Folder Name: **Clinical Practice Guidelines**
Date of Issue: 8/10/2011
Issued By: Dr. Mathias Gysler, Chief of Medical Staff

Title: Contrast-Enhanced Diagnostic Studies CPG

PURPOSE:

To guide physicians in the choice on contrast when required for diagnostic studies for peripheral vascular disease, abdominal aortic aneurysm, or malignancy

DEFINITIONS:

Abbreviations:	
AAA: abdominal aortic aneurysm	ACEI: angiotensin cardioverting enzyme inhibitor
ARB: angiotensin receptor blocker	ARF: acute renal failure
CT: computed tomography	DRI: direct renin inhibitor
eGFR: estimated glomerular filtration rate	GBCA: gadolinium based contrast agent
HD: hemodialysis	NSAIDs: non-steroidal anti-inflammatory drugs
NSF: nephrogenic systemic fibrosis	MRA: magnetic resonance angiography
MRI: magnetic resonance imaging	PD: peritoneal dialysis
PVD: peripheral vascular disease	RCM: radiopaque contrast media

SELECTION CRITERIA:

Inclusion Criteria:

Patients with suspicion of peripheral vascular disease, abdominal aortic aneurysm or malignancy who require diagnostic studies

ASSESSMENT AND TREATMENT AND/OR MONITORING:

Suspected Peripheral Vascular Disease - see **algorithm in Appendix A**

Suspected Abdominal Aortic Aneurysm, Malignancy - see **algorithm in Appendix B**

Monitoring

Patients at risk for CIN (Contrast Induced Nephropathy) should have follow-up creatinine and eGFR performed 3 days after receiving RCM (radiopaque contrast media).

Patients at risk for NSF (Nephrogenic Systemic Fibrosis) who receive GBCA (Gadolinium Based Contrast Agent) should be educated about the signs and symptoms of NSF and to report these to their healthcare professional.

REFERENCES:

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NSF Archive. (n.d.). Retrieved November 1, 2010, from European Society of Urogenital Radiology: http://www.esur.org/NSF-archive.39.0.html

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RELATED DOCUMENTS:

See **[Para-Link] Radiopaque Contrast Media Clinical Practice Guideline 19-2**.

EDUCATION

The Document Leader/Renal Access Forum will be responsible for an education plan to ensure physicians and staff members directed by the information contained in the clinical

practice guideline are notified. New physicians and staff will receive education through hospital and/or department orientation.

EVALUATION:

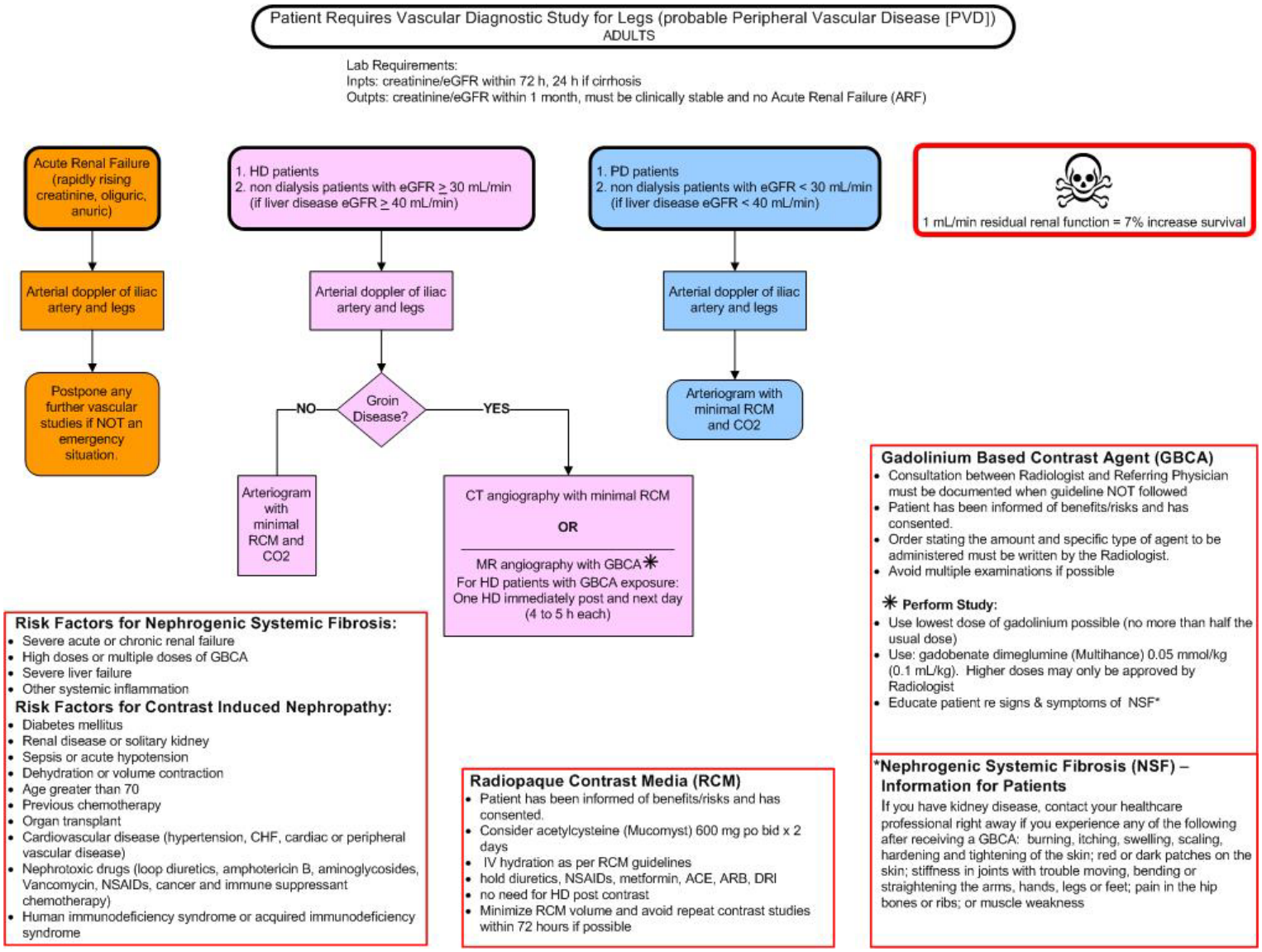
Patients who receive gadolinium will be educated to report any symptoms of Nephrogenic Systemic Fibrosis. These reports will be tracked through the on line incident reporting system.

