Preoperative Peritoneal Scintigraphy

Editor:

To increase the utilization of peritoneal dialysis (PD), successful PD catheter placement is of paramount importance. In many centers, patients with prior major abdominal surgeries are not considered for PD because of concerns about adhesions. Adhesions in the peritoneal cavity can cause problems not only during the process of placing the PD catheter, but also with dialysate flow through the catheter, which may be poor because of the compartmentalization of dialysate in the abdominal cavity.

In earlier reports about PD catheter insertion by non-laparoscopic methods, patients with a history of extensive peritoneal contamination, of complications, or of major abdominal surgery were excluded (1). According to one estimate, excluding such patients can cut the potential candidate pool for PD by as much as half (2). Patients with prior abdominal surgery require more operation time and are high risk of complications, mainly because of adhesions (2). Because of a higher risk of catheter placement failure, placement by laparoscopy, when adhesiolysis can be done, is preferred in such cases (2–4). However, that approach requires surgeons well-experienced in laparoscopy and dedicated to the PD program, and such surgeons are not easily found (5). In many such cases, surgeons don't even attempt laparoscopy because of concerns about complications from suspected peritoneal adhesions, leaving such patients to move toward hemodialysis. In such cases, preoperative peritoneal scintigraphy may have a role.

Scintigraphy has been used to detect PD fluid leaks (6,7); however, little has been reported about the use

of scintigraphy to look for adhesions in the peritoneal cavity before PD catheter placement. In one report, Gudit *et al.* (8) noted that, in scintigraphic views of one patient already on PD, a nonuniform distribution of dialysate and several loculations were consistent with a finding of adhesions on laparoscopy.

Here, we report the case of a 37-year-old man who developed chronic kidney disease stage 5 secondary to type 2 diabetes mellitus. His past history included an exploration of the left groin for an undescended testicle when he was 10 years old. Then, at age 26, he developed severe acute pancreatitis, with subsequent development of pseudocyst treated with pseudocyst aspiration. Later, he underwent exploratory laparotomy, Roux-en-Y cyst jejunostomy, and feeding jejunostomy. During surgery, some adhesions of the small bowel to the pseudocyst were taken down by sharp dissection. Also, the omentum was adherent to multiple spots on the abdominal wall, and those spots were taken down with cautery. The feeding jejunostomy was later removed. Since then, the patient had experienced no issues regarding his gastrointestinal system.

Because of this significant history, surgeons were concerned that the patient might have many adhesions in the peritoneal cavity and might not be a candidate for PD. Hence, preoperative peritoneal scintigraphy was performed.

Because the patient did not have a PD catheter, an intraperitoneal 5 French Yueh catheter was placed by Interventional Radiology under computed tomography

guidance. Then, in the Nuclear Medicine department, scintigraphic views were obtained using a dual-head gamma camera equipped with a low-energy high-resolution parallel-hole collimator. Photopeak was set at 140 keV, with a 15% window.

The patient was positioned so as to maximize the view of the abdomen. Over a 15-minute period, normal saline (1 L) containing 74 MBq of Tc-99m sulfur colloid was infused through the catheter into the abdominal cavity. Dynamic infusion images were obtained in the supine position at 1 minute per frame for a total of 15 minutes. Immediate post-infusion images of the abdomen were obtained in the anterior, posterior, lateral, and oblique projections at 5 minutes per view. The patient walked for 15 minutes before returning for repeat images of the abdomen in the same views.

Instillation-phase images demonstrated free flow of radiotracer throughout the peritoneal cavity, outlining the intraperitoneal recesses (Figure 1). Post-infusion images demonstrated normal intraperitoneal distribution of the radiotracer (Figure 2). Post-ambulatory images appeared similar to those from the post-infusion phase.

Subsequently, the patient underwent laparoscopy under general anesthesia. Adhesions with omentum attached to the anterior abdominal wall were noted. No bowel was attached to the anterior abdominal wall. Adhesions were taken down, and the omentum was freed from the anterior abdominal wall on the right side. Once adequate space was made, the PD dialysis catheter was placed. Good flow in and out of the abdomen was noted.

Figure 1 — Free flow of radiotracer throughout the peritoneal cavity, outlining the intraperitoneal recesses.

Figure 2 — Post-infusion images demonstrated normal intraperitoneal distribution of the radiotracer.

An umbilical hernia was repaired with a C-QUR V-Patch mesh (Atrium Medical Corporation, Hudson, NH, USA).

Although the scintigraphic images showed normal intraperitoneal distribution of tracer, the surgeons did find some adhesions, but none severe enough to preclude placement of the PD catheter. Until now, laparoscopy seemed to be the only method to determine the presence of adhesions in the peritoneal cavity (9). The present case highlights the possibility of using peritoneal scintigraphy before PD catheter placement in patients with prior major abdominal surgeries.

Successful placement of PD catheters has been performed in patients with adhesions (9,10), and so even if peritoneal scintigraphy shows evidence of adhesions, those findings should not preclude laparoscopic placement of a PD catheter. However, we note that, if scintigraphy shows smooth distribution of tracer, more surgeons might be reassured and convinced to attempt laparoscopy when they might not otherwise operate in patients with a history of major abdominal surgeries. Moreover, if clear films are noted on scintigraphy, then centers that rely on non-laparoscopic methods might be able to make more attempts to place PD catheters in such patients. Another test is added in this situation, but we believe that the risks of radiologically placing a catheter for scintigraphy are minimal, specially if the result will be more attempts at PD catheter insertion. The extra step will not be unnecessary, but a step in the right direction.

To the best of our knowledge this is the first time that this particular approach has been reported. More study will be needed to confirm the correlation of peritoneal scintigraphic images with laparoscopic findings of adhesions, but for now it seems that, if preoperative

peritoneal scintigraphic images do not show loculations in a patient with history of major abdominal surgeries, then placement of a PD catheter can safely be attempted.

DISCLOSURES

The authors have no financial conflicts of interest to declare.

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