

Contrast-Induced Nephropathy at What Cost?

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19th Annual Conference

2018
May 30 - June 01

THE PERIPHERAL EVENT OF THE YEAR



Disclosures

- No Disclosures

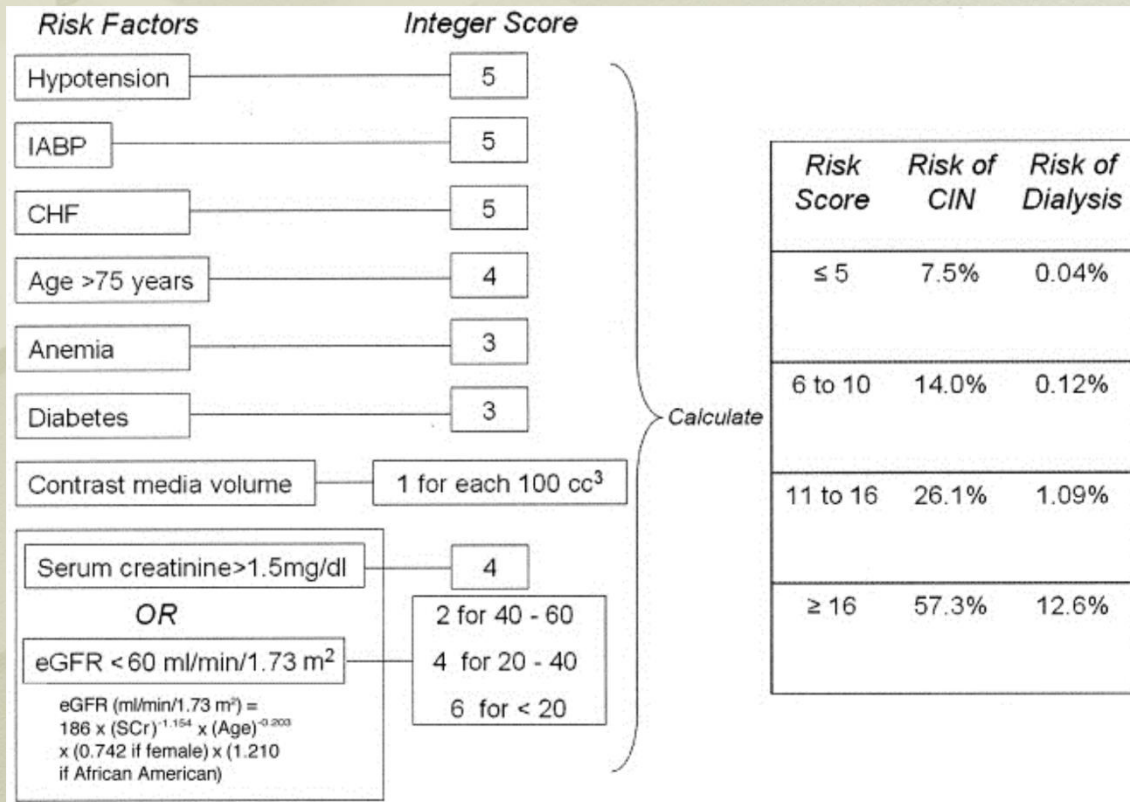
CIN utilizing Iodinated Contrast Media

- 3rd most common cause of hospital acquired acute renal failure (behind shock and nephrotoxic drugs).
- Dramatically increases mortality, morbidity, length of stay, and cost.
- Average increased cost \$10,345 in hospital and \$11,812 1st year
- Only absolute prevention is no iodinated contrast

DEFINITION OF CIN

- Rise in serum Cr $>$.5 mg/dl
- Rise of serum Cr $>$ 25% baseline

INDEPENDENT CIN RISK FACTORS



PAD patients are typically older. Diabetes is common. Mild anemia is common. Prior CHF is common. **ANY IODINATED CONTRAST IS RISKY!!**

WE NEED TO ASSESS MORE THAN BUN AND Cr.