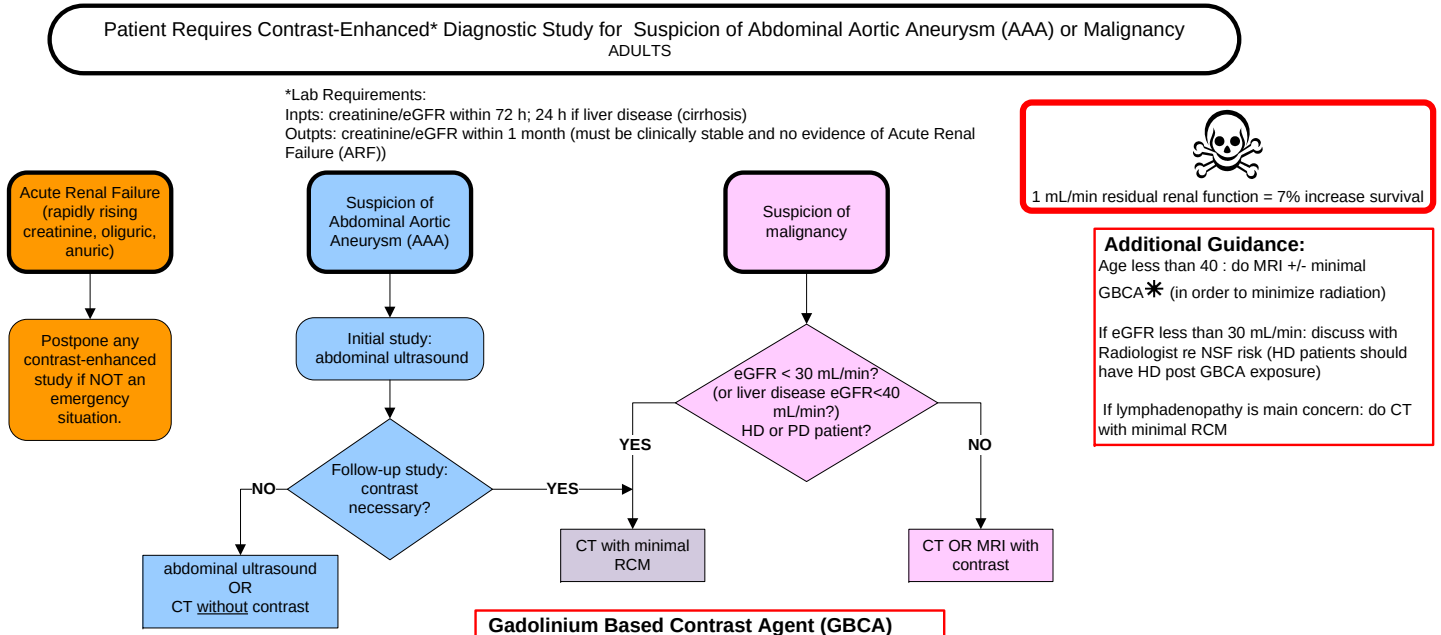
DEVELOPED BY:

Dr. D. Perkins, Department of Nephrology
Renal Access Forum (including members from the Renal program, Diagnostic Imaging, Vascular Surgery, Quality, Performance & Risk Management Department)

APPROVED BY:

