CT & MRI in Ovarian cancer

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DECLARATION OF INTERESTS

Nothing to declare

Contents

Contents

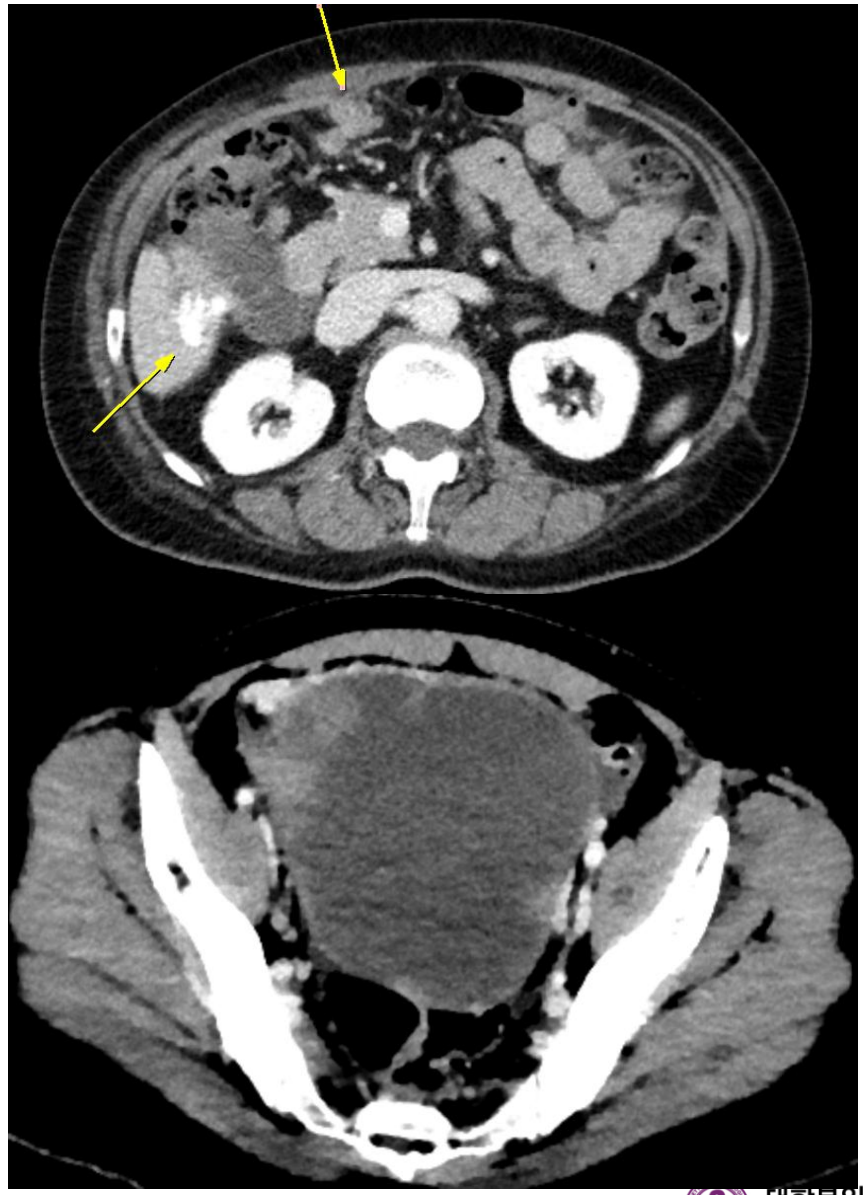
Imaging modalities

CT vs. MRI

	CT	MRI
공간해상도	매우 좋음 (submillimeter, iso-voxel)	CT보다 낮음
조직대조도	제한적	매우 좋음
스캔 시간	수 분 · breath-hold 수 초	30–40분 · motion artifact에 취약
스캔 범위	Chest–abdomen–pelvis 한 번에 가능	Pelvis 국한
방사선 / 조영제	방사선 피폭, Iodine 조영제 - 신독성 · allergy	피폭 없음, Gd 조영제
사용성	높음	낮음

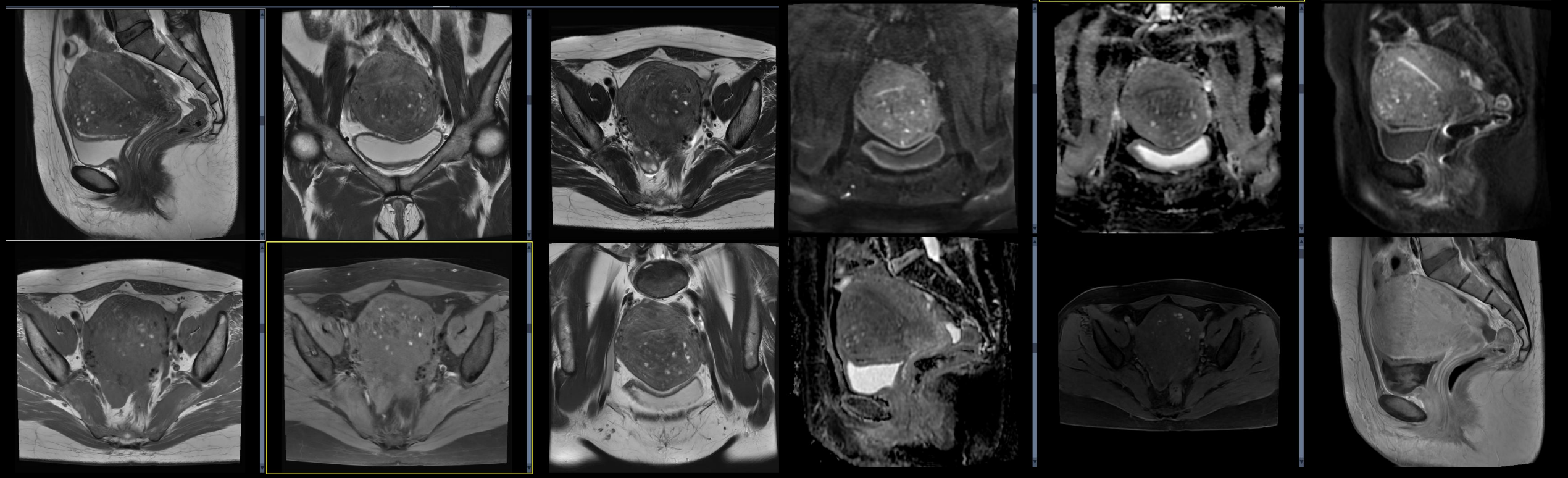
When to use CT?

- Staging (extent 평가)
- 치료 효과 평가
- 합병증 확인
- 병변 characterization에는 부적절!

