



# Unusual PD Complications

**Jeffrey Perl MD SM FRCP(C)  
Associate Professor of Medicine  
University of Toronto  
ISPD NAC Session  
Sunday March 7, 2020**

[Jeffrey.perl@unityhealth.to](mailto:Jeffrey.perl@unityhealth.to)

 @PD\_Perls

# Case 1: *Entering The Milky Way*

---



# The Case:

---

- 75 F
- CKD ischemic nephropathy
- DM2
- CAD with Impaired LV function
- Admitted With CHF and worsening renal function
- Creatinine 4.0
- PD catheter inserted and after two weeks of healing presents to home dialysis clinic for evaluation

# What is It?



# What Would You Do Next?

Date/Time	Triglyceride Random (<1.60) mmol/L	Triglyceride Fluid mmol/L
05/19/15 12:07	1.30	
03/10/15 13:50	0.75	
03/10/15 12:47		<0.30 ▲
03/03/15 16:58		0.70
02/06/15 10:54	0.52	
02/06/15 10:35		5.86 ▲
02/04/15 15:01		0.38 ▲
02/04/15 14:43		4.59 ▲

# Chyloperitoneum

---

- A rare complication of PD
- Caused by damage disruption to the lymphatic system
  - thoracic duct and/or lymphatic tributaries
- Definition
  - Triglyceride PD fluid > Serum
  - Absolute level
    - > 1.24 mmol/L or > 2.26 mmol /L  
(>110 - >200 mg/dL)

# Chyloperitoneum: Causes

---

- Intrabdominal malignancy
- Lymphoma
- Tb/ Filiriasis
- Sarcoidosis
- Cirrhosis
- Pancreatitis
- Constrictive pericarditis
- Calcium channel blockers
- Intrabdominal trauma
  - Post intraabdominal surgery AAA repair
  - Post PD catheter insertion

# Management of Chyloperitoneum

---

## 1. Look for underlying cause:

- PD fluid cell count
- PD fluid cytology
- AFB peritoneal biopsy (if suspicion high)
- CT scan
- Lymphoma
  - LDH / bone marrow biopsy
  - flow cytometry PD fluid)



# Management of Chyloperitoneum

---

## 2. Dietary Management:

- Lymphatic flow influenced by ingestion of fatty meal
- Long-chain triglycerides are converted into monoglycerides and free fatty acids which are transported as chylomicrons in intestinal lymph ducts
- Medium-chain triglycerides are directly absorbed into the portal vein and reduce production of lymph

# Management of Chyloperitoneum

---

## 2. Dietary Management:

- Low fat diet
- Supplementation of medium chain triglycerides (coconut, palm oil, nutritional supplement)
- Some GI side effects (n/v, diarrhoea)
- Bowel rest, TPN in severe cases

## 3. Medical therapy

- Octreotide may help to reduce intestinal fat absorption
- Used in 2 case reports with success

# Back To Our Patient ....

- No identifiable cause on work up identified
- Felt to be due to PD access insertion
- Dietary management
  - Low fat
  - MCT supplementation
- Resolution of chyloperitoneum after one month
- Doing well on PD



## **CASE 2: *Scrotal Recall***

---

# The Case

---

- 70 year old male
- CKD due to diabetic nephropathy
- Ongoing pancytopenias
  - BM X 2 normal
- June 2014 embedded lap. PD catheter placed

# The Case

---

- August 2014 admitted to hospital with volume overload
- Creatinine 6.0 mg/dL
- PD catheter exteriorized
- Discharged home and started CAPD 2L x 3 exchanges
- Dwell volume increased to 2.5 L in January 2014
- Residual Kidney Function: 1 L / 24 hours (8 mL/min)
- March 2015 presents to home dialysis unit with complaint



