
SHORT REPORTS

A Critical Pathway for Outpatient Treatment of CAPD Peritonitis

A critical pathway is a multidisciplinary patient care plan that outlines the pharmacological and nonpharmacological therapies, interventions, and outcomes expected throughout a patient's hospitalization or treatment (1-3). It allows for a standardized approach to patient management using current practices, scientific evidence, and benchmarking, and may be used for documentation of interventions and outcomes (4). We developed a Critical Pathway for the treatment of continuous ambulatory peritoneal dialysis (CAPD) peritonitis in an effort to incorporate evidence-based literature, to standardize treatment, and to implement once-daily intraperitoneal aminoglycoside dosing (5-7). The following report describes our experience with development, implementation, and evaluation of a critical pathway for the treatment of CAPD peritonitis.

MATERIALS AND METHODS

A Critical Pathway for the treatment of CAPD peritonitis and an accompanying preprinted Physician's Orders sheet, based on the "*Peritoneal Dialysis-Related Peritonitis Treatment Recommendations: 1996 Update*" and other evidence-based literature, were developed by Pharmacy and reviewed by a multidisciplinary team of medical, nursing, and pharmacy staff from the Peritoneal Dialysis Unit at St. Paul's Hospital (SPH), Saskatoon, Saskatchewan, Canada (5-7). The Critical Pathway form indicates when diagnostic tests, interventions, and patient education are to take place during treatment days 1 - 21 and posttreatment follow-up (see Figure 1). It also allows for documentation of outcomes such as culture-and-sensitivity results and patient-reported signs and symptoms of peritonitis and their resolution. The Physician's Orders outlines empiric and definitive antibiotic therapy for CAPD peritonitis and includes provision for once-daily intraperitoneal aminoglycoside dosing.

The Critical Pathway and Physician's Orders were implemented in a pilot project from 18 January to 9 April 1999. Patients were eligible for inclusion in the project if they were on CAPD, if treatment was provided on an out-patient basis, if the physician approved the use of the Critical Pathway and Physician's Orders, and if the patient was 18 years of age or older. Patients were excluded if hospitalized typically when peritonitis symptoms did not resolve after 3 days or when the patient decompensated or required catheter removal.

The peritoneal dialysis (PD) nurse contacted the physician and initiated the critical pathway when a report of suspected peritonitis from an eligible patient was received. The critical pathway was to be followed for all care and documentation. The PD nurse coordinated care by telephone with physicians, patients, and home care, and ensured all responsibilities on the Critical Pathway were completed and documented. The preprinted Physician's Orders were used by physicians to prescribe empiric antibiotics for patients presenting with a suspected peritonitis. When PD effluent culture-and-sensitivity results were received, physicians used the definitive antibiotic therapy section to adjust antibiotic therapy. Tobramycin serum concentrations were indicated when therapy was continued for enterococcus, pseudomonas, and multiple-organism infections.

CRITICAL PATHWAY FOR THE TREATMENT OF CAPD PERITONITIS

Effective date: _____ Physician's signature: _____

PT = patient; HC = home care; RN = nurse; MD = physician; s/s = signs/symptoms; = check box (to indicate task completion)

Day 1

(Call to PD unit reporting peritonitis symptoms)

Date: _____

Days 3-7

1. Reporting/Consults

PT: 1. Report s/s immediately upon detection to PD unit or on-call nephrologist
RN: 1. Report suspected peritonitis to MD
2. Remind patient to contact PD unit by day 3 if symptoms are still present
MD/RN: 1. Notify home care (if applicable)

PT/HC: 1. If symptoms not resolving, report current s/s to unit
RN: 1. Report organism and C/S results to MD _____
2. Relay change in antibiotic therapy to patient, caregiver, home care
3. Remind patient to send dialysate from 7th day after treatment is complete
4. Consider scheduling "refresher" appointment within 1 month of completing antibiotic therapy

2. Diagnostic tests

PT/HC: 1. Sample dialysate and send to SPH

3. Interventions

MD: 1. Order **Critical Pathway** and **Physician's Orders** (if there is not an active order)
 (See preprinted **Physician's Orders: Empiric Antibiotic Therapy**)

MD: 1. Adjust antibiotics based on C/S (See preprinted **Physician's Orders: Definitive Antibiotic Therapy**)
2. Patient requires hospital admission (If yes, # of days hospitalized _____)

4. Patient education

5. Medications/Supplies

PT/HC: 1. Flush peritoneum with 3 _____ bags of 1.5% dialysis solution
 Add 1000 U heparin to each flush bag if possible
2. Start empiric treatment (See preprinted **Physician's Orders: Empiric Antibiotic Therapy**)
RN: 1. Send loading dose and maintenance doses for 14 days of cefazolin and tobramycin
2. Send replacement peritonitis kit

PT/HC: 1. Adjust antibiotics based on C/S (See preprinted **Physician's Orders: Definitive Antibiotic Therapy**)
RN: 1. Send prescription/antibiotics if required for changes in antibiotic therapy

6. Outcomes

RN: 1. Document s/s of patient (description, when symptoms appeared):
cloudy bag _____
abdominal pain: mild moderate severe _____
fever _____

RN: 1. Document s/s of patient (when communication with the patient occurs):
symptoms resolved _____
appearance of dialysate: cloudy clear _____
abdominal pain _____
fever _____

(continued on next page)

Following completion of the pilot project, the Critical Pathway and Physician's Orders were evaluated using a retrospective chart review and health care professional (HCP) questionnaire.