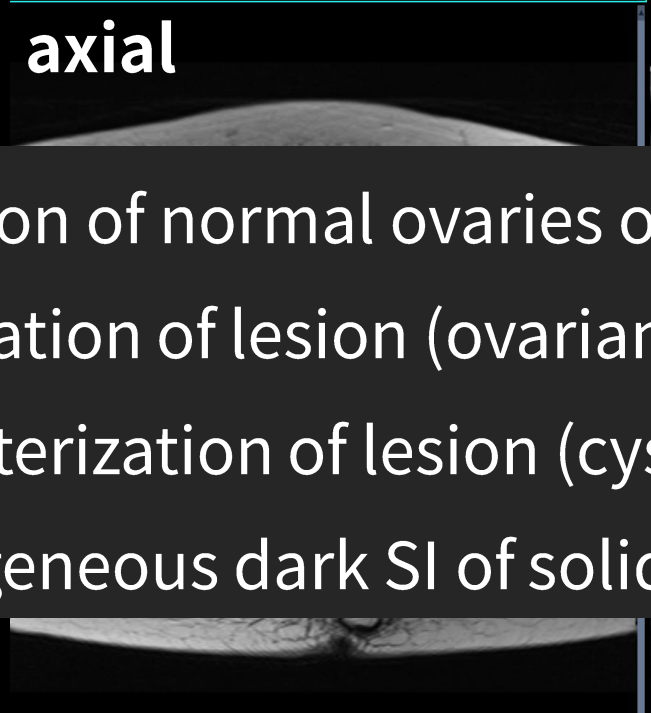


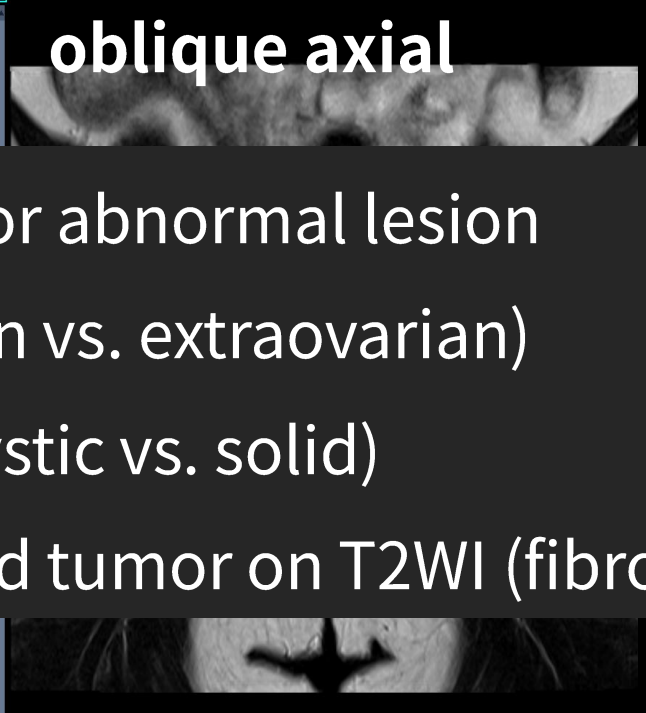
When to use MR?

- 병변의 characterization
- Mass의 기원이 불분명 (난소, 자궁..)
- Local evaluation
- CT 금기증 (임산부, 신기능 저하 환자)

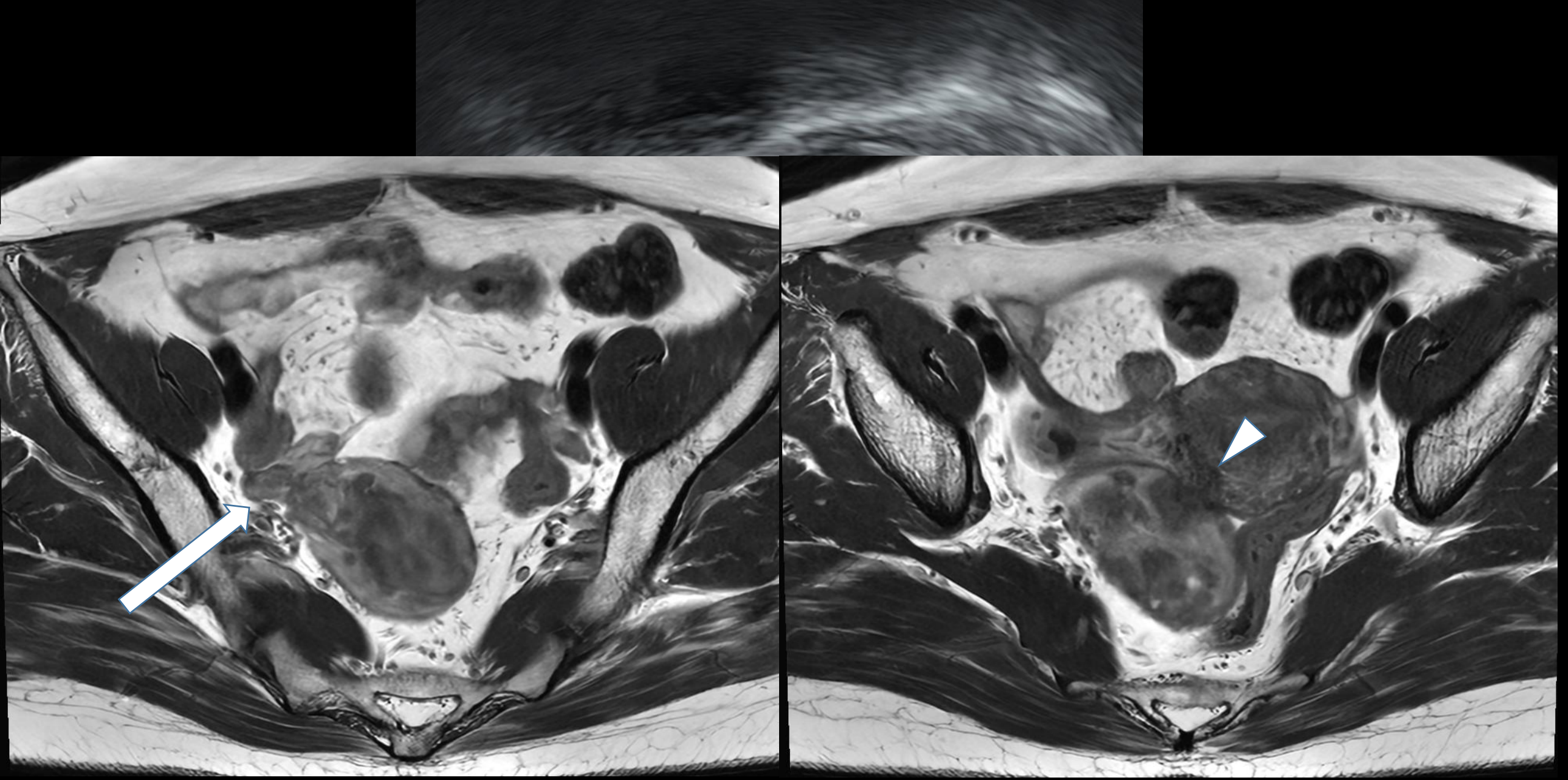


T2-weighted image (T2WI)



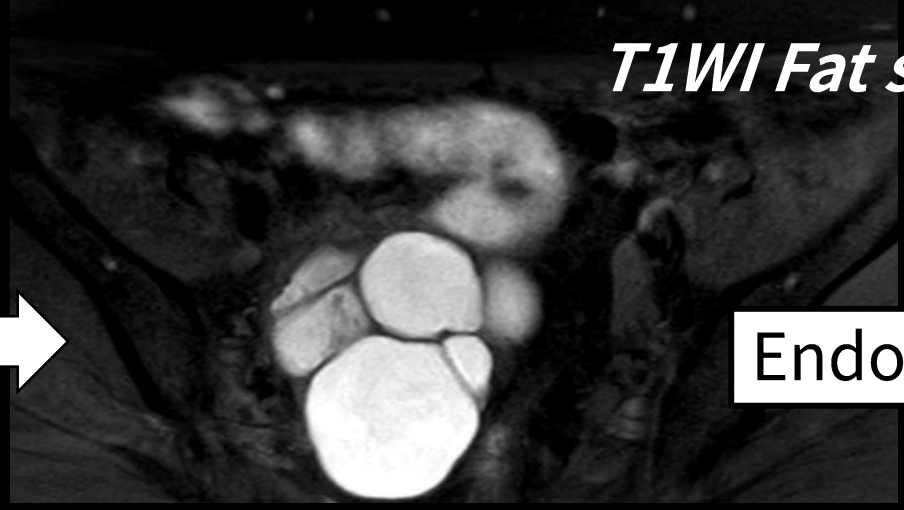


1. Detection of normal ovaries or abnormal lesion
2. Localization of lesion (ovarian vs. extraovarian)
3. Characterization of lesion (cystic vs. solid)
4. Homogeneous dark SI of solid tumor on T2WI (fibroma)