Figure Legend: Scheme to define contrast-induced nephropathy (CIN) risk score. Anemia = baseline hematocrit value <39% for men and <36% for women; CHF = congestive heart failure class III/IV by New York Heart Association classification and/or history of pulmonary edema; eGFR = estimated glomerular filtration rate; hypotension = systolic blood pressure <80 mm Hg for at least 1 h requiring inotropic support with medications or intra-aortic balloon pump (IABP) within 24 h periprocedurally

R Mehran; J Am Coll Cardiol. 2004;44(7):1393-1399. doi:10.1016/j.jacc.2004.06.068

From: A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: Development and initial validation

CIN SUMMARY

- CIN increases acute and long-term mortality
- CIN increases acute and long-term morbidity
- CIN increases acute and long-term cost
- CIN is strongly associated with independent risk factors that should be assessed
- **CIN MUST BE AVOIDED**

AVOIDING CONTRAST INDUCED NEPHROPATHY

- The only way to absolutely avoid CIN is to not administer iodinated contrast.
- In PAD there are viable options
 - External duplex guidance
 - CO₂ angiography - THIS HAS TOTALLY CHANGED MY PRACTICE
 - No renal function too impaired
 - No limit on imaging – better results
 - No pre-admission or prolonged stay
 - Can image with smaller catheters (less viscous)

CIN RISK IS INCREASING IN PAD CASES

- Diabetes is epidemic
- More interventions are being performed
- More complex interventions (limb salvage)
- Older patients
- Even patients on dialysis have contrast risk. If a patient is actively making urine, iodinated contrast may result in the patient becoming anuric.

WHY CONSIDER CO₂ ANGIOGRAPHY

- Avoiding contrast induced nephropathy
 - Rise in serum Cr > .5 mg/dl
 - Rise of serum Cr > 25% baseline
- Avoiding severe allergic response
- Lower viscosity
 - Can image via smaller bore longer catheters
 - Can image with close tolerances (6F compatible device in 6F sheath as example.)
 - Occasionally allows visualization of critically stenotic grafts or lesions in native vessels that appear totally occluded by iodinated contrast images.
- Cost
 - \$0.02/cc vs. \$1.00/cc
 - Indirect costs (longer stays, meds, dialysis, etc.)

