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Editorial Comment

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Peritoneal dialysis catheter placement by interventional radiologists

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In this issue, Quach and colleagues report on their single-center experience with peritoneal dialysis (PD) catheters placed by radiologists using ultrasound and fluoroscopic guidance, largely as outpatient same-day procedures under local anesthesia [1]. In 30 catheters placed, subsequent migration was noted in four patients and one patient ultimately required surgical intervention. These generally acceptable clinical end points, combined with the operational efficiency inherent in avoiding scheduling delays due to scarce surgical resources, operating room scheduling and general anesthesia requirements, may have contributed to the 67% increase in PD patient uptake during the year after their introduction of this new placement approach.

We too have had success with this PD catheter placement approach publishing a description of the procedure used at the University of Alabama in Birmingham (UAB) and Kaiser Permanente in Northern California and recently convening a working group composed of five interventional radiologists (IRs) in the USA to compile best practices for PD catheter placement by IR [2–5]. Other reports in the literature also document success with IR PD catheter placement [6–8]. At the UAB institution, the interventionalists continue to establish best practices for percutaneous PD catheter placement and believe that the direction of the initial needle stick is an important step in preventing the migration noted by Quach and colleagues. Directing the needle in a 45 degree angle caudally, and slightly laterally, helps prevent this complication. Tunneling of the catheter through a section of the rectus abdominis muscle can also reduce the chances of migration. Additionally, PD catheter dysfunction has been addressed by radiologists with catheter repositioning utilizing a variety of techniques such as stiff wire manipulation [9–11]. A recent report added significant clarity to the field by identifying clinical factors most associated with successful fluoroscopic manipulation of dysfunctional PD catheters [12].

While the technical outcomes of PD catheter placement may be most impacted by the training and expertise of the operator, recent comparisons of outcomes between surgically and percutaneously placed catheters have documented that the percutaneous approach is cost-effective and not inferior to catheters placed with open surgery [13, 14]. As some centers consider only patients not having had previous abdominal surgery as candidates for percutaneous techniques, introducing selection bias into comparative studies, it is interesting to note that Quach and colleagues state that 46.7% of their patients had previously undergone abdominal surgery.

A general criticism of percutaneously placed catheters is that the procedure is via the Seldinger technique and does not allow for the more advanced laparoscopic approaches and adjuvant procedures such as rectus sheath tunneling, adhesiolysis, omentopexy or prophylactic resection of epiploic appendages [15]. It is indeed the case that the best PD catheter outcomes to date have involved these laparoscopic approaches [16]. However, given the economic benefits, efficiency and expansion of IR capabilities in this field, it could be argued that the first attempt at PD catheter placement could be with this ultrasound/fluoroscopic approach and laparoscopic intervention reserved as a back-up procedure should the initial percutaneous catheter fail to provide long-term success. Indeed, several publications report on laparoscopic salvage of PD catheters [17, 18]. If revision is required, the transmural section of the catheter (deep cuff, intercuff segment and superficial cuff) can be left undisturbed by using laparoscopic revision through two or three small ports to provide definitive management of the cause of dysfunction, removal of intraluminal obstructive material and repositioning of the intraperitoneal portion of the catheter. These laparoscopic-enabled interventions reduce the likelihood of recurrent dysfunction (personal communication, John Crabtree MD). As the original cuffs are left intact during the revision and the laparoscopic ports are small, PD can often be resumed immediately post-operatively with lower dwell volumes in the recumbent position without interruption of PD or temporary conversion to hemodialysis with a temporary vascular catheter.

In the USA, increased interest in IR-placed catheters has occurred subsequent to a publication describing the urgent initiation of PD in late-referred patients with advanced kidney disease [19]. Ghaffari published the experience with urgent-start PD at the Los Angeles County Hospital, a hospital system frequently impacted by late-referred patients with little-to-no prior nephrologic care. The patients who were thought to be in need of urgent dialysis were given expedited dialysis options education followed by a questionnaire to assess for PD candidacy and if deemed a candidate were given the recommendation to initiate dialysis with PD—the primary goals being to improve access to the PD dialysis option, avoid temporary vascular access catheters and the need for subsequent additional vascular access procedures. The patients initiating PD had urgent PD catheter placements in the IR suite and were typically discharged from the hospital and brought into the outpatient PD department. These new patients were placed in the recumbent position and

initiated on PD by staff-assisted cycler exchanges using lower volume infusions, strictly in this recumbent position, to lessen the chance of leak. Dialysis was performed as intermittent PD, typically on a 3-day a week schedule for the first 2 weeks until the catheter cuffs and incision had healed. At that point, patients were trained on PD and transitioned to self-care in the home. The success of this program was dependent on the ability to urgently place a PD catheter which was accomplished by the avoidance of operating room and surgical consultation barriers and, instead, a more seamless referral to the radiology department for percutaneous catheter placement under local anesthesia. This publication led to increased discussions of this treatment algorithm and the development of over 100 urgent-start PD programs in the USA [20].

It is somewhat difficult to know precisely how many PD catheters are currently being placed by IRs in the USA but in 2011 the Centers of Medicare and Medicaid Services (CMS) issued a report suggesting that over 16% of catheters were placed using percutaneous approaches [21]. Some of these catheters may have been placed for treatments other than PD, such as drainage of malignant ascites, so the precise estimate of true PD catheter placement by these techniques is unclear.

This current publication by Quach and colleagues in *Clinical Kidney Journal* will add to the existing literature on IR catheter placement. As this and other publications suggest, some centers having an ultrasound/fluoroscopic-guided PD catheter placement capability have reported significant uptake of PD as a dialysis modality and, therefore, may suggest that centers desiring increased PD utilization should consider this percutaneous approach to initial PD catheter placement.

Conflict of interest statement. Dr Guest is an employee of Baxter Healthcare Corporation.

(See related article by Quach *et al.* Radiological insertion of Tenckhoff catheters for peritoneal dialysis: a 1-year single-centre experience. *Clin Kidney J* 2014; 7: 23–26)

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