T1-weighted image (T1WI)

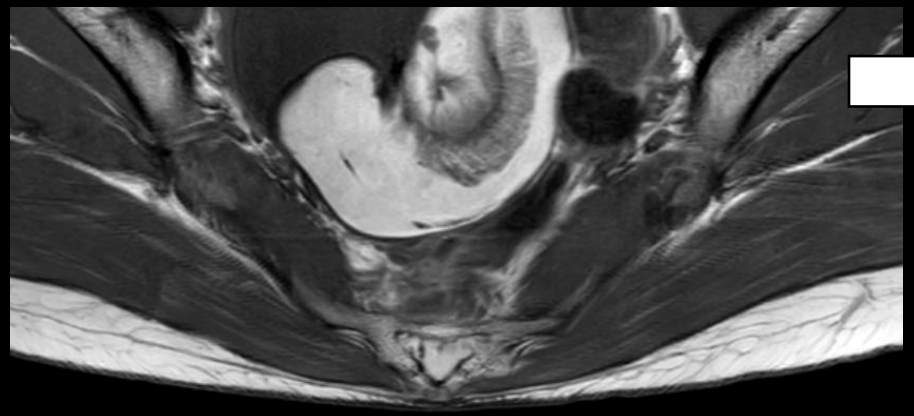
T1WI Fat suppression

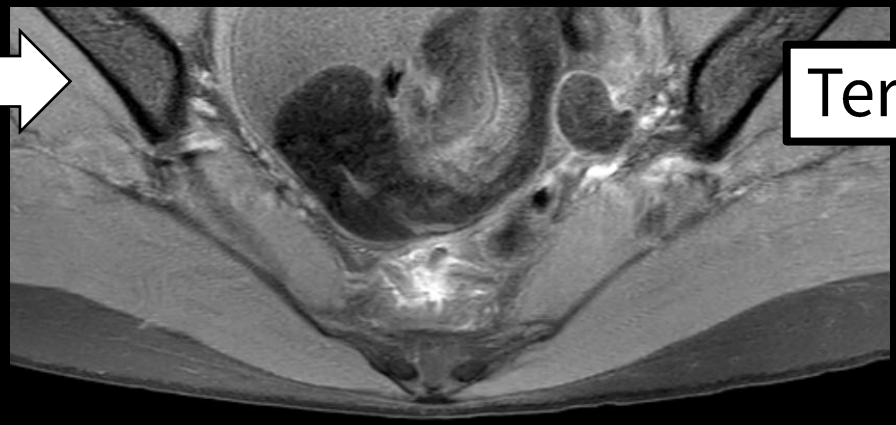


Endometriosis

High SI on T1WI (fat, hemorrhage, proteinaceous fluid, etc.)

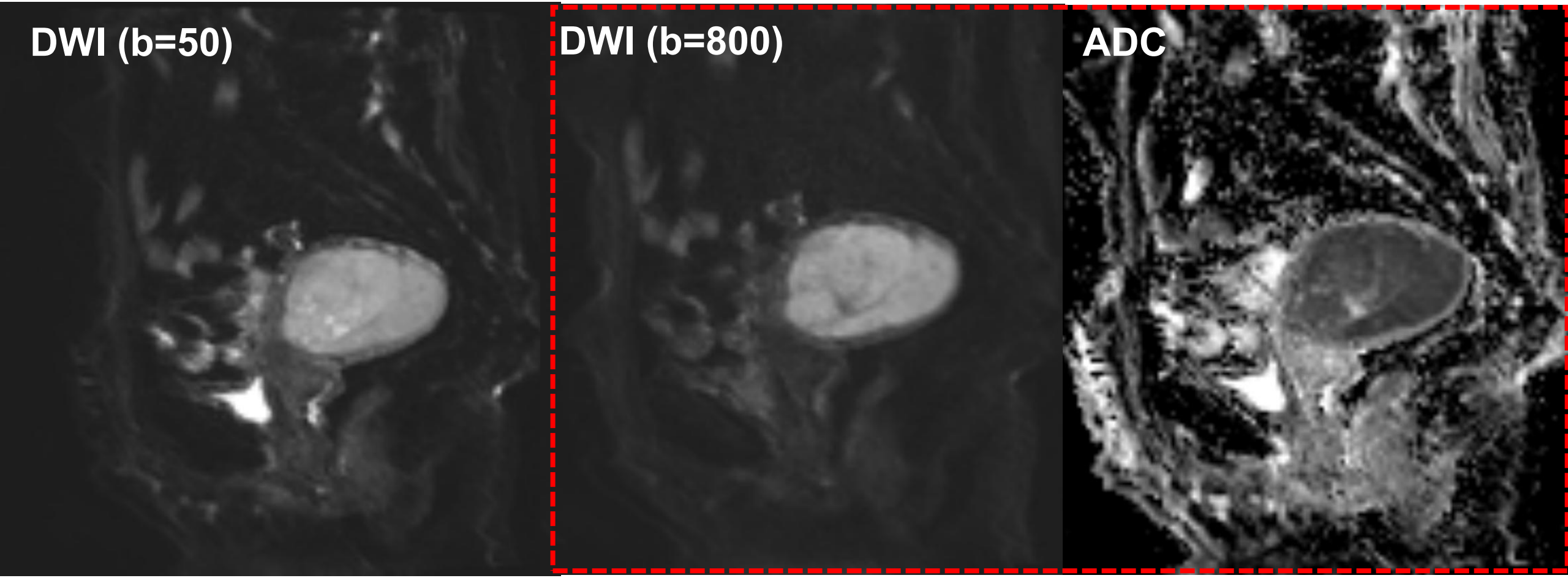
Fat-suppressed T1WI
Signal suppression of high SI → macroscopic fat in teratoma
Persistent high SI → endometrial cyst, hemorrhagic cyst, mucinous tumor, etc.





