

Obstructive Nephrolithiasis in Pregnant Woman

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10/16/2019

RAD 4001

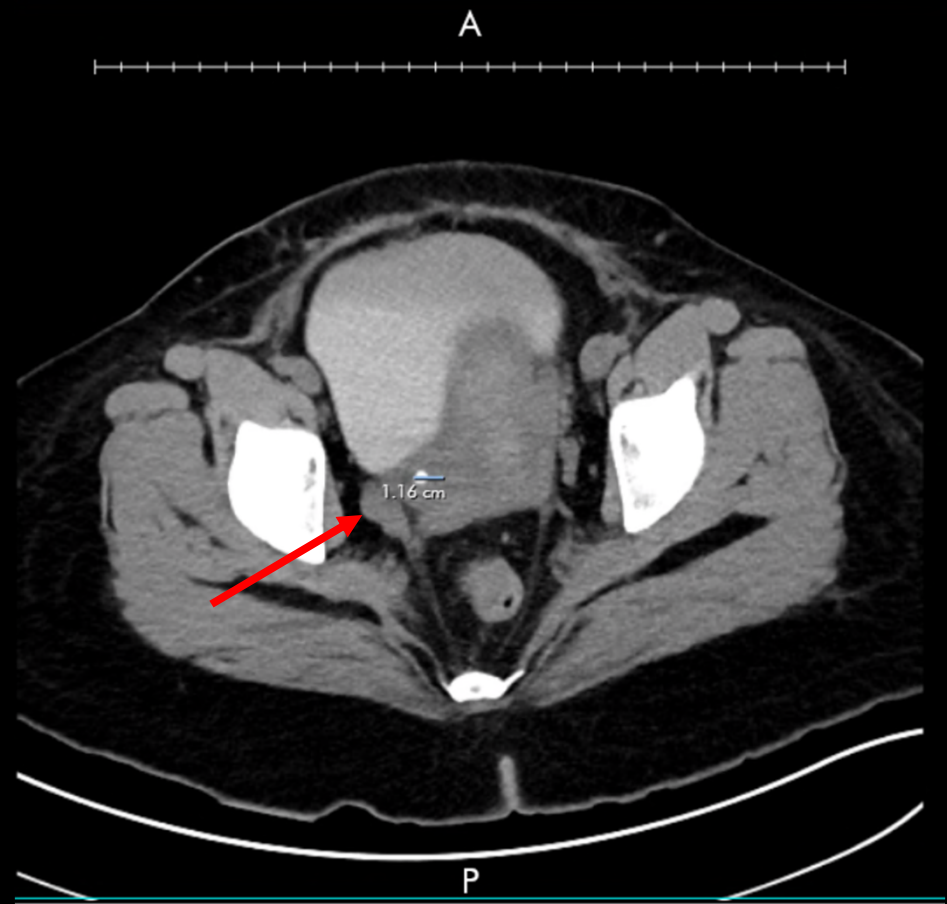
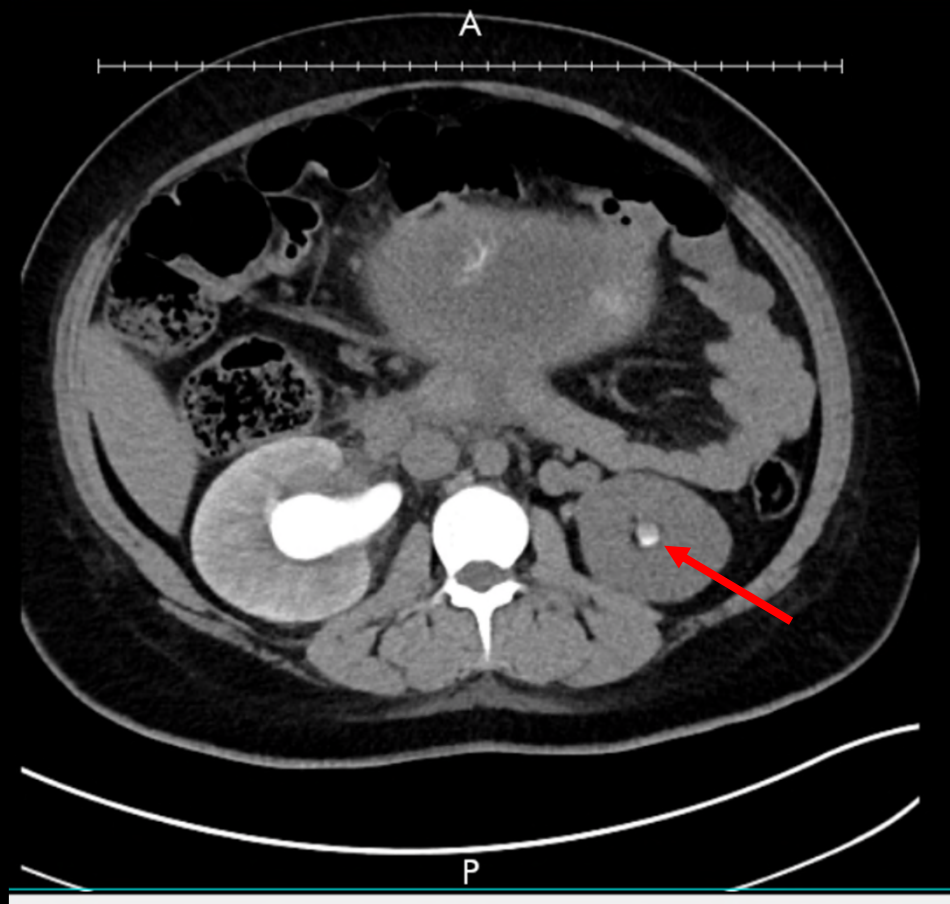
Reviewed by: Dr. Pritish Bawa



