

Selected Problems in PD Access

Management of Drain Pain, Malposition, and PD-Related Peritonitis

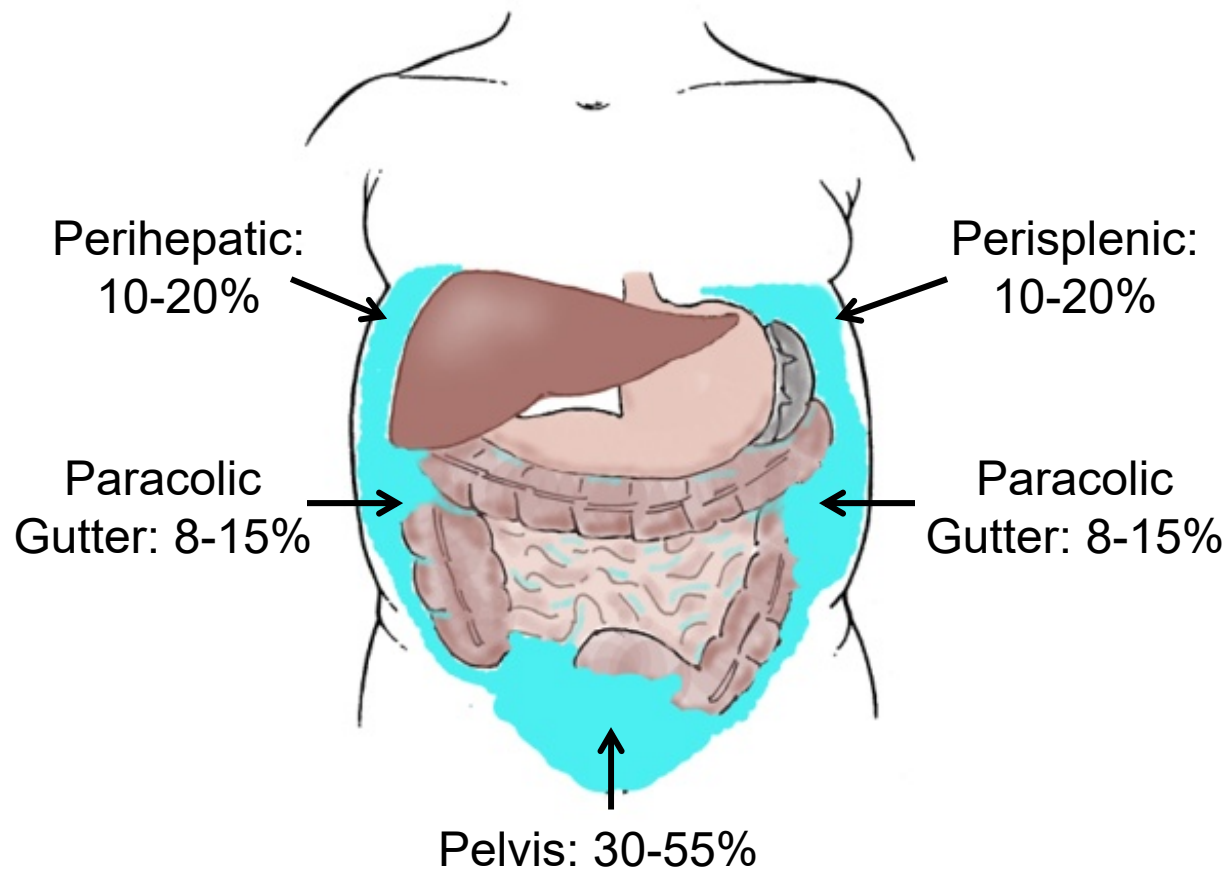
John H. Crabtree, MD
Harbor-University of California Los Angeles Medical Center
Torrance, CA

Chair, ISPD's PD University for Surgeons-North America
Activity Director, ISPD's PD University for Surgeons-Europe
International Society for Peritoneal Dialysis
www.pdusurgeons.com

Drain Pain

Where Do We Locate the Catheter Tip?