# What Would You Do?

---





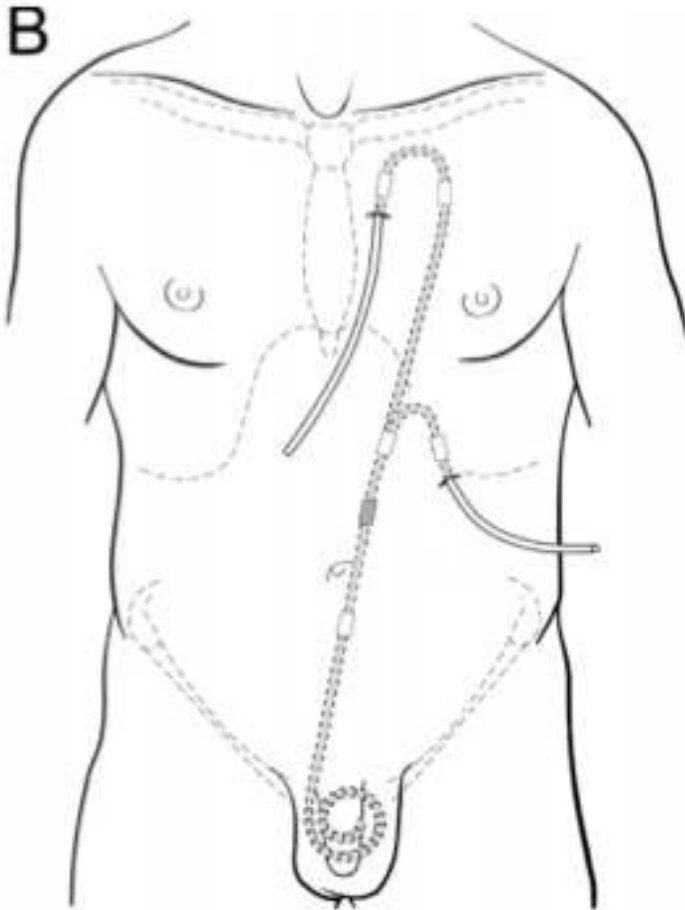
# Leaks and PD

---

Site:

- Peri-catheter
- Genital Abdominal Wall
  - hernia / non hernia related
- Retroperitoneal
- Pleural

# Unusual Peri-catheter Leak

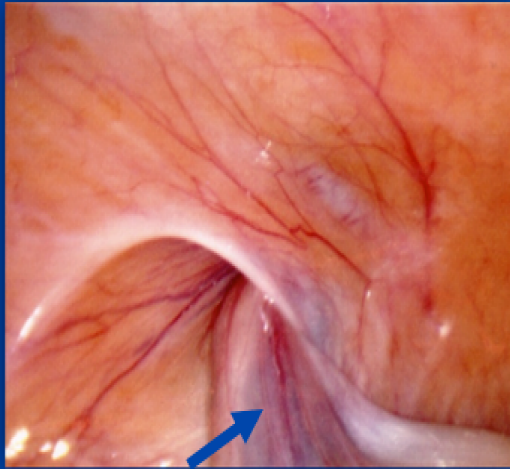


# Genital Edema / Scrotal Edema

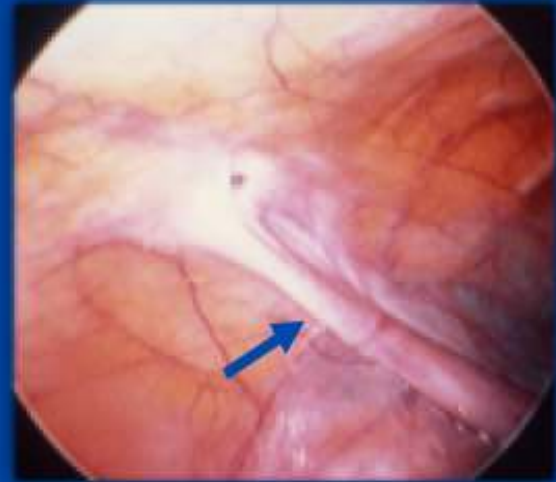
---

- Fluid extravasation from an indirect hernial sac
- Patent processus vaginalis
- Peritoneal Leaks and tears along the PD catheter

# Patent Processus Vaginalis



Patent Processus Vaginalis (Male)



Patent Processus Vaginalis (Female)

# So What Did I Do With The Patient With The Scrotal Leak

---

## 1. CT Scan With IP Dye

- *Patent processus vaginalis*
- *Peritoneal fluid tracking into scrotal sacs*
- *Fat containing inguinal hernias bilaterally*

ACC: 8063071

Study Desc: PERITONEAL LEAK

Series Desc: NON CONTRAST COR THICK

602 - 26

Lossy (1:13)

