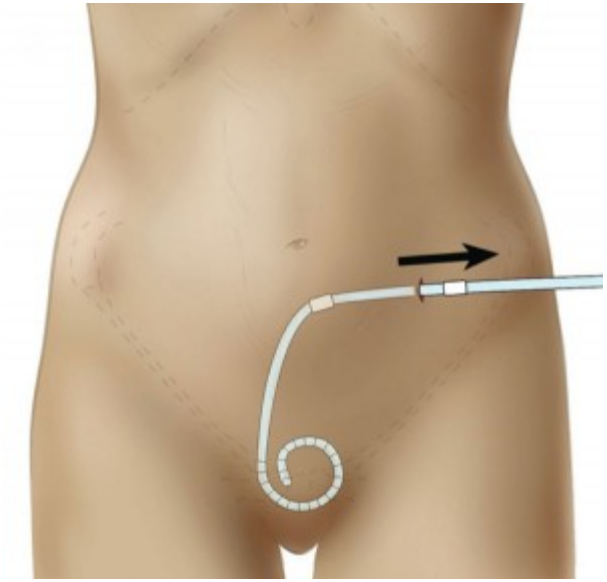
Malfunctioning PD Catheters



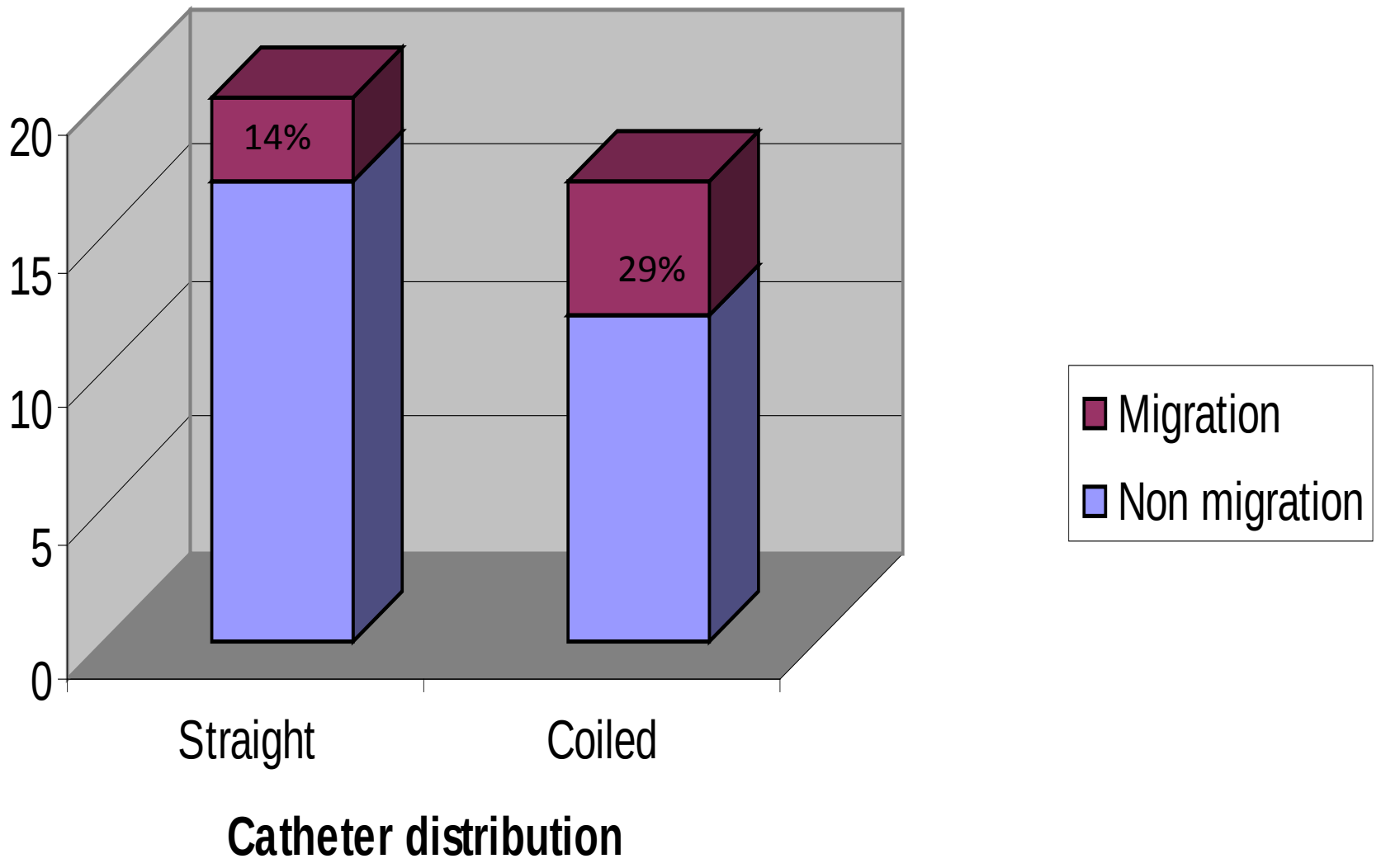
Introduction

- 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
20
15
10
5
0
14%
29%
Straight
Coiled
Catheter distribution
Migration
Non migration