Dialysate Tends to Pool in 5 Pockets



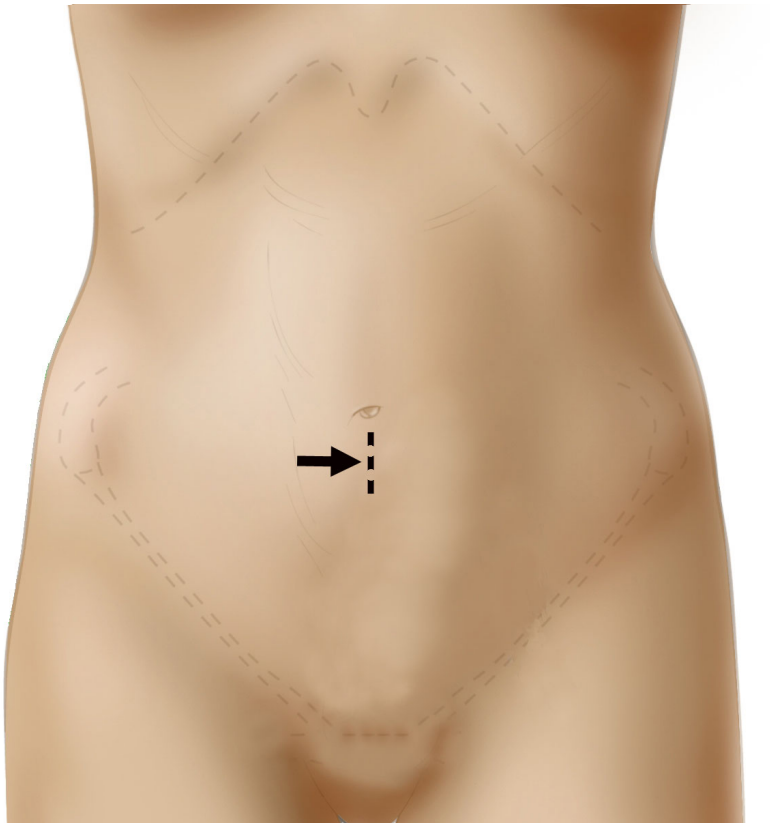
Pelvic Placement of Catheter Tip and End of Drain Pain

Cross-sectional survey performed at 6 large PD units in the province of Ontario, Canada, in the summer of 2010

- 25% of patients on APD were using Tidal PD for severe end of drain pain (center variation was 4% to 37% suggesting relationship to how PD catheter was placed)
- End of drain pain not controlled with Tidal PD resulted in patients being converted to CAPD or transferring to HD
- Most likely cause of observed end of drain pain was PD catheter implanted too low in pelvis when catheter dimensions and patient's body habitus were not taken into account

Blake et al. A multicenter survey of why and how tidal peritoneal dialysis (TPD) is being used. Perit Dial Int 2014; 34:458-60.

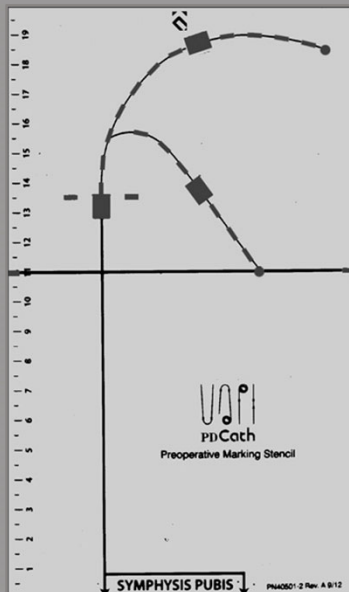
Preoperative Mapping to Determine the Most Appropriate Catheter Type, Insertion Site, and Exit-Site Location to Reduce the Potential for Catheter-Related Pain