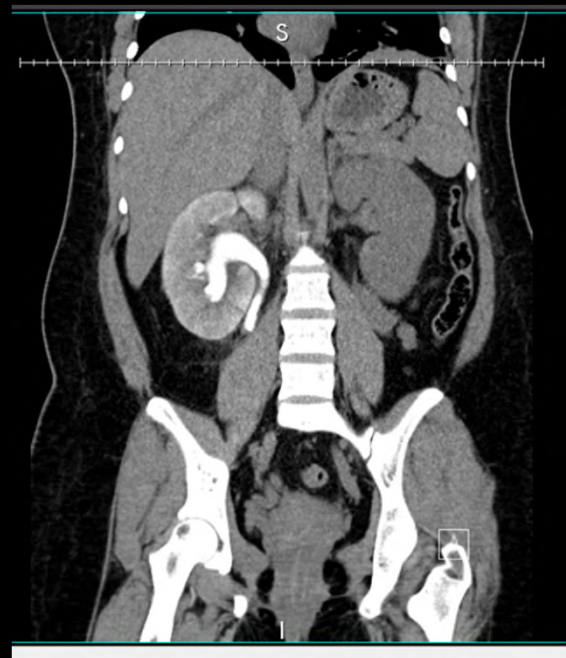
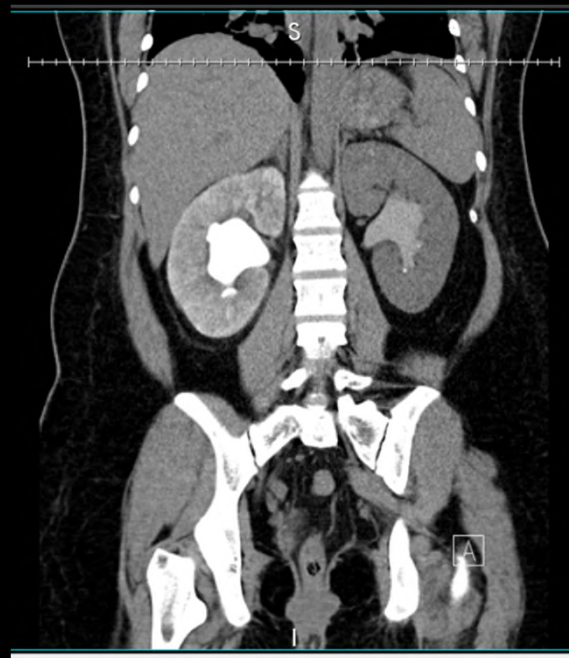
Clinical History

- 24yo female G5P2022 at 27w2d
 - Presents w/ right flank and groin pain, fever, chills x2days
 - Obstructive R renal stone on US
 - CT PE negative after concern for PE w/ desats
 - Transferred to MHH after failing to pass stone
 - WBC 12.9
 - No complications previously w/ current pregnancy