Risk Factors

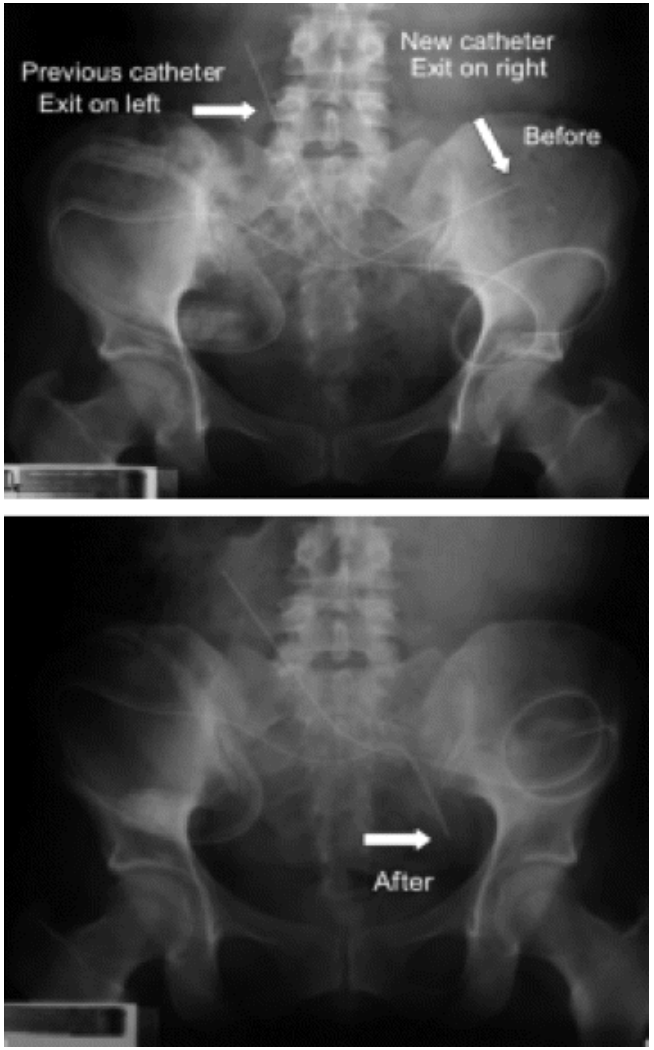
- Catheter Length
  - Increased risk if excessively long catheter used