Medical Advisory Committee: May 2011


Patient Requires Vascular Diagnostic Study for Legs (probable Peripheral Vascular Disease [PVD])
ADULTS
Lab Requirements:
Inpts: creatinine/eGFR within 72 h, 24 h if cirrhosis
Outpts: creatinine/eGFR within 1 month, must be clinically stable and no Acute Renal Failure (ARF)
Acute Renal Failure (rapidly rising creatinine, oliguric, anuric)
Arterial doppler of iliac artery and legs
Postpone any further vascular studies if NOT an emergency situation.
1. HD patients
2. non dialysis patients with eGFR ≥ 30 mL/min (if liver disease eGFR ≥ 40 mL/min)
Arterial doppler of iliac artery and legs
Groin Disease?
NO
YES
Arteriogram with minimal RCM and CO2
CT angiography with minimal RCM
OR
MR angiography with GBCA✳
For HD patients with GBCA exposure: One HD immediately post and next day (4 to 5 h each)
1. PD patients
2. non dialysis patients with eGFR < 30 mL/min (if liver disease eGFR < 40 mL/min)
Arterial doppler of iliac artery and legs
Arteriogram with minimal RCM and CO2
1 mL/min residual renal function = 7% increase survival
Risk Factors for Nephrogenic Systemic Fibrosis:
Severe acute or chronic renal failure
High doses or multiple doses of GBCA
Severe liver failure
Other systemic inflammation
Risk Factors for Contrast Induced Nephropathy:
Diabetes mellitus
Renal disease or solitary kidney
Sepsis or acute hypotension
Dehydration or volume contraction
Age greater than 70
Previous chemotherapy
Organ transplant
Cardiovascular disease (hypertension, CHF, cardiac or peripheral vascular disease)
Nephrotoxic drugs (loop diuretics, amphotericin B, aminoglycosides, Vancomycin, NSAIDs, cancer and immune suppressant chemotherapy)
Human immunodeficiency syndrome or acquired immunodeficiency syndrome
Radiopaque Contrast Media (RCM)
Patient has been informed of benefits/risks and has consented.
Consider acetylcysteine (Mucomyst) 600 mg po bid x 2 days
IV hydration as per RCM guidelines
hold diuretics, NSAIDs, metformin, ACE, ARB, DRI
no need for HD post contrast
Minimize RCM volume and avoid repeat contrast studies within 72 hours if possible
Gadolinium Based Contrast Agent (GBCA)
Consultation between Radiologist and Referring Physician must be documented when guideline NOT followed
Patient has been informed of benefits/risks and has consented.
Order stating the amount and specific type of agent to be administered must be written by the Radiologist.
Avoid multiple examinations if possible
✳ Perform Study:
Use lowest dose of gadolinium possible (no more than half the usual dose)
Use: gadobenate dimeglumine (Multihance) 0.05 mmol/kg (0.1 mL/kg). Higher doses may only be approved by Radiologist
Educate patient re signs & symptoms of NSF*
*Nephrogenic Systemic Fibrosis (NSF) – Information for Patients
If you have kidney disease, contact your healthcare professional right away if you experience any of the following after receiving a GBCA: burning, itching, swelling, scaling, hardening and tightening of the skin; red or dark patches on the skin; stiffness in joints with trouble moving, bending or straightening the arms, hands, legs or feet; pain in the hip bones or ribs; or muscle weakness



Additional Guidance:
Age less than 40 : do MRI +/- minimal GBCA✳ (in order to minimize radiation)

If eGFR less than 30 mL/min: discuss with Radiologist re NSF risk (HD patients should have HD post GBCA exposure)

If lymphadenopathy is main concern: do CT with minimal RCM

Gadolinium Based Contrast Agent (GBCA)
- Consultation between Radiologist and Referring Physician must be documented when guideline NOT followed
- Patient has been informed of benefits/risks and has consented.
- Order stating the amount and specific type of agent to be administered must be written by the Radiologist.
- Avoid multiple examinations if possible

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- Educate patient re signs & symptoms of NSF*

Risk Factors for Nephrogenic Systemic Fibrosis:
- severe acute or chronic renal failure
- high doses or multiple doses of GBCA
- severe liver failure
- Other systemic inflammation

Risk Factors for Contrast Induced Nephropathy:
- Diabetes mellitus
- Renal disease or solitary kidney
- Sepsis or acute hypotension
- Dehydration or volume contraction
- Age greater than 70
- Previous chemotherapy
- Organ transplant
- Cardiovascular disease (hypertension, CHF, cardiac or peripheral vascular disease)
- Nephrotoxic drugs (loop diuretics, amphotericin B, aminoglycosides, Vancomycin, NSAIDs, cancer and immune suppressant chemotherapy)
- Human immunodeficiency syndrome or acquired immunodeficiency syndrome

***Nephrogenic Systemic Fibrosis (NSF) – Information for Patients**

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