BWH Radiology Documentation

Document Number
7.5.5SOP

Title		
Patient Management - Patients with specific conditions and treatments		
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PRESUMES PRACTITIONERS KNOWLEDGE OF: (title)	SPECIAL NOTES
NA	**ABSOLUTE CONTRAINDICATIONS:** NA **EXPOSURE:** NA **PROTECTIVE EQUIPMENT:** NA **PATIENT/FAMILY EDUCATION MATERIALS:** NA **EQUIPMENT:** NA

1.0 PURPOSE

1.1 To provide guidelines for the management of patients who are using Non-ionic iodinated contrast material

2.0 SCOPE

NA

3.0 RESPONSIBILITIES

NA

4.0 DEFINITIONS

NA

5.0 POLICY / PROCEDURE

5.1 DIALYSIS

5.1.1 LONG TERM DIALYSIS

5.1.1.1 For patient on long-term dialysis, urgent dialysis after the use of contrast media in not necessary, unless there is a significant underlying cardiac dysfunction or very large volumes of contrast media are used. It is important, however, to limit the volume of contrast media administered in these patients and to consider the use of low osmolar or iso osmolar contrast media if there is a risk of adverse effects of hyper tonicity.

5.1.2 **INTERMITTENT OR OCCASIONAL DIALYSIS**

5.1.2.1 Patients with renal insufficiency who require only intermittent or occasional dialysis are at substantial risk for contrast media-induced nephrotoxicity with further permanent worsening of their renal function. Alternative imaging studies that do not require contrast media should be considered.

5.2 PROPHYLACTIC PROCEDURES

5.2.1 **HYDRATION (NEED CAVEATE FROM KOENRAAD)**

5.2.1.1 Fluid intake is encouraged (at least 500ml of water or soft drinks orally starting 4h before and 2,500ml for 24hr after contrast administration).

5.2.1.2 If the patient cannot take adequate oral hydration, consider intravenous infusion of 0.45% or 0.9% sodium chloride at 100 ml/hr, beginning 6-12 hours before and continuing 4-12 hours after the administration of contrast material.

5.3 ACETYLCYSTEINE AND HYDRATION

5.3.1 The efficacy of Acetylcysteine (Mucomyst®, Mucosil t®) in the prevention of contrast medium-induced nephropathy remains debatable and further studies are required.

5.3.2 If serum Creatinine is above 1.4 mg/dl or Creatinine clearance is less then 50 ml per minute consider using acetylcysteine 600mg p.o. twice on the day before and on the day of injection along with hydration, although its benefits are controversial. If greater than .5mg/dl change in Creatinine or 25% change in Creatinine clearance consult with Radiologist. Alternatively, a regimen of IV administration beginning 30 minutes prior to contrast administration may be considered (150 mg/kg over 30 minutes, followed by 50 mg/kg over 4 hours).

5.4 IODIXANOL AND HYDRATION

5.4.1 Indication for Iodixanol (Visipaque ®) use and benefits are conflicting, especially in CT.

5.5 SODIUM BICARBONATE HYDRATION

5.5.1 Sodium bicarbonate (NaHCO3) solution [3 ampoules (150Meq) of NaHCO3 to 1 L of 5% dextrose in H2O] administered IV 3 mL/Kg 1hr prior following 1 mL/Kg during and 6h after the procedure demonstrated prevention of

contrast-induced nephropathy. This is a recently published procedure and needs to be validated, especially in intravenous/CT studies.

5.6 USE OF GADOLINIUM

5.6.1 Gadolinium-based contrast agents are known to be safe and not nephrotoxic in the usual MRI dose of up to 0.3 mmol/kg body weight. Gadolinium-based contrast media have more nephrotoxic potential than iodinated contrast media in equivalent X-ray attenuating doses, according to experimental data. Nephrotoxicity of the gadolinium based contrast agents has now been described in both man and animals when high dose (>0.3 mmol/kg) are used. Therefore, use of such doses of gadolinium agents instead of iodinated contrast in patients with impaired renal function is not routinely recommended.

5.7 DIURETICS: MANNITOL AND FUROSEMIDE

5.7.1 There is no beneficial effect from the osmotic diuretic mannitol; and loop diuretic furosemide can exacerbate contrast media renal dysfunction.

5.8 NEPHROTOXIC DRUGS

5.8.1 Regular use of nephrotoxic antibiotics, such as aminoglycosides, antimetabolites like Methotrexate, chemotherapeutic drugs like Cisplatinum and nonsteroidal anti-inflammatory drugs can cause renal damage. Renal function should be checked prior to contrast administration

5.9 Use of Metformin

5.9.1 Any medication containing Metformin such as Avandamet®, Glucophage®, Glucophage XR®, Glucovance®, Glucovange®, or Metaglip® should be discontinued at the time of an examination or procedure using intravascular iodinated contrast medium, withheld for 48 hours after the procedure, and reinstated only after renal function has been re-evaluated and found to be back to baseline values.

5.9.2 The examination may proceed even if the patient took a dose of Metformin on the morning of the examination.

5.9.3 In elective studies, if renal function is abnormal, administration of contrast media to diabetic patients taking Metformin, the Metformin should be stopped and the contrast study should be delayed for 48 hours. Metformin should be restarted 48 hr later only if renal function and serum creatinine level are unchanged.