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

Perit Dial Int May-June 2009
Wen- Ting Tu

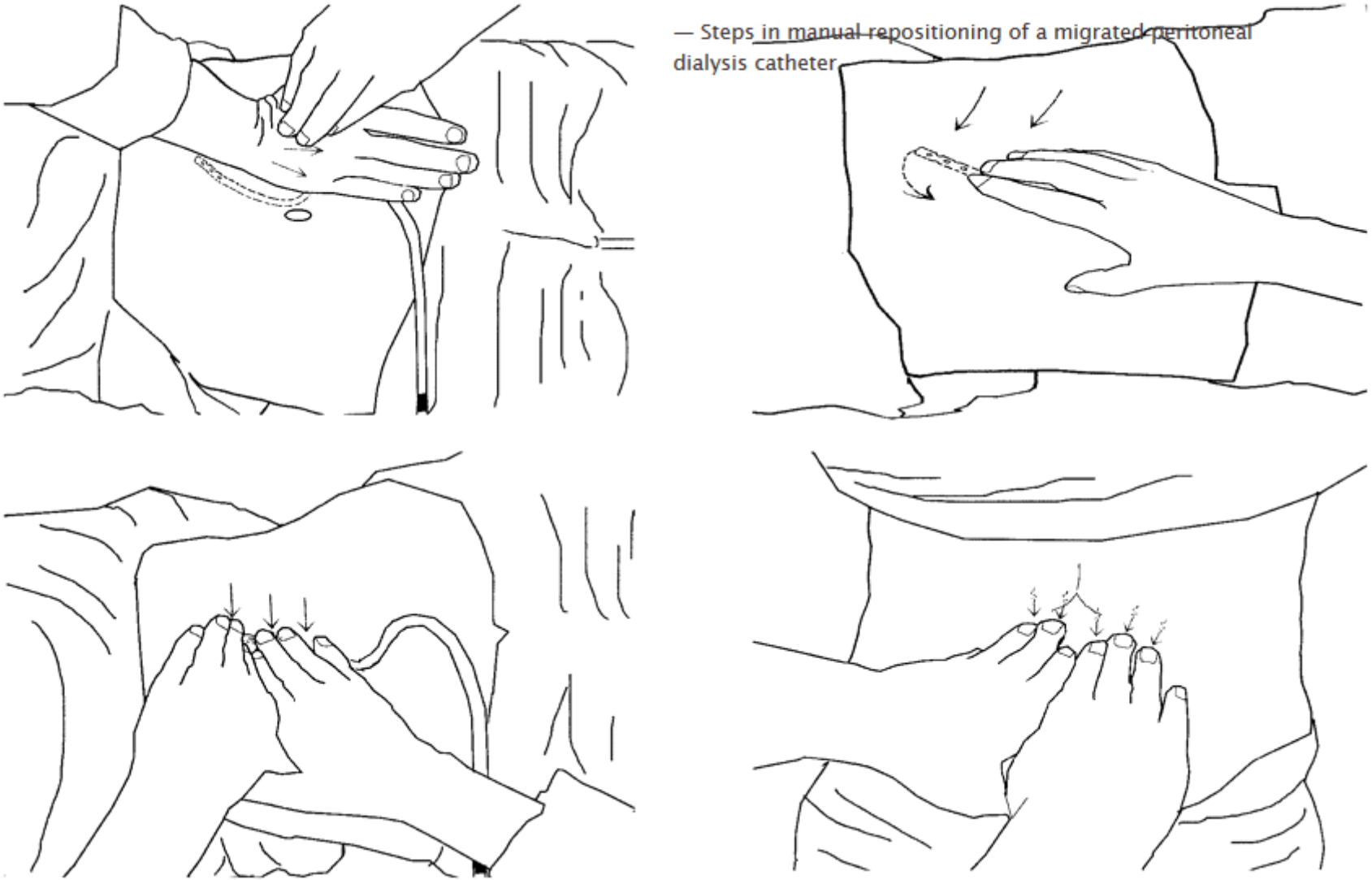
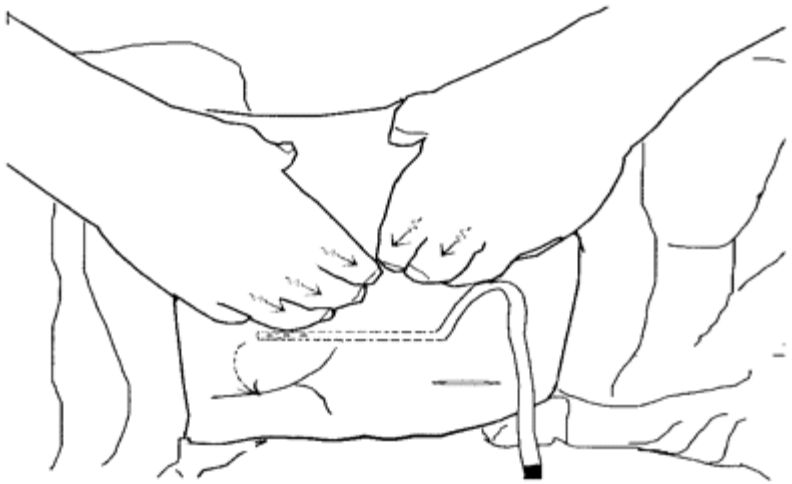
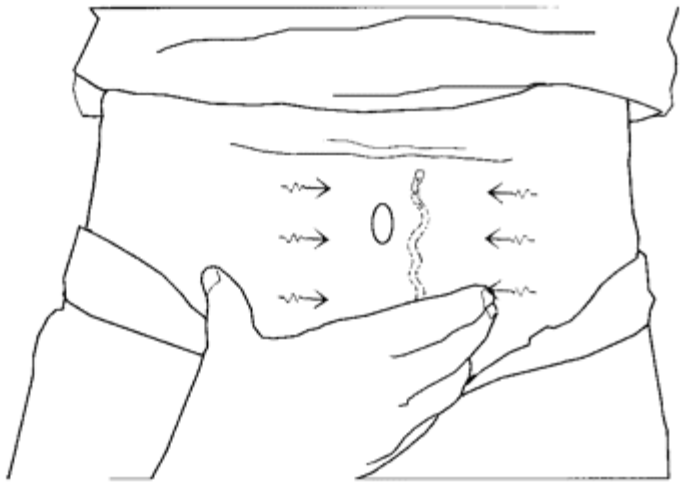
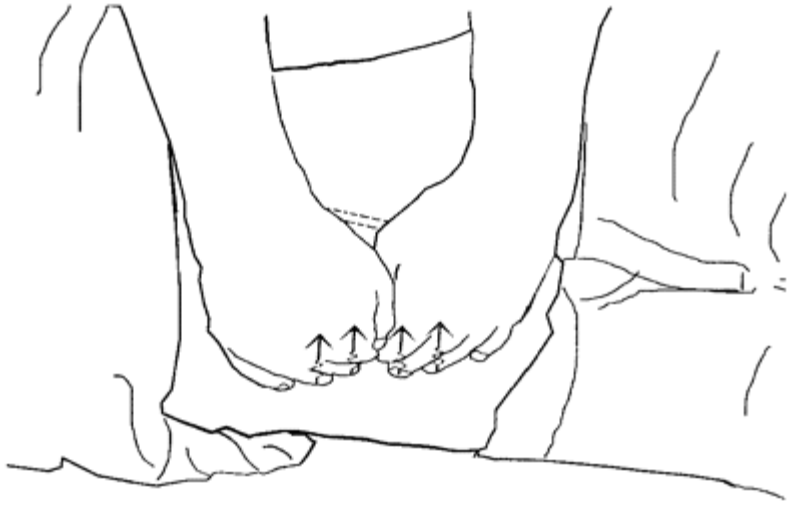