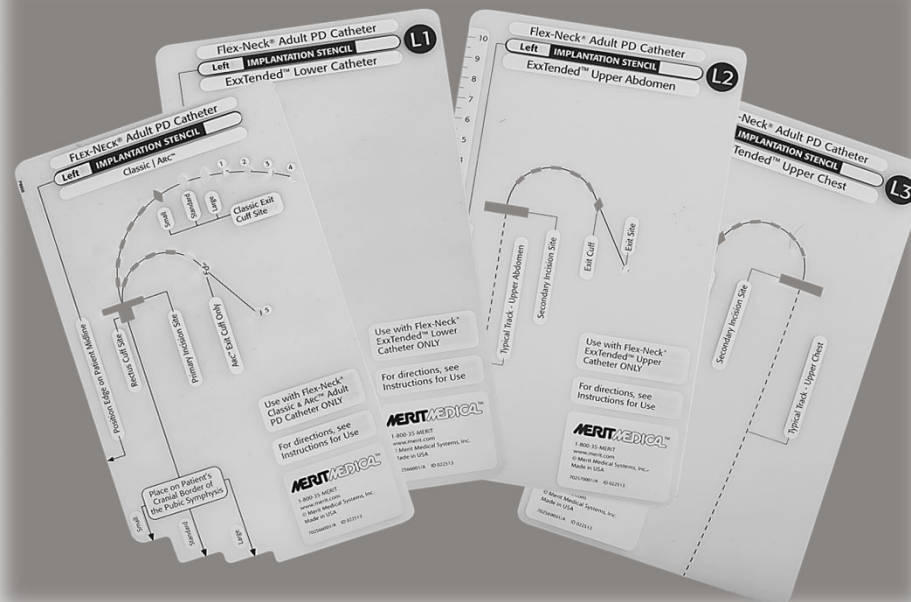
Crabtree JH, Piraino B, Gellens M, Guest S, Firanek CA, Mancini A. Preoperative mapping to determine the most appropriate catheter type, insertion site, and exit-site location. In: *Access Care And Complications Management Update, 2017. Care Of The Adult Patient On Peritoneal Dialysis*. Baxter Healthcare Corporation, 2017, pp 62-7.

Stencil-Based Preoperative Mapping

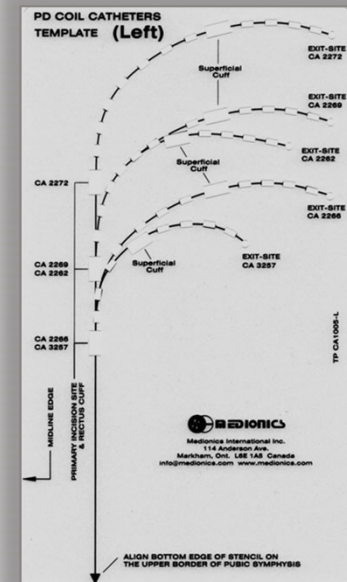
Mapping provides an objective and reproducible method of determining catheter insertion site.