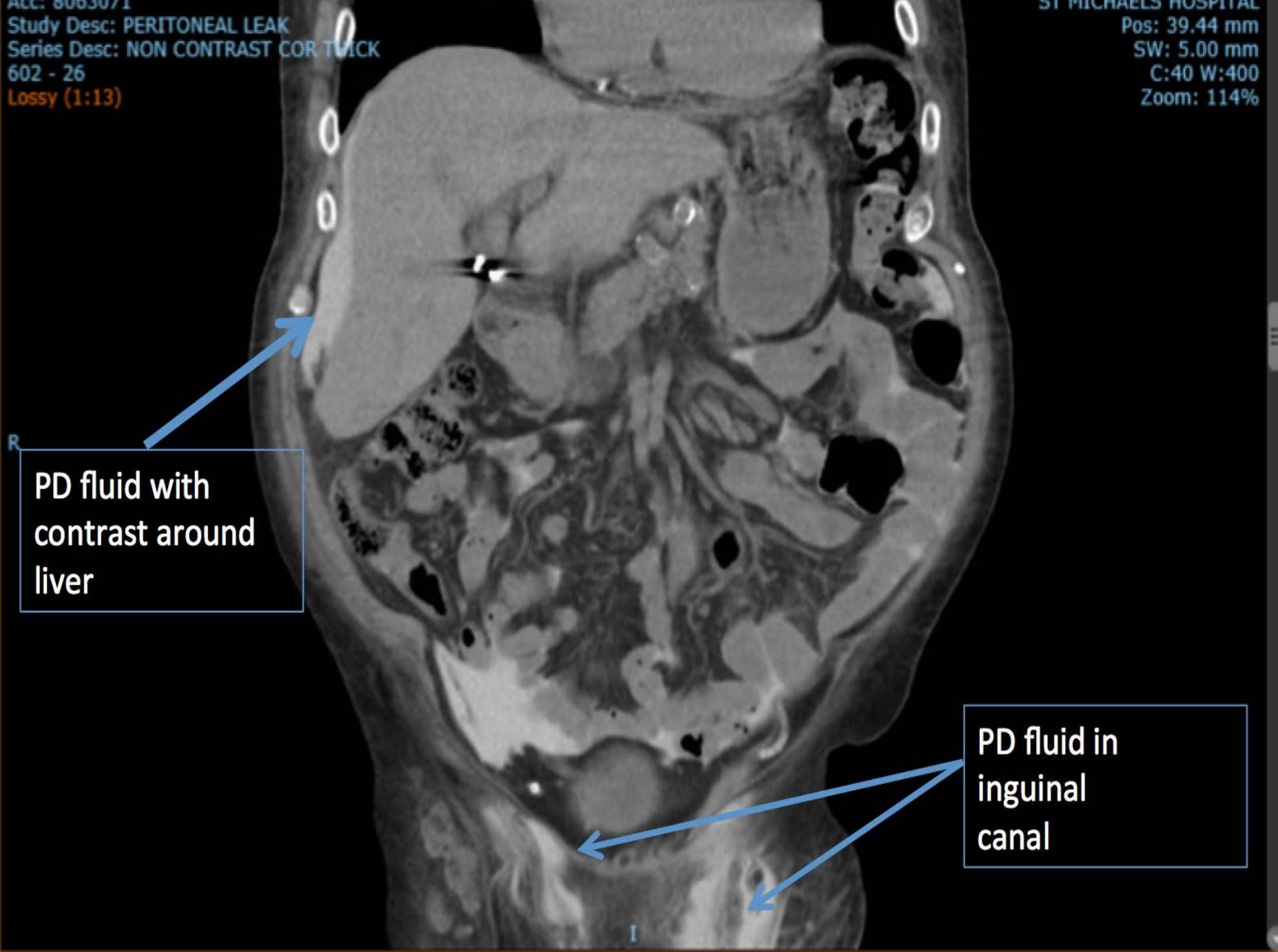
ST MICHAELS HOSPITAL

Pos: 39.44 mm

SW: 5.00 mm

C:40 W:400

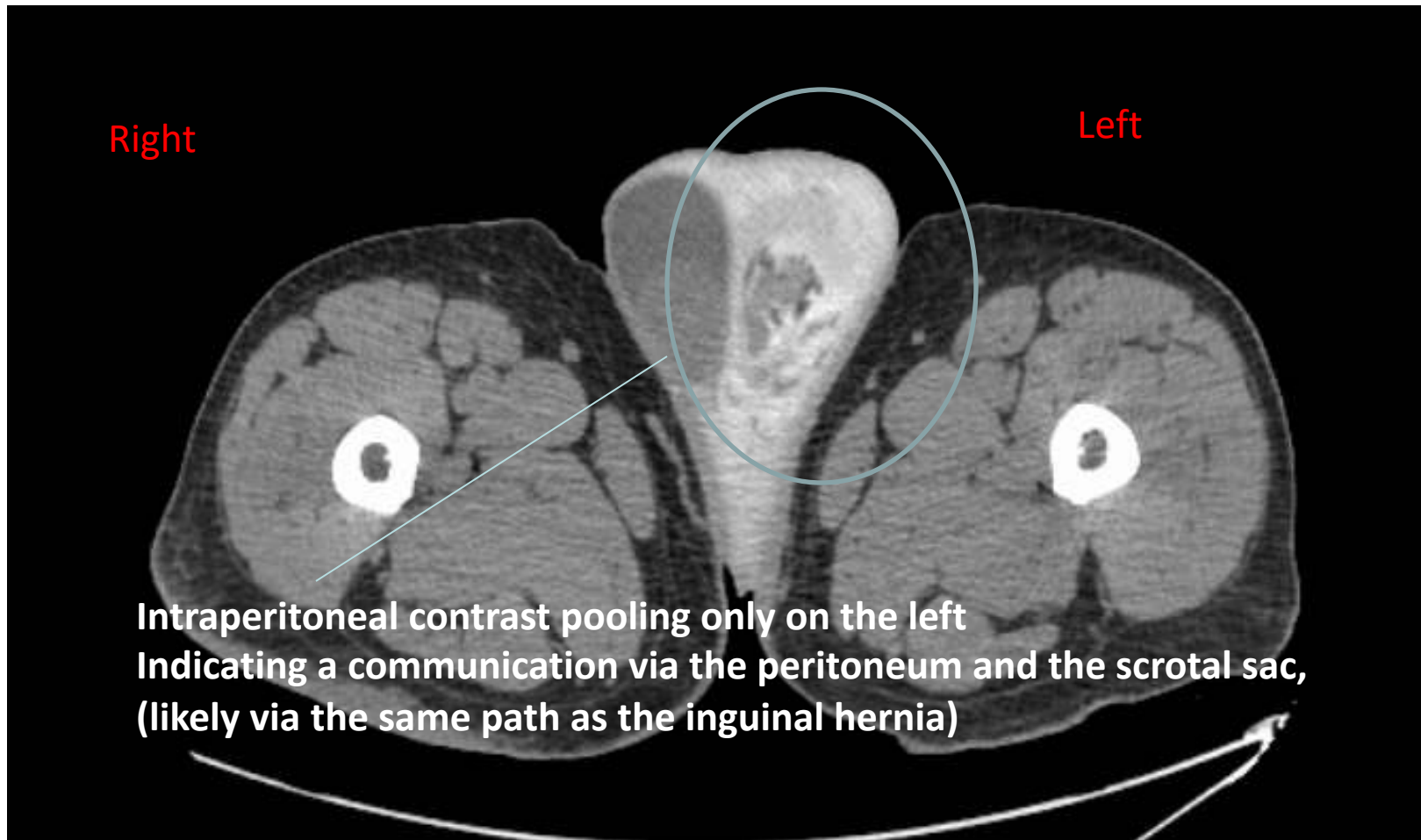
Zoom: 114%



PD fluid with  
contrast around  
