



The following training module was developed as a quality improvement project to serve as an educational tool for junior radiology residents. The following diagnostic radiology protocoling modules were developed by University of Washington radiology residents Patricia Ojeda and Mariam Shehata.

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Genitourinary

Common Clinical Scenarios
Protocols Module

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Outline

GU protocols to be covered:

- KUB
- Ultra-low dose KUB
- IVP 2-phase
- IVP 3-phase
- Cystogram
- Ultrasound



Clinical scenario

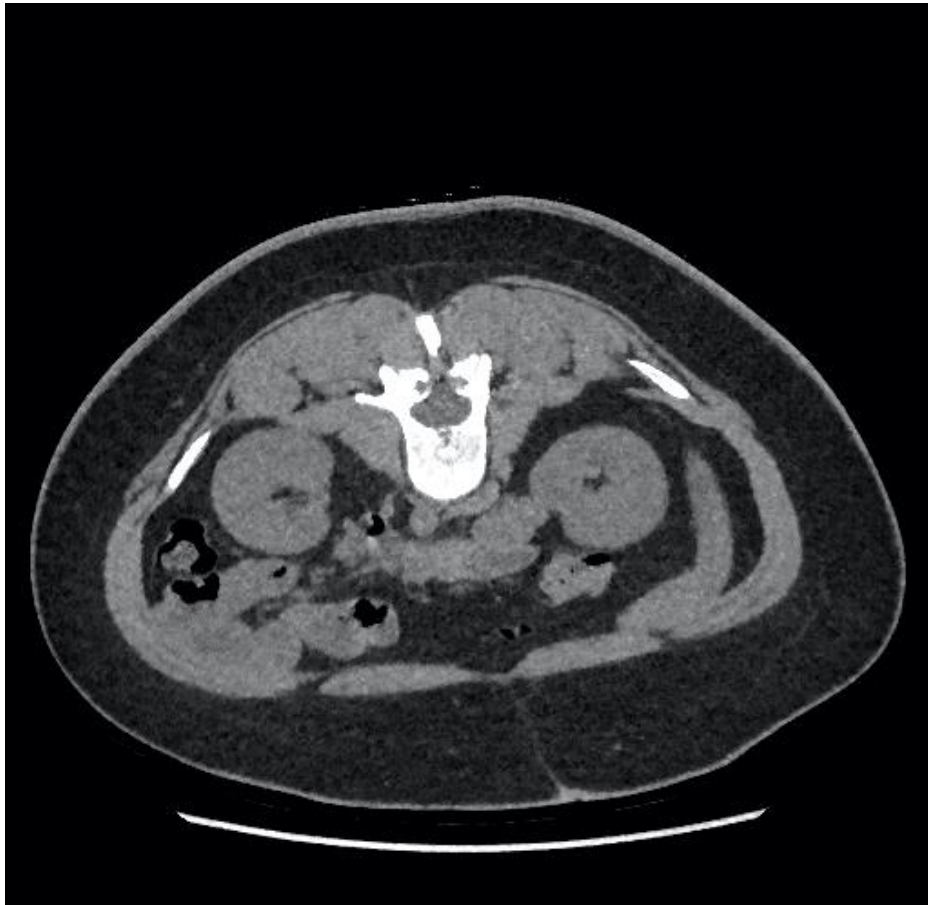
- Patient with acute back pain and bloody urine



KUB Non-Contrast

- Indication: Painful hematuria
 - Concern for renal stone
- Different from a regular non-contrast CT Abdomen/Pelvis
 - Different anatomic cut-offs
- Patients are scanned prone
 - Assess if stones are in the bladder or if they are lodged in the ureteropelvic junction
 - Stones in the bladder will be mobile and fall dorsally
- Follow-Up Protocol: Ultra Low Dose CT KUB
 - Used for surveillance of known stones
 - Reduces Radiation

