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FIVE THINGS TO KNOW ABOUT ...

Contrast-induced nephropathy

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1 Contrast-induced nephropathy is a common cause of hospital-acquired renal failure

Contrast-induced nephropathy is defined as a serum creatinine level that increases by at least 25% or is 44.2 µmol/L greater than baseline within three days of receiving contrast medium intravascularly in the absence of another cause.[1] Contrast-induced nephropathy is usually self-limiting; at worst, it can make the patient permanently dependent on hemodialysis or can result in death.

2 Main risk factors are renal dysfunction and diabetes (particularly in the presence of chronic renal disease)

The possibility of renal dysfunction should be considered in a patient with one or more of the following characteristics:[2]

- dehydration
- increased age
- use of nephrotoxic drugs (e.g., nonsteroidal anti-inflammatory drugs, loop diuretics, aminoglycosides, chemotherapy)
- heart failure
- cirrhosis
- sepsis

3 Assess renal function in a patient with risk factors

A patient with diabetes or possible renal dysfunction should have his or her renal function assessed before undergoing contrast-enhanced imaging. The estimated glomerular filtration rate is the preferred measure. The serum creatinine level may not be an accurate measure in elderly and very frail patients. An estimated glomerular filtration rate of 30–59 mL/min per 1.73 m^2 indicates moderate renal dysfunction. An estimated rate of less than 30 mL/min per 1.73 m^2 indicates severe renal dysfunction.[3]

4 If intravascular use of a contrast medium is considered essential in a patient with moderate or severe renal function, use renal protective measures

These measures include[4]:

- hydration or volume expansion, ideally with intravenous 0.9% saline solution or isotonic bicarbonate solution;
- administration of acetylcysteine (600 mg orally twice daily) the day before and the day of the test (although there is some disagreement in the literature about its usefulness);
- reduction of the amount of contrast medium, and
- no additional administration of contrast medium for at least 72 hours.

A patient at increased risk of contrast-induced nephropathy should have his or her serum creatinine level measured again 48–72 hours after receiving contrast medium intravascularly. If renal function does not return to baseline, referral to a nephrologist may be necessary.

5 Consider alternative imaging tests

In a patient with moderate or severe renal dysfunction, alternative imaging tests may yield the same information without the risks. Other options include computed tomography without contrast medium, ultrasonography and magnetic resonance imaging.

REFERENCES

1. Morcos SK, Thomsen HS, Webb JA. Contrast-media-induced nephrotoxicity: a consensus report. Contrast Media Safety Committee, European Society of Urogenital Radiology (ESUR). *Eur Radiol* 1999;9:1602-13.
2. Benko A, Fraser-Hill M, Magner P, et al. Canadian Association of Radiologists: consensus guidelines for the prevention of contrast-induced nephropathy. *Can Assoc Radiol J* 2007;58:79-87.
3. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Am J Kidney Dis* 2002;39(Suppl 1):S1-266.
4. Thomsen HS, Morcos SK. Contrast media and the kidney: European Society of Urogenital Radiology (ESUR) guidelines. *Br J Radiol* 2003;76:513-8.

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