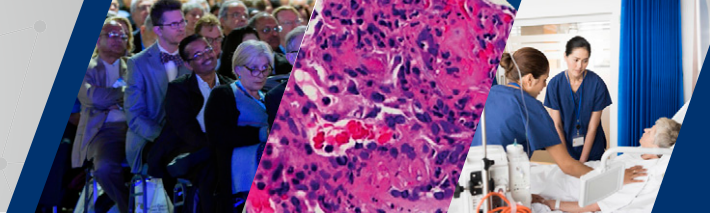

Peritoneal Dialysis in the Obese Patient

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Introduction

The body mass index (BMI) of patients with incident ESKD is increasing over time and outstripping that of the increasing BMI in the general population. Options for KRT tend to be more restricted in patients with obesity. Although obese patients have better long-term outcomes following transplantation compared with remaining on dialysis, many jurisdictions have a BMI threshold above which patients cannot be listed for transplantation due to a higher rate of perioperative and long-term complications than their nonobese counterparts.

How I Treat: Peritoneal Dialysis in the Obese Patient

Some view obesity as an absolute or relative contraindication to peritoneal dialysis (PD), with the main concerns being metabolic complications, infectious complications, PD fluid leaks, lower dialysis adequacy, and lower patient survival. We suggest that PD can be safely and effectively carried out in almost all patients with obesity who are otherwise suitable PD candidates, although the concerns mentioned above must be carefully considered and are discussed below along with other issues unique to obese patients on PD.

Patient Selection

Although commonly used in clinical and research settings, BMI is an imperfect metric that is insensitive to body composition. For that reason, we do not use a specific BMI cutoff for PD candidacy. We consider each patient individually on the basis of medical history, surgical risk, and other individual patient characteristics.

In those obese patients proceeding with PD, it is important that they understand that a switch to hemodialysis (HD) may be necessary in future. Registry data have demonstrated that time to HD transfer is shorter and time to transplantation is longer in obese patients than in their nonobese counterparts (1).

Catheter Insertion

In our center, PD catheter insertion in obese patients is performed under general anesthetic with a paramedian approach and under laparoscopic guidance. Rectus sheath tunneling of the deep cuff is performed to help prevent catheter malposition and reduce the risk of pericatheter leaks. Selective omentopexy is performed if a large draping omentum is evident (2).

We suggest that meticulous PD catheter positioning is critical for catheter exit site care in the context of obesity. An extended subcutaneous catheter tract, with an upper abdominal or presternal exit site, can help patients see and care for the exit site and therefore, minimize infection risk. The catheter exit site should be planned preoperatively in several positions (standing and sitting) and not while the patient is lying supine on the operating table. Nonrandomized data suggest that extended catheters have satisfactory survival compared with conventional catheters (3). Although this study did not identify a difference in exit site, tunnel, or peritonitis infection rates, there was a higher rate of extended catheter removal in the context of peritonitis.

The catheter should be fully healed (several weeks) prior to use. The initial PD prescription, if done by cycler, should incorporate low fill volumes at night and a dry abdomen by day, and it should be increased over time as tolerated. For the patient on manual bag exchanges, lower fill volumes can be used until the healing from the catheter insertion is complete.

Metabolic Issues

Because features of the metabolic syndrome (central obesity, insulin resistance, hypertension, and dyslipidemia) cluster, meticulous attention should be paid to these parameters in obese patients on PD.

Several studies have demonstrated that a range of glucose absorption is observed in different patients on different PD regimens, with an average of 100–200 g of glucose (or 400–800 kcal) absorbed daily, accounting for approximately 20% of total daily energy intake (4). To limit systemic glucose absorption, we use icodextrin for the long dwell in most patients, especially those with obesity or diabetes. Compared with dextrose-based dialysate, icodextrin results in a lower glucose/caloric load for equivalent or increased ultrafiltration during the long dwell (4).