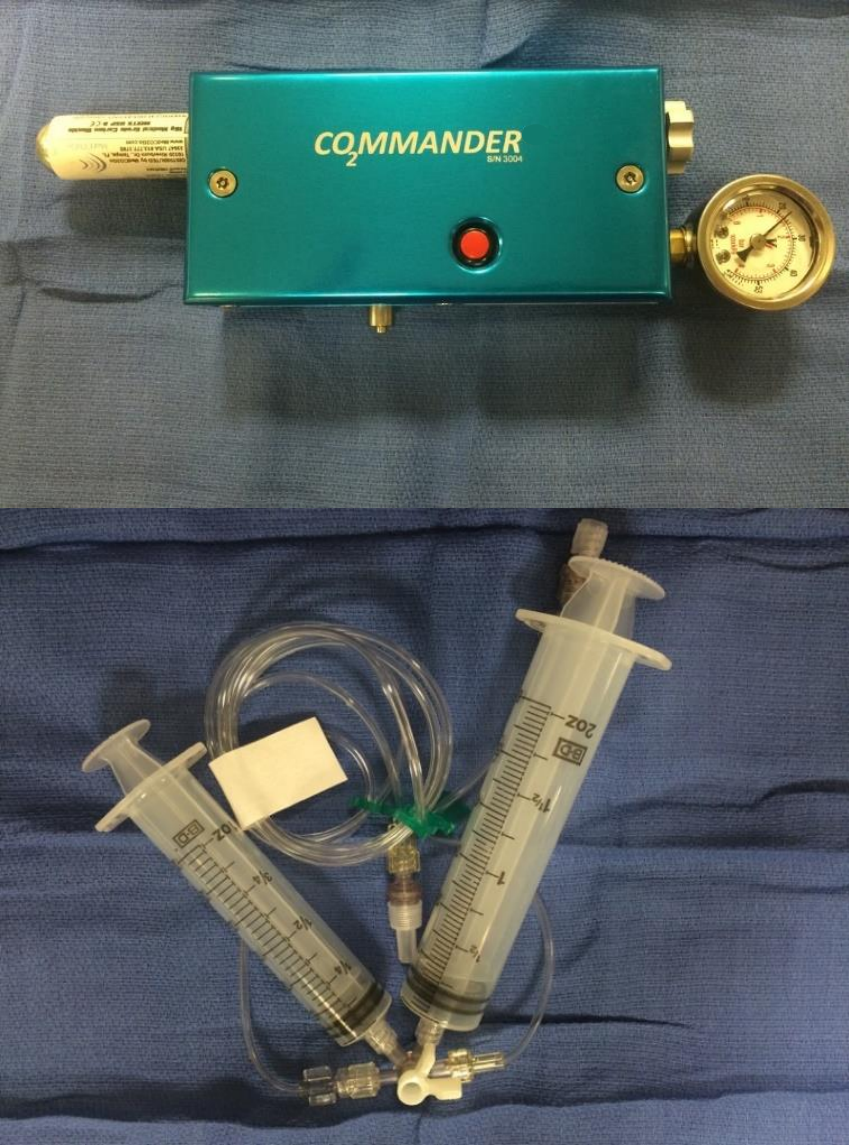
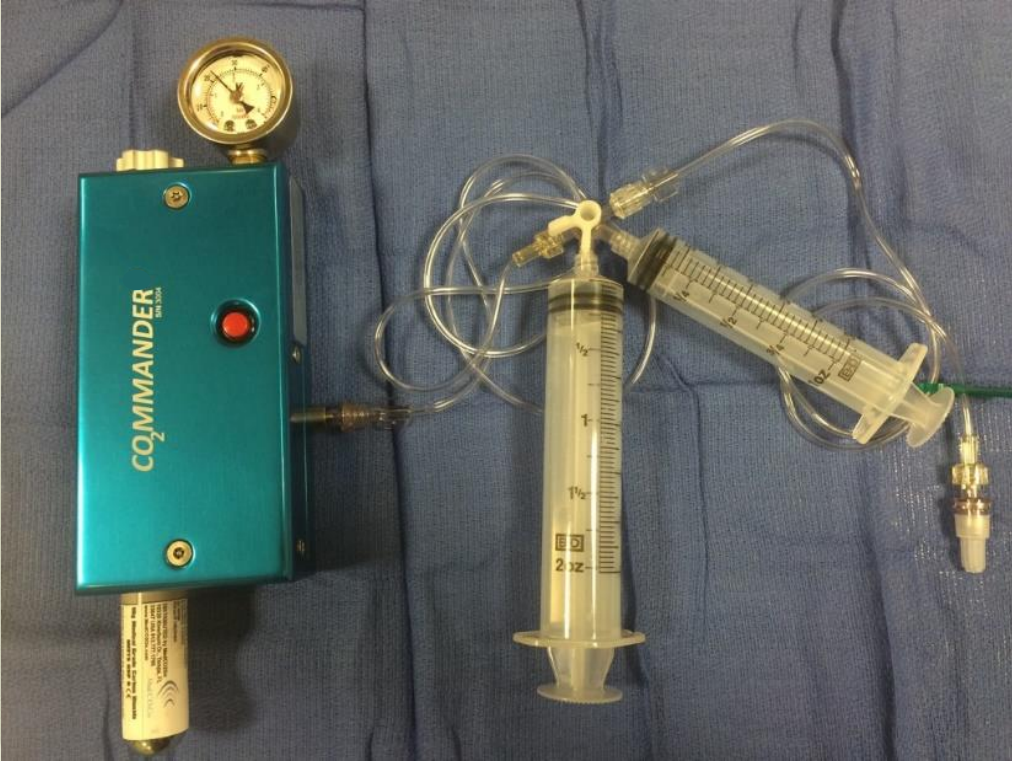
OPTIMIZING CO₂ IMAGES

- Requires DSA imaging. It is crucial the patient not move.
- Use end-hole catheters (less bubbles). Place the catheter as close to the artery to be imaged as possible.
- Slow low-pressure injection
- Rotate patient or camera if excessive bowel gas. May consider glucagon.
- Recognize that gravity affects imaging. May need to elevate lower leg, renal artery imaging may require rotation of patient if non-selective.

Correlation with Iodinated Contrast

- Seeger demonstrated close correlation in peripheral arterial imaging.
 - 92% when CO₂ was utilized as sole agent
 - 100% when supplemented by small doses of iodinated contrast.