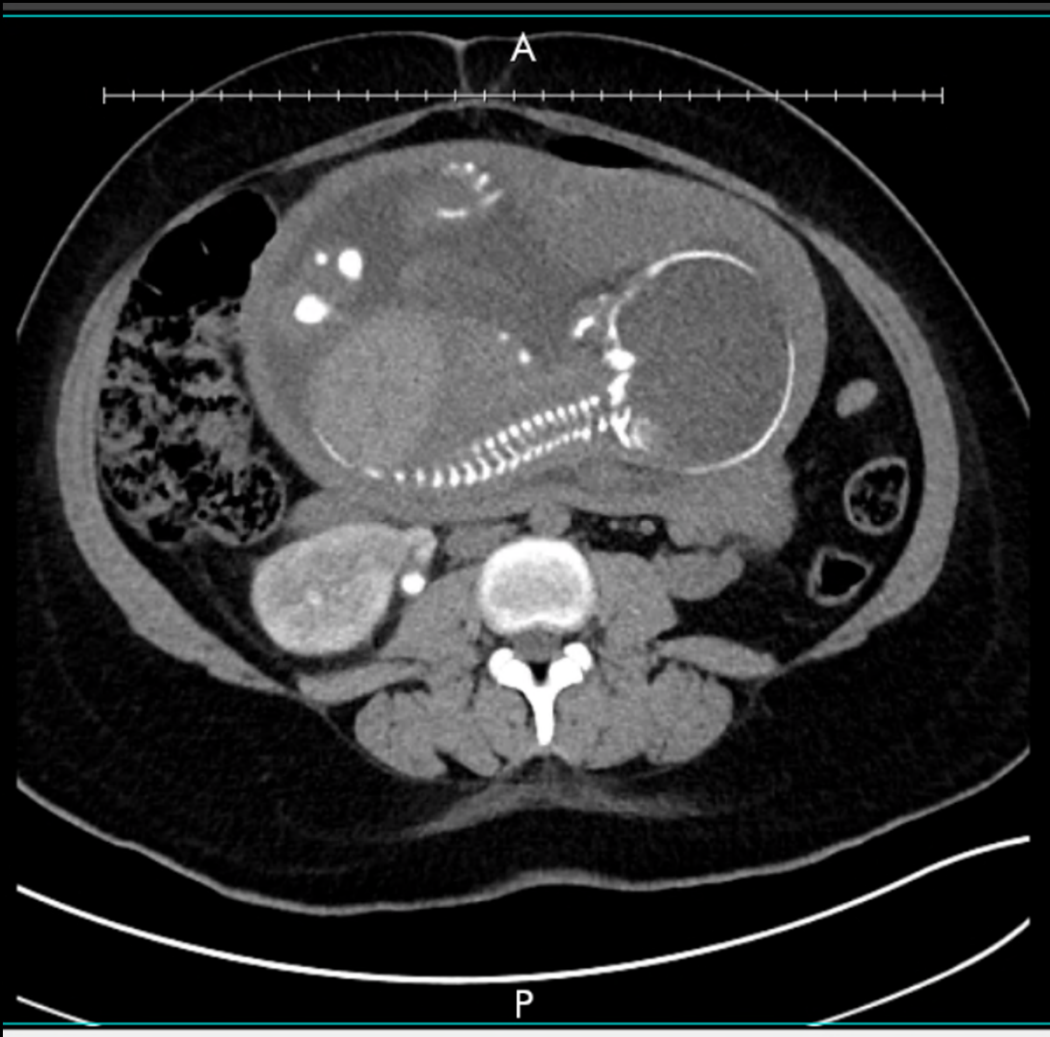
Renal Stone CT 8/24



Renal Stone CT 8/24



Renal Stone CT 8/24

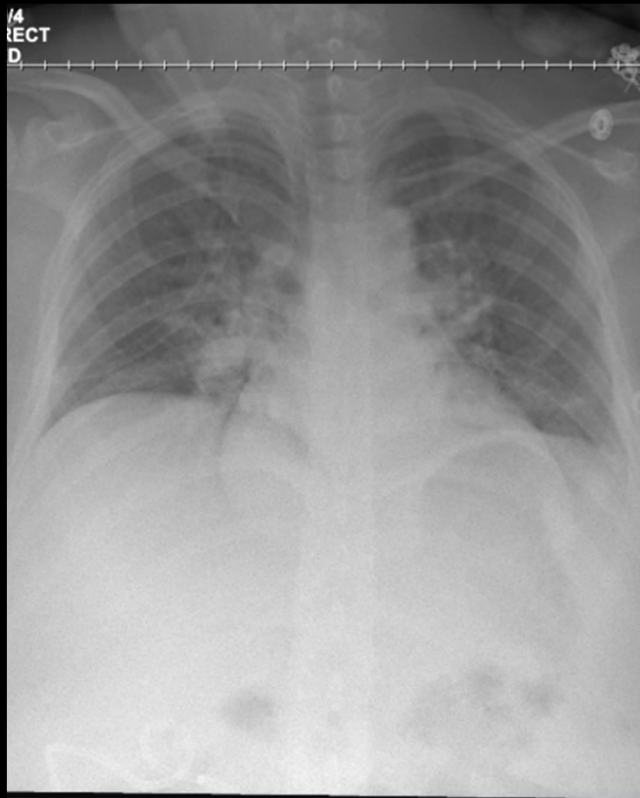


PCN Fluoro 8/24, Revision 9/13 & 9/27

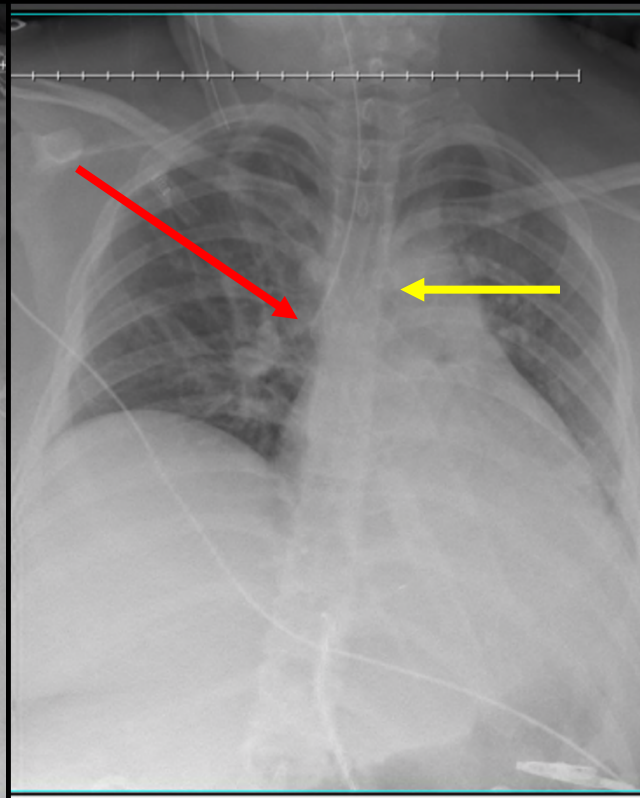


- Improved after PCN and discharged
- Toddler pulled on PCN causing bleed and obstruction
- Replaced 9/13
- 9/27 stent found to be infected and replaced

