SELECTING PERITONEAL DIALYSIS IN THE OLDER DIALYSIS POPULATION

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Selecting peritoneal dialysis (PD) in older individuals is a complex, multi-step process. At each step, older individuals may not have the opportunity to receive PD unless care is optimized. Older individuals are less likely to complete a PD assessment, because of unstable medical conditions, consideration of palliative care, or reluctance to approach frail patients once they are established on hemodialysis (HD). Older individuals are also more likely to have medical or social conditions that contraindicate PD or to have barriers to self-care PD that may not be overcome with support. Older individuals who are eligible for PD may be reluctant to choose it, leaving HD as the default modality. Finally, receipt of PD may be compromised by urgent HD or PD catheter-related complications at the time of insertion. Despite all these challenges, older patients can do very well on PD, so each step should be well understood and optimized in renal programs to maximize PD use in older patients.

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Selecting peritoneal dialysis (PD) can be a time-consuming process for older patients, who have high comorbidity and functional disabilities. If this process is not performed well and in a timely manner, the default modality will be in-center hemodialysis (HD). Furthermore, many older patients who express interest in PD never receive this modality. They initiate HD urgently and never transfer to PD. It is critically important that the selection process is adapted for older individuals so PD use can be maintained. Despite the challenges, it is worth the effort because PD in older individuals is usually very well tolerated and can be provided in the comfort of their homes.

ASSESSING OLDER INDIVIDUALS FOR PD ELIGIBILITY

All older individuals with incident end-stage renal disease (ESRD) should be identified and assessed for PD. This process can be facilitated by conducting regular sit-down rounds with an

interdisciplinary team to review patients who are about to start dialysis, or who have recently started dialysis. The assessment should include a review of medical conditions, as well as physical, cognitive, and social factors that may represent barriers or contraindications to self-care dialysis (Tables 1 and 2). Ideally, the assessment should be completed prior to starting dialysis. However, this is often not the case as older patients are at risk for urgent starts and may be referred late to nephrologists (1).

The PD assessment should be conducted by an interdisciplinary team, consisting of a nephrologist, experienced nurse, and a social worker at a minimum. Surgeons and an interventional radiologist/nephrologist should also assess the suitability of the belly prior to PD catheter insertion. In more complex cases, the team might include professionals from geriatric medicine, psychiatry, neurology, physiotherapy, occupational therapy, and home care (2). Our research group is currently conducting formal geriatric assessments (Timed up and Go Testing, Hand Grip Testing, Lawton-Brody Instrumental Activities of Daily Living [ADL], Barthel ADL Index and Montreal Cognitive Assessment) during PD training to determine if they identify unrecognized barriers and predict the need for assisted PD (co-principal investigator Dr. V. Jassal). Other tools such as Method to Assess Treatment Choices for Home Dialysis (MATCH-D, Medical Education Institute) have also been developed to assess patients for home dialysis eligibility in a more standardized manner (<http://homedialysis.org/match-d>). Assessments in the older population may require multiple visits, and often adult children will accompany their older parents.

Potential reasons for not completing PD assessments include early death soon after the initiation of dialysis, unstable medical conditions, a reluctance to approach frail patients once they stabilize on HD (modality inertia), and consideration of palliative care (e.g. patient has active cancer). There are no studies to our knowledge that show older patients are less likely to complete PD assessments, but these reasons are more common in this age group.

PERITONEAL DIALYSIS ELIGIBILITY – CONTRAINDICATIONS

The determination of PD eligibility begins by screening individuals for medical and social contraindications to PD. What constitutes a contraindication to PD varies in the literature and among programs. The availability of resources required

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TABLE 1
Relative Contraindications to Peritoneal Dialysis*

Medical conditions
Abdominal surgery – prior scarring, recent or planned surgeries
Colostomy, ileostomy, or ileal conduit
Diverticulitis – active
Gastric tube
Hernias – uncorrectable
Inflammatory bowel disease – active
Obesity – morbid
Polycystic kidney disease – very large kidneys
Pulmonary disease – severe
Other bowel abnormalities (cancer, ischemia)
Social conditions
Residence does not permit PD
Employment does not permit PD

PD = peritoneal dialysis.

* Contraindications listed are frequently cited reasons that patients are not offered PD but do not necessarily represent absolute contraindications in all PD programs or in the opinion of all nephrologists.