KUB Non-Contrast



CT KUB



CT KUB Ultra Low Dose



Clinical scenario

- Patient presents with painless hematuria

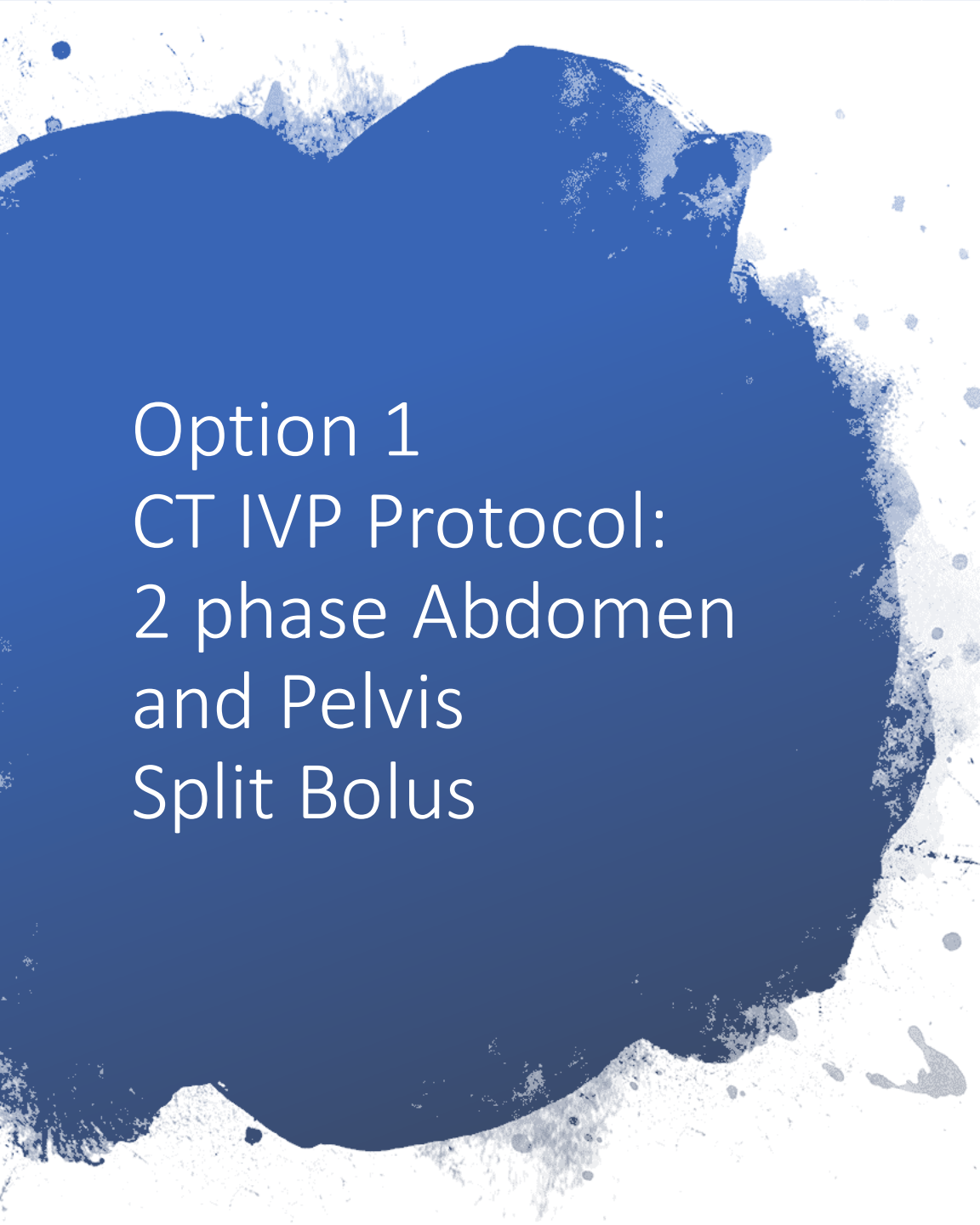
CT IVP Protocol: 3 Phase Abdomen and Pelvis CT

- Indication: Painless hematuria
- CT IVP protocols usually involve three phases
 - Each phase is used to identify specific abnormalities
- 1. Non-contrast
 - Renal stones
 - Masses
- 2. Venous (90 seconds)
 - Renal parenchyma enhancement
 - Parenchymal masses
- 3. Delayed (10 minutes)
 - Excretory system contains contrast
 - Intraluminal masses



CT IVP Protocols

- CT IVP >50 protocol
 - 3 phases
- CT IVP <50 protocol
 - 2 phases



Option 1 CT IVP Protocol: 2 phase Abdomen and Pelvis Split Bolus

- <50 year old patient: 2 phase protocol
 - Radiation Reduction
 - Less concern for cancer as hematuria is more likely due to stones
- Two injections
 - Once after non-contrast scan
 - Second at 10 minutes after first injection
 - IV hydration in between injections
- Two phases:
 1. Non-contrast
 2. Venous + Delayed (at 12 minutes)
 - Two-minute delay after 2nd injection