MedComp



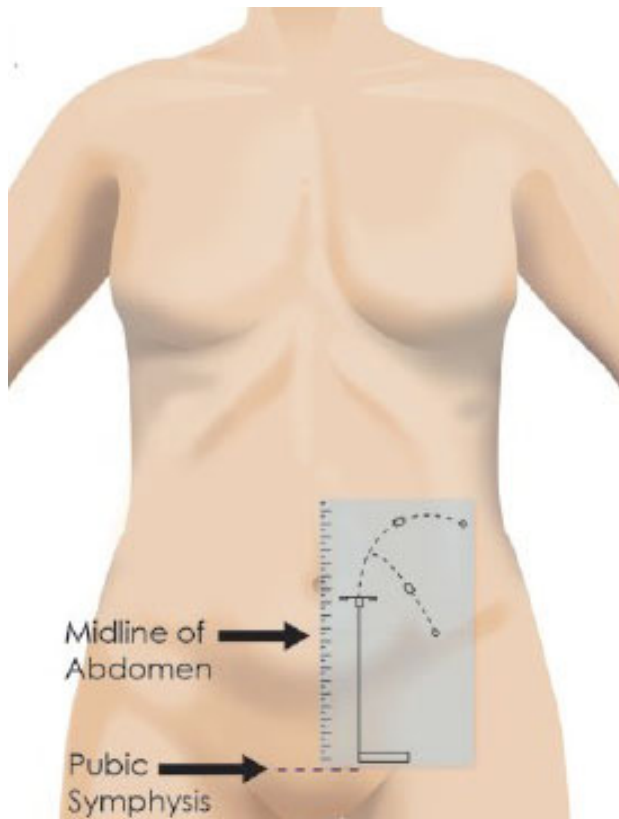
Merit



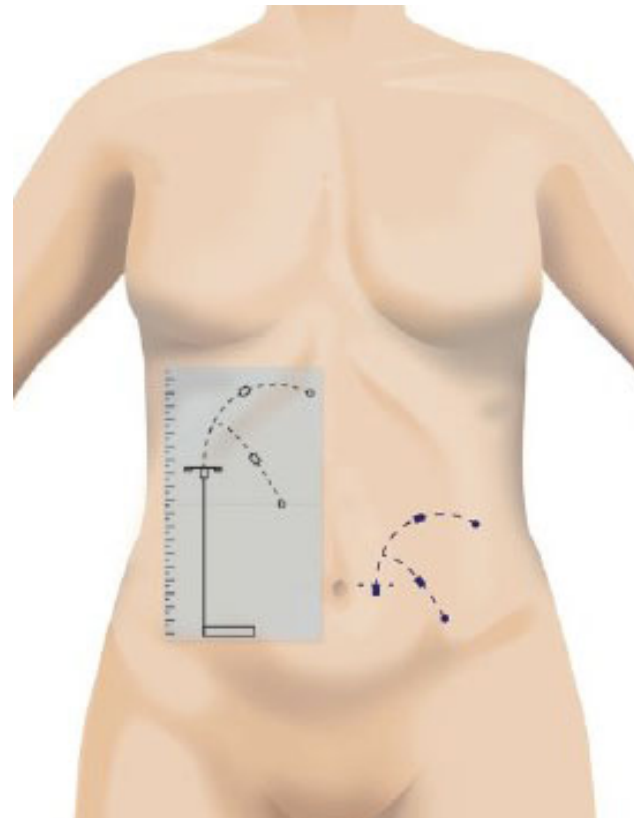
Medionics

Commercially Available Stencils
for Specific Catheter Products

Mapping Insertion Site for PD Catheters



Mark in Supine Position



Examine Exit Site in Sitting Position

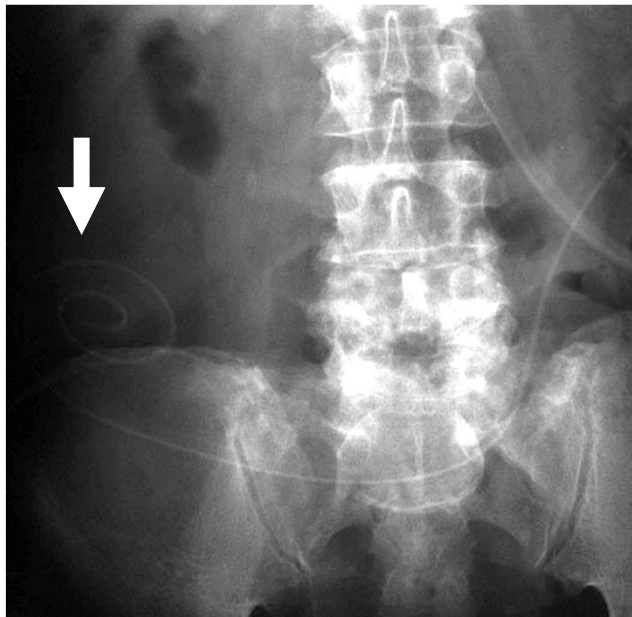
Crabtree JH, Piraino B, Gellens M, Guest S, Firanek CA, Mancini A. Preoperative mapping to determine the most appropriate catheter type, insertion site, and exit-site location. In: *Access Care And Complications Management Update, 2017. Care Of The Adult Patient On Peritoneal Dialysis*. Baxter Healthcare Corporation, 2017, pp 62-7.

Catheter Tip Malposition

MECHANICAL CATHETER FLOW DYSFUNCTION FROM CATHETER TIP MIGRATION

CATHETER TIP IN POSITION OF POOR DRAINAGE (SLOW FLOW, LOW DRAIN VOLUME, OR PAINFUL INFLOW AND/OR OUTFLOW)

- Shape-memory resiliency forces can lead to migration of the catheter tip into a position of poor drainage function, produce flow pain, or result in omental entrapment



Tube straightening with migration of catheter tip out of the pelvis

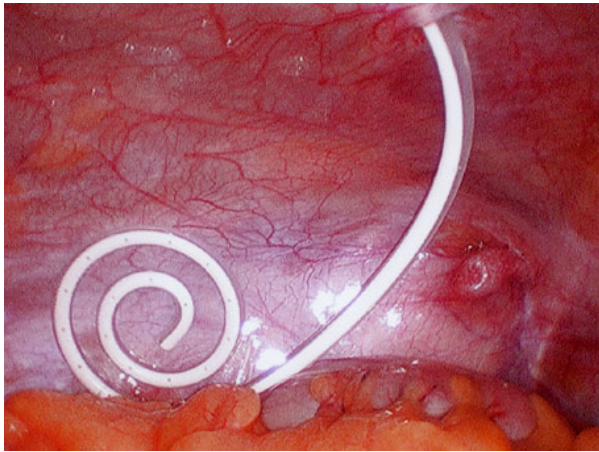
COMPLICATIONS OF FLUOROSCOPIC GUIDEWIRE MANIPULATION