TABLE 2
Barriers to Peritoneal Dialysis and Other Factors
Influencing Choice

Barriers
Medical barriers – diarrhea, incontinence, gastroparesis
Physical barriers – decreased strength, manual dexterity, vision, hearing, and general frailty
Cognitive barriers – decreased memory, executive functions, dementia, prior stroke, psychiatric conditions
Availability of support
Spouse
Other family members – adult children, parents
Homecare
Nursing home, complex continuing care
Other factors that influence modality choice
Distance to a hemodialysis center
Desire to travel
Flexibility of schedule
Medicalization of the home
Employment
Effect on other caregivers or family members
Finances/expenses
Availability of space/storage in the residence
Other lifestyle issues e.g. swimming, pets
Experience of other patients
Desire to socialize with other patients/health care professionals
Body image with abdominal catheter

to address specific challenges (e.g. the availability of PD for nursing home residents or pre-sternal catheters for obese patients) may also vary. For our purposes, we have defined contraindications as a medical or social condition which makes an individual ineligible for PD regardless of available support

(Table 1). The conditions listed are relative contraindications because they are judged by the interdisciplinary team and are therefore somewhat subjective.

Our working definition of contraindications is not modified by available supports, which distinguish these conditions from barriers to self-care PD such as physical or mental disabilities. Applying this definition to consecutive incident dialysis patients at multiple centers in Canada, we found that contraindications were present in 22% (3). Screening potential candidates for contraindications first increases the efficiency of the PD assessment because it is not necessary to review barriers to self-care or available supports in the contraindicated patient. Common medical contraindications include abdominal scarring, recent or planned abdominal surgery, gastric tubes, colostomies, ileostomies, ileal conduits, severe pulmonary disease, liver disease with ascites (varies by program), and active bowel malignancy. All of these conditions are likely to increase with age.

Social contraindications include living in a long-term care facility (nursing home) or chronic care hospital that does not permit PD for administrative reasons. Patients may also temporarily reside in rehabilitation centers that delay the PD assessment, decreasing the likelihood a patient will go on to receive PD because they become used to receiving HD (modality inertia). Some patients also have occupations that do not permit PD, although employment issues are less common in the older population.

PERITONEAL DIALYSIS ELIGIBILITY – BARRIERS AND SUPPORT

Older patients who do not have a contraindication to PD should be carefully evaluated for barriers to PD. Barriers are defined as medical, physical, cognitive, and social conditions that potentially interfere with self-care PD but do not automatically make the patient ineligible for PD (Table 2). Many barriers can be overcome by support, so there is an interaction between barriers and support—unlike contraindications. Barriers are also more subjective, and how the interdisciplinary team perceives them likely explains much of the variance in eligibility across programs. For example, some programs cite age as a barrier to PD when in fact it is only a surrogate for other barriers (4).

Medical conditions including gastroparesis, incontinence, insomnia (for PD cyclers), and diarrhea may be perceived as barriers to PD. Physical barriers include reduced strength that makes the lifting of PD bags difficult, reduced manual dexterity, decreased vision, or decreased hearing. We found that these physical barriers were present in 53%, 43%, 33%, and 16%, respectively of 245 consecutive patients evaluated for PD who did not have contraindications to the therapy (3).

Cognitive impairment is also very common. For example, in a multicenter study of 314 chronic HD patients, Sarnak *et al.* found that significant mental impairment was present in 22% of chronic HD patients when examined with validated neurocognitive tests (Mini-Mental State Examination, North American Adult Reading Test, Wechsler Memory Scale-III Word

List Learning Subtest, Wechsler Adult Intelligence Scale-III Block Design and Digit Symbol-Coding Subtests and Trail Making Tests A and B). Deficits were worse in executive functions than memory, and vascular disease was a strong risk factor (5). In a smaller study of 51 PD patients, severe cognitive impairment was present in 31% of patients when examined with 9 validated neuropsychological tests (6). Among incident ESRD patients, our interdisciplinary team, using routine clinical assessments, only identified cognitive barriers to PD in 8%, suggesting these conditions are under-recognized, or that not all cognitive dysfunction detected by sophisticated testing is severe enough to interfere with a patient's ability to do PD. Finally, social barriers to PD may be more common in older patients who live in small apartments that lack storage space for supplies.

The impact of barriers on PD eligibility, as we define them, can be modified by available supports. Some older patients with many barriers can overcome them if significant support is available in their residence. For example, older patients living with their adult children who are willing and able to provide assistance can often receive PD despite significant barriers. We found that the availability of family support increased PD eligibility 18% and 35% in patients with at least 1 physical or cognitive barrier to self-care PD, respectively (3). In patients who had both at least 1 physical and 1 cognitive barrier, family support increased eligibility by 46%, indicating that older patients with multiple barriers will choose PD if support is available to them.