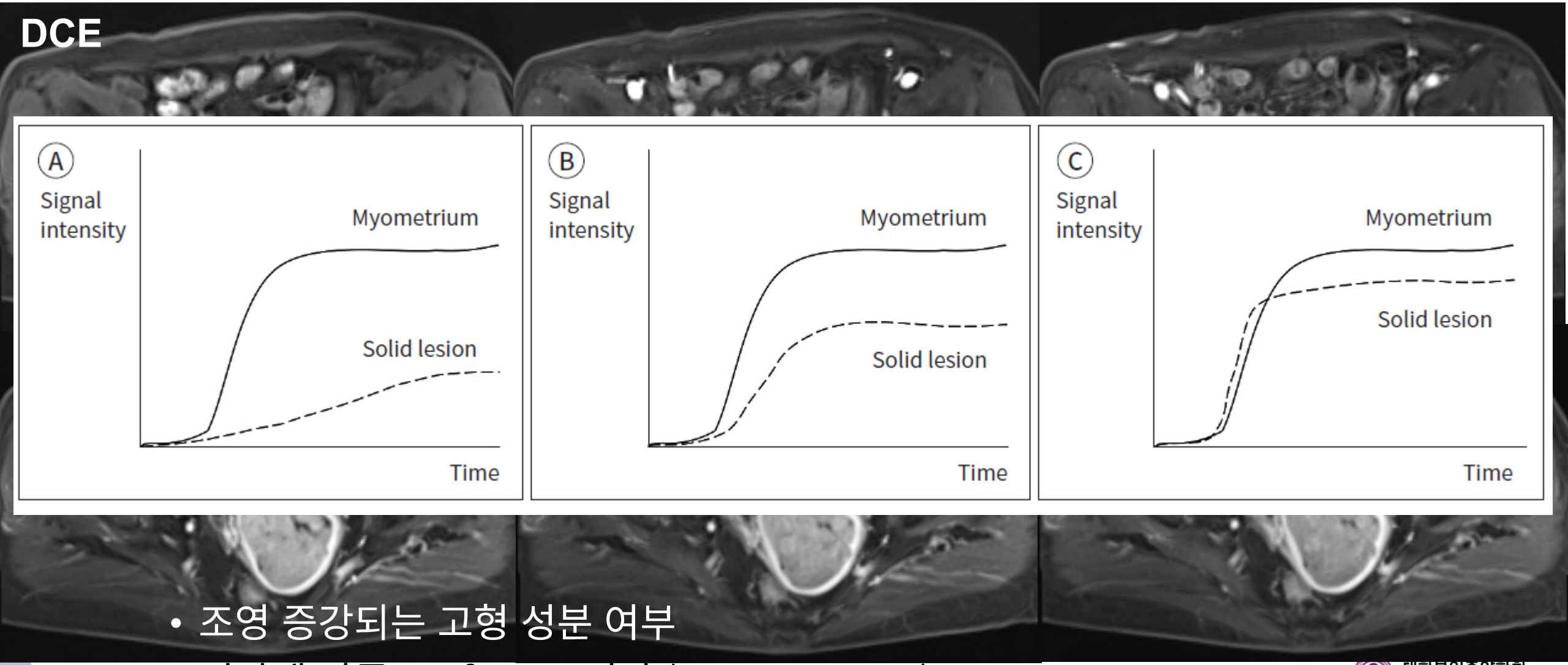
Teratoma

Diffusion weighted imaging (확산제한영상)



- High b-value (b = 800) image와 corresponding ADC map 함께 보기
- DWI high, ADC low ⟶ Diffusion restriction (+) = Cellularity가 높다 = Malignancy ↑

Dynamic contrast-enhanced imaging (역동적 조영증강)



- 조영 증강되는 고형 성분 여부
- 시간에 따른 perfusion 평가 (time-SI curve)

J Korean Soc Radiol 2021;82(5):1066-1082

Contents

Characterization

Signs of borderline or malignancy

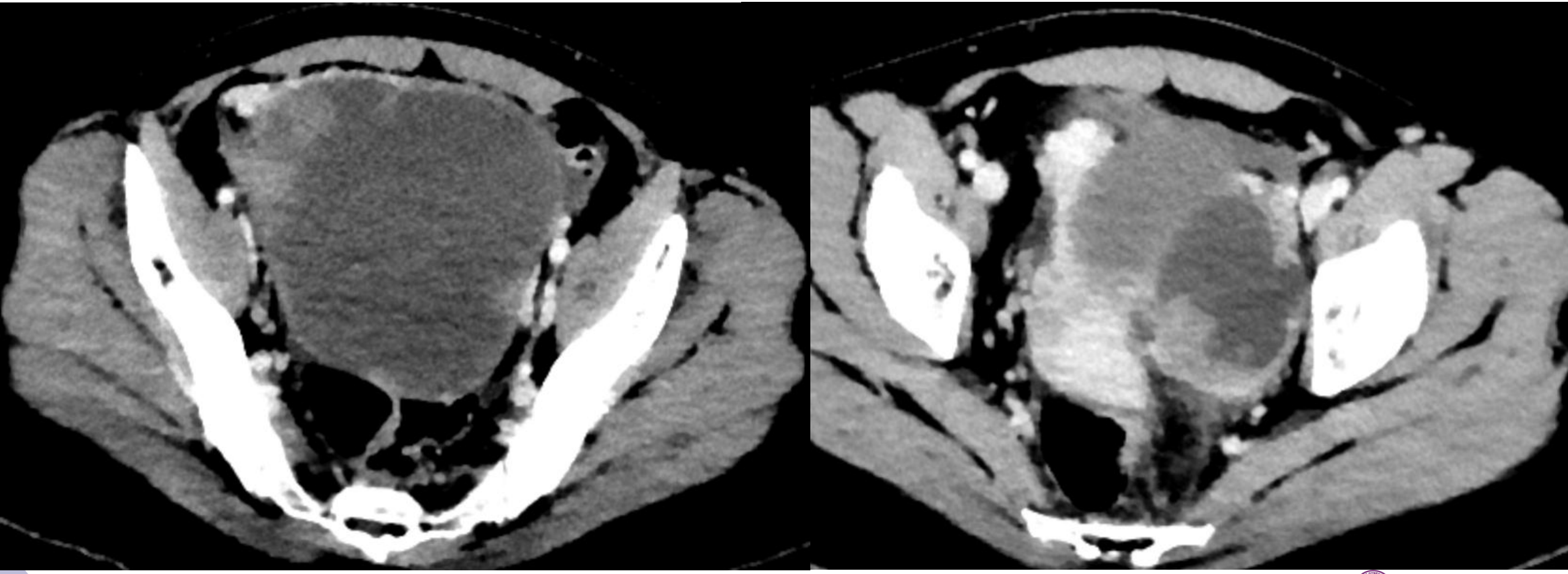
- Solid component
- Papillary projection
- Thickened septa or wall (≥3mm)
- Large size, multilocular
- Peritoneal seeding, LN metastases..
- Tumor marker elevation (CA-125, HE-4, CA19-9(mucinous))

Benign epithelial tumor

51/F

Malignant epithelial tumor

40/F



Malignant epithelial tumor

61/F

Benign? Borderline? Malignant?

