

Utility of Abdominal Imaging in Peritoneal Dialysis Patients Presenting With Peritonitis

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Disclosures

- Dr. Emilie Trinh:
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 - Consultant for Amgen/Baxter/Otsuka.
 - Speaker's Bureau for Amgen/DaVita Health Care Partners

Background

- In the setting of PD peritonitis, abdominal imaging is often performed to look for other concomitant intra-abdominal processes
- Dialysis patients undergo frequent imaging with radiation doses that may increase the risk of cancer.
- The utility of abdominal imaging in the setting of PD peritonitis is unknown.

Objective

- Assess the prevalence of abdominal imaging performed in PD peritonitis
- Evaluate predictors of abnormal imaging results to identify clinical situations in which radiographic examinations are informative.

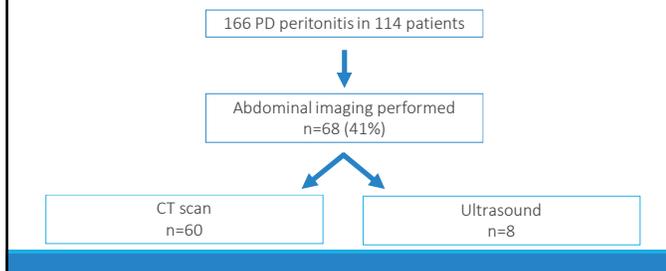
Methods

- Observational cohort study
- Inclusion:
 - All episodes of PD peritonitis in patients at University Health Network between January 1, 2011 and June 30, 2016
- Exclusion:
 - Missing information regarding peritonitis episode or hospital admission

Methods

- Data collection from electronic records and clinic charts
- Data collected:
 - Patient demographics and comorbidities
 - Peritonitis: organism, treatment and complications
 - Abdominal imaging: type and presence of abnormality
 - Hospital admission: vital signs upon admission, need for ICU, mortality

Results



Characteristics of the cohort

Age, years (mean \pm SD)	64.9 \pm 17.0
Male sex (n, %)	77 (46.4%)
Cause of ESRD (n,%)	
Diabetes	56 (33.7%)
Vascular	14 (8.4%)
Glomerulonephritis	45 (27.1%)
Polycystic kidney disease	8 (4.8%)
Other	43 (25.9%)
Comorbidities (n,%)	
Diabetes	76 (45.8%)
Coronary artery disease	64 (38.6%)
Peripheral vascular disease	27 (16.3%)
Cerebrovascular disease	20 (12.0%)

Characteristics of the peritonitis episode

Peritonitis organism (n, %)	
Gram positive	68 (41.0%)
Gram negative	35 (21.1%)
Polymicrobial	27 (16.3%)
Fungal	13 (7.8%)
Culture negative	20 (12.0%)
Mycobacterium	3 (1.8%)
Need for hospitalization (n, %)	
Need for ICU admission (n, %)	23 (13.9%)
Length of admission (mean \pm SD)	18 \pm 26
Relapse, recurrent, or refractory peritonitis	28 (16.9%)

Characteristics of patients with imaging

- Similar baseline characteristics
- Peritonitis :
 - More likely to have gram negative, polymicrobial or fungal organism
 - Less likely to be culture negative
 - More likely to have a relapse, recurrent, or refractory peritonitis
- Hospital admission:
 - Higher risk of hospital admission
 - Higher risk of ICU admission

Characteristics of patients with imaging

- Clinical presentation:
 - More likely to present with hypotension or tachycardia
 - Higher serum lactate
- Complications:
 - Higher risk of requiring hemodialysis (HD)
 - Higher risk of need for PD catheter removal

Causative organisms in patients with or without imaging

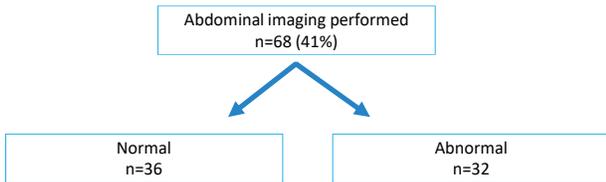
Peritonitis organism (n,%)	No imaging n=98	Imaging performed n=68	p value
Gram positive	51 (52.0%)	17 (25.0%)	<0.01
Gram negative	19 (19.4%)	16 (23.5%)	
Polymicrobial	10 (10.2%)	17 (25.0%)	
Fungal	4 (4.1%)	9 (13.2%)	
Culture negative	14 (14.3%)	6 (8.8%)	
Mycobacterium	0 (0%)	3 (4.4%)	