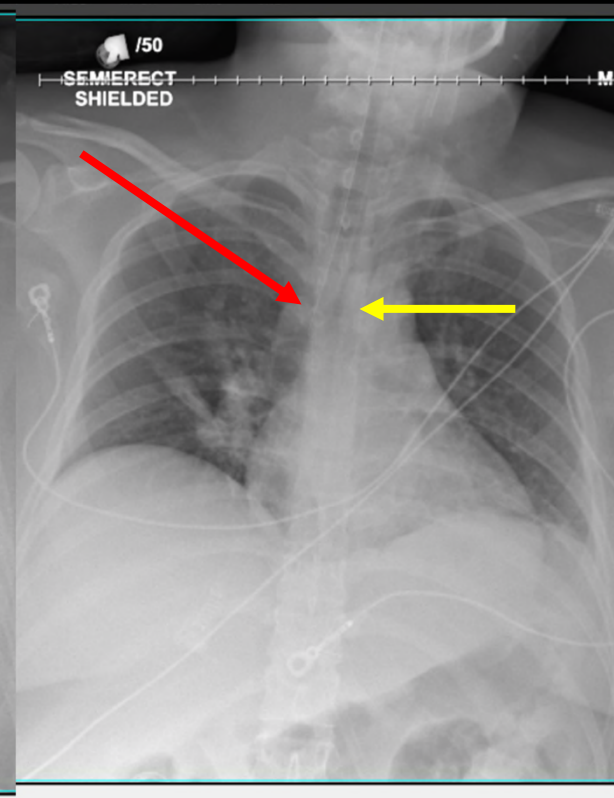
CXR 9/27



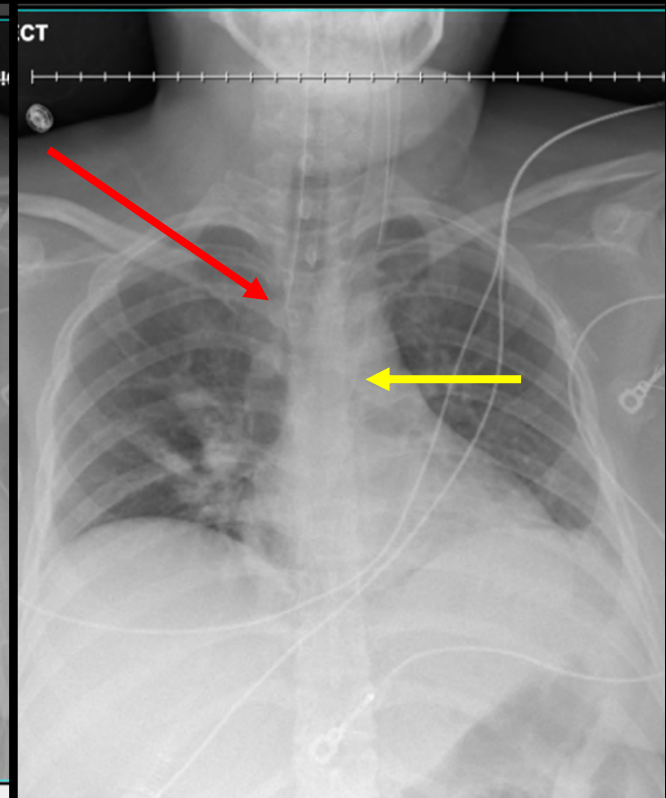
Pre-Intubation



RMB Intubation

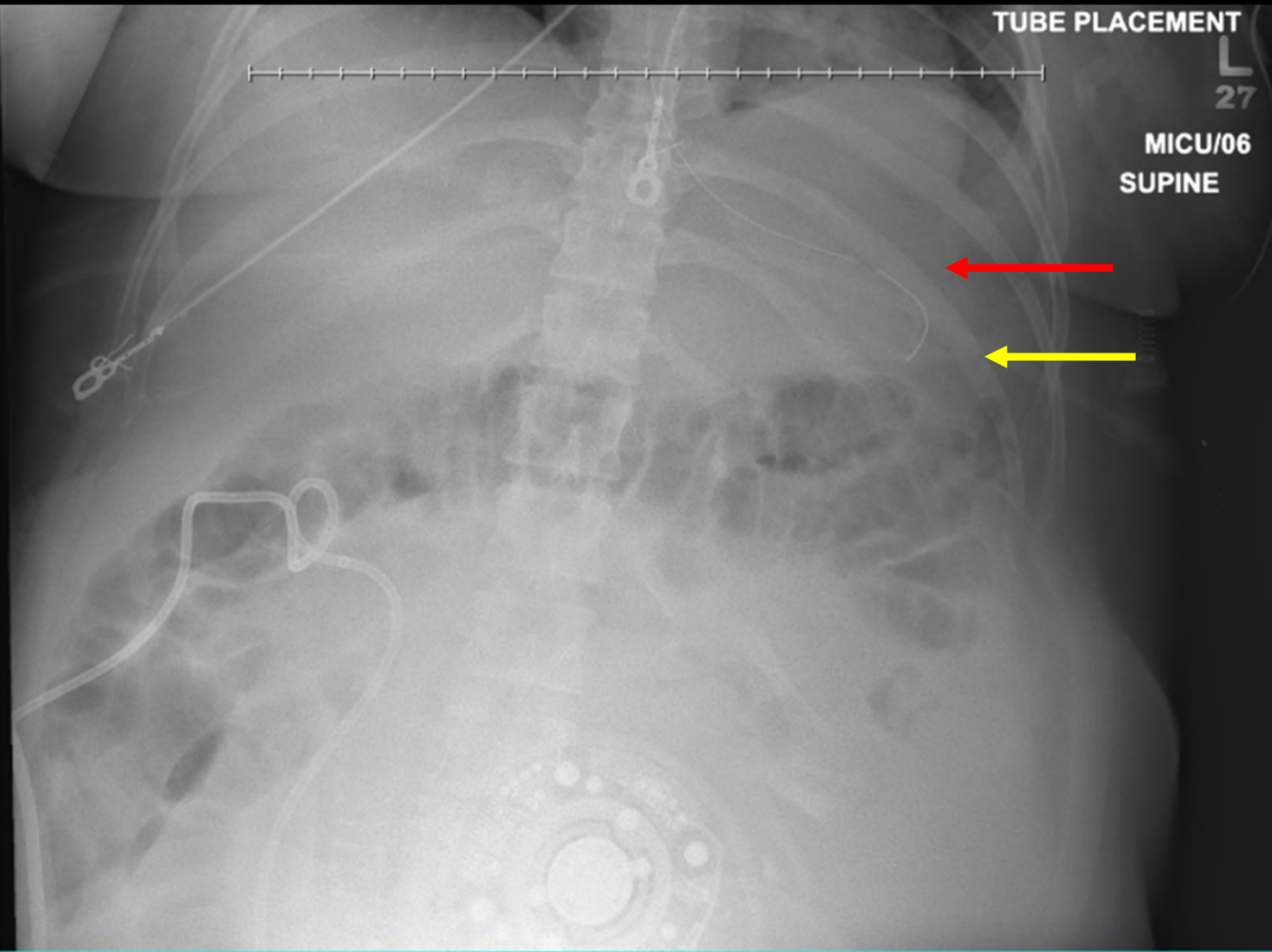


At Origin of RMB

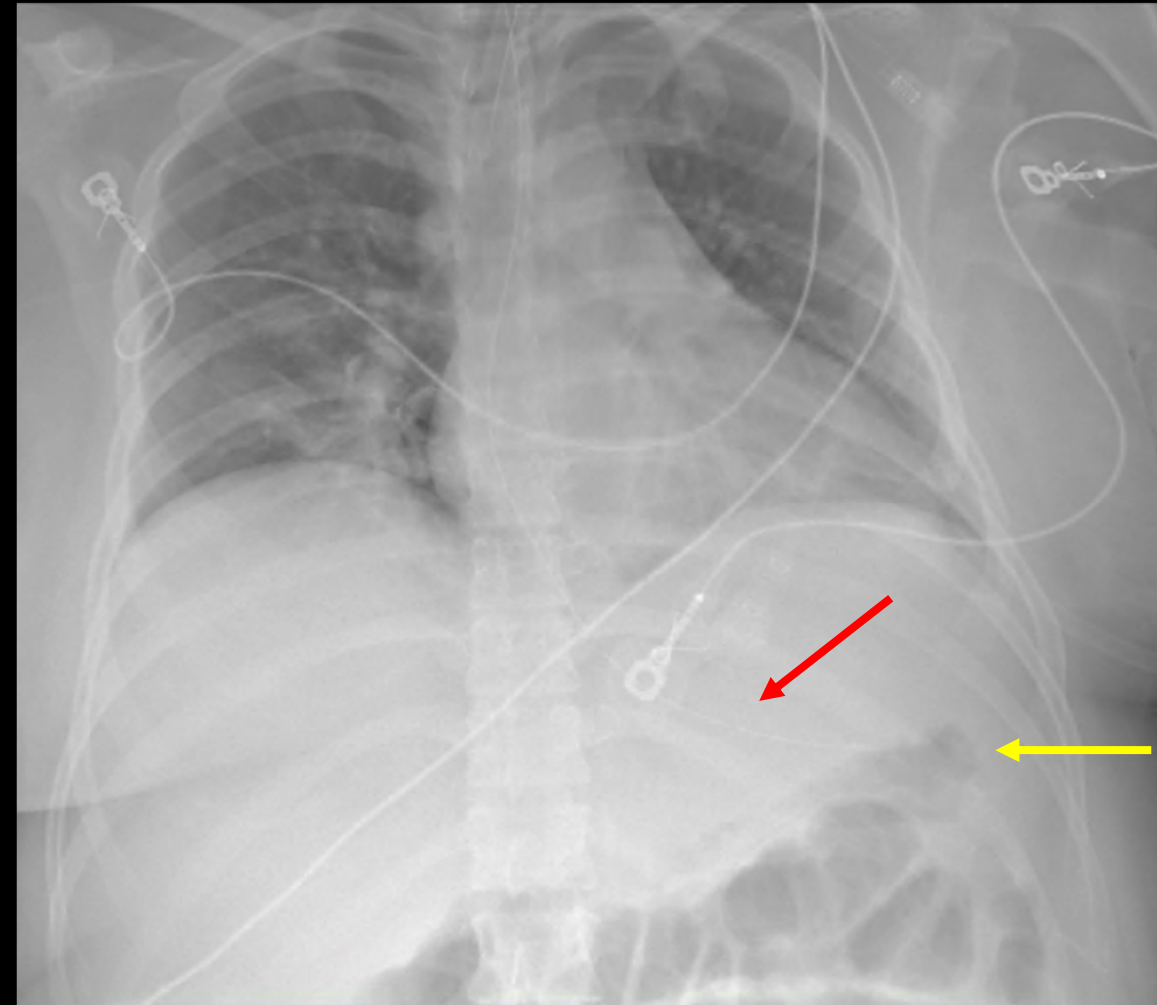


3 cm above Carina

ABD XR for line placement 9/27

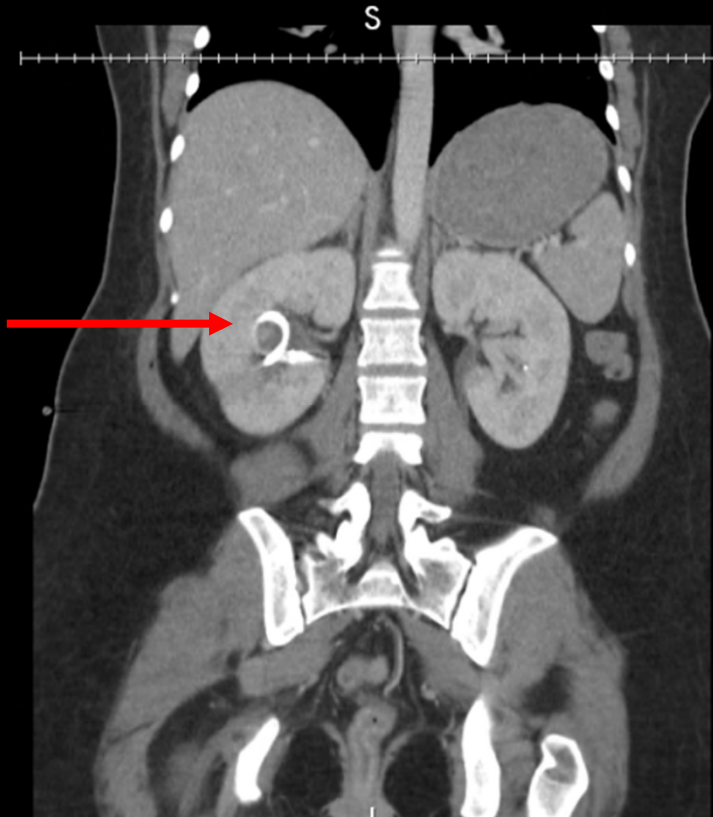