The same appears to be true if patients are offered support in the home by homecare professionals (nurses, nursing assistants). We found that the availability of homecare assistance for PD increased eligibility from 65% to 80% in a population with a median age of 75 (7). In a large study ($n = 9,801$) from France, 43% of PD patients received assisted PD with visiting private nurses (8). This high use of assisted PD is indirect evidence that homecare support increases PD eligibility, given that the assisted PD patients had a mean age of 78—considerably older than the typical self-care PD population. Even higher levels of support for PD are available in nursing homes, where PD is provided to patients regardless of barriers to self-care (9).

PERITONEAL DIALYSIS CHOICE

If an older individual is deemed eligible for PD, they should be educated about their treatment options and offered it. It has been shown that approximately 50% of patients will choose PD if offered in a systematic way (10). Some programs may not offer choice or strongly encourage home dialysis for economic reasons, but international guidelines recommend a shared decision-making model where patients and their families are fully informed about all their dialysis options (11). A number of factors have been shown to influence the likelihood that patients will choose PD (Table 2). These factors include travel time to the dialysis unit, flexibility of their dialysis schedule, autonomy, concerns about medicalization of the home, impact on family members, finances, body image, and desire to

socialize with other patients. Unlike self-care barriers, which reduce PD choice in the older population, it is less clear how these factors are influenced by age (3).

The timing of choice is another consideration. Studies of pre-dialysis patients show that the majority of predialysis patients who are eligible for PD will choose it, but this "theoretical" choice often does not translate into actual receipt of PD. For example, Liebman *et al.* found that approximately half of the patients who initially chose PD in the predialysis clinic (glomerular filtration rates [GFR] 14–15 mL/min) actually received HD when dialysis was started, and most did not convert to PD (12). Being over the age of 75 was a risk factor for choosing PD but not receiving it. Some have argued that placing a buried PD catheter at a higher GFR could help convert the patient's initial choice into receipt of PD as they lose renal function (13).

Older patients are less likely to choose PD, and while it is not clear which of the many factors listed above are responsible, it is likely that a combination of several are at play for most. In 1 study, a 1-year increase in age that reduced the likelihood of choosing PD did so by 1–2% (10,14). Similarly, Jager *et al.* found patients 18 to 40 years old were 6 times more likely to choose PD than patients who were 70 years of age or older (15).

PERITONEAL DIALYSIS RECEIPT

Once an older patient chooses PD, they must undergo timely PD catheter insertion and complete some form of PD training to successfully receive PD (exceptions are patients who have their PD performed by others). Older patients may have difficulty completing bowel preparation regimes or tolerating their side effects, and in some cases, admission to hospital may be required to facilitate PD catheter placement in very frail patients. Older patients with cardiac or respiratory disease are likely at a higher risk for complications following any operation or invasive procedures including PD catheter insertions. Older patients also require more healing time following insertion to reduce the chance of early exit-site leaks (16). Hernias may develop or be recognized once fluid is instilled in the abdomen but an association with age is not clearly established (17).

The aforementioned impact of aging on PD assessment, eligibility, and choice ultimately reduces the proportion of older patients who receive PD. Incident PD use in Canada in 2012 was 21%, 17%, and 14% in patients in the age groups of 45–64, 65–74, and 75+, respectively (18). In the US, for similar age groups and time periods, incident PD use was 7.0%, 5.6%, and 4.0% (19) (both Canadian and US percentages include pre-emptive transplants in the denominator). Multivariate analysis of US registry data has found that each decade of age in the ESRD population reduces incident use of PD by 12% (20). As a result, it is not surprising that incident PD patients are, on average 5 to 6 years younger than incident HD patients (21,22).

SUMMARY

Selecting PD in the older individual is a multi-step process with numerous factors influencing the final receipt of PD. Older

patients often have medical or social conditions which reduce the likelihood they will be assessed for PD, be considered eligible, choose it if offered, and ultimately receive it. However, PD can be successful in many older patients. It is important that a disciplined approach to assessing older patients is taken, and that it is conducted by an experienced interdisciplinary team. Identifying barriers to PD in older patients and having adequate supports available are important components of a successful program, and are required to maximize the safe and effective use of PD in this patient population.

KEY POINTS

- Successfully starting an older patient on PD therapy is a multi-step process that includes an assessment and determination of eligibility, the offer of PD to an eligible patient, the selection of PD as the modality of his/her choice, and ultimately, successful receipt of PD.
- An interdisciplinary team is required to adequately assess and educate older patients about PD as a modality option.
- Older patients have medical and social conditions that influence the ability to make it through each step in this process.
- Barriers to PD can often be overcome if adequate assistance is provided by family members, homecare workers, or staff in long-term care facilities.

DISCLOSURES

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