Effect of Ultrafiltration on Aortic Augmentation Pressure and Index in Patients on Maintenance Hemodialysis

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Published In/Presented At

Aure, S., Gersbach, E., Kandarpa, M., Sadowsky, L., Chewaproug, D., Oliner, C., Gaughan, W., Dissanayake, I, Bloom, E. (2008) *Effect of Ultrafiltration on Aortic Augmentation Pressure and Index in Patients on Maintenance Hemodialysis.* American Journal of Kidney Diseases, 51,(4): B33-B33.

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EFFECT OF ULTRAFILTRATION ON AORTIC AUGMENTATION PRESSURE AN D INDEX IN PATIENTS ON MAINTENANCE HEMODIALYSIS

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Aortic augmentation pressure and index are parameters that reflect the central aortic pressures. These parameters have a direct relationship with cardiovascular mortality and morbidity. In patients on chronic hemodialysis, hypertension has always been thought to be volume-mediated. Hence, an effective ultrafiltration during hemodialysis should lead towards a lower peripheral blood pressure. It is not clear whether ultrafiltration has the same effect in central blood pressures. The purpose of this study was to determine the effect of ultrafiltration on aortic augmentation pressure and index in patients on chronic hemodialysis.

We performed a prospective study on 129 patients on chronic hemodialysis. We measured their aortic augmentation pressure (AAP) and index (AIX) using applanation tonometry (SphygmoCor apparatus) at the beginning and at the end of a single dialysis session. We grouped the patients into 2: Group 1 included those who achieved an ultrafiltration of less than 1.8 liters, and Group 2 included those who achieved an ultrafiltration of more than 1.8 liters.

There was a bigger drop in the AAP in Group 2 than Group 1 at the end of the hemodialysis , however, this was not of statistical significance (drop in AAP 3.4 mmHg vs. 1.9 mmHg, p=0.351). There was no difference in the drop in AIX between the two groups at the end of the hemodialysis (drop in AIX 2.2 vs. 2.2, p=0.995).

In conclusion, ultrafiltration does not affect changes in AAP and AIX after a single hemodialysis session, although there is a trend for a bigger drop in AAP with greater ultrafiltration.

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CONVERSION FROM CYCLOSPORINE TO TACROLIMUS BASED IMMUNOSUPPRESSION THERAPY IN RENAL TRANSPLANT RECIPIENTS

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This is an an interim analysis of an investigator-driven multicenter trial in renal transplant recipients: the Prospective Quality of life Renal Transplantation Switch Study; Tacrolimus-based immunosuppression ("PQRST study"). **Patients and methods:** Patients included in the trial were initially treated with cyclosporine-based immunosuppression after renal transplantation. They experienced cyclosporine- or steroid-related side-effects, such as hypertension, hyperlipidemia, hypertrichosis, or other adverse reactions and were converted to a tacrolimus-based immunosuppressive regimen (*n* = 63). Steroids were subsequently discontinued between 3 and 6 months after the conversion. Follow up ranged from 2 to 24 months. **Results:** One patient died from a PTLD 7 months after the conversion. This event was however not felt to be related to the change in immunosuppression. There have been no acute rejection episodes and no other grafts were lost. As of today 19/31(60%) patients, who have completed at least 6 months, are successfully weaned off steroids with the remaining patients in this process. No patient experienced an acute rejection episode. The blood pressure and the need for antihypertensive medication decreased. No patient developed *de novo* diabetes or other serious side effects related to the conversion. Three patients were withdrawn from the trial because of bleeding, depression, and proteinuria. However, none of these adverse events were felt to be directly related to the change of the immunosuppressive regimen to tacrolimus based immunosuppression. **In conclusion**, conversion from cyclosporine to tacrolimus-based immunosuppressive therapy was safe and well tolerated and may improve the cardiovascular risk profile after kidney transplantation.