NG tube overlying gastric cardia

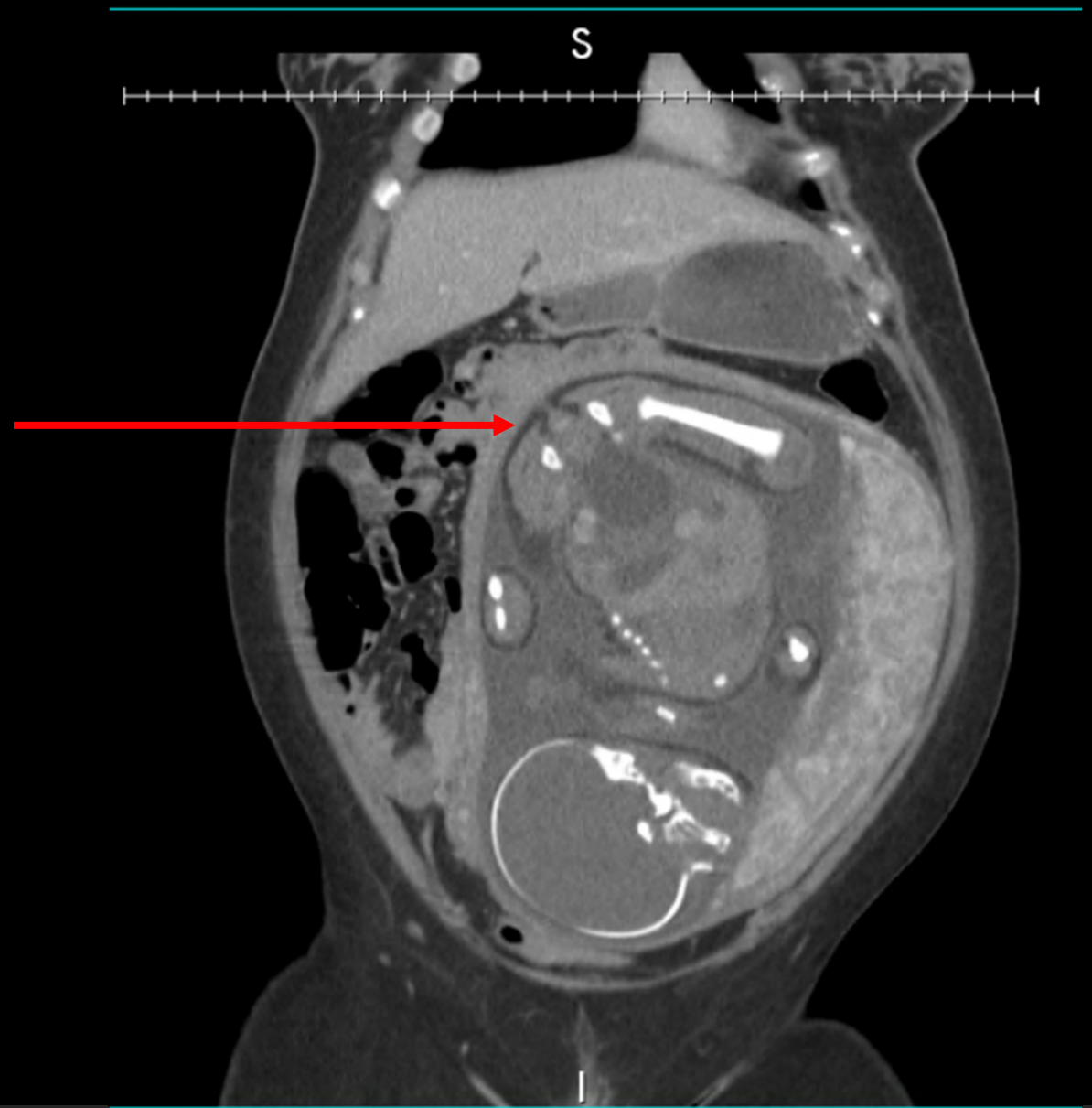


Advanced 3cm

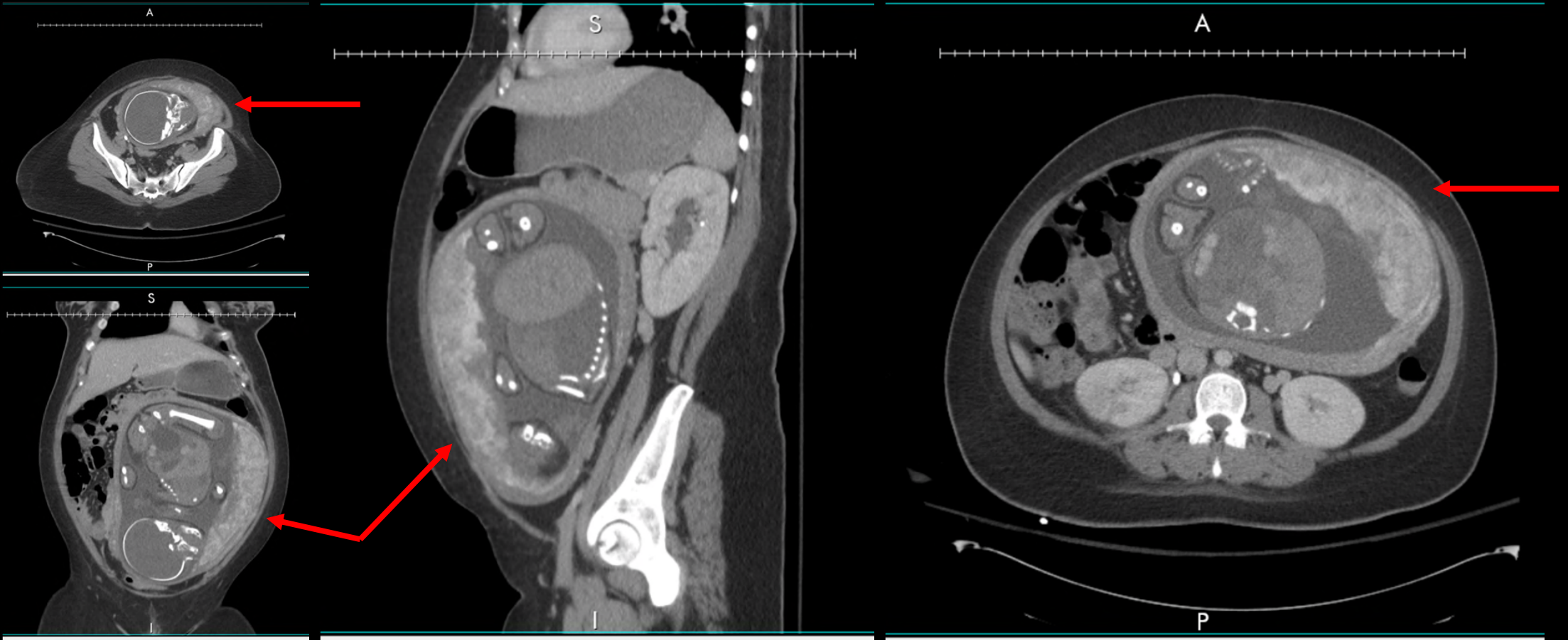
CT ABD/Pelvis 9/30



CT ABD/Pelvis 9/30



CT ABD/Pelvis 9/30



Key Imaging Findings

1. Obstructing nephrolithiasis measuring 0.9 x 0.4 x 0.4
 1. Larger than 5mm unlikely to pass
2. ET tube placed 3cm above carina
 1. Recommended placement 5 +/- 2 cm above carina
3. Gravid uterus w/ fetus without gross abnormality

Differential Diagnosis

- Primary nephrolithiasis
- Nephrolithiasis 2/2 calcium disorder
- Nephrolithiasis 2/2 medication

Discussion - Stones

- Labs wnl and patient not taking any medications
- Likely primary stone formation
 - No path yet on stone type
 - Likely Calcium oxalate
- Risk factors
 - Increased urine Ca
 - Gut absorption, renal excretion, high urine concentration
 - Increased urine oxalate
 - More likely to cause precipitation
 - Increased absorption of dietary oxalate with low calcium diet