liver

PD fluid in  
inguinal  
canal

# Scrotal Leak Due to Inguinal Hernia on PD



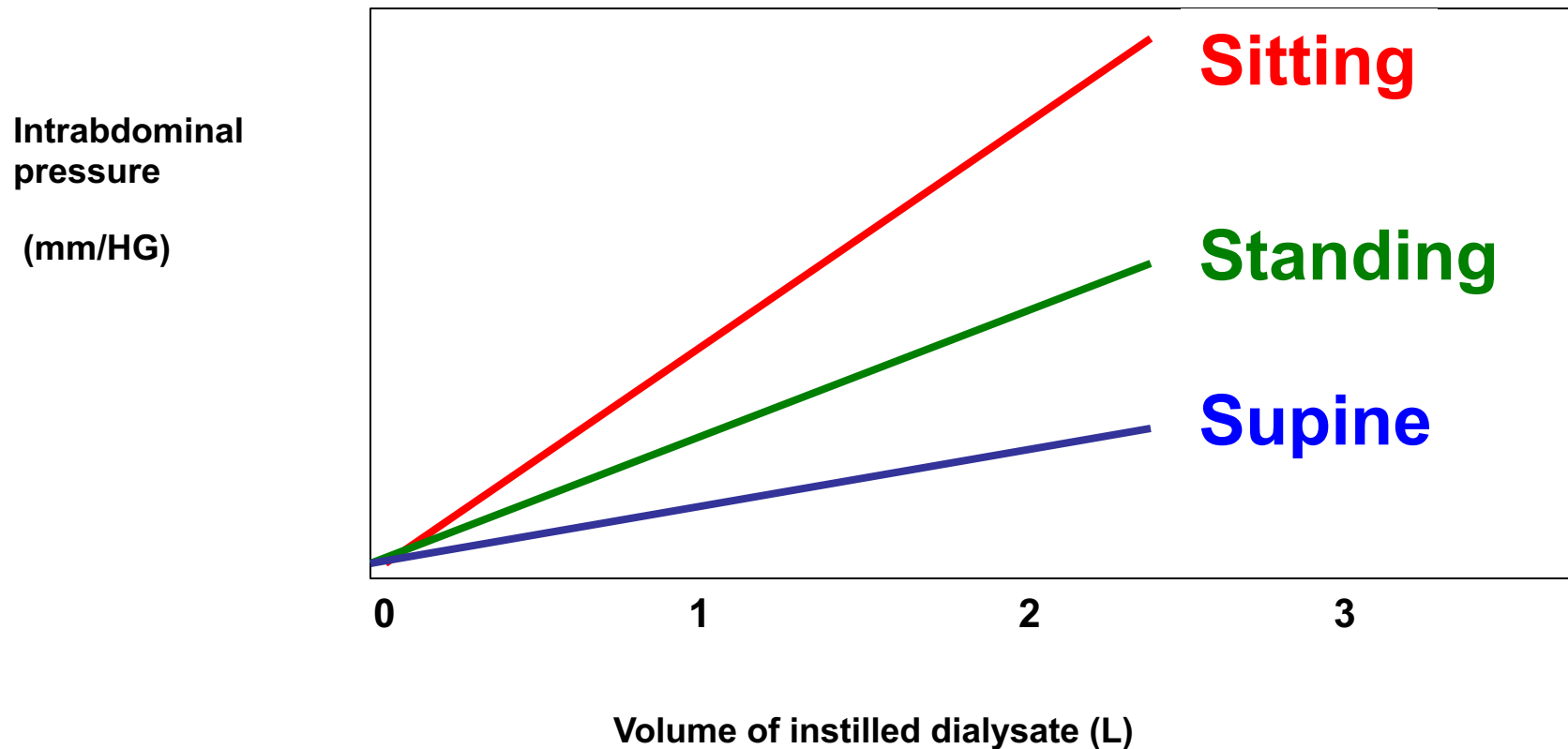
# So What Did I Do With The Patient With The Scrotal Leak