Characteristics and disposition of patients with or without imaging

	No imaging n=98	Imaging performed n=68	p value
Need for hospitalization (n, %)	53 (54.1%)	66 (97.1%)	<0.01
Need for ICU admission (n, %)	5 (5.1%)	18 (26.5%)	<0.01
Need for temporary or permanent HD	9 (9.2%)	31 (45.6%)	<0.01
Need for catheter removal	14 (14.3%)	28 (41.2%)	<0.01
Relapse, recurrent, or refractory peritonitis	10 (10.2%)	18 (26.5%)	<0.01
Hypotension in ER	5 (5.1%)	17 (25.0%)	<0.01
Tachycardia in ER	15 (15.3%)	22 (32.4%)	<0.01
Initial serum lactate	2.1 ± 1.1	3.0 ± 2.1	0.05

Abdominal Imaging Results



Abdominal Imaging Results

Abnormal findings	Number of patients
Bowel obstruction	8
Intra-abdominal collection or abscess	5
Bile duct dilation with stones	3
Pyelonephritis	2
Splenic infarction	2
Colitis / thickening of bowel wall	2
Bowel ischemia	2
Intra-abdominal hemorrhage	1
Colonic mass	1
Acute diverticulitis with microperforation	1
Abdominal wall hematoma	1
Perforated gallbladder	1
Distended gallbladder	1
Obstructing renal stone	1
Liver mass	1

Predictors of abnormal imaging results

- Significant predictors:
 - Need for ICU admission
 - Need for permanent or temporary HD

- Peritonitis organism did not predict radiological abnormalities

Predictors of abnormal imaging results

	No abnormalities n=36	Abnormal n=32	p value
Peritonitis organism			0.35
Gram positive	12 (33.3%)	5 (15.6%)	
Gram negative	8 (22.2%)	8 (25.0%)	
Polymicrobial	8 (22.2%)	9 (28.1%)	
Fungal	1 (2.8%)	2 (6.2%)	
Fungal with other bacterial organism	4 (11.1%)	2 (6.2%)	
Culture negative	1 (2.8%)	5 (15.6%)	
Mycobacterium	2 (5.6%)	1 (3.1%)	

Predictors of abnormal imaging results

	No abnormalities n=36	Abnormal n=32	p value
Need for ICU admission (n, %)	5 (14.3%)	13 (43.3%)	<0.01
Need for temporary or permanent HD	11 (30.6%)	20 (62.5%)	<0.01
Need for catheter removal	11 (30.6%)	17 (53.1%)	0.06
Relapse, recurrent, or refractory peritonitis	8 (22.2%)	10 (31.2%)	0.40
Hypotension in ER	5 (13.9%)	12 (37.5%)	0.07
Tachycardia in ER	13 (36.1%)	9 (28.1%)	0.78
Initial serum lactate	2.7 ± 1.8	3.3 ± 2.5	0.26

Multivariate analysis

- Need for ICU admission was the only significant predictor of abnormalities.

	OR (95% CI)	p value
ICU admission	4.37 (1.10-17.42)	0.04
Polymicrobial organism	0.90 (0.26-3.08)	0.87
Serum lactate	1.02 (0.75-1.39)	0.89

Limitations

- Single-center retrospective observational study
- Information regarding type of physician (ED or nephrologist) who ordered abdominal imaging unknown

Conclusion (I)

- Abdominal imaging is commonly performed in the setting of PD peritonitis.
- Abnormalities are not infrequent and are present in almost half of cases, with need for ICU admission being a strong predictor.

Conclusion (II)

- Abdominal imaging should be performed in carefully-selected patients with PD peritonitis, especially if there is evidence of hemodynamic instability.
- While the finding of fungal or polymicrobial peritonitis was a driver for abdominal imaging, the presence of these organisms did not predict radiologic abnormalities.
