OSU Medical Center / Radiology - Diagnostic

OKLAHOMA STATE UNIVERSITY
CENTER FOR HEALTH SCIENCES

Contrast Reactions: Are Radiology Residents Prepared?

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INTRODUCTION

Various forms of contrast media are widely used in daily practice throughout the world to improve medical imaging. The risks to patients are generally low with adverse reactions occurring less frequently since the advent of iso-osmolar contrast agents[2]. Contrast reactions range in severity from minor physiologic disturbances to severe acute life threatening situations[2]. These severe acute life threatening situations are rare, and are thus unlikely to be encountered by a resident during their diagnostic radiology training.

OBJECTIVES

Assess the radiology residents preparedness for contrast reactions via contrast reaction quizzes prior to and following simulation lab.

Improve radiology residents preparedness for contrast reactions via simulation lab.

METHODS

In the fall of 2020, the radiology residents were given an impromptu contrast reactions quiz in order to test their general knowledge on the subject. This took place during didactics with faculty advisor present. The quiz asked questions about pretreatment, recognizing different types of contrast reactions, and the different treatment options and dosages for contrast reaction treatment.

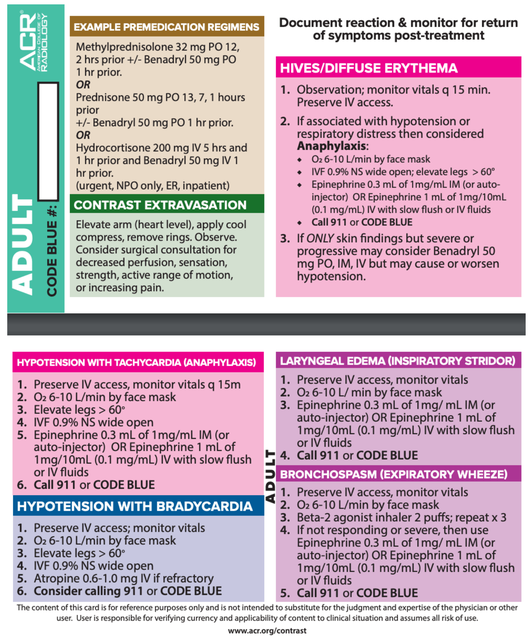
Following this, the radiology residents were asked to study the ACR contrast reaction cards and prepare for a simulation. The simulation was held in the fall of 2020 at the OSU-CHS simulation lab. Each radiology resident went through a contrast reaction simulation and were asked to evaluate each situation and provide step-bystep treatment protocols.

Following the simulation, a discussion with the faculty advisor was had about the proper protocols and how each situation could have been improved. The residents were then given the same contrast reaction quiz in the weeks following the simulation in the presence of a faculty advisor to assess their knowledge improvement of contrast reactions.

As expected, the residents knowledge of contrast reactions improved following the simulation lab.

Contrast Reactions Simulation Lab

ACR Contrast Reaction Card



Contrast Reactions Quiz

1. Which of these regimens can be used for premedicating patients with a history of contrast reactions?
a. Benadryl 50mg PO 1 hr prior
b. Methylprednisolone 32mg PO at 12 and 2 hours prior +/- Benadryl 50mg PO 1 hour prior
c. Epinephrine 0.1 mg/mL IV
d. Prednisone 50mg PO 7 and 1 hour prior +/- Benadryl 50mg PO 1 hour prior

2. What steps should you take with a patient after a contrast extravasation?
a. Elevate arm and apply cool compress
b. Order an X-ray
c. Discharge patient
d. Administer Benadryl 50 mg PO
e. Consult interventional radiology

3. What signs and symptoms seen with contrast extravasation may require surgical consult?
a. Decreased perfusion
b. Decreased sensation
c. Increasing pain
d. Decreased active range of motion
e. All of the above
f. None of the above

4. Following contrast administration, your patient develops diffuse erythema/hives. Vitals signs are stable. What medication may be used to treat the patient?
a. Epinephrine 0.1 mg/mL IV
b. Prednisone 50 mg PO
c. Atropine 1 mg IV
d. Benadryl 50mg PO

5. Your patient with erythema and hives develops hypotension. What medication should now be used to treat the patient?
a. Atropine 1 mg IV
b. Epinephrine 0.1 mg/mL IV
c. Benadryl 50 mg PO
d. Hydrocortisone 200 mg IV

6. What steps should be taken with all anaphylactic patients prior to medication being given?
a. Observe, monitor vitals, and give oxygen as needed
b. Order a chest X-ray
c. Place patient in Trendelenburg, preserve IV access, and give IVF 0.9% NS wide open
d. Preserve IV access, monitor vitals, give oxygen by face mask, elevate legs >60 degrees, and IVF 0.9% NS wide open

7. Following contrast administration, your patients blood pressure drops to 90/60 and heart rate decreases to 50. You take the steps above for anaphylactic patients but the patients blood pressure and heart rate are unchanged. What medication may be used to treat this patient?
a. Atropine 1mg IV
b. Benadryl 50 mg PO
c. Methylprednisolone 32 mg PO
d. Epinephrine 0.1 mg/mL IV

Contrast Reactions Quiz Results

Pre Simulation Average: 71.25%
Post Simulation Average: 85%

CONCLUSION

Due to the rare occurrence of severe contrast reactions, it is unlikely that a radiology resident would be adequately trained during residency to enact the best treatment protocol for patient safety. Therefore, these lifesaving treatment protocols need to be reinforced during residency in order to be better prepared for such reactions when out in practice. As a quality improvement measure within our program, extra steps were taken to incorporate this into our training. After studying the reaction protocols and performing a simulation lab residents will be better prepared when faced with a severe contrast reaction. This will hopefully improve the quality of patient care within our department.

REFERENCES

1. “New ACR Contrast Reaction Card.” American College of Radiology | American College of Radiology, American College of Radiology, 6 Feb. 2018, www.acr.org/Media-Center/ACR-News-Releases/2018/New-ACR-Contrast-Reaction-Card-Can-Help-Improve-Management-of-Contrast-Related-Adverse-Events.
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3. Katayama H, Yamaguchi K, Kozuka T, et al. Adverse reactions to ionic and nonionic contrast media. A report from the Japanese Committee on the Safety of Contrast Media. Radiology 1990; 175:621.