---

2. Switched the patient from CAPD to APD
  - *Lower dialysate night volumes*
  - *Day dry*



# Impact of Position on Intraperitoneal Pressure



# The Same Patient After 4 weeks of NIPD

NIPD X 4 Weeks



# So What Did I Do With The Patient With The Scrotal Leak

---

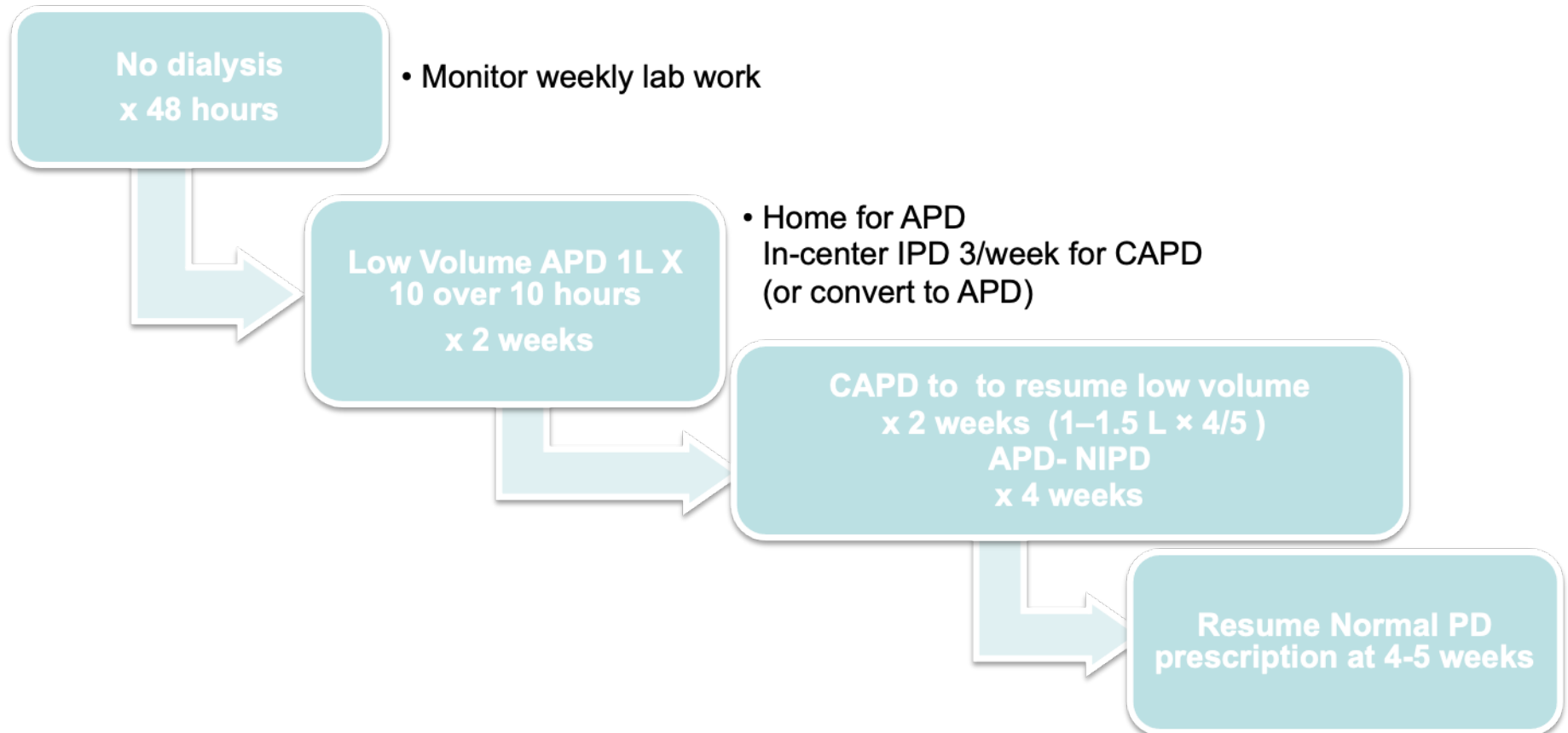
## 3. Referred the patient for surgical repair

