



## Complete Summary

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### GUIDELINE TITLE

ACR Appropriateness Criteria™ for percutaneous nephrostomy.

### BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Interventional Radiology. Percutaneous nephrostomy. Reston (VA): American College of Radiology (ACR); 2002. 9 p. (ACR appropriateness criteria). [60 references]

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## SCOPE

### DISEASE/CONDITION(S)

Urinary tract obstruction

### GUIDELINE CATEGORY

Treatment

### CLINICAL SPECIALTY

Obstetrics and Gynecology  
Oncology  
Radiology  
Urology

### INTENDED USERS

Health Plans  
Hospitals  
Managed Care Organizations

Physicians  
Utilization Management

#### GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of percutaneous nephrostomy

#### TARGET POPULATION

- Patients with urinary tract obstruction in the setting of infection
- Patients with obstructing stone disease
- Patients with malignant urinary tract obstruction
- Patients with urinary obstruction in the setting of pregnancy

#### INTERVENTIONS AND PRACTICES CONSIDERED

Percutaneous nephrostomy

#### MAJOR OUTCOMES CONSIDERED

Success and complication rates of percutaneous nephrostomy

## METHODOLOGY

#### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

#### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

#### NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

#### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)  
Weighting According to a Rating Scheme (Scheme Not Given)

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

## METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Interventional Procedure: Percutaneous Nephrostomy

Variant 1: Ureteral calculus with obstruction.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
<b>History</b>		
Failed retrograde ureteral stent placement	6	
Acute flank pain	4	
No retrograde ureteral stent attempted	4	
<b>Physical Examination</b>		
Febrile, appears septic	8	
<b>Laboratory Findings</b>		
Creatinine 5 mg/dL	8	
Elevated WBC	8	
Creatinine normal	6	
Correctable coagulopathy	6	Following failed retrograde.
Uncorrectable coagulopathy	2	
<b>Imaging Findings</b>		
12-mm calculus with hydronephrosis	8	
3-mm calculus without hydronephrosis	4	
<u><b>Appropriateness Criteria Scale</b></u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Abbreviation: WBC, white blood cell (count)

Variant 2: Renal pelvic calculus with obstruction.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
History		
Failed retrograde ureteral stent placement	7	
Acute flank pain	4	
No retrograde ureteral stent attempted	4	
Physical Examination		
Febrile, appears septic	8	
Laboratory Findings		
Creatinine 5 mg/dL	8	
Elevated WBC	7	
Creatinine normal	6	
Correctable coagulopathy	6	Following failed retrograde.
Uncorrectable coagulopathy	2	
Imaging Findings		
12-mm calculus with hydronephrosis	8	
Huge staghorn calculus for attempted nephrolithotomy	8	
3-mm calculus without hydronephrosis	4	
<p><u>Appropriateness Criteria Scale</u></p> <p>1 2 3 4 5 6 7 8 9</p> <p>1=Least appropriate 9=Most appropriate</p>		

Variant 3: Pregnancy and flank pain with possible obstruction.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
History		
Failed retrograde ureteral stent placement	5	Dependent on fetal risk factors.
Acute flank pain	3	
Chronic flank discomfort	2	
No retrograde ureteral stent attempted	2	
Physical Examination		
Febrile, appears septic	6	
Laboratory Findings		
Correctable coagulopathy	5	Following failed retrograde.
Creatinine 5 mg/dL	4	
Elevated WBC	4	
Creatinine normal	2	
Uncorrectable coagulopathy	2	
Imaging Findings		
12-mm calculus with hydronephrosis	8	
3-mm calculus without hydronephrosis	2	
<u>Appropriateness Criteria Scale</u>  1 2 3 4 5 6 7 8 9  1=Least appropriate 9=Most appropriate		

Interventional Procedure: Percutaneous Nephrostomy

Variant 4: Cervical carcinoma with ureteral obstruction.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
History		

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
Failed retrograde ureteral stent placement	8	
Newly diagnosed disease, not yet treated	7	
Acute flank pain	5	
No retrograde ureteral stent attempted	5	
Recurrent end-stage disease	4	
<b>Physical Examination</b>		
Febrile, appears septic	8	
Chronically cachectic	No Consensus	Depends on other clinical factors.
<b>Laboratory Findings</b>		
Creatinine 5 mg/dL	8	
Elevated WBC	8	
Correctable coagulopathy	6	
Creatinine normal	3	
Uncorrectable coagulopathy	2	
<b>Imaging Findings</b>		
Bulky pelvic mass with lymphadenopathy	7	
No ureteral encasement by CT	6	
Diffuse metastatic disease with ascites	5	
<b><u>Appropriateness Criteria Scale</u></b>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Abbreviations: WBC, white blood cell (count); CT, computed tomography

Variant 5: Urinary tract infection.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
History		
Dysuria; no imaging work-up	2	
Fever; no imaging work-up	2	
Imaging Findings		
Hydronephrosis	4	
Normal renal collecting systems	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Interventional Procedure: Percutaneous Nephrostomy

Variant 6: Urinary tract infection with hydronephrosis.