FLUOROSCOPIC INTERVENTIONS

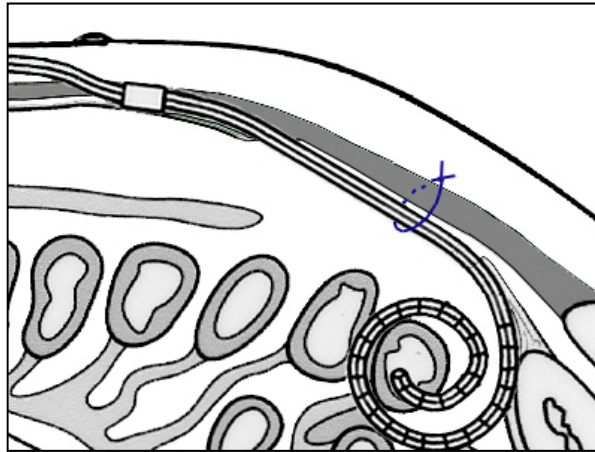
- Multiple procedures often required due to failure to reposition or the recurrence of migration
- Published clinical failure rates for fluoroscopic manipulation vary from 25–75%
- Recurrence following fluoroscopic manipulation is due to not addressing the underlying problem of shape-memory resiliency forces produced by the original catheter implantation procedure
- When laparoscopic backup not available, technical failures are often managed by catheter replacement with frequent recurrence of the same problem
- Patients often become frustrated with interruption of therapy and multiple interventions and elect to transfer permanently to hemodialysis

LAPAROSCOPIC RESCUE FOR CATHETER TIP MIGRATION

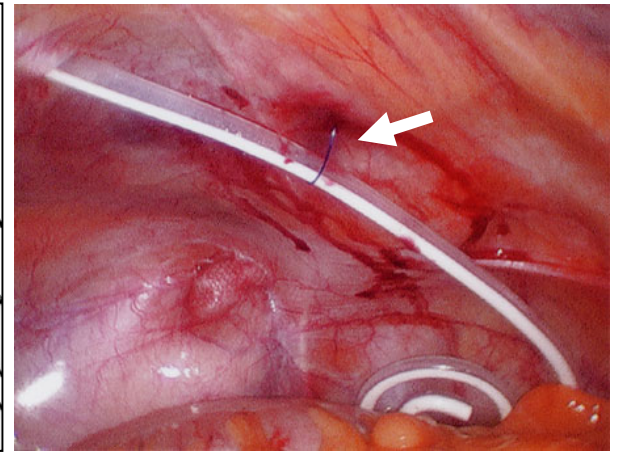
LAPAROSCOPIC SUTURE SLING FOR CATHETER TIP MIGRATION



Migration of catheter tip out of the pelvis into upper abdomen



Percutaneous suture sling stitch placed with suture passer to maintain catheter tip in pelvic position