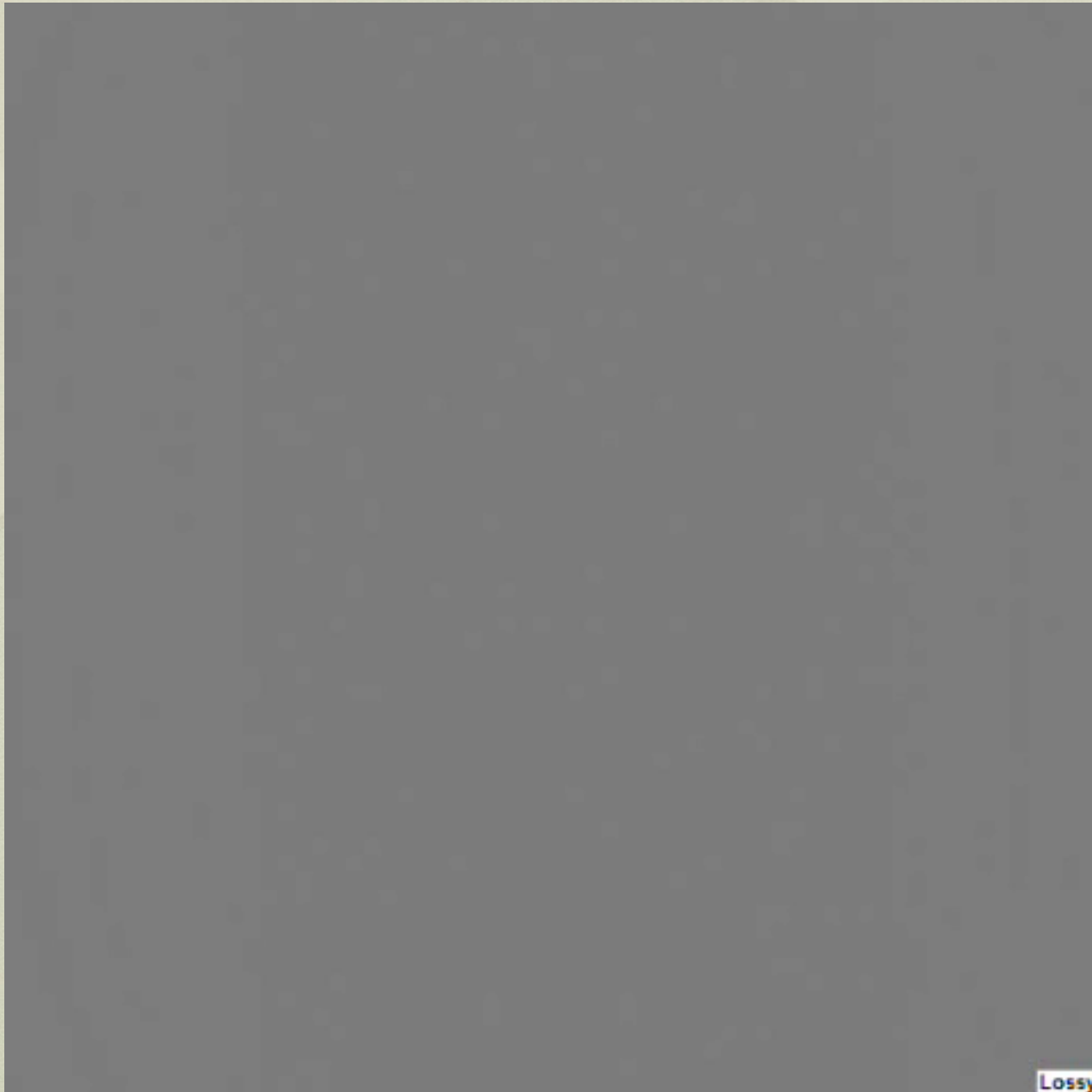
CO₂ COMMANDER





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CO₂ ANGIOGRAPHY HAS CHANGED MY PRACTICE

- No pre-admission for renal insufficiency
- No pre-medication for allergy
- Has dramatically increased the number of patients on whom I would consider intervention.

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