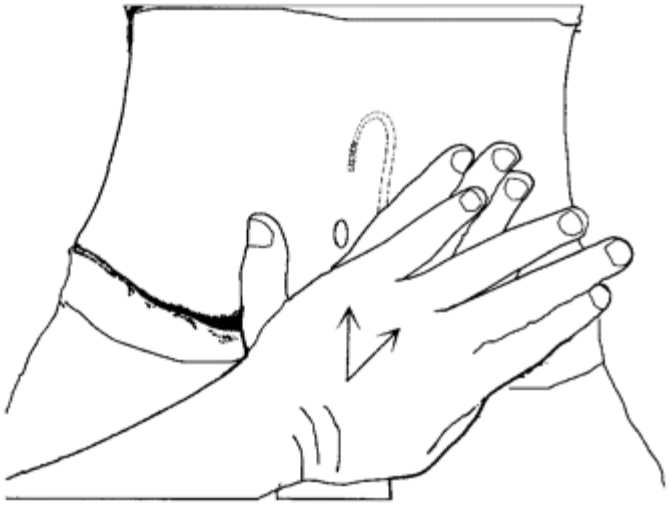
Figure 1

— 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 a50cm 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

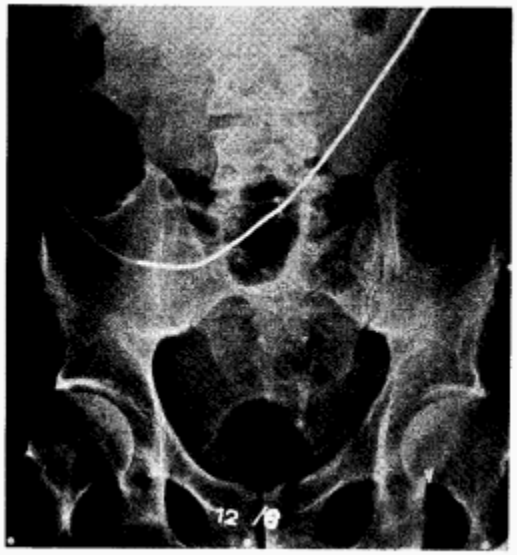


FIGURE 3 X-ray of the catheter guide bent to form a slight curve and introduced into the catheter. Its end lies near the tip of the catheter.

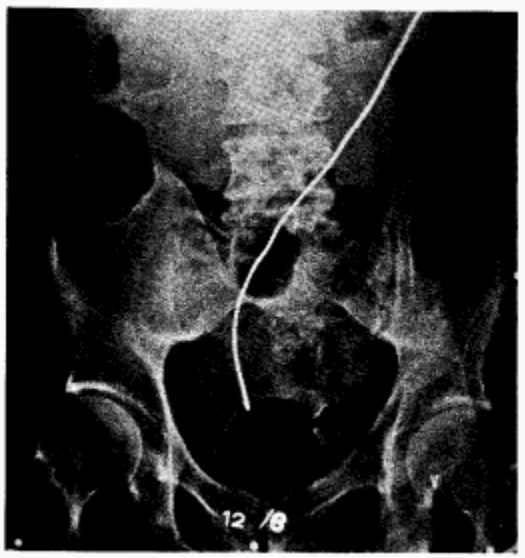


FIGURE 4 The catheter guide has been switched and the catheter tip is situated in the lower abdomen.

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 .*

Miller CJSAN 2012

- 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.