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PREVALENCE OF CHRONIC KIDNEY DISEASE (CKD) IN THE HOSPITAL SETTING

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Available data suggest that CKD is under-diagnosed. Patients with CKD often have comorbid conditions, such as diabetes and cardiovascular conditions, which contribute to higher hospitalization rates compared with the general population. Given their increased chance of hospitalization, the hospital may be a unique venue to identify patients with CKD that may otherwise go undiagnosed. The purpose of this analysis was to utilize longitudinal electronic health records to establish the prevalence of CKD in hospitalized patients.

A population of unique adults with $\geq$ 1 admission to any of the Intermountain Healthcare hospitals from 1/2003 to 12/2003 was identified. From this cohort, all eGFR and relevant ICD-9 diagnosis/procedure codes from 1/2000 to 7/2007 were retrieved for every known inpatient and outpatient historical encounter. Patients were subsequently profiled according to diagnoses of dialysis, kidney transplant, CKD, or reduced kidney function.

A total of 83,190 unique patients were admitted between 1/2003 and 12/2003. Of the total admissions, 54% (n = 45,258) had an eGFR measurement within 72 hours of admission, of which 23% (n = 10,473) had an eGFR <60 mL/min/1.73m^2. Of the group with an eGFR <60 mL/min/1.73m^2 within 72 hours of admission, 41% (n = 4,317) had a confirmed CKD diagnosis prior to hospitalization, of those patients, 43% (n = 1,837) had CKD diagnosis based on ICD-9 codes, and 57% (n = 2,480) had CKD based on 2 consecutive eGFR measurements of <60 mL/min/1.73m^2 taken at least 3 months apart, but were not yet formally diagnosed.

The results of this analysis indicate that at least 9.5% (4,317/45,258) of patients admitted to a hospital and have an eGFR measurement have CKD, and over half of those are not yet diagnosed. Given that at least one in ten patients has CKD in the hospital, identification and diagnosis of this patient population during hospitalization may provide an opportunity to improve disease management, and an earlier referral to nephrologists if appropriate.

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RESOLUTION OF CAST NEPHROPATHY FOLLOWING FREE LIGHT CHAIN REMOVAL BY HEMODIALYSIS IN A PATIENT WITH MULTIPLE MYELOMA.

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Background and Aims: Acute renal failure (ARF) in multiple myeloma (MM) is most commonly caused by cast nephropathy. The natural history of cast nephropathy after diagnosis and treatment is unknown.

We report the case of a 61 year old patient with dialysis-dependent ARF, MM and biopsy-proven cast nephropathy treated with chemotherapy and high cut-off hemodialysis. As the patient remained dialysis dependent after 6 weeks, a repeat renal biopsy was performed. This showed complete resolution of casts.

Methods: Identification of casts was performed on Hematoxylin and Eosin stained sections of kidney biopsy, while interstitial fibrosis scoring was performed on Elastic van Gieson stained sections. Chemotherapy protocol consisted of pulsed dexamethasone (40 mg once daily for 4 days per pulse) and thalidomide 100 mg once daily. Free light chain (FLC) concentrations were measured using the FREELITE™ assay. The patient received 8 dialysis sessions of 6-8 hours each for the first 14 days, followed by a thrice weekly 4-6 hour dialysis schedule. Two Gambro HCO1100™ high cut-off diaysers were used in series.

Results: On the initial renal biopsy, myelomatous casts were seen in approximately 30% of tubules, along with moderate interstitial fibrosis. On the follow-up biopsy, less than 5% of tubules contained casts, while interstitial fibrosis remained unchanged. Prior to treatment, serum kappa FLC concentration was 15,700 mg/L. Median reduction in FLC per dialysis session was 74%. After 16 dialysis sessions, 33 days after starting treatment, FLC concentration was reduced to less than 500 mg/L and were maintained below this level.

Conclusions: This report provides histological evidence that as serum FLC concentrations fall, casts can resolve within weeks. This observation provides an explanation for the successful reversal of ARF due to cast nephropathy in MM after rapid reduction of serum FLC by high cut-off hemodialysis.