INTRAVENOUS ACCESS AND CONTRAST MEDIUM IN CT

Harmandeep Madra, RN

Contrast enhanced examination goals

- Appropriate for patient and indication
- Minimize likelihood of reaction/complications
- Early detection and adequate preparation for complications

Screening form

| YES | NO |  |  |  | Outpatients
Please complete. |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Are you allergic to contrast material / X-ray dye?</td>
<td>Are you allergic to:</td>
<td></td>
<td>Weight:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medications?</td>
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<td></td>
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<td>Do you have only one kidney or a kidney transplant?</td>
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<td></td>
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<td>Do you have a history of diabetes?</td>
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<td></td>
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<td>Do you take any medication that contains metformin?</td>
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<td></td>
<td></td>
<td>Are you pregnant or breast feeding?</td>
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<td></td>
<td></td>
<td>Have you ever been diagnosed with any of the following:</td>
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<tr>
<td></td>
<td></td>
<td>asthma</td>
<td>heart disease</td>
<td>sickle cell anemia</td>
<td>pheochromocytoma</td>
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<td></td>
<td></td>
<td>What time did you last eat or drink?</td>
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</tbody>
</table>

Allergy

- Shellfish/seafood allergy is no longer relevant
- Prior allergy increases risk five folds
- Use extreme caution with patients who had past severe reactions to other allergens
- Always ask for the type and severity of reaction
- History of Asthma increases risk for reaction

Other factors that can increase risk for reactions

- Renal insufficiency, CIN and NSF
- Symptomatic angina and CHF, Severe aortic stenosis, Pulmonary hypertension
- Increased anxiety and Age
- Multiple myeloma patient may experience irreversible renal failure (tubular protein aggregation and precipitation)
- Sickle Cell trait- Per ACR there is no significant risk
- Pheochromocytoma (increase in catecholamines that may lead to hypertensive crisis)
- Carcinoma of the thyroid (interferes with radioactive iodine therapy) and thyroid disease (delayed hyperthyroidism in 4-6 weeks)
**NPO Policy**

<table>
<thead>
<tr>
<th>NPO</th>
<th>GT Feedings</th>
<th>JT Feedings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatients</td>
<td>2 ½ hours except for clear liquids</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Inpatient</td>
<td>4 hours except for clear liquids</td>
<td>4 hrs</td>
</tr>
</tbody>
</table>

**Vascular Access**

**HIGH FLOW**
- Location of catheter
- Site
- Age
- Try not to inject in hand
- Look for good flashback
- Least resistance when flushed
- Site Free of redness, edema, clearly visible
- Remove extra tape
- Check at the hub
- Not positional
- The size can withstand the rate of injection
- Do not rush
- Central Line- Kind of catheter

**LOW FLOW**
- Benefit from ability to monitor slower rate
- Exercise caution when using venet IV
- Do not use PICC line if no blood return, low flow does not prevent the clot from thrombosing

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**PICC Precaution**

* PICCs or central lines with no blood return WILL NOT be used for contrast injections even if you are able to infuse. A type of thrombotic occlusion, a fibrin tail (also called fibrin flap) acts as a one way valve permitting infusion when the infused solution pushes the tail away from the catheter tip but preventing withdrawal as the tail is sucked against the tip. A power injection in this case may cause an embolus of the fibrin tail.

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**Prior to Injection**

- Identify the patient using 2 identifiers
- Order for the exam
- IV access and connection at the hub
- Latest creatinine (for all hospitalized patients)
- Air in line or the injector (prevent venous air embolus)
- Respond to patient’s questions and alleviate anxiety

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**Extravasations**

- Range from 0.1% to 0.9% (1/1,000 patients to 1/106 patients)
- Inflammatory response may peak in 24-48 hours
- May be severe
- Watch for compartment syndrome (result of mechanical compression)
- Skin ulceration and tissue necrosis may occur as early as 6 hours
- One study by Wang reports 1 in 442 extravasations experienced severe complication (compartment syndrome)

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**VASCULAR ACCESS DEVICES**

**COMPATIBLE WITH IV CONTRAST CT SCANS**

<table>
<thead>
<tr>
<th>TYPE OF VADs</th>
<th>CT SCAN</th>
<th>LOW-FLOW (≤ 3 ml/sec)</th>
<th>HIGH FLOW (&gt; 3 ml/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERIPHERAL IV 2G</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>PERIPHERAL IV 2G AND LARGER (&gt; 3 ml/sec)</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>REGULAR PICCs</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>GROSHING PICCs</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>PAS ports / BROVIAC CATHETERS</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>SINGLE LUMEN CVP CATHETERS</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>REGULAR TRIPLE LUMEN CATHETERS</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>SWAN GANZ CATHETERS</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>REGULAR MEDIPORTS / USE POWER LOC NEEDLES</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>HICKMAN / HOEFN / COOK CATHETERS</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>POWER PICCs</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>POWER MULTI-LUMEN CATHETERS</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>POWER PORTS (use 20g or larger Power Loc needles)</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>CORDIS INTRODUCTORS (MUST BE EMPTY)</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>We do not use Dialysis Catheter</td>
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Extravasation Rate

Extravasations treatment

- Elevate the extremity
- Use either cold or warm compress
- Cold better for pain control and warm better to improve blood flow and absorption
- Our policy is to use warm compress
- Do not try to aspirate fluid from the site
- We do not have written instructions for patients at this time
- Talk to your patient and act confident

Premedications

- Prednisone 50mg 13, 7 and 1 hr and Benadryl 50mg 1 hr prior.
  - IV for patient unable to take PO premedication:
    - Hydrocortisone 200 mg IV at 13, 7, and 1 hour prior to examination,
    - Diphenhydramine 50mg IV
    - No shorter protocol recommended.
- Emergency premeds: Solu-Medrol 40mg or Solu-Cortef 200 mg IV every 4 hrs and Benadryl 50 mg 1 hr prior
- Whenever possible steroids (oral or IV) should be given a minimum of 6 hr prior

Metformin

- Intake causes Lactic Acidosis in 0.008 cases per 1000 patient years
  - 500% mortality rate reported with acidosis
  - 90% eliminated via kidney in 24 hours
  - IV contrast a concern when other underlying renal issues present
  - Try to limit amount of contrast & encourage hydration
  - No co morbidities-no need to discontinue
  - Co morbidities-Discontinue for 48 hours post injection, encourage patient to have repeat cr

METFORMIN

- Janumet
- Metaglip
- Metformin
- Riomet
- Glumetza
- Actoplusmet
- Avandamet
- Fortamet
- Glucophage
- Glucovance

Allergic Reaction

- Do not wait for the RN- call RRT or Code for severe reaction
- Start with basics- ABC
- Get the med box
- Epi
- Benadryl
- Steroids
- Pcpid
- Albuterol
- Time is critical-airway can close completely
- Air embolus a concern
- Seizures, hypoglycemia, vagal reaction
Perception of Care

- Talk to your patient
- Talk to colleagues
- Communicate
- Communicate
- Communicate

Did you know?

- Patients that were informed about IV contrast and those who were not scored equally on the Anxiety scale
- Beta blockers lowers the threshold for and increases the severity of contrast reactions
- Heparin may be combined with contrast medium
- IV site with multiple punctures and IV older than 24 hours has increased risk of extravasation

ANY QUESTIONS???