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
History		
Failed retrograde ureteral stent placement	9	
Retrograde ureteral catheterization not successful	8	
Retrograde ureteral catheterization not attempted	4	
Physical Examination		
Febrile with overwhelming sepsis	8	
Afebrile and nontoxic	4	
Laboratory Findings		
Correctable coagulopathy	4	
Uncorrectable coagulopathy	2	
<u>Appropriateness Criteria Scale</u>		

Presentation/Signs/Symptoms	Appropriateness Rating	Comments
<p>1 2 3 4 5 6 7 8 9</p> <p>1=Least appropriate 9=Most appropriate</p>		

### Summary

In experienced hands, percutaneous nephrostomy (PCN) catheter placement is safe and usually successful. It affords access into the renal collecting system for both temporary and permanent decompression, and facilitates endourologic interventional procedures.

### CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

- In the setting of pyonephrosis, survival was 92% when percutaneous nephrostomy (PCN) was used, compared with 88% for surgical decompression and 60% for medical therapy without decompression. In addition, hospitalization times were shorter in the nephrostomy group.
- In neonatal renal candidiasis, PCN drainage allows both urinary tract decompression and the direct administration of antifungal agents into the renal collecting system.
- In patients who have not yet undergone cancer treatment or in patients with treatment-related complications, PCN decompression seems valuable. In such patients, PCN results in longer survival, improved quality of life, and a better chance of receiving definitive cancer treatment. The patients most likely to benefit from PCN decompression are thus patients for whom viable treatment options exist for their underlying malignancy.
- In appropriately selected patients with other pelvic malignancies (such as transitional cell carcinoma and prostate carcinoma), PCN decompression has been shown valuable in improving renal function and improving survival.
- Nephrostomy tube placement may be preferable in selected scenarios, since it preserves ureteric peristalsis and may actually facilitate stone passage. In addition, it is believed to often provide better decompression of the urinary

- system (particularly in the setting of superimposed infection) with less risk of urosepsis.
- Percutaneous nephrostomy (PCN) may be the preferable option in patients at high risk for anesthesia, or in a setting such as pyonephrosis, when larger tube decompression may be warranted.
  - The primary management of ureteral injuries by PCN decompression results in a decreased need for reoperation and decreased morbidity rates.

## POTENTIAL HARMS

- In the setting of pyonephrosis or noninfected obstruction and poor renal function in patients ultimately undergoing simple nephrectomy, the incidence of wound infections is increased in patients undergoing preoperative nephrostomy decompression.
- In patients with more advanced disease, for whom no definitive treatment is available, there is little if any benefit to percutaneous nephrostomy (PCN) decompression. In these patients, overall performance status and survival after decompression are poor, and the risk of complications and need for secondary percutaneous procedures are high.
- One of the most common complications related to PCN placement is postprocedural sepsis.
- Clinically asymptomatic bleeding is a relatively common finding: Mild hematuria is present in approximately 50% of patients after PCN and evidence of retroperitoneal hemorrhage is seen by computed tomography (CT) in 13%. Clinically significant bleeding, either into the collecting system or into the retroperitoneum, is fortunately less common. Bleeding is seen more commonly in patients with thrombocytopenia.
- Other complications related to PCN are much less common and include bowel injury, splenic injury, gallbladder puncture, and pneumothorax. The latter is more common when upper pole calyceal puncture is necessary, but occasionally such intercostal approaches may be necessary to allow optimal access for stone removal. In the setting of uroepithelial neoplasms, tumor growth along the nephrostomy tract has been reported, but is believed to be a very uncommon phenomenon. Like any indwelling drainage catheters, PCN tubes are subject to fracture, dislodgement, and occlusion.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as

investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Interventional Radiology. Percutaneous nephrostomy. Reston (VA): American College of Radiology (ACR); 2002. 9 p. (ACR appropriateness criteria). [60 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2002

### GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

### SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria™.

## GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Interventional Radiology

## COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Richard Duszak Jr, MD; Jonathan M. Levy, MD; Curtis W. Bakal, MD; Donald F. Denny Jr, MD; Louis G. Martin, MD; Arl Van Moore Jr, MD; Michael J. Pentecost, MD; Anne C. Roberts, MD; Robert L. Vogelzang, MD; Bruce A. Perler, MD; Martin I. Resnick, MD; Jerome Richie, MD

## FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

## GUIDELINE STATUS

This is the current release of the guideline.

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The anticipated next review date for this topic is 2007.

## GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site](#).

Print copies: Available from American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

## AVAILABILITY OF COMPANION DOCUMENTS

None available

## PATIENT RESOURCES

None available

## NGC STATUS

This summary was completed by ECRI on March 14, 2003. The information was verified by the guideline developer on June 23, 2003.

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