- *Seen by surgeon*
- *Told by surgeon would have to put patient on hemo*
- *Did trial of NIPD (successful as per previous slide)*
- *Hernias and patent processus vaginalis repaired*
- *No PD x 4 days (bloodwork followed)*
- *Reintroduce PD day dry x 2 months, then gradually increased PD prescription with wet day*

# Protocol for Continued PD After Hernia Repair

## Shah et al PDI 2006; Crabtree et al 2006

- 50 patients (42 CAPD, 8 CCPD) single centre treated without the need for interim hemodialysis.
- Umbilical (25 patients), inguinal (18), incisional (5) epigastric (2)



Cas

ur



# The Case:

---

- 65 M retired police officer
- ESRD due to PCKD 1993
- HD until 1996, successful deceased donor kidney transplant
- 2013 progressive graft failure
- Waldenstrom's macroglobulinemia, treated with rituxamab and in remission
- Referred to Kidney Care Clinic
- PD catheter inserted and initiated PD due to symptoms of nausea, vomiting fatigue at GFR of 5 mL/min, urine output of 1.5 L / day

# The Case:

---

- Initiates NIPD 2 L X 5 exchanges over 9 hours
- Uremic symptomatology improves, more energy , edema resolves
- PET test HA transporter
- 3 months into PD feels so good that books a trip to Florida for winter
- 3 weeks before trip calls PD unit with shortness of breath
- Told to increase tonicity on cyclor to all 2.5%
- Lasix 120 mg po bid started

# The Case:

---

- 2 weeks before trip reports no improvement , UFs on cyclor 800-900 mL
- Told to start a daytime exchange
- 1 week before trip sees me in clinic and still feels mildly short of breath
- Satting well on room air
- What would you do now ?





# PD Hydrothorax

---

- Communication of peritoneal dialysis fluid between the peritoneal cavity and the pleural space
- Prevalence 1-2 %, variably reported
  - Female gender > male in one report (not consistent)
  - PCKD may be a risk factor -> increased IAP
- Presentation
  - Shortness of breath
  - Weight Gain
  - Diminished peritoneal effluent
  - Unilateral pleural effusion, 90% are right sided !!
  - Usually shortly after initiation of PD

# Pleural Blebs in The Diaphragm

460 KIRSCHNER

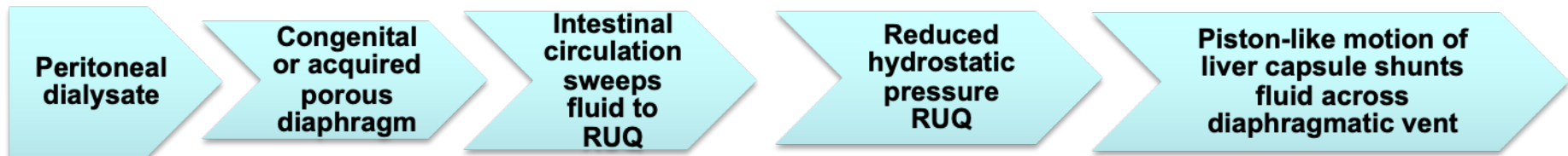


**Figure 6.** Photomicrograph of pleural "blister" ("bleb") overlying defect in diaphragm. (From Lieberman FL, Hidemura R, Peters RL, et al: Pathogenesis and treatment of hydrothorax complicating cirrhosis with ascites. *Ann Intern Med* 64:346, 1966; with permission.)

Kirschner PA. Porous diaphragm syndromes. *Chest Surgery Clinics of NA.* 1998;8:449-472.  
Picture courtesy Dr. Michael Ko

# Pathogenesis of PD Hydrothorax

---



# Diagnosis of PD Hydrothorax

---

## 1. Methylene blue

- No !!
- Painful / Chemical Peritonitis
- May be too dilute to see anything
- 2-3 hour dwells