Malpositioned peritoneal dialysis catheters: Am J Kidney Dis 15 : 305 –308, 1990

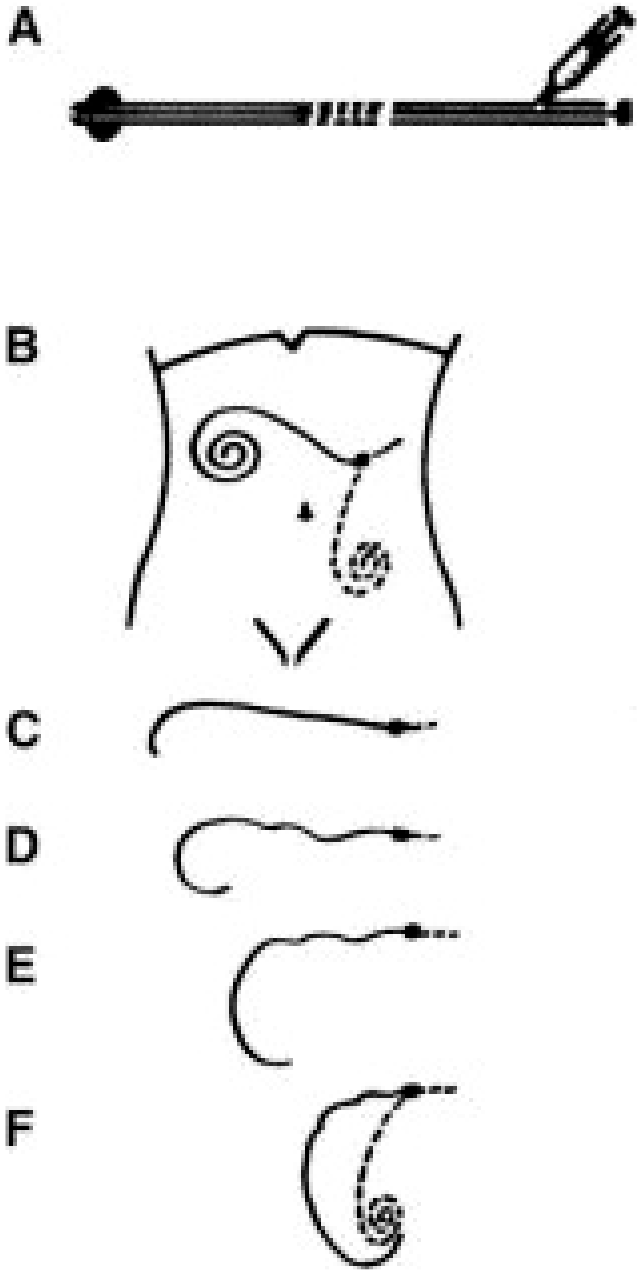
- The rate of initial success with fluoroscopic guide-wire manipulation is in the range of 60 to 85%, but the improvement is often short lived and the long-term patency rate is <50% in most series.

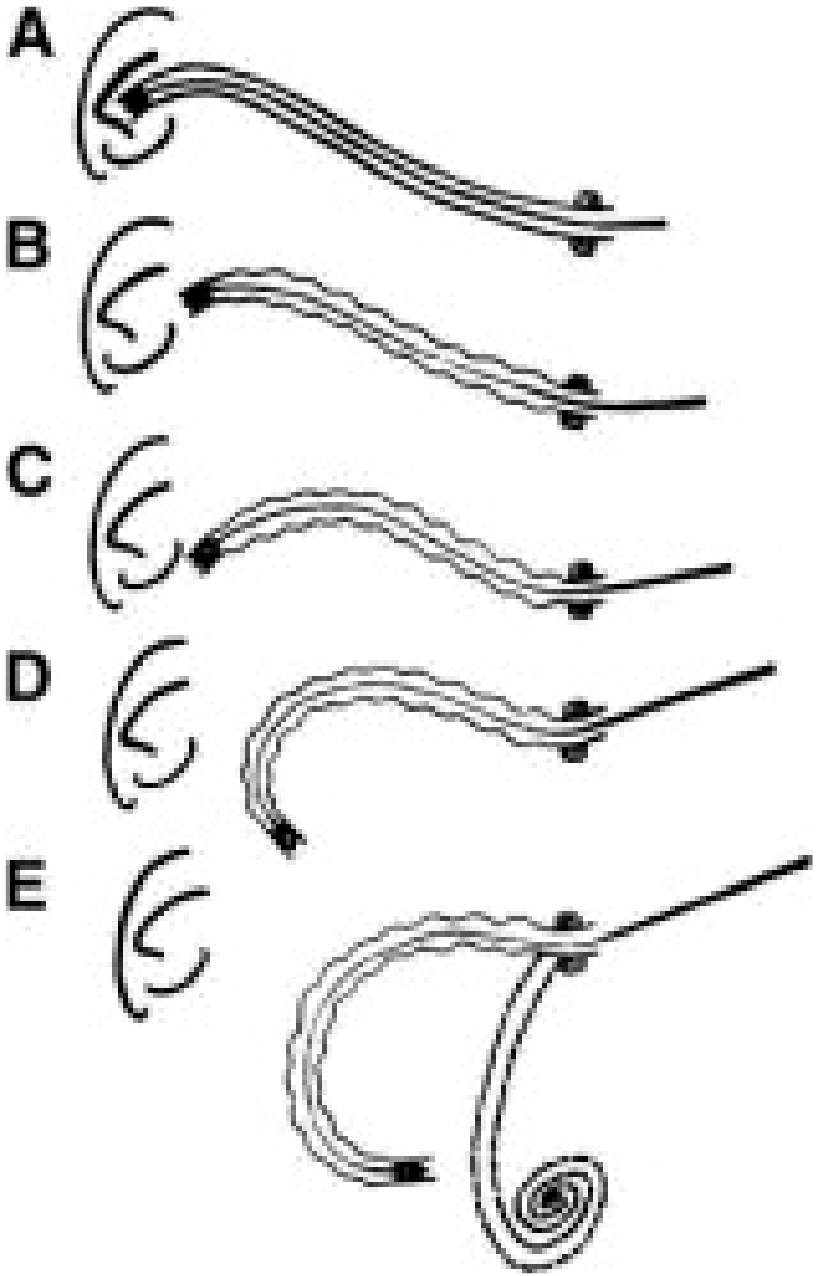
- Laparoscopic salvage of malfunctioning catheters is increasingly popular, with reported success rates of >80%, although rates of recurrent obstruction vary widely.