CT IVP - Two Phases



Non-Contrast

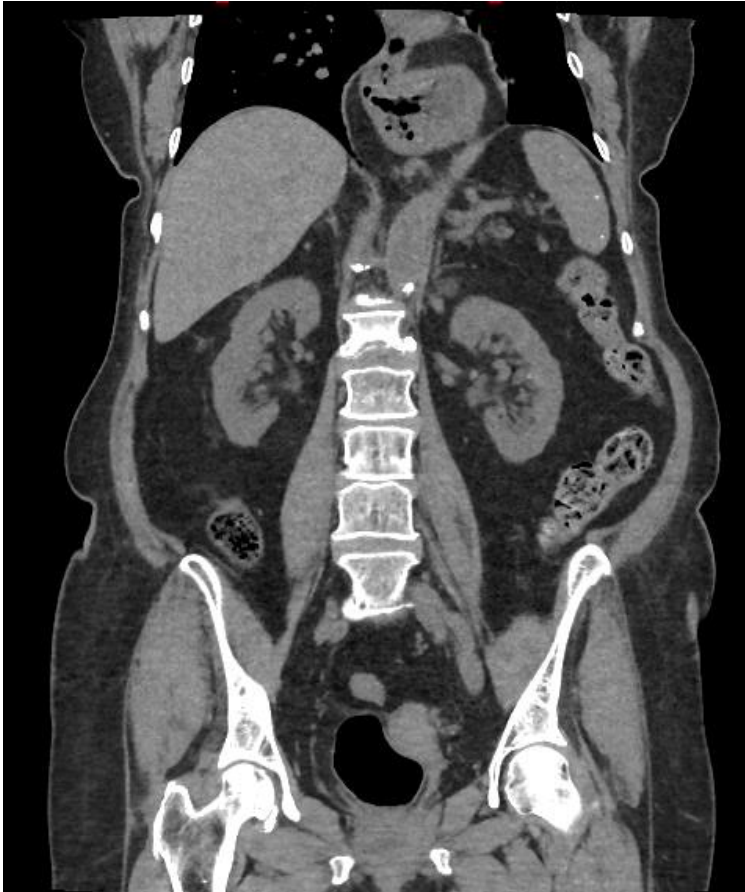


12 minute Delay

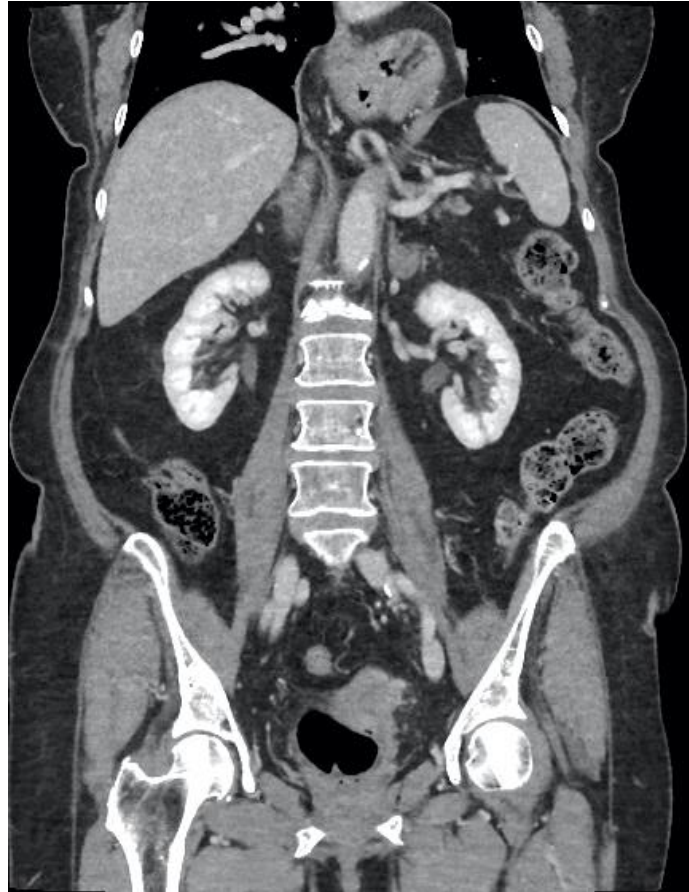
Option 2
CT IVP Protocol:
3 phase Abdomen
and Pelvis
Non-contrast, 90
second delay, and 10
minute delay