RESULTS

During the study period, there were 21 episodes of peritonitis in 14 patients. The Critical Pathway or Physician's Orders was used in 13 episodes (in 11 patients). Five episodes were excluded because the patient was hospitalized. Three episodes were eligible yet excluded because neither the Critical Pathway nor Physician's Orders was used. The preprinted Physician's Orders was used in 100% (13/13) of eligible episodes

<i>Days 7-21</i>	<i>7 days post antibiotic treatment</i>	<i>Next visit to PD unit</i>
	Date: _____	Date: _____
1. Reporting/Consults		
2. Diagnostic tests		
	PT: 1. Send dialysate sample to SPH	
3. Interventions		
MD: 1. At conclusion of treatment, consider ordering a new Critical Pathway and Physician's Orders for the next episode		RN/PT: 1. Nose swab for <i>S. aureus</i> for patients who had <i>S. aureus</i> peritonitis
4. Patient education		
		RN/PT: 1. Consider "refresher" session to review aseptic technique
5. Medications/Supplies		
	RN: 1. Send replacement peritonitis kit	PT: 1. Mupirocin (Bactroban) to exit site daily x 5 days (nasal swab positive for <i>S. aureus</i>) 2. Bring in PD antibiotics for expiry check
6. Outcomes		
		RN: 1. Report final outcome of peritonitis: resolved _____ relapse _____ other: catheter removal transfer to hemodialysis change system death other _____ _____ _____ _____ _____ _____ _____ _____ _____
		2. Document problems noted in patient technique and points that were reviewed _____ _____ _____ _____ _____ _____ _____

Figure 1 – Critical Pathway for the treatment of CAPD peritonitis.

and the Critical Pathway was used in 77% (10/13) of eligible episodes.

The definitive antibiotic therapy from the Physician's Orders was used in 77% (10/13) of episodes. In two episodes, the suggested antibiotic therapy was not used because the effluent was positive for cephalothin-resistant coagulase-negative staphylococci and treatment with vancomycin was required. Vancomycin was not listed in the definite therapy choices for treatment, but was added in revision to the Physician's Orders. In another case, the suggested antibiotic therapy was not used because an effluent culture resulted in no growth and cytology indicated normal numbers of white blood cells and

neutrophils.

An HCP evaluation questionnaire to evaluate the Critical Pathway and Physician's Orders was distributed to 5 physicians and 6 nurses affiliated with the PD unit at SPH. Of these health professionals, only 2 nephrologists and 3 nurses felt they had had adequate experience using the Critical Pathway and Physician's Orders to complete the questionnaire.

All HCP strongly agreed or agreed the format of the Critical Pathway including the checkboxes and documentation sections was easy to use and logical. All HCP strongly agreed or agreed that the ability to directly document activities, laboratory results, and communication with the patient on the Critical Pathway reduced time and allowed for standardization. In evaluation of the preprinted Physician's Orders, all HCP strongly agreed or agreed that all sections were useful and the empiric and definitive therapy was appropriate. The HCP were asked to compare use of the Critical Pathway and preprinted Physician's Orders to the previous "peritonitis protocols" and procedures utilized by the Unit. All (100%) HCP surveyed indicated they preferred the Critical Pathway to previous protocols because it resulted in time savings and standardization, and used evidence-based treatment.

DISCUSSION

Many patients whose care is directed by the PD Unit at SPH live in remote communities and may not have easy access to medical care in the event of peritonitis. During PD training, patients are instructed on signs, symptoms, and treatment of peritonitis and are given a supply of intraperitoneal antibiotics to take home. When these patients develop a peritonitis episode, they telephone the Peritoneal Dialysis Unit nurse for guidance. The nurse contacts the physician and, after receiving approval, instructs the patient to begin home antibiotic treatment. Our Unit had no standardized protocol for the treatment of peritonitis. Therefore, for each new patient or episode of peritonitis, the PD nurse was required to telephone the physician for detailed orders for antibiotics, other treatments, and follow-up, which wasted time. We developed a Critical Pathway and preprinted Physician's Orders to assist the HCP in treating CAPD peritonitis by incorporating evidence-based literature, standardizing treatment, and implementing once-daily intraperitoneal aminoglycoside dosing. An HCP evaluation of the Critical Pathway and orders indicated a high degree of satisfaction with the format and content of the Critical Pathway and Physician's Orders as these tools saved time and standardized the approach to care.

We believe that the development of a Critical Pathway and Physician's Orders improved patient care. A Critical Pathway could be valuable to standardize treatment of symptoms and other diseases encountered in the dialysis patient. As new guidelines for treatment of CAPD peritonitis will soon be available, these will be used to revise the Critical Pathway and preprinted Physician's Orders.

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