Gadallah – AJKD 2000
Fogarty Ballon

- Catheter migration occurred in 34 of 232 patients (15% incidence).

- All patients had curled-end, double-cuffed, non–swan-neck PD catheters.





American Journal of Kidney Diseases 2000; 35:301-305

Gadallah – AJKD 2000

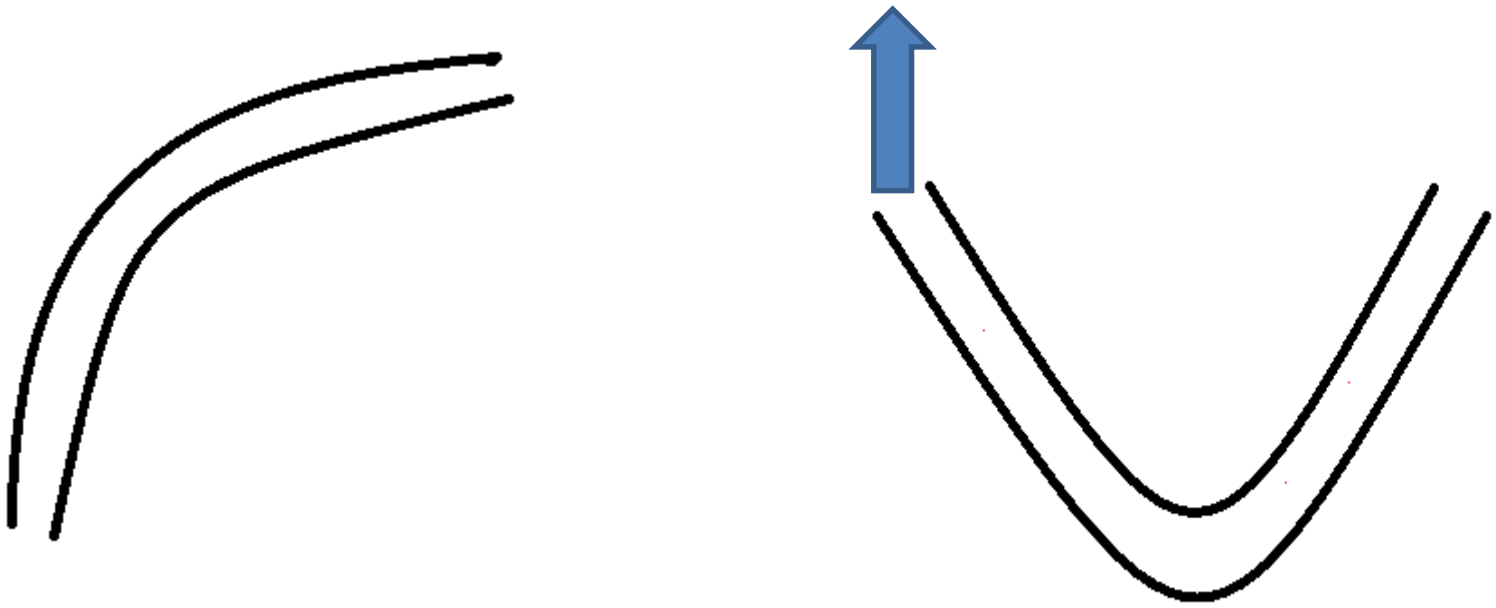
- Successful repositioning occurred in 24 of 34 patients (71%).
- None of the 24 repositioned catheters had early recurrence
- 1 of 24 catheters (4%) had late recurrence.
- None of the patients had procedure-related peritonitis, bowel perforation, or exit-site trauma