- >50 year old patient: 3 phase protocol
 - Higher concern for malignancy therefore a more thorough investigation is required
- One injection
- Three Phases:
 1. Non-contrast
 2. Venous/Nephrogenic (90 seconds)
 3. Delayed/Excretory (10 minutes)

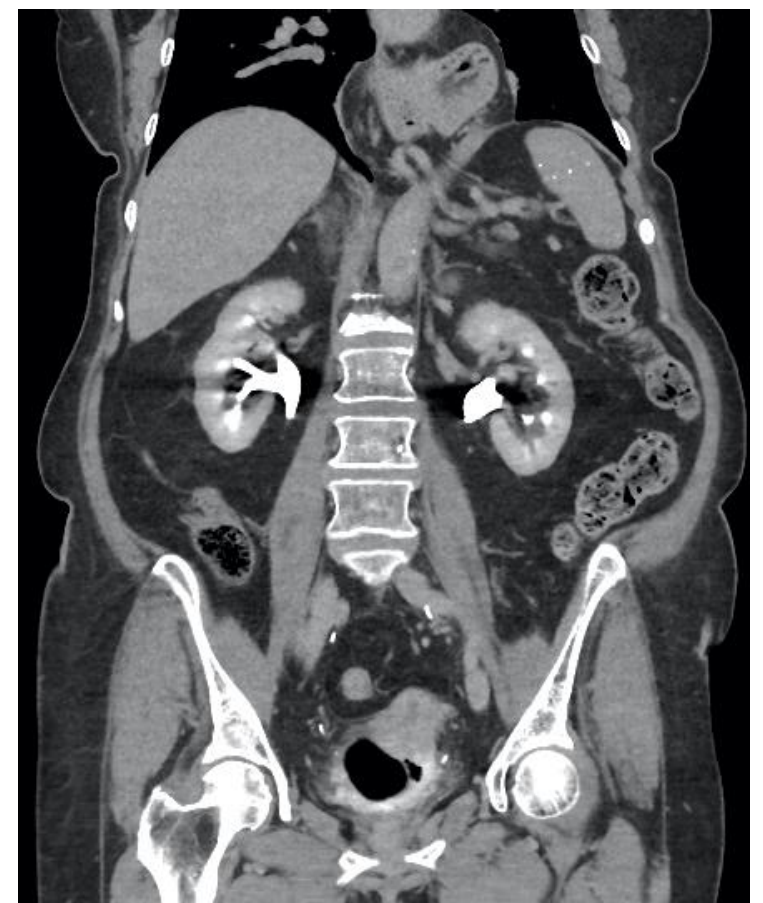
CT IVP - Three Phase



Non-contrast



Venous



Delayed

CT IVP Summary

	CT IVP 2 Phase/Split Bolus	CT IVP 3 Phase
Types of Phases	<ol style="list-style-type: none">1. Non-Contrast2. Venous + Delayed (12 minutes)	<ol style="list-style-type: none">1. Non-Contrast2. Venous (90 seconds)3. Delayed (10 minutes)
Number of Contrast Injections	Two Injections	One Injection
Contrast Injection Timing	<ol style="list-style-type: none">1. Immediately after non-contrast scan2. 10 minutes after first injection	Immediately after non-contrast scan
Patient Age	< 50 years old	> 50 years old
Primary Concern	Renal Stones	Malignancy



Clinical scenario

- Patient with a history of traumatic bladder rupture is status post repair – a surveillance study to evaluate bladder integrity is requested



CT Cystogram

- Protocol specifically assessing the bladder.
- Contrast is administered retrograde into the bladder
 - No intravenous contrast indicated
- Important distinction between the two available CT Cystogram protocols:
 - **Trauma CT Cystogram – 1 phase**
 - **Indicated for suspected bladder rupture or leak**
 - CT Cystogram – 2 phase
 - Indicated for suspected bladder fistula or mass.



