Malfunctioning PD Catheters
Introduction

• Migration reported to occur in between 5% to 35% of the implanted catheters.

• majority migrates to the right upper quadrant
  – suggests that the problem bears a relationship to bowel peristalsis.
Risk Factors

• Catheter geometry
  – Swan Neck - Gadallah 2000 reduced migration < 1% vs 15 % using swan neck vs straight catheters
  – Lye et al showed a 15% incidence of catheter-tip migration in straight Tenckhoff catheters compared with 5% in swan-neck catheters
  – Nielson -straight, single-cuffed catheters compared with curled, single-cuffed Tenckhoff catheters, with a 1-year catheter survival rate of 77% in the curled catheters compared with 34% in the straight catheters
p = 0.29

<table>
<thead>
<tr>
<th>Catheter Distribution</th>
<th>Migration</th>
<th>Non Migration</th>
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<tbody>
<tr>
<td>Straight</td>
<td>14%</td>
<td>86%</td>
</tr>
<tr>
<td>Coiled</td>
<td>29%</td>
<td>71%</td>
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Risk Factors

- Catheter Length
  - Increased risk if excessively long catheter used
Constipation

- Constipation is associated with poor catheter performance because fecal impaction can cause catheter migration and external compression of the lumen by bowel.
The Problem
The Solution
Repositioning

- Manual
- Stiff Wire
- Fogarty Ballon
- Other
Manual Manipulation

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Wen- Ting Tu
Figure 1

Steps in manual repositioning of a migrated peritoneal dialysis catheter.
Guide Wire- Yoshihara
the alpha replacement method

• Under fluoroscopic guidance, a flexible guide wire is advanced into the PD catheter until its tip makes contact with the mesenterium.
• Continuous gentle pressure causes the guide wire to make a big loop
• As the loop increases in size, the catheter is moved into the pelvic space.
• Repositioned 8 displaced swan-neck PD catheters 100% success. No follow up
Manual Manipulation

• 30 cases of PD catheter migration

• repositioning was successful on the first attempt in 9 cases, on the third attempt in 10 cases, on the seventh attempt in 7 cases, and failed in 4 cases.

• The overall success rate was 86.7%.
Stiff Wire
fluoroscopically guided stiff-wire manipulation

- A malleable metal rod is inserted under fluoroscopic guidance into the catheter to within 2 to 5 cm from the end.
- Using the abdominal wall as a fulcrum point, the catheter is repositioned as close to the retrovesical pouch as possible
- using wide sweeping motions of the metal rod.
fluoroscopically guided stiff-wire manipulation

• Moss et al - 48 patients 78% success
  – only 25 (51%) and 12 procedures (25%) resulted in functioning catheters at 1 week and 1 month

• In another study, recurrence after an average of 55 days from the initial manipulation in 48 of 70 patients [69% ]

• In these studies and the catheters were single-cuffed, straight
Whiplash Method
Eero Honkanen

• Fluoroscopy

• 2 mm guide

• For analgesia, 4 - 5 ml of 1% Lidocaine is injected into the abdominal cavity.

• The catheter guide (CG) ('the whiplash') is a 50 cm long thread made of copper with a diameter of 2 mm (Figure 2).
Whiplash Method

• using a 2-mm thick catheter guide bent to form a slight curve.

• The catheter guide is introduced, advanced to near the tip of the migrated catheter, and rotated in a whiplash fashion to bring the catheter to the pelvis
FIGURE 3  X-ray of the catheter guide bent to form a slight curve and introduced into the catheter. Its end lies near the tip of the catheter.

FIGURE 4  The catheter guide has been switched and the catheter tip is situated in the lower abdomen.
Whip Lash Method

• Fifty procedures in 21 patients.
• *In 86% of the cases the procedure was successful.*
• 52% of the patients needed only one reposition while 48% experienced two or more repositions.
• The reposition procedure *was free of complications.*
• Of the 70 manipulations, 44 were successful (62.9%).

• In univariate analysis success more likely:
  – catheters located in the pelvis compared with those in the upper abdomen (73.5% versus 42.9%, $P=0.01$)
  – catheters were previously functional compared with those that failed at exteriorization (75.0% versus 46.7%, $P=0.04$)
fluoroscopically guided stiff-wire manipulation

• This technique
  – requires fluoroscopy
  – conscious sedation
  – cannot be used in swan-neck Tenkhoff catheters because the bend of the swan neck will preclude the insertion of the stiff wire.

• The rate of initial success with fluoroscopic guide-wire manipulation is in the range of 60 to 85%, but the improvement is often short lived and the long-term patency rate is <50% in most series.

• Laparoscopic salvage of malfunctioning catheters is increasingly popular, with reported success rates of >80%, although rates of recurrent obstruction vary widely.
Catheter migration occurred in 34 of 232 patients (15% incidence).

All patients had curled-end, double-cuffed, non–swan-neck PD catheters.
Successful repositioning occurred in 24 of 34 patients (71%).

None of the 24 repositioned catheters had early recurrence.

1 of 24 catheters (4%) had late recurrence.

None of the patients had procedure-related peritonitis, bowel perforation, or exit-site trauma.
• The procedure is less likely to succeed in patients with postoperative migration related to technical or anatomic problems.

• The success of the Fogarty catheter manipulation technique in PD catheters with swan-neck configuration remains to be determined.
Laparoscopy
Conclusion

1. Prevention
   – Constipation, catheter length, configuration

2. Manipulation potential treatment