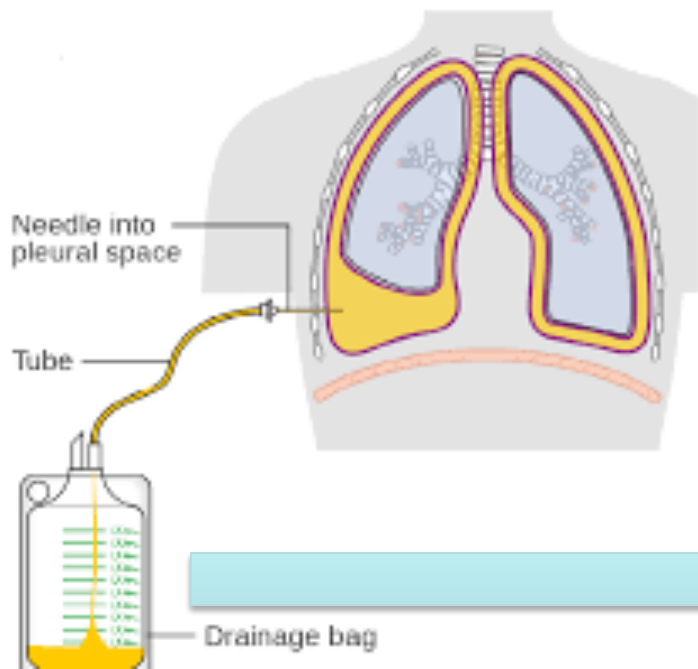
## 2. Thoracentesis

- Transudate
- Pleural glucose > Serum Glucose
- Extremely low protein
- Caution if hydrothorax chronic

## 3. Peritoneal Scintigraphy / CT with IP dye

- 2-3 hours need to wait before taking pictures
- Tell the patient to pack a lunch

# A Novel Diagnostic Strategy



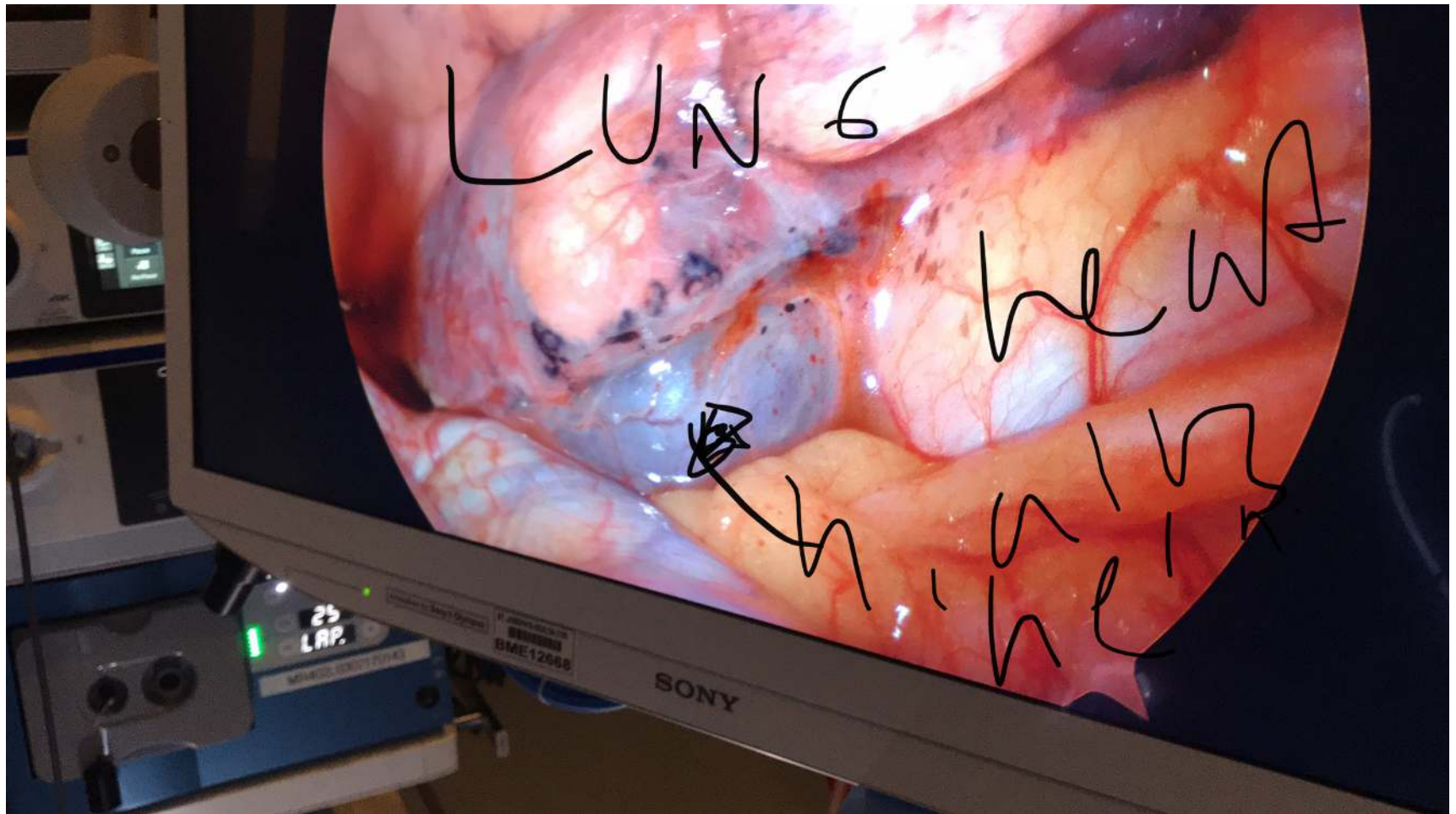
Reactive Protein	<input type="checkbox"/> (0.0 - 5.0) mg/L	1.3	1.2
Apolipoprot A1	<input type="checkbox"/> (0.92 - 1.96) g/L		
Apolipoprot B	<input type="checkbox"/> (0.59 - 1.46) g/L		
Fluid Type Result	<input type="checkbox"/>	Pleural	
Glucose Fluid	<input type="checkbox"/> mmol/L	57.4	7.7
Total Protein Fluid	<input type="checkbox"/> g/L	<30	<30
LD Fluid	<input type="checkbox"/> U/L	<8	40
pH Fluid	<input type="checkbox"/>		7.87
Fluid Type	<input type="checkbox"/>		
Appearance Fluid	<input type="checkbox"/>		
Fluid Erythroid	<input type="checkbox"/> E6/L		
Neutrophils	<input type="checkbox"/>		
Lymphocytes Fluid	<input type="checkbox"/>		
Mesothelial Fluid	<input type="checkbox"/>		
Exudates Fluid	<input type="checkbox"/>		

