The adjusted mortality risk for patients initiating chronic dialysis was 70% higher for those whose indication was volume overload compared to those whose indication was only a laboratory based decline in renal function. The study examined 461 patients (24 on PD) in a retrospective review of records (1).

The presence of short, asymptomatic supraventricular arrhythmias was found on Holter monitoring over six consecutive hemodialysis treatments in 38 of 77 patients in sinus rhythm. The adjusted risk of death over the median 40 month follow-up for this finding was much increased (HR 3.2) as were the risks of nonfatal cardiovascular events (HR 4.3) and atrial fibrillation (HR 17.2) (2).

Among over 50,000 HD patients, 6538 had baseline and 1 year assessments of residual urea clearance; median values were 3.3 and 2.1 ml/minute per 1.73 m². The adjusted risk of subsequent mortality was higher in those with a more rapid decline in residual renal function (HRs 2.0, 1.25, 0.81 and 0.61 for the four quartiles of rapidity in decline in urea clearance). Data were similar for urine volumes which fell (median values) from 900 to 650 ml/day over the first year (3).

Lung ultrasound found evidence of moderate or severe lung congestion in 262 of 1106 assessments (24%) in 79 patients. Physical exam showed crackles in only 39% of cases with such congestion. However, crackles were a fairly specific finding being present in only 21 of the exams without lung findings of congestion (4).

Of 4362 patients starting PD, 1165 (27%) switched to HD for at least 180 days, 51% were using a catheter vascular access; their mortality was higher over the next year than those using a permanent vascular access (HR 0.66) (5).

A study of 1113 twice weekly HD patients found that those with a serum creatinine <6 mg/dl and albumin <3.5 g/dl had a 1.8 fold greater adjusted mortality than those with higher values of both measures. A matched group of 4448 thrice weekly HD patients also had an increased relative mortality risk (HR 2.2) when low creatinine and albumin levels were present (6).

A retrospective study of 118,394 HD patients examined ultrafiltration rates (UFR) and mortality. Adjusted mortality was higher (HR 1.3) for those whose UFR was above 13 ml/hour/kg vs. those with lower values; a similar mortality difference was seen using a cutoff of 10 ml/kg/hour (HR 1.22). Normalizing UFR to body weight, mass or surface area did not alter the findings. UFRs >10 ml/kg/hour were found in 41% of patients (7).

An analysis of USRDS and National Center for Health Statistics data found that the lifetime risk of ESRD varied considerably by gender, race and ethnicity. Risks for whites, Hispanics and blacks were 3.1%, 6.2% and 8.0% for males and 2%, 4.3% and 6.8% for females, respectively (8).

According to USRDS and Medicare data, carotid endarterectomy was performed in 5142 dialysis patients during 2006–2011, 85% of whom were asymptomatic. In this large, asymptomatic subgroup, 30 day perioperative stroke risk was 2.7%, substantially higher than the 1.1–1.2% seen in two studies in the general population (9).

A study of data from the USRDS and Centers for Medicare and Medicaid Services on 1569 children on HD found no association of hemoglobin >12 g/dl with adverse outcomes. In fact, the adjusted risks of mortality and all cause hospitalization were lower (0.33 and 0.81, respectively) in the high hemoglobin group compared to those in children with hemoglobin levels of 10–12 g/dl (10).

During a seven year period in Scotland, withdrawal of dialysis was the primary cause of death in 19% of ESRD patients and was a contributor to death in an additional 17%. Withdrawal of dialysis was much more likely in women than in men (adjusted HR, 1.4) (11).

Permanet pacemaker implantation rates in HD (N = 18,771) and PD (N = 9700) patients in Taiwan were similar but far higher (5.9 and 3.5 fold, respectively) than in an age and sex matched control group without kidney disease (12).

An analysis of published data on 681 pregnancies in dialysis patients found an 83% rate of preterm delivery, a lower incidence of “small for gestational age (SGA) babies with HD vs. PD (31% vs. 67%) and a continuous effect of increasing weekly hours of HD with less frequent preterm delivery and SGA babies (13).

The dose of dialysis (Kt/V) is routinely normalized for body water (V) but might reasonably be adjusted for other measures. When the Kt/V (for a Kt/V of 1.7) was normalized to total energy expenditure in 148 PD patients, a significantly lower dialysis dose was calculated for patients who were younger, women, employed or weighed less compared to patients

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who were men, older, unemployed or weighed more (14).

- A target dialysis dose (Kt) normalized to body water (V) of 1.4 is considered adequate but yields a range of doses when normalized to body surface area. An observational study of 6129 HD patients examined outcomes of patients whose dialysis dose was reanalyzed and normalized to body surface area; mortality and hospitalization risks were significantly lower in the patients receiving a higher Kt with this alternative normalization assessment (15).

- A retrospective analysis found that the adjusted risk of death for 1206 HD patients receiving extended hours (nocturnal) HD (mean, 399 minutes) was 33% lower than that in 111,707 patients receiving conventional HD (mean, 211 minutes) (16).

- The clinical effect of the 2011 policy changes by the Centers for Medicare and Medicaid Services (“bundling” of ESA costs) and the Food and Drug Administration (lower recommended ESA dosing) were examined in 69,718 incident hemodialysis patients for periods before and after the changes. After bundling and new labeling, stroke risk fell (HR 0.77) and, in black patients, all-cause mortality declined (HR 0.82) as did the risk of major cardiovascular events (HR 0.82); ESA use declined by over 30% and blood transfusions increased by about 10% (17).

- A 1 year study in 27 HD patients found that both exercise and an increase in hematocrit (from 30% to 42%) improved peak power and oxygen consumption. However, peak arteriovenous oxygen difference remained depressed, an observation attributed to the findings on muscle biopsy of markedly thickened capillary endothelium and basement membrane (total mean thickness 1130 nm and 680 nm, HD patients vs. controls) (18).

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