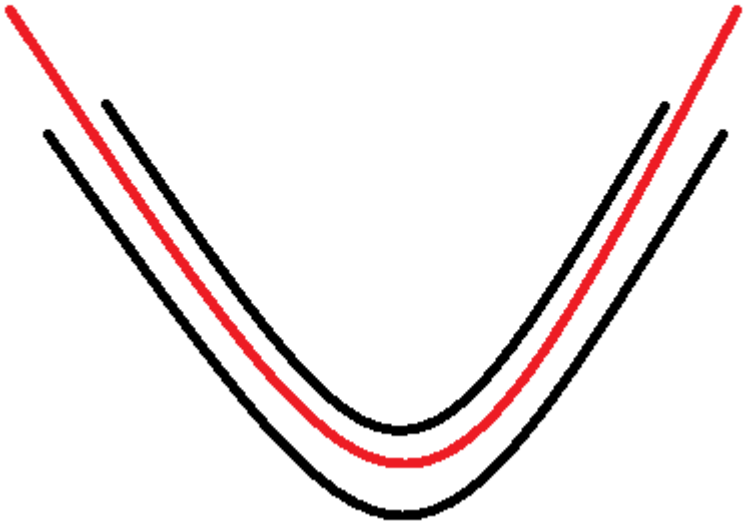
Gadallah – AJKD 2000

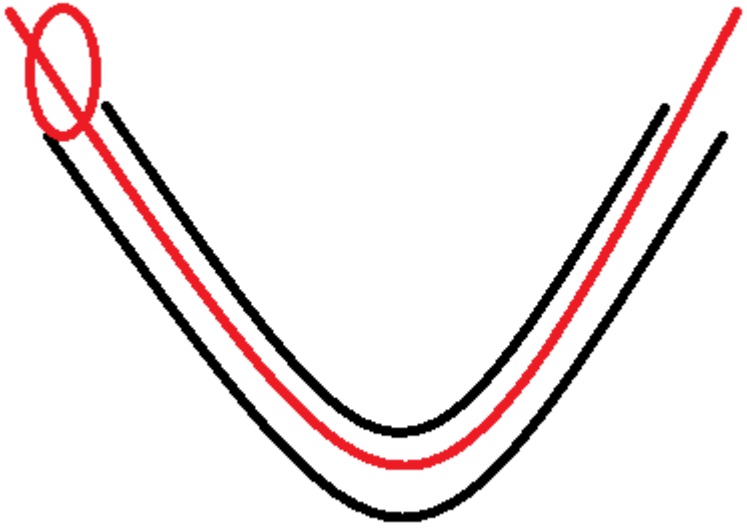
- The procedure is less likely to succeed in patients with postoperative migration related to technical or anatomic problems.

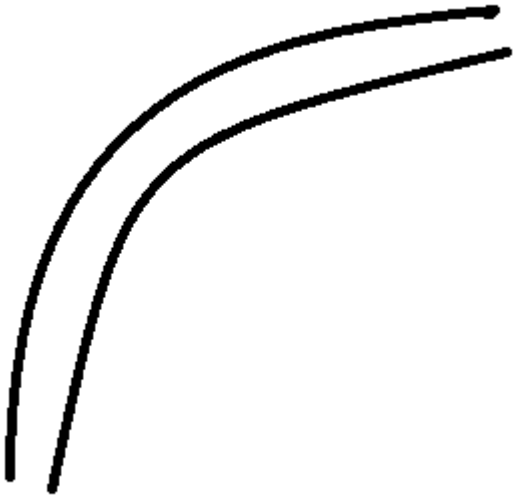
- The success of the Fogarty catheter manipulation technique in PD catheters with swan-neck configuration remains to be determined.

