INJECTIONS & OUR SCANS
Daisha Marsh RT (R)(CT)

WHAT WENT WRONG WITH THIS INJECTION?

OUTLINE
- Technologist Error
- Patient Dynamics
- Anomalies
- Leaks & Computer Errors

BEFORE WE BEGIN

WHAT ARE TYPES OF TECHNOLOGIST ERRORS?
- Poor ROI placement
- Example: PE
  - Placed in the wrong anatomy

WHAT DOES THIS IMAGE TELL US?
- We placed the ROI in the incorrect anatomy
- We began our scan too late for a PE study
HOW CAN WE AVOID THIS?

Know your anatomy
Know your circulatory system
If you have questions, don’t be afraid to ask

WHAT WENT WRONG WITH THIS INJECTION?

NON CON IMAGES

NON CON IMAGES

NON CON IMAGES

NON CON IMAGES
There is an aneurysm present

This is a post operative scan

There is a stent-graft present in this exam

We placed the ROI in the aneurysm

This part of the aneurysm has no blood flow. The new blood flow will be present within the stent-graft.

Place your ROI in the ascending aorta.

Watch for clips, stent, and SVC contrast artifact

Know what you’re scanning and why

This is the first image of a CTA Head & Neck.

What do you see?

Where is the contrast?

Will this be a diagnostic study?

NOPE...

The contrast is still in the Pulmonary Arteries

The scan was started too soon
How can we avoid this?

- If you see contrast in the SVC, be patient.
- If there is no contrast anywhere on your scan...
  - You may have infiltrated
  - Your contrast may be leaking from the IV
- Know your anatomy
- Watch your graph and your images simultaneously.

Patient dynamics

- We cannot control patient dynamics
- We can work with them, not against them

These types of patients include:
- Pregnant patient
- Patients who valsalva

Other types of technologist errors...

- Wrong injection rate
  - Too slow for an angio exam
  - Weight / Injection ratio
- Wrong injection pressure
  - The injector is still set at a low PSI from a previous exam

What happened with this contrast injection?

- Decreased contrast rate
- Decreased contrast volume
- Increased Cardiac output
- Or...
  - Valsalva

What happened to this contrast injection?

- Ao HU 287
- MPA HU 139

This is a smart prep image of a pregnant patient

Was the ROI placed correctly?
Yes

Are we at the appropriate HU threshold?
Yes

Should we start the scan with the appropriate diagnostic delay?
Yes
HOW CAN WE AVOID THIS?

- The Pregnant Patient
  - Find out patients weight
  - Ask for an 18g
  - DO NOT decrease the rate of the injection
  - DO NOT decrease the amount of contrast
  - Coach the patient to avoid a valsalva

WHAT HAPPENS WHEN THE PATIENT VALSALVAS?

- Increase in intra-thoracic pressure
- Temporarily interrupts venous return into SVC
- Increase in intra-abdominal pressure
- Temporarily increases venous return from IVC

What type of exam can this be problematic with?
- PE

HOW TO AVOID THE VALSALVA

- Coach your patient through the exam
  - Avoid straining
  - Ask them to open their mouth during the breath hold
- Increase your diagnostic delay
  - Increase your delay by 3 seconds

THE VALSALVA IN ACTION...

Unopacified blood enters right atrium and pulmonary arterial tree

Presence of blood and not contrast

VALSALVA

- Deep Breath & Hold
- Open Mouth

NO VALSALVA

Unopacified blood enters the right atrium and pulmonary arterial tree

ANOMALIES

- Definition: A deviation from the common rule, type, arrangement or form

How can this monopolize our scans?

Let’s take a look...
THIS IS THE SMART PREP IMAGE OF A 46 YEAR OLD TRAUMA PATIENT

Was the ROI placed correctly?
YES

Are we at the appropriate HU threshold?
YES

Should we start the scan with the appropriate diagnostic delay?
YES
WHAT HAPPENED TO THIS CONTRAST INJECTION?

End

WHAT DOES THIS IMAGE TELL US?
There is a large amount of contrast in the subclavian. This patient may have a condition called THORACIC OUTLET SYNDROME.

WHAT IS THORACIC OUTLET SYNDROME?
A compression of an artery or vein that pass between the upper arm and chest.

ANOMALIES

HOW CAN WE AVOID THIS?
- Double check for a contrast leak
- Ask the radiologist if it’s ok to proceed with a 2nd injection
- Place the patient arm by their side
- Re-inject with the same parameters

DID THIS IMPROVE THE SCAN?

DID THIS IMPROVE THE SCAN?
What types of contrast leaks occur during our CT scans?
- A loose connection between the catheter and the IV tubing
- An infiltrate in the subcutaneous tissue

How can we avoid this?
- Check your connections prior to scanning
- Check your IV for patency prior to injection
- Infiltrates are not always predictable

This patient was injected into their central line. Their central line was not placed correctly. Since the patient was on medication and intubated we were not aware of the extravasation.

Other errors that can occur with our injections?
- Forgetting to change back our pressures
- You inject a mediport at 85psi and fail to return the psi to 300
- This can cause your next scan to be suboptimal
1. SCAN BEGAN TOO LATE
HOW CAN WE AVOID THIS?

- Watch your delay time

2. THE CONTRAST IS ALREADY RETURNING IN THE VEINS
SMART PREP JUST ABOVE THE ILIAC BIFURCATION
- Double check your IV’s for leakage and possible infiltrates
- Be sure of where you place your ROI during your smart prep imaging
- Work with your patients dynamics, not against them
- Let your patient know what you expect of them during the scan
- Remember not everything is under our control but we can learn to how to fix it 😊