O-RADS MRI Score

	대표 소견	악성 위험	임상적 방향 (참고)
0	**Incomplete** 병변 일부 미포함 · 시퀀스 누락 · artifact로 판독 불가	—	재검사
1	**Normal** Follicle, corpus luteum, 출혈성 낭종 ≤ 3 cm (폐경 전)	N/A	추적 불필요
2	**Almost benign** Simple/endometrioid 단방성 낭 · mature teratoma T2·DWI 모두 저신호 solid (fibroma) · paraovarian cyst	< 0.5%	산부인과 통상 관리 (추적 or 경과관찰)
3	**Low risk** 벽 조영되는 단방성 낭 (proteinaceous/hemorrhagic/mucinous) · 다방성 낭 + 얇은 격벽· solid + curve type 1	≈ 5%	양성 수술 or 추적 (전문의 판단)
4	**Intermediate** Solid tissue + curve type 2 (plateau) 지방 성분 + 조영되는 solid tissue	≈ 50%	부인종양 전문의 상의 수술적 확인 고려
5	**High risk** Solid tissue + curve type 3 (early peak 복막 파종 · 이차 전이 병변 동반	≈ 90%	부인종양 센터 의뢰 CT staging 연계

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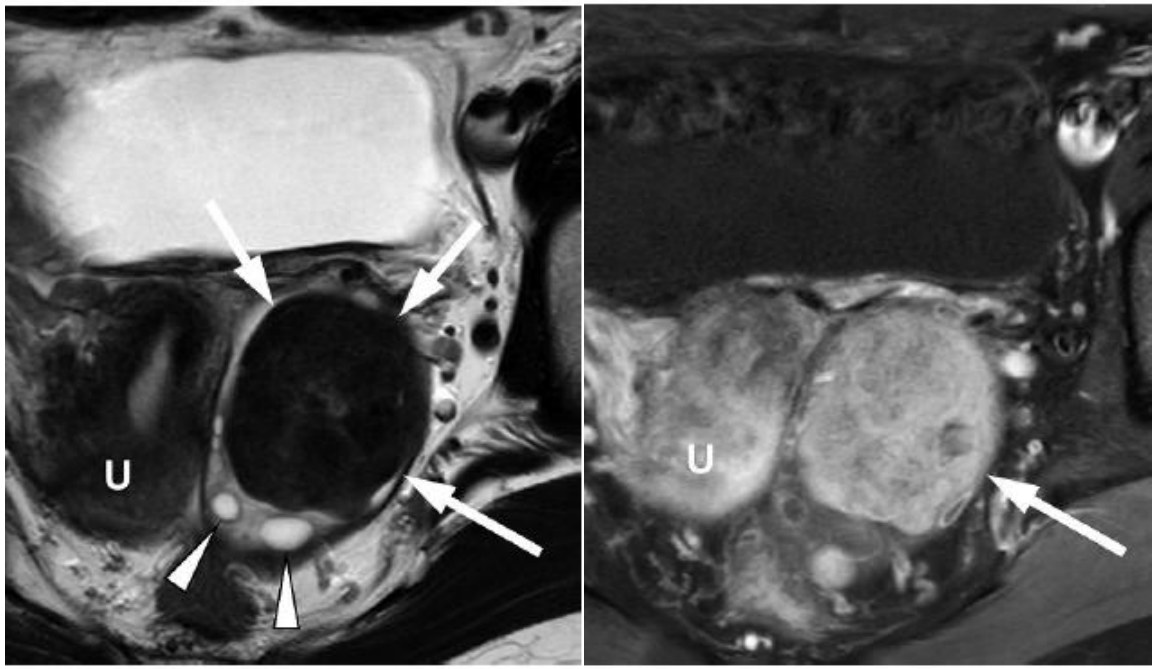
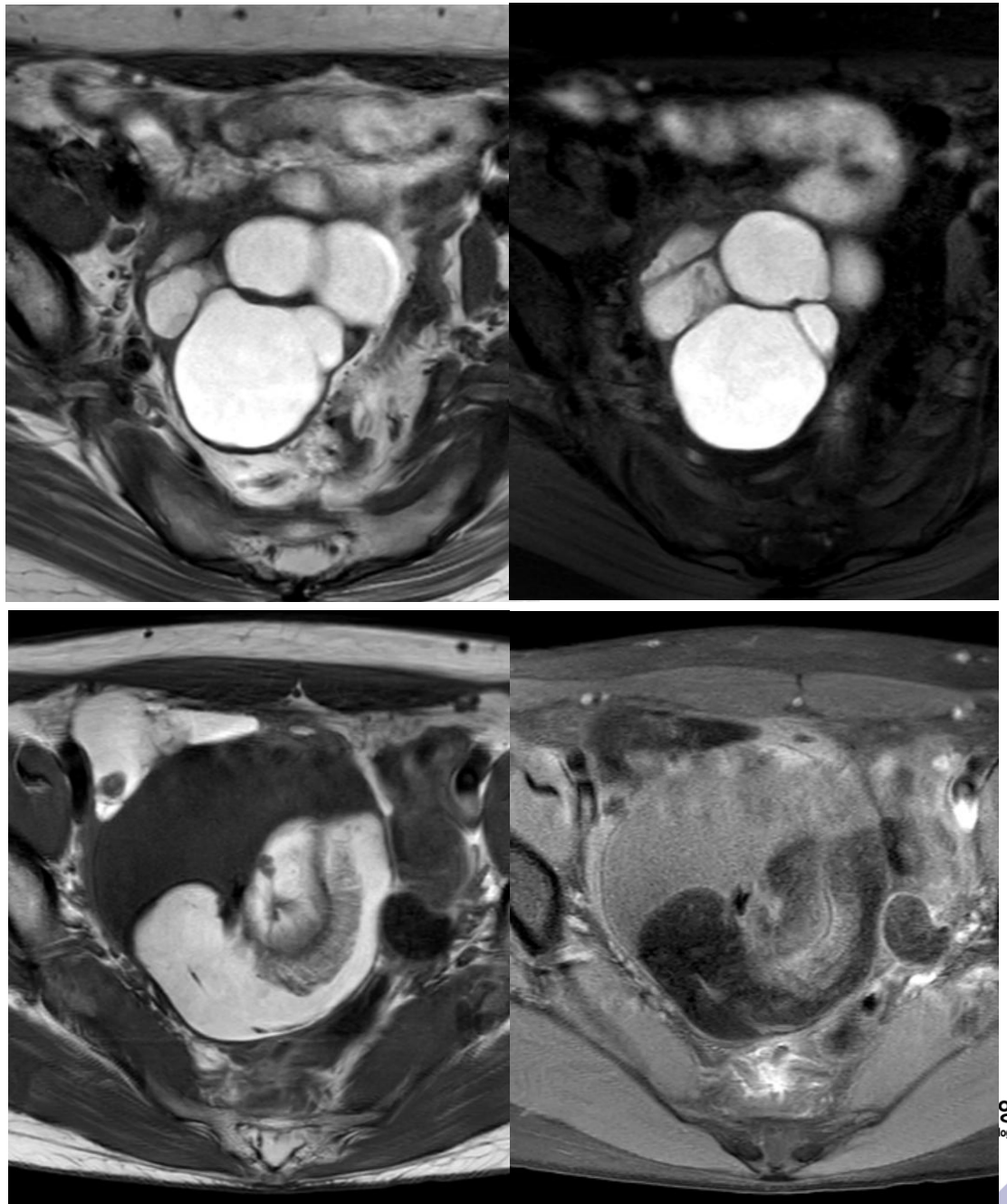
O-RADS score 2