5.9.4 In emergency cases, if renal function is abnormal (or unknown), the physician should weigh the risks and benefits of contrast administration. If contrast media administration is deemed necessary, the following precautions should be implemented:

5.9.4.1 Metformin should be stopped.

5.9.4.1.1 The patient should be hydrated (e.g., >= 100 ml/hr of soft drinks or IV saline up to 24 hr after contrast media administration; in hot areas more fluid should be given).

5.9.4.1.2 .Monitor renal function (serum creatinine), serum lactic acid, and pH of blood.

5.9.4.1.3 Look for symptoms of lactic acidosis (vomiting, somnolence, nausea, epigastric pain, anorexia, hyperpnoea, lethargy, diarrhea, and thirsty). Blood test results indicative of lactic acidosis, pH<7.25 and lactic acid >5mmol.

5.9.5 Communication between the radiologist, the healthcare practitioner, and the patient is necessary to establish the procedure for reassessing renal function and restarting Metformin after the contrast examination. For this purpose a handout will be given to all patients who informed us they are using any medication containing Metformin (supplement XIII) and it will orient patients to call their doctor's office the same day of examination to have him/her arrange to have a blood test 2 days from now that evaluates their renal function.

5.9.6 It is not necessary to discontinue Metformin prior to gadolinium-enhanced MR studies when the amount of gadolinium administered is the usual dose range of 0.1-0.3 mmol/kg. Nevertheless Metformin should be discontinued before large-dose gadolinium procedure.

5.10 INTERLEUKIN-2 THERAPY

5.10.1 Patients treated with interleukin-2 immunotherapy, either concurrently or in the past (even 2 years after interleukin-2 therapy), can develop delayed reactions after the administration of the contrast media that mimic the side effects associated with interleukin-2 therapy. In order to educate patient a handout should be provided

5.11 SICKLE CELL ANEMIA DISEASE

5.11.1 There are only few papers discussing in vitro studies of donated blood from homozygous patients and correlating sickling phenomenon, red cell volume and filterability with contrast concentration/osmolality.

5.11.2 Low osmolar contrast agents should be used. Iso osmolar contrast agents may theoretically have less risk of additional hemolysis.

5.12 PHEOCHROMOCYTOMA

5.12.1 The ACR Manual on Contrast Media Version 6 writes,"Some patients with pheochromocytoma develop an increase in serum catecholamine levels after the intravenous injection of high-osmolality, conventional ionic contrast media. A subsequent study showed no elevation of catecholamine levels after the intravenous injection of nonionic contrast media. Direct injection of either type of contrast medium into the adrenal or renal artery may cause a hypertensive crisis".

5.13 THYROID DISEASE

5.13.1 Iodinated contrast media injection may cause thyrotoxicosis in patients with Graves' disease and multinodular goiter with thyroid autonomy. Some patients with hyperthyroidism or other thyroid disease (especially those who live in iodine-deficient areas) may develop iodine-provoked delayed hyperthyroidism (4-6 weeks after intravascular contrast administration).

5.13.2 It can also compromise diagnostic thyroid scintigraphy and radioiodine treatment of thyroid malignancies for 2 months after administration of contrast media. Consultation with ordering clinician prior to contrast administration in these patients is recommended.

5.14 CARDIAC STATUS

5.14.1 In patients with angina, congestive heart failure symptoms with minimal exertion, severe aortic stenosis, primary pulmonary hypertension, or severe but well-compensated cardiomyopathy particular attention should be paid to limiting the volume of contrast agent.

5.15 PARAPROTEINEMIAS

5.15.1 Patients with paraproteinemias, particularly multiple myeloma, should be well hydrated before contrast injection to prevent irreversible renal failure that can occur after contrast administration due to protein precipitation in the renal tubules. Oral and, if necessary, intravenous hydration should be encouraged (at least 500ml of water or soft drinks orally starting 4h before

and 2,500ml for 24hr after contrast administration Unless indicated by referring physician, contrast should not be used

5.16 BREAST-FEEDING

5.16.1 The available data suggests that it is safe for the mother and infant to continue breast-feeding after receiving iodinated or gadolinium contrast material since a very small percentage of iodinated contrast medium is excreted into the breast milk and absorbed by the infant's gut (less than 0,01% of iodine contrast and less than 0,0004% of gadolinium of the intravascular dose given to the mother).

5.16.2 If the mother remains concerned about any potential ill effect to the infant, she may abstain from breast-feeding for 24 hours with active expressing and discharge of breast pump to obtain milk from both breasts during that period.

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REVISION SHEET

DATE	REV	REVIEWED / REVISED / APPROVED	BY
6/20/2006	-	Initial Approval	Pharmacy & Therapeutics Comm.
9/18/2007	-	Annual Reviewed	OSC Comm.
4/28/2008	-	Annual Review	OSC Comm.
6/15/2009		Annual Review	OSC Comm.
7/10/2009	A	Change to New Template	Duncan Phillips
7/16/2009	A	Reviewed	E. Bozadjian