Final Diagnosis

- Sepsis/Hydronephrosis 2/2 obstructive infected nephrolithiasis

Discussion - Radiation

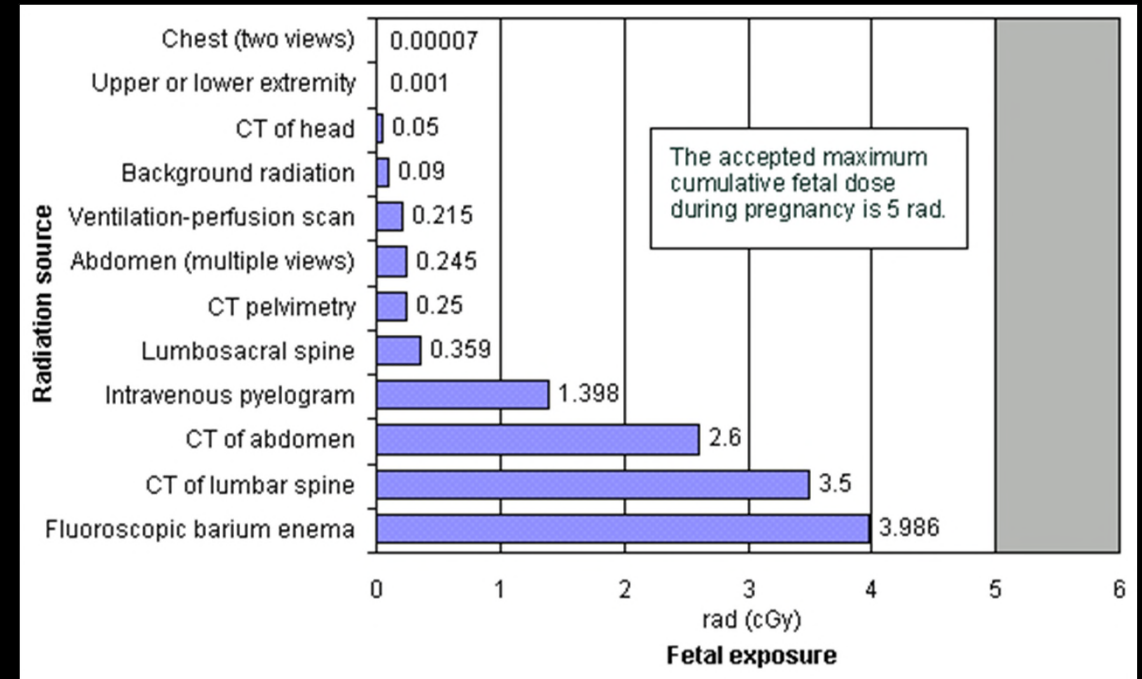
Gestational Period	Effects	Estimated Threshold Dose*
Before implantation (0–2 wk after conception)	Death of embryo or no consequence (all or none)	50–100 mGy
Organogenesis (2–8 wk after conception)	Congenital anomalies (skeleton, eyes, genitals)	200 mGy
	Growth retardation	200–250 mGy
Fetal period 8–15 wk	Severe mental retardation (high risk) [†]	60–310 mGy
	Intellectual deficit	25 IQ point loss per gray
	Microcephaly	200 mGy
16–25 wk	Severe mental retardation (low risk)	250–280 mGy

Gestational Age (wk)	Potential Effects by Radiation Exposure		
	<50 mGy	50–100 mGy	>100 mGy
0–2	None	None	None
3–4	None	Probably none	Possible spontaneous abortion
5–10	None	Uncertain	Possible malformations
11–17	None	Uncertain	Possible deficits in IQ or mental retardation
18–27	None	None	IQ deficits not detectable at diagnostic doses
>27	None	None	None applicable to diagnostic medicine

Dose to Conceptus (mGy)	No Malformation (%)	No Childhood Cancer (%)	No Malformation and No Childhood Cancer (%)
0	96.00	99.93	95.93
0.5	95.999	99.926	95.928
1.0	95.998	99.921	95.922
2.5	95.995	99.908	95.91
5.0	95.99	99.89	95.88
10.0	95.98	99.84	95.83
50.0	95.90	99.51	95.43
100.0	95.80	99.07	94.91

Discussion - Radiation

- Max recommended dose
 - 50 mGy = 5 rad
- Likely to see effect
 - >100 mGy = 10 rad



Fetal Radiation Exposure

<u>Study</u>	<u>Number</u>	<u>Total Exposure (rad)</u>
US Retroperitoneum	2	0
CT PE	1	1.25
CT ABD/Pelvis w/ contrast	1	2.6
CT Renal Stone	1	2.6
Fluoro	3	0
Venous Doppler	1	0
XR Chest 1V	6	0.01
XR ABD 1V	2	0.49
TTE	1	0
V/Q Scan	1	0.215
Total		5.9

ACR appropriateness Criteria

- Common enough ACR criteria for nephrolithiasis in pregnant patients
- Rarely indicated – CT w/ contrast, possibly indicated in ICU
- Not indicated – V/Q scan in 3rd trimester
 - CT PE preferred because of lower radiation dose

Clinical Condition: Acute Onset Flank Pain—Suspicion of Stone Disease (Urolithiasis)			
Variant 3: Pregnant patient.			
Radiologic Procedure	Rating	Comments	RRL*
US color Doppler kidneys and bladder retroperitoneal	8		0
CT abdomen and pelvis without IV contrast	6		***
MRI abdomen and pelvis without IV contrast	5		0
CT abdomen and pelvis without and with IV contrast	2		*****
CT abdomen and pelvis with IV contrast	2		***
X-ray abdomen and pelvis (KUB)	2		**
Radiography intravenous urography	1		***
MRI abdomen and pelvis without and with IV contrast	1		0
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Cost – Uninsured @ MHH-TMC

<u>Study</u>	<u>Number</u>	<u>Cost</u>
US Retroperitoneum	2	\$ 1,134
CT PE	1	\$ 1,417
CT ABD/Pelvis w/ contrast	1	\$ 2,879
CT Renal Stone	1	\$ 2,114
Fluoro	3	\$ 1,926
Venous Doppler	1	\$ 779
XR Chest 1V	6	\$ 1,476
XR ABD 1V	2	\$ 482
TTE	1	\$ 675
V/Q Scan	1	\$ 449
Total		\$ 11,347

Take Home Points

- Radiographs not absolutely contraindicated in pregnancy
- Important to minimize dose
- Imaging outside abd/pelvis relatively low risk
- 5mm stones unlikely to pass
- ET tubes 5 +/- 2 cm from carina

References

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Questions?