Patients tend to gain several kilograms of weight following initiation of dialysis (HD and PD), presumably due to resolution of uremic anorexia. Recent studies have used sophisticated techniques, such as bioimpedance and dual-energy x-ray absorptiometry,

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to assess changes in body composition following initiation of PD. Such studies suggest the weight gain after PD initiation is due to an increase in fat mass and not lean tissue mass (5). Our multidisciplinary team, which includes clinical dieticians, counsels and supports all obese patients regarding the effect of obesity on survival and general health, appropriate dietary restrictions, and individualized weight targets in the context of PD initiation. Published pilot data suggest that the multidisciplinary approach can facilitate significant and sustained weight loss in select obese patients on PD (6). There is also growing experience in our center and worldwide with bariatric surgery in select obese patients with ESKD who are otherwise kidney transplant candidates. Laparoscopic sleeve gastrectomy is now the favored technique, with complication rates in ESKD similar to those observed in the general population (7). Uninterrupted PD in the context of laparoscopic bariatric surgery has been described (2).

Infectious Complications

There are conflicting reports regarding the association of obesity with technique survival in obese patients on PD. Peritonitis and PD catheter infection rates are important determinants of technique survival. A Canadian group studied the infectious outcomes of 938 patients on PD categorized into quartiles of BMI (8). In multivariable analysis, a higher risk of coagulase-negative staphylococcal peritonitis was identified in the quartile with the highest BMI. Because there was no association between BMI and exit site infection rates, the group postulated that the higher coagulase-negative staphylococcal peritonitis rate was not due to poorly visualized exit site infections (although exit site locations were not described). Instead, they hypothesized that obesity was a marker of medical and socioeconomic factors (such as diabetes and lower socioeconomic status) that together were associated with a higher risk of peritonitis.

Dialysis Adequacy

The additional limitations of Kt/V to assess adequacy of dialysis in the context of obesity must be recognized. V is the volume of distribution of urea (approximately equal to total body water). Adipose tissue has low water content and does not increase the volume of distribution of urea, although it increases the body weight. In an obese patient, if actual body weight is used to estimate V, the estimate for V will be falsely high, and the Kt/V will be falsely low. Instead, the Kidney Disease Outcomes Quality Initiative recommends that the lean body weight be used to calculate V in this context, although admittedly there is no evidence to guide this recommendation (9). We do not use Kt/V as an adequacy target in obese (or nonobese) patients on PD; instead, we focus on clinical and other biochemical measures of adequacy.

For those who are mandated to use Kt/V, it is important to note that United States registry data identified a faster decline in kidney Kt/V in obese versus lean patients on PD (1). In this context, the dialysate fill volumes can be increased as tolerated (usually to 2500–3000 ml) in an attempt to increase the peritoneal Kt/V and maintain total Kt/V. Because continuous cycler peritoneal dialysis may better facilitate these larger volumes, obese patients tend to be managed with continuous cycler peritoneal dialysis rather than continuous ambulatory PD. As mentioned, registry data also identified a shorter time to HD transfer in obese patients on PD (1). Although the reasons for this were not specifically captured, it is likely that the inability to meet solute clearance targets played a role, with 23% of those that transferred to HD not meeting the total weekly Kt/V target of 1.7 in the months leading up to modality transfer. The use of fat-free weight in the calculation of V may obviate some of these transfers.

Patient Survival

Although obesity has been consistently associated with a survival benefit in patients on HD, there are conflicting reports regarding this association in patients on PD (1,10) A United States review (n=15,573) reported a U-shaped mortality curve, with the lowest mortality risk in the BMI range of 30–35 kg/m^2 in the patient mix–adjusted model (1). However, an Australian registry review (n=9679) suggested that obesity in the context of PD is associated with a higher risk of mortality (4). BMI was modeled as a continuous variable and demonstrated a J-shaped mortality curve—mortality risk was lowest for BMI values of approximately 20 kg/m^2 and steadily increased up to a BMI of 40 kg/m^2 (10).

To summarize, an increasing proportion of our patients on incident and prevalent PD are categorized as obese by BMI criteria. We counsel these patients regarding appropriate weight loss and use icodextrin for the long dwell where possible to minimize systemic glucose absorption and additional weight gain. We place emphasis on the meticulous positioning of extended PD catheters and allow generous time for healing prior to use. We do not use Kt/V as a target of dialysis adequacy and instead, rely on clinical and other biochemical measures of adequacy. If Kt/V urea reporting is mandated, the V on the basis of lean body mass should be used. We target transplantation for our obese patients who are otherwise transplant candidates; occasionally, bariatric surgery is required to realize this target. We do not consider obesity a contraindication to PD, and we encourage others to offer PD to obese patients who are otherwise PD candidates.

Disclosures

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