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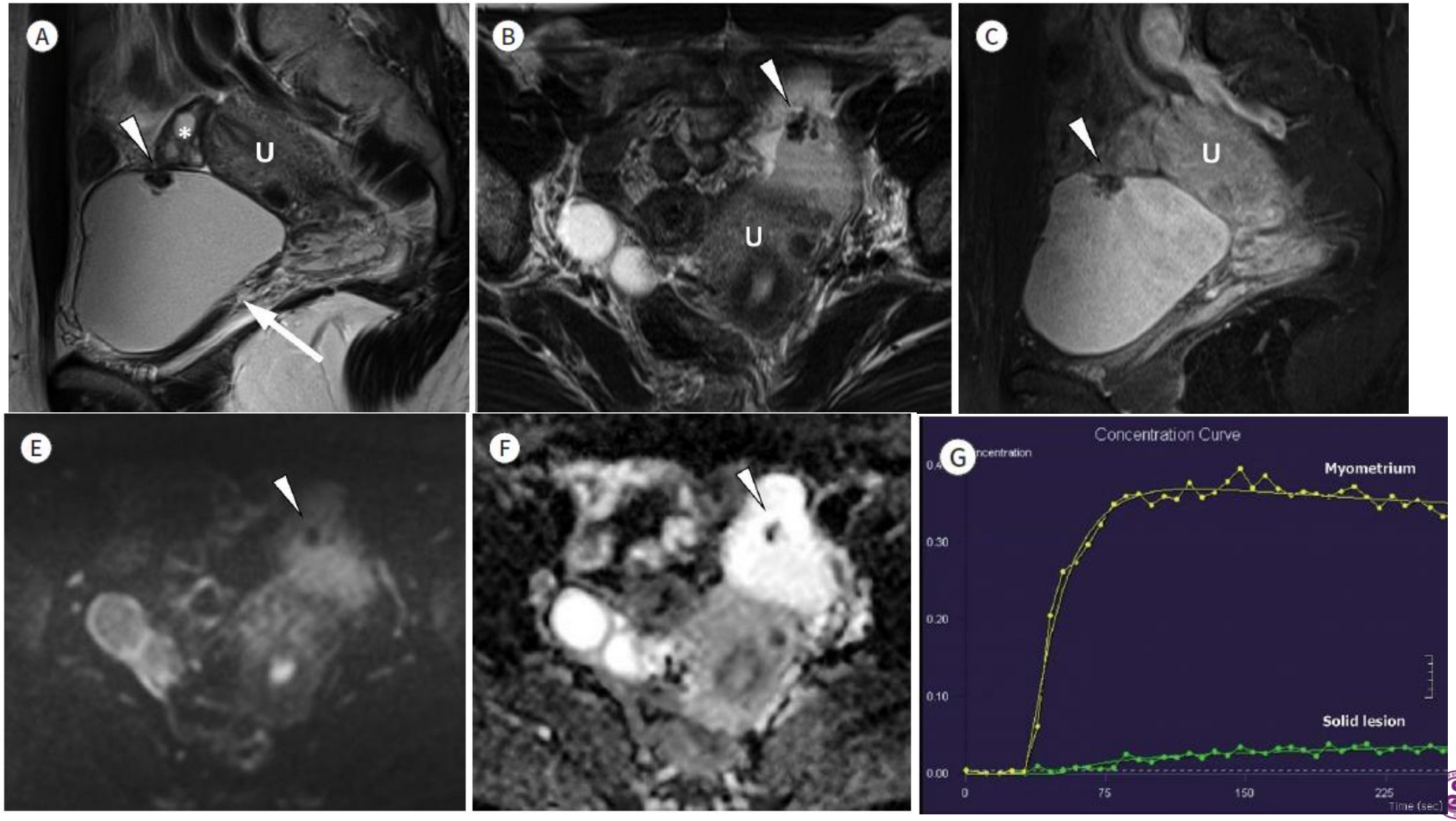
O-RADS score 3



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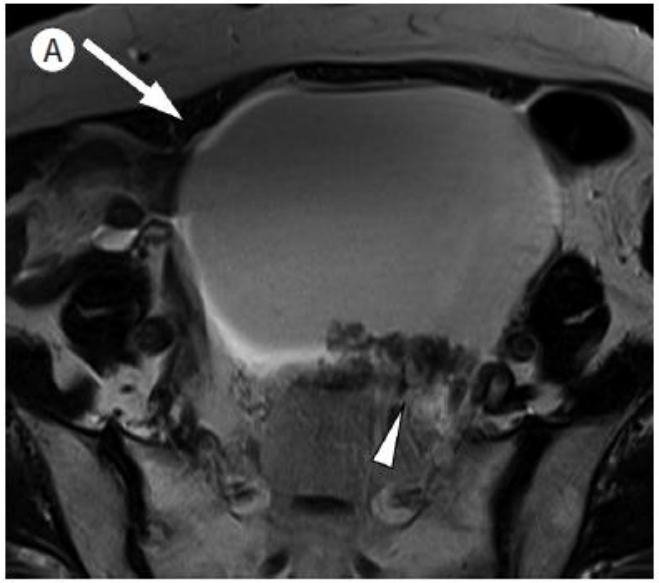
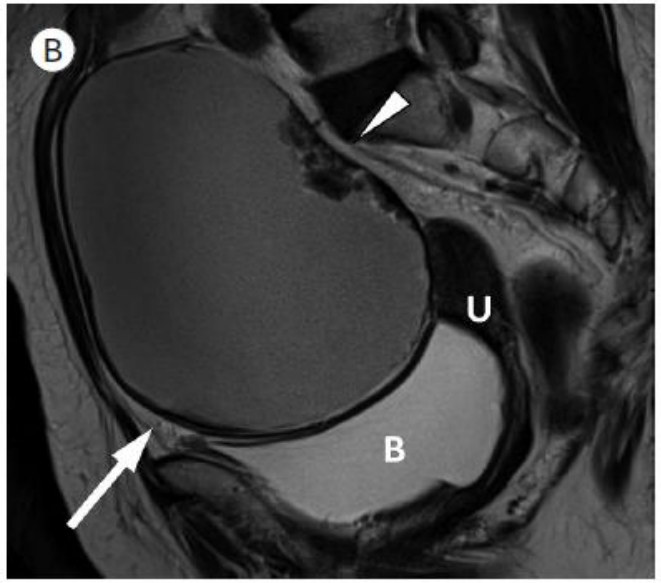
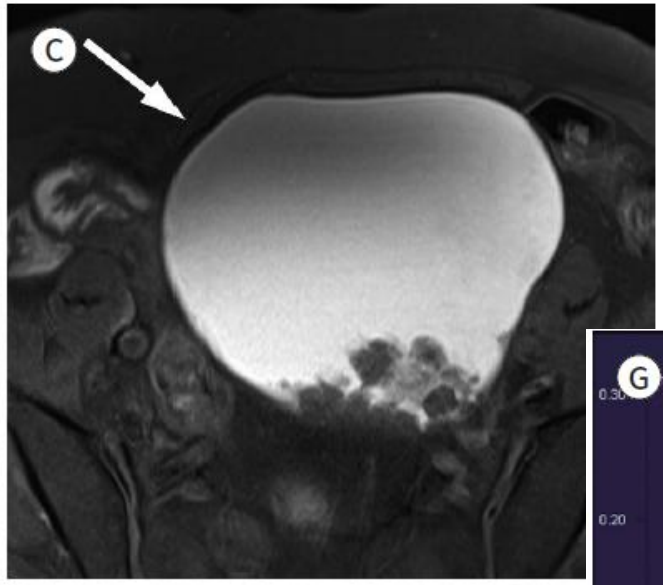
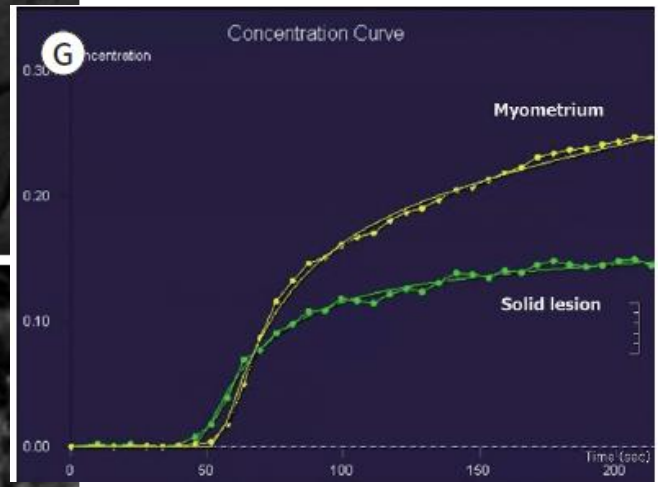
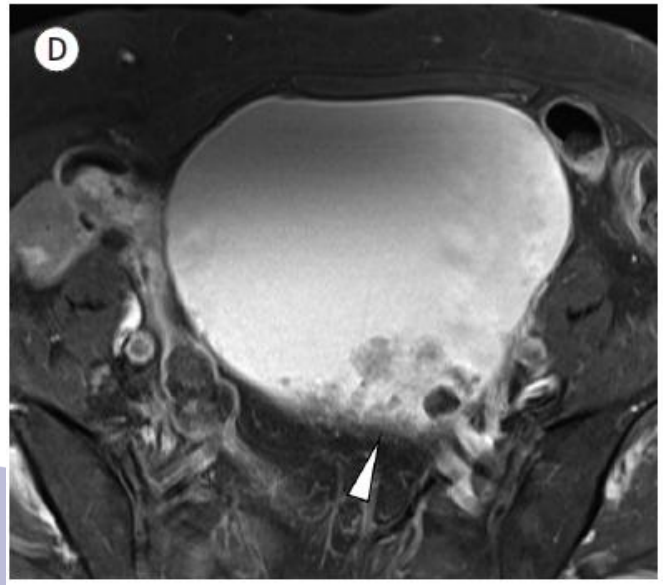
O-RADS score 4