Balloon and Wire

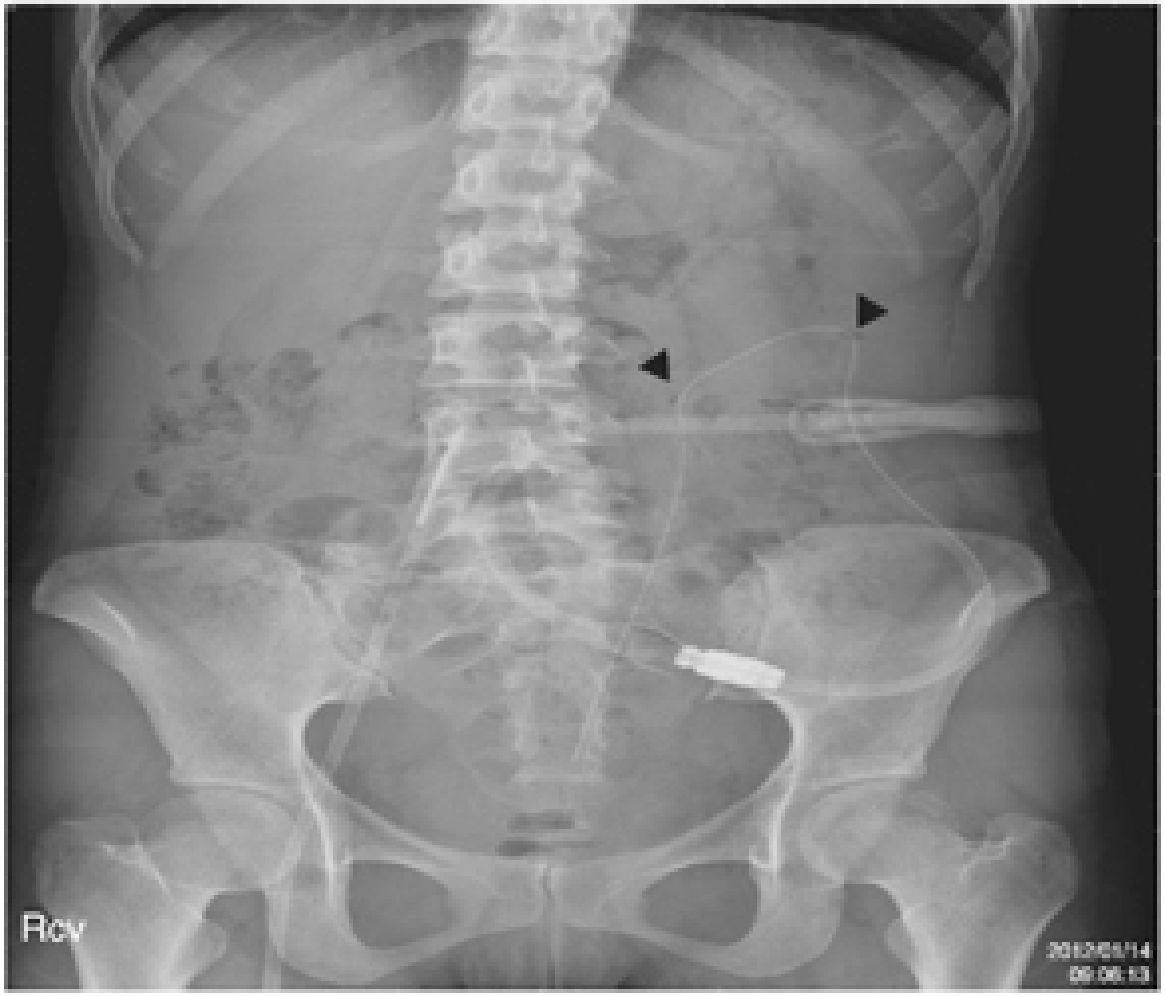


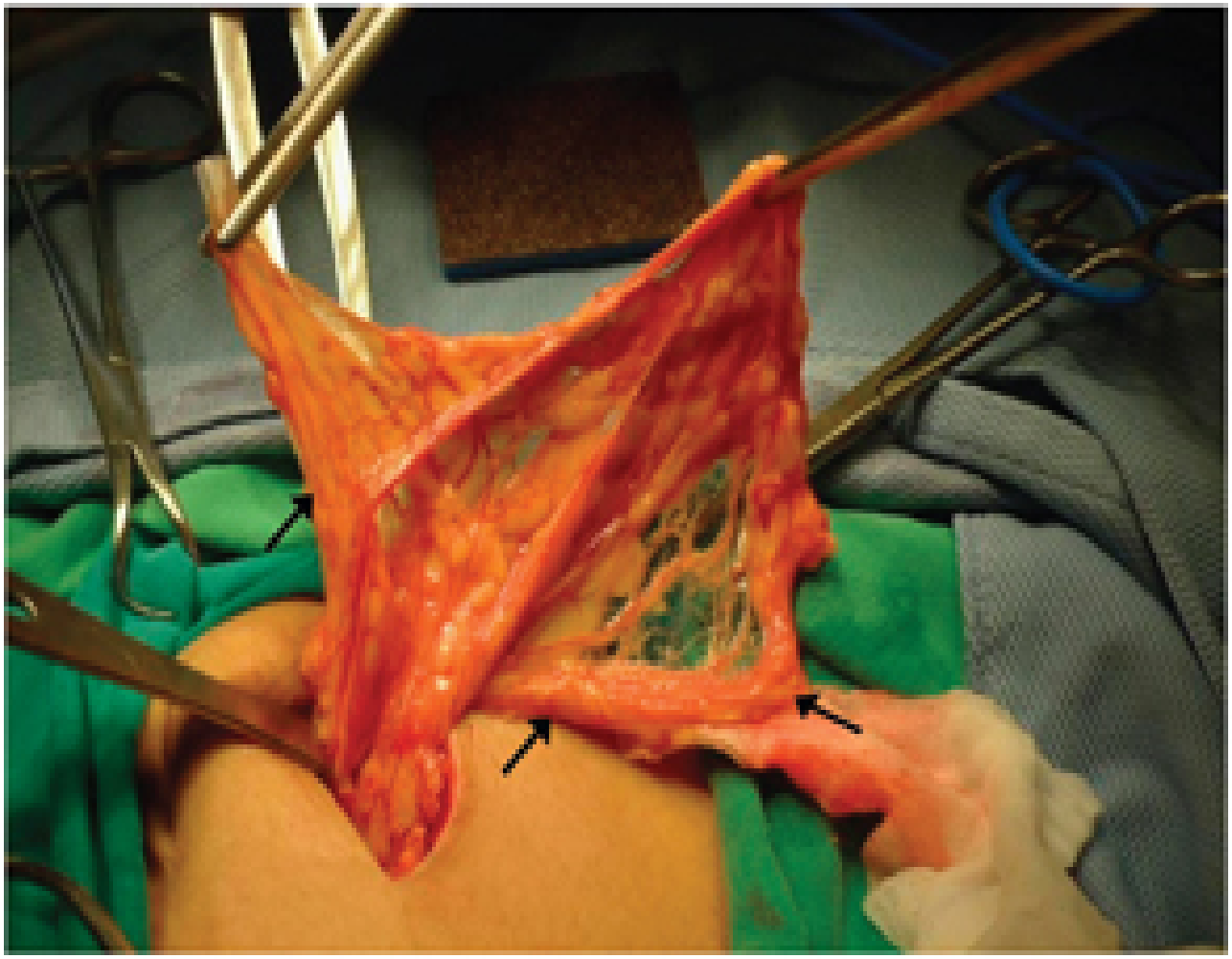






Laparoscopy





Conclusion

1. Prevention
   – Constipation, catheter length, configuration

2. Manipulation potential treatment