Assessment of Volume Status in Chronic Kidney Disease Patients on Hemodialysis

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Objectives : Dry weight of the patient is usually assessed by using clinical parameters (edema, BP, JVP etc), Biochemical parameters (BNP, ANP), Bioimpedance Spectroscopy (BIS) or IVC diameter and collapsibility on ultrasound (VCI index). Ultrasonographic lung comets (counting B-lines artifact) evaluate extravascular lung water and hence is considered as a useful tool to evaluate the hydration status of hemodialysis patients. This study aims to compare the efficacy of body fluid volume status and lung water assessment by clinical methods, Ultrasound chest and Bioimpedance Spectroscopy in chronic kidney disease patients on hemodialysis.
Methods : Dry weight of the patient was assessed by the attending nephrologist based on clinical criteria such as: weight, blood pressure, presence of edema or vascular congestion. A Longitudnal Ultrasound scan of the chest was performed using MicroMaxx Ultrasound System with patient in supine position from second to fourth intercostal space of left hemi-thorax and second to fifth intercostal space of right hemi-thorax along parasternal, midclavicular, anterior axillary and midaxillary lines of each side in a total of 28 sectors. Pre and Post dialysis comet score was determined by calculating the total B-lines in each sector. Bioimpedance spectroscopy using Bodystat QuadScan 4000 was performed. Pre and post dialysis total body water (TBW), intracellular water (ICW), extracellular water (ECW) and residual fluid overload (ECW pre HD- ECW post HD) were recorded.
Results : The residual fluid overload on Bio impedance spectroscopy and lung ultrasound comet score after dialysis had a significant correlation (p value <0.0001). Of the 100 assessments, 40% had fluid overload after dialysis on Bio impedance and 35% had lung congestion on ultrasound chest even after achieving euvolemia according to the dry weight assessed clinically.
Conclusions : Lung comets on ultrasound chest and residual volume on bio impedance spectroscopy may precede the development of clinical sign and symptoms in a patient.

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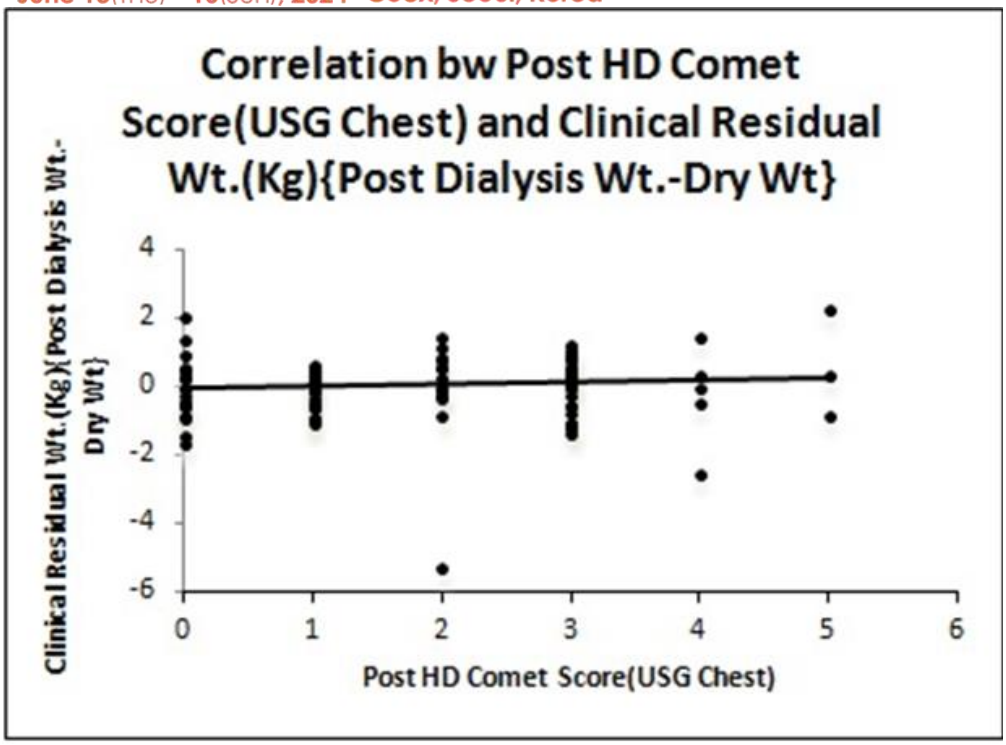
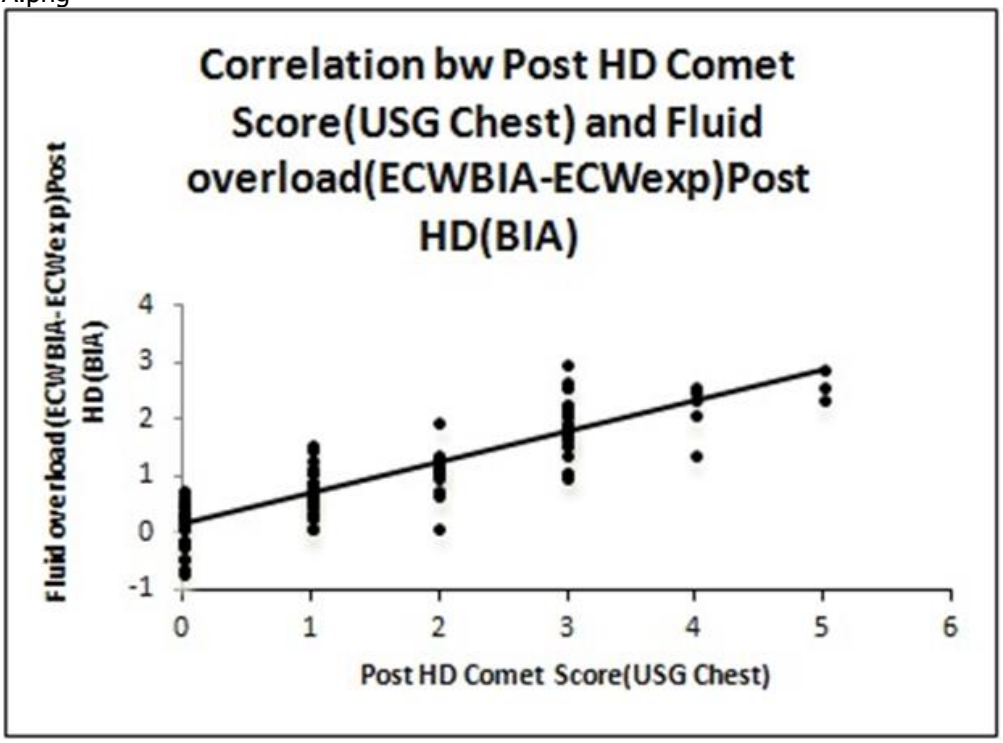

Correlation bw Post HD Comet Score(USG Chest) and Clinical Residual Wt.(Kg){Post Dialysis Wt.-Dry Wt}
Clinical Residual Wt.(Kg){Post Dialysis Wt.-Dry Wt}
4
2
0
-2
-4
-6
0
1
2
3
4
5
6
Post HD Comet Score(USG Chest)

A.png


Correlation bw Post HD Comet Score(USG Chest) and Fluid overload(ECWBIA-ECWexp)Post HD(BIA)
Fluid overload(ECWBIA-ECWexp)Post HD(BIA)
4
3
2
1
0
-1
0
1
2
3
4
5
6
Post HD Comet Score(USG Chest)