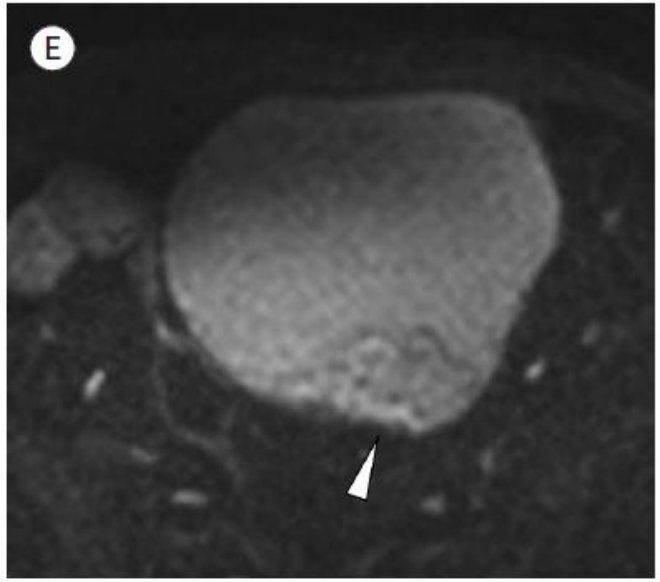


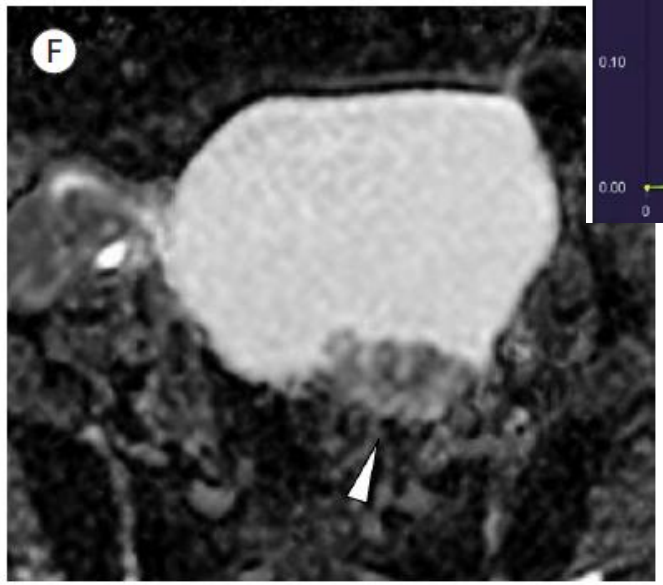












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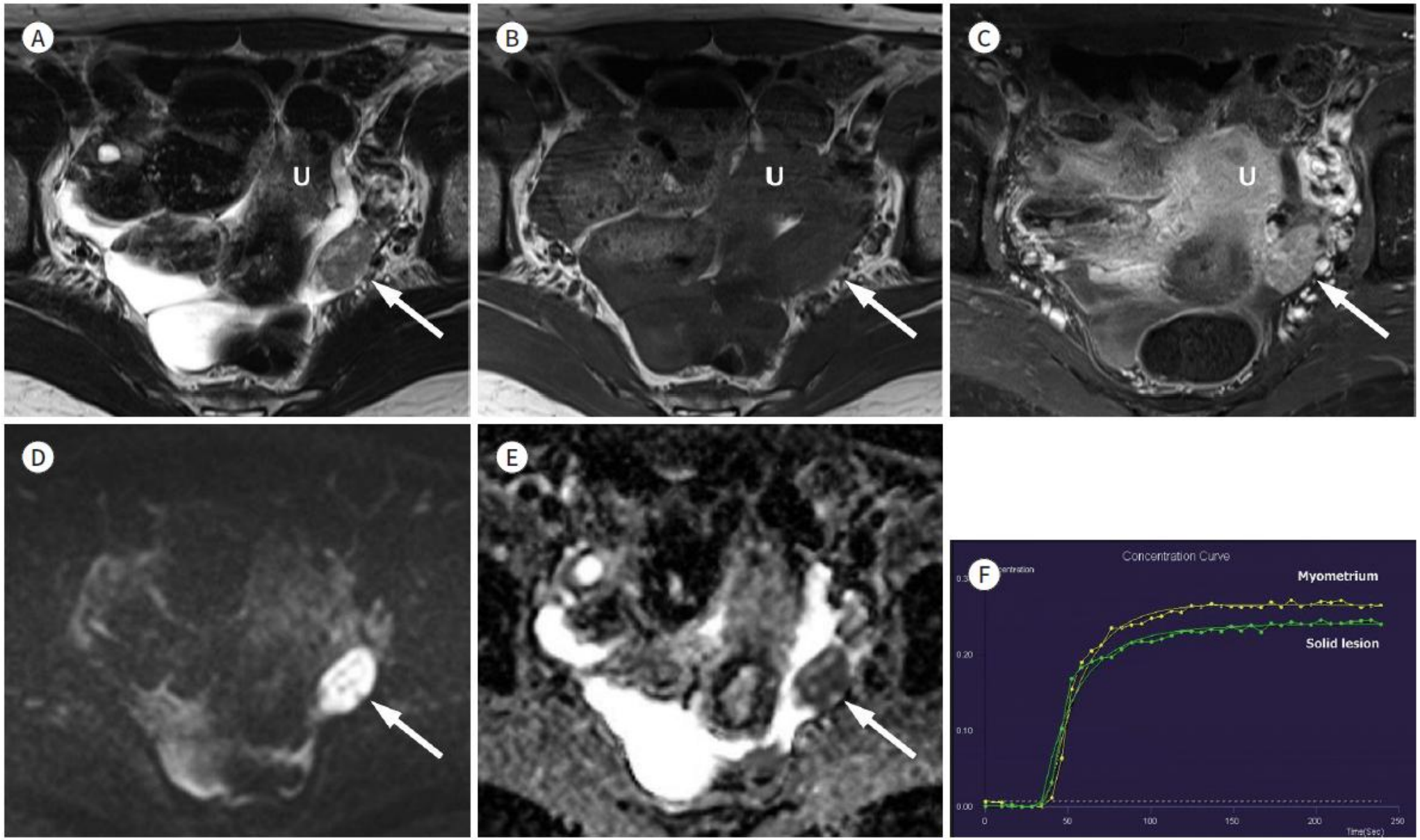
O-RADS score 5