# The Iodine Test





# An Unusual Cause





# Management of PD Hydrothorax

---

- Thoracentesis for symptom relief
- Discontinue PD
- Rest off PD (6 weeks and rechallenge PD)
  - Successful in 50 % of cases (less in my experience)
- Discussion about remaining on HD
- Pleurodesis
  - Talc, autologous blood tetracycline, fibrin glue, antiplasmin
  - VATS gaining popularity
  - 58 percent success rate overall
  - Painful

# What Happened to Our patient !

---

- Hemodialysis initiated , discussion with patient
- Opted for pleurodesis
- Feb 2014- Vats pleurodesis with Talc
- Resumed PD 4 weeks later with recurrence of pleural effusion
- June 2014- Repeat Vats with betadine
- July 2014 resumed PD night cyclor
- October 2014 one month trip to Florida !!

# **Case 6: Unusual Peritonitis**



---

# The Case

---

- 72 M
- ESRD due to hypertension
- Laparoscopic PD catheter insertion and omentopexy March 2013
- April 2013 PD training completed and starts NIPD 2L x 5
- Comes to PD unit with cloudy fluid
- No abdominal pain

# The Initial Cell Count

Fluid Analysis		◀ more	◀ 05/06/15 15:25	05/05/15 18:15
			J7062209	J7052770
Fluid Type	<input type="checkbox"/>		PD ▲	Peritoneal ▲
			ASPIRATE	
Appearance Fluid	<input type="checkbox"/>		 ▲	 ▲
Fluid Erythroid	<input type="checkbox"/> E6/L		2 ▲	2 ▲
Nonerythroid	<input type="checkbox"/> E6/L		336 ▲	236 ▲
Neutrophils fluid	<input type="checkbox"/>		0.050 ▲	0.070 ▲
Lymphocytes Fluid	<input type="checkbox"/>		0.150 ▲	0.040 ▲
Eosinophils Fluid	<input type="checkbox"/>		0.490 ▲	0.690 ▲
Basophils Fluid	<input type="checkbox"/>			0.020 ▲
Mesothelials Fluid	<input type="checkbox"/>			0.010 ▲
Macrophages Fluid	<input type="checkbox"/>		0.310 ▲	0.170 ▲
Comments Fluid Diff	<input type="checkbox"/>		cancelled ▲	cancelled ▲
Review Fluid	<input type="checkbox"/>			

# Eosinophilic peritonitis

---

- Typically occurs within the first weeks of initiating PD
- Upper estimates - 2 to 4%
- 57% had some peripheral eosinophilia
- Unclear Etiology:
  - Plasticizers, solutions, air, reaction to the PD catheter itself
- Typically resolves spontaneously
- Can smolder for up to 6 months
- After ruling out bacterial infection some authors suggest temporary anti-histamines or low dose steroid therapy

# Back To Our Patient

---

- Received initial empiric antibiotics
- No systemic eosinophilia
- Cell culture negative
- Stopped antibiotics
- Patient doing well, resolution of cloudy effluent and cell count normalized

# Questions and Comments!!



Home Dialysis: St. Michael's Hospital 2018