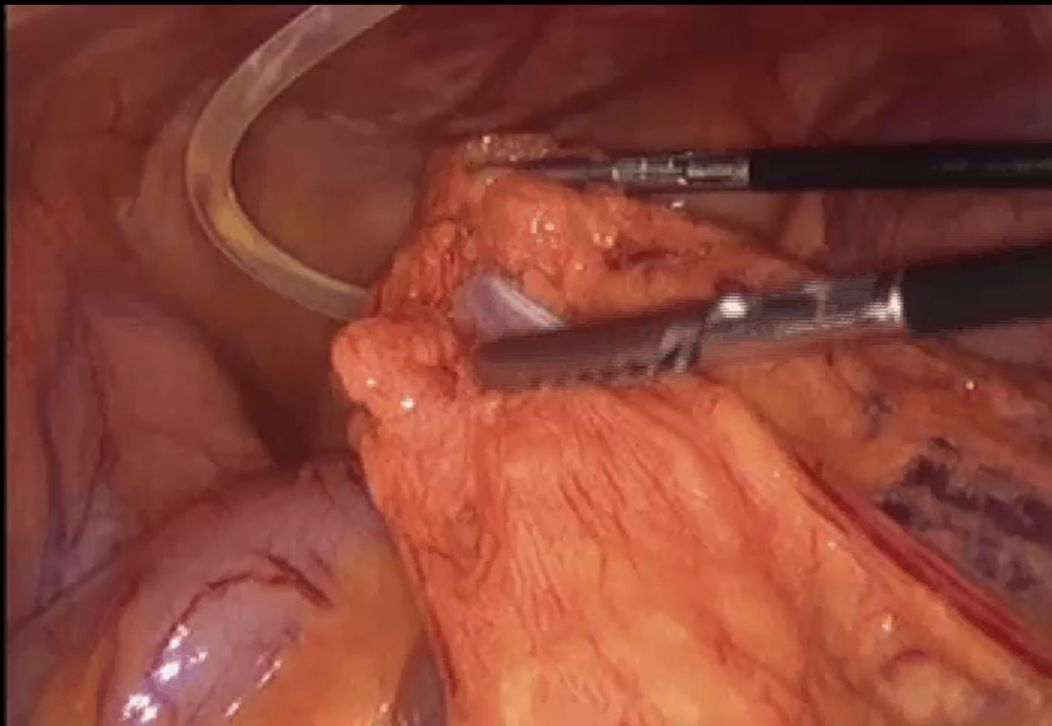


End result of securing catheter tip in pelvis with suture sling

MALPOSITION DUE TO OMENTAL ATTACHMENT



OMENTAL ENTRAPMENT



Omentolysis and Omentopexy

PD-Related Peritonitis

Surgical Management of PD-Related Peritonitis

- Must maintain low threshold for removal of the catheter (save the peritoneal membrane)
- Remove catheter if no definite improvement within 5 days (most will show clinical improvement within 48 to 72 hours of initiating appropriate antibiotic therapy)
- Remove catheter immediately for fungal peritonitis
- Reinsertion of catheter after 2-3 weeks if resolution of peritoneal symptoms is complete
- Consider simultaneous catheter replacement for selected cases of relapsing peritonitis

Simultaneous Catheter Replacement for Relapsing Peritonitis

- Relapsing peritonitis is defined as an episode of peritonitis within 4-weeks of completing antibiotic therapy for prior episode with the same organism or one sterile episode
- Bacteria persist in a biofilm on the catheter

General Guidelines for Simultaneous Catheter Replacement

- Procedure acceptable for peritonitis not due to mycobacteria, fungi, enteric organisms, or Pseudomonas species.
- Clinical signs of peritonitis must be resolved and peritoneal leukocyte count is $< 100/\mu\text{L}$.
- Continue appropriate antibiotic coverage perioperatively.
- Insert new catheter (clean step) before removal of old catheter (dirty step).
- Close watertight all penetrating points through musculofascial layers of abdominal wall.
- Utilize intermittent regimen of supine, low-volume peritoneal dialysis during interval of postoperative recovery; leave peritoneum dry during ambulatory periods.

Micro-Organisms for Peritonitis-Related Indication for Simultaneous Catheter Removal and Replacement

Location of Infection	Organism	Patients (n)
Peritonitis		28
	Coagulase-negative staphylococcus	24
	Coagulase-negative staphylococcus (concurrent Escherichia coli tunnel infection)	1
	Coagulase-negative staphylococcus (concurrent Pseudomonas aeruginosa tunnel infection)	1
	Staphylococcus aureus	1
	Streptococcus viridans	1

Crabtree JH, Siddiqi, RA. Perit Dial Int 2016; 36:182-7.

Outcomes of Simultaneous Catheter Replacement for Relapsing Peritonitis

	Relapsing Peritonitis
Number of subjects	28
Uninterrupted PD	28 (100%)
Dialysate Leak	1
Postop hemodialysis	0
Exit-site or wound infection of new catheter	0
Relapsing peritonitis within 8 weeks postop	0
Recurrent* or new peritonitis within 8 weeks	1 (cured)

* Recurrent: An episode that occurs within 4 weeks of completion of antibiotic therapy for previous event but with a different organism

Selected Problems in PD Access

Thank You