Trauma CT Cystogram

- Indication: Suspected bladder rupture, post-operative bladder surveillance, or suspected bladder leak
 - This specific cystogram protocol is most commonly indicated at HMC
- Scan is started as soon as contrast is completely drained into bladder
 - Post-void imaging is not necessary
- Evaluate for contrast extravasation from the bladder

Trauma CT Cystogram



Axial view of the bladder



Coronal view of the bladder



Clinical scenario

- Patient presents with pelvic pain
 - Concern for ovarian torsion, post-menopausal bleeding, ectopic pregnancy, testicular torsion/trauma, epididymitis



Ultrasound

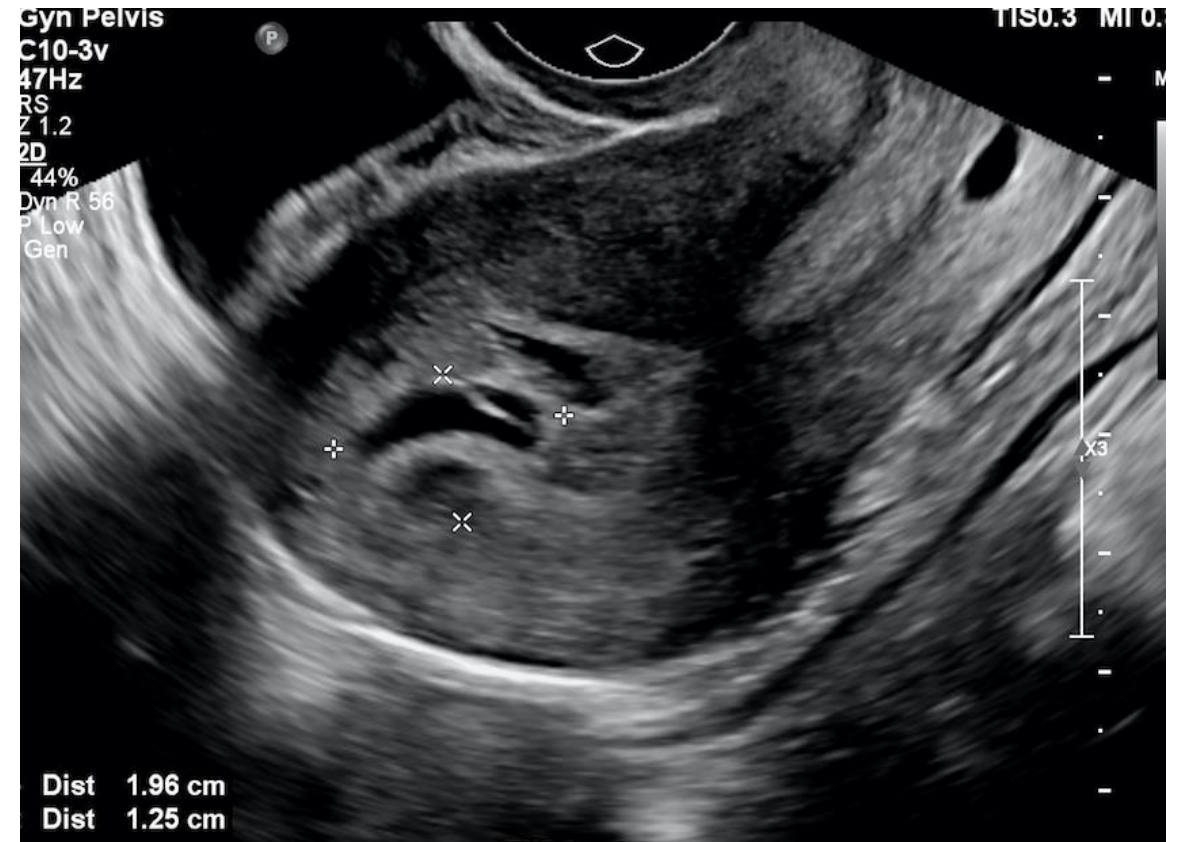
- Ultrasonography is the modality of choice when the underlying cause of pelvic pain is thought to be gynecologic.
- Allows for detailed evaluation of the pelvic anatomy, including vascular components.
- Decreases or eliminates the need for imaging studies that involve radiation exposure.

<https://pubs.rsna.org/doi/full/10.1148/rg.345130135>

Ultrasound



Testicular US "Buddy shot"



Uterine US showing Interstitial ectopic pregnancy