Pre-Procedural Checklists Reduce Fluoroscopy Times Among First-Year Residents and Improve Team Performance

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Purpose

- To reduce fluoroscopy times (radiation dose) and improve team performance during fluoroscopic examinations performed by first-year residents by developing pre-procedural checklists for common GI/GU procedures.

Background

- Radiation dose delivered during fluoroscopy examinations is dependent on operator experience.
- First-year residents tend to have higher fluoroscopy times due to relative unfamiliarity with the multistep procedures of gastrointestinal and genitourinary (GI/GU) radiology.
- Use of checklists can improve communication and team performance, important for first-year residents since they learn GI/GU procedures from a multidisciplinary team of senior radiologists and technologists.
- Previous demonstrated that use of targeted educational and training interventions can significantly reduce fluoroscopy times.

Significance

- Rather than use remediation to improve fluoroscopy times, in this study we hypothesize that proactive use of pre-procedural checklists can reduce fluoroscopy times while also improving efficiency and communication.

Pre-Procedural Checklists

- GI/GU Checklist items include
  - brief description of procedure
  - basic procedural steps
  - goal fluoroscopy time
  - tips unique to each procedure.
- General Tips items include
  - Tips for the day before the procedure
  - Tips for the day of the procedure
  - Tips applicable for all studies to reduce fluoroscopy time and radiation dose

General Tips Checklist

General tips

The Day Before the Study:

- Check the schedule on IDX for the next day so you can learn about the patients. See appendix for looking up the schedule on IDX. Eg 080, camgigu, mon-fri
- Know the plan for each study, particularly where the pathology is if there are prior studies and which views best demonstrated the abnormalities. This is especially important for repeat cystography or voiding cystourethrography (to see where the leak is).

The Day of the Study:

- Review the pre-procedure checklist. Discuss the procedure with the attending and technologist.
- When entering the room, always first introduce yourself to the patient. Ask if they have any questions or concerns. You will be surprised how many patients lie on the table and say they don't know what study they are having and why.
- If you are unsure what to do at any point, stop the procedure and ask the technologist or the attending. If you feel yourself getting lost, there is a tendency to overuse fluoro.

Minimizing Radiation Dose:

- Familiarize yourself with the equipment and the room setup. Before starting any study, make sure you are comfortable with table position, foot pedal position, and monitor position.
- Collimate all images. This reduces scatter and decreases radiation dose. Make sure to exclude the lung bases and any areas that are outside the patient. When air in included in a field of view, the phototimer automatically changes settings and increases dose.
- Tap (or pulse) fluoro rather than continuously holding down the fluoro button or stepping on the fluoro pedal. The only instances when you need to continuously fluoro are explicitly outlined in each procedure.
- Do not use continuous fluoro to center the image. Rather, tap fluoro and move the tower to where you approximate the tower should go, then tap another fluoro image to confirm position.
- A single image is equivalent to 30 seconds of continuous fluoro, so do not take unnecessary images.
- Magnification increases radiation dose; therefore, there are few instances when magnification images are necessary.

GU Checklist Example

Procedure: Retrograde Urethrogram (RUG) (men only)

Goal Fluoroscopy Time: 2 minutes

Indications and Brief Discussion of the procedure: Retrograde urethrography (RUG), often in conjunction with voiding cystourethrography, is commonly performed for evaluation of urethral and periurethral injuries, strictures, and fistulas (1). A RUG is often better for evaluation of the anterior urethra (penile and bubar portions) which a VCUG better delineates the posterior urethra (membranous and prostatic portions). Contraindications to RUG include contrast reactions. Using sterile technique, a 18-F Foley catheter is placed into the penis. The balloon is inflated at the level of the fossa navicularis. For optimal imaging purposes, the penis should be placed laterally over the proximal thigh with moderate traction. The patient can also be positioned in the RPO position.

1. Tap fluoro to center the lower pelvis. The radiopaque Foley will serve as a guide.
2. Under fluoroscopy guidance, inject 20-30 mL of Cystografin. The external urethral sphincter may be under spasm and may prevent filling of the bulbar, membranous, and prostatic urethras; if this can be overcome by slightly more forceful injection.
3. Obtain AP spot images of the anterior and posterior urethra with contrast injection.
4. Obtain an AP spot image of contrast within the bladder.

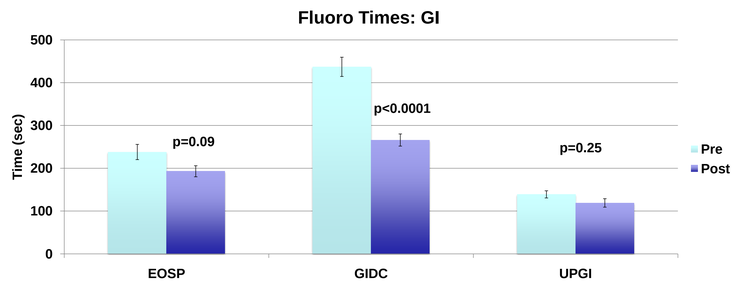
Important Points:

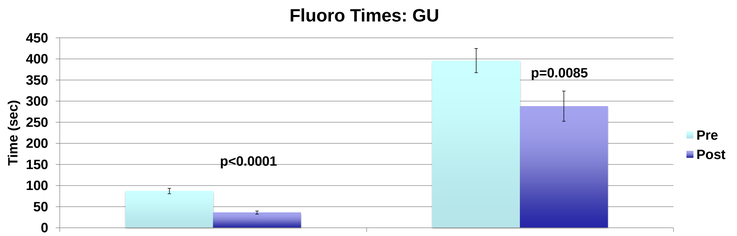
- Unlike conventional Foley catheterization, lubrication is not used as it may prevent optimal balloon occlusion.
- If both a RUG and VCUG are ordered, perform the RUG first. If the bladder fills during the RUG, use the catheter you already have to continue filling the bladder with contrast. If the bladder does not fill, pass a sterile (different) Foley into the bladder and do the remainder of the exam in the usual fashion.
- The varumontanum will appear as an ovoid filling defect in the posterior part of the prostatic urethra. Do not confuse this with pathology.

Selected References:

1. Kawashima A, Sandler CM, Wasserman NF, LeRoy AJ, King BF Jr, Goldman SM. Imaging of urethral disease: a pictorial review. Radiographics. 2004, 24 Suppl 1:S195-216.

Results





Conclusions

- Pre-procedural checklists for common fluoroscopic GI/GU procedures reduce fluoroscopic times and may improve communication among a multidisciplinary team.

Future Directions

- Continue to collect data
- Use actual mGy readings from the fluoroscopy unit to measure radiation dose.

References

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- O'Reilly, KB. 2008. "Infection rates drop as Michigan hospitals turn to checklists". American Medical News. http://www.ama-assn.org/amednews/2010/03/01/prsa0301.htm.
- Gawande, A. 2007. "The Checklist, If something so simple can transform intensive care, what else can it do?" New Yorker Magazine: p. 86.