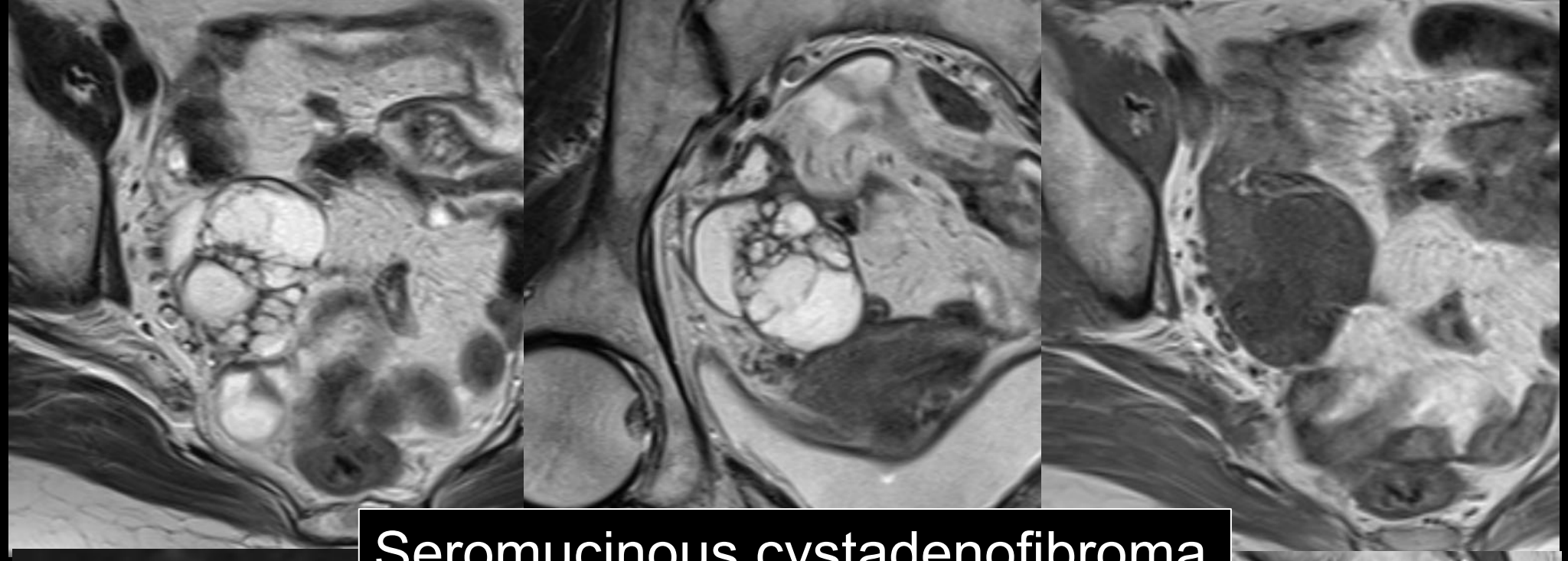


Limitations of O-RADS MRI

- DCE curve만 사용 (score 3-5)
  - Solid component 크기/비율, Papillary projection 개수 등 미반영
  - Reference tissue 선택에 따른 curve 편차 (폐경, adenomyosis, hysterectomy..)
- DWI 정보는 사용 안함
  - 확산제한정도도 malignancy 평가에 유용
- 낮은 PPV (score 4가 50%)

64/F

CA-125 11
HE4 33
CA 19-9 5.4



Seromucinous cystadenofibroma

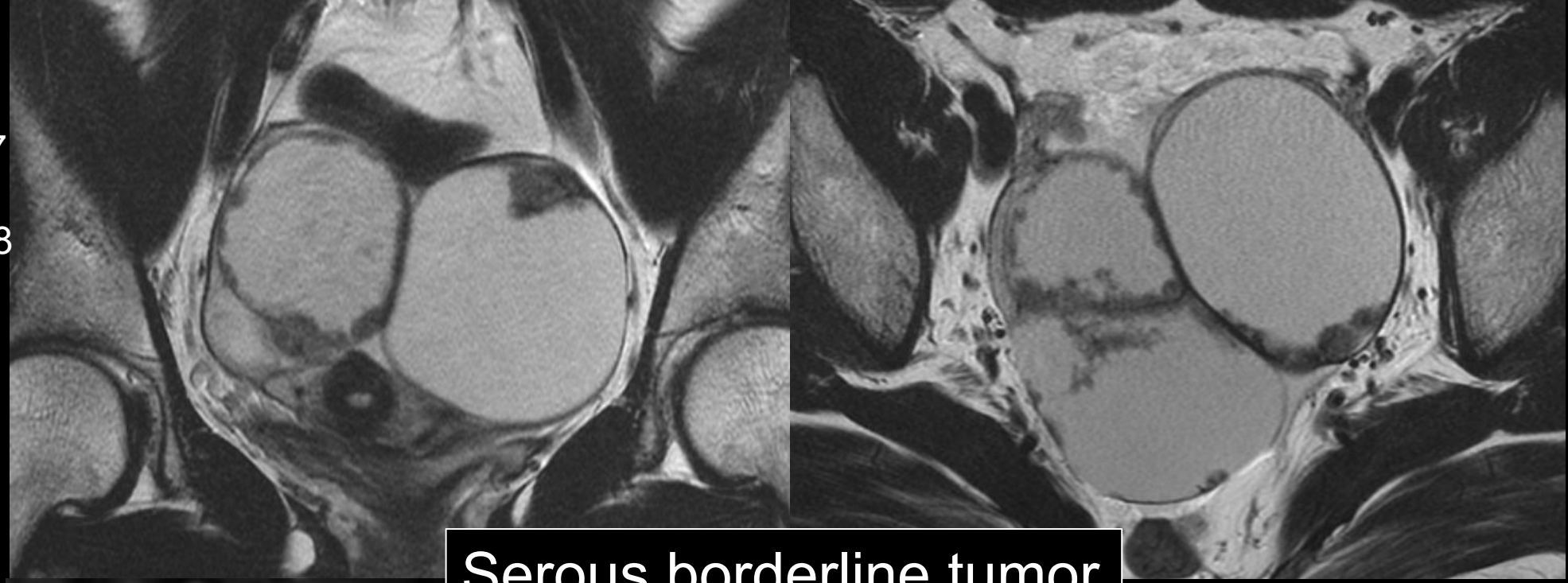
18/F

CA-125 463
HE4 39.1
CA 19-9
>1000

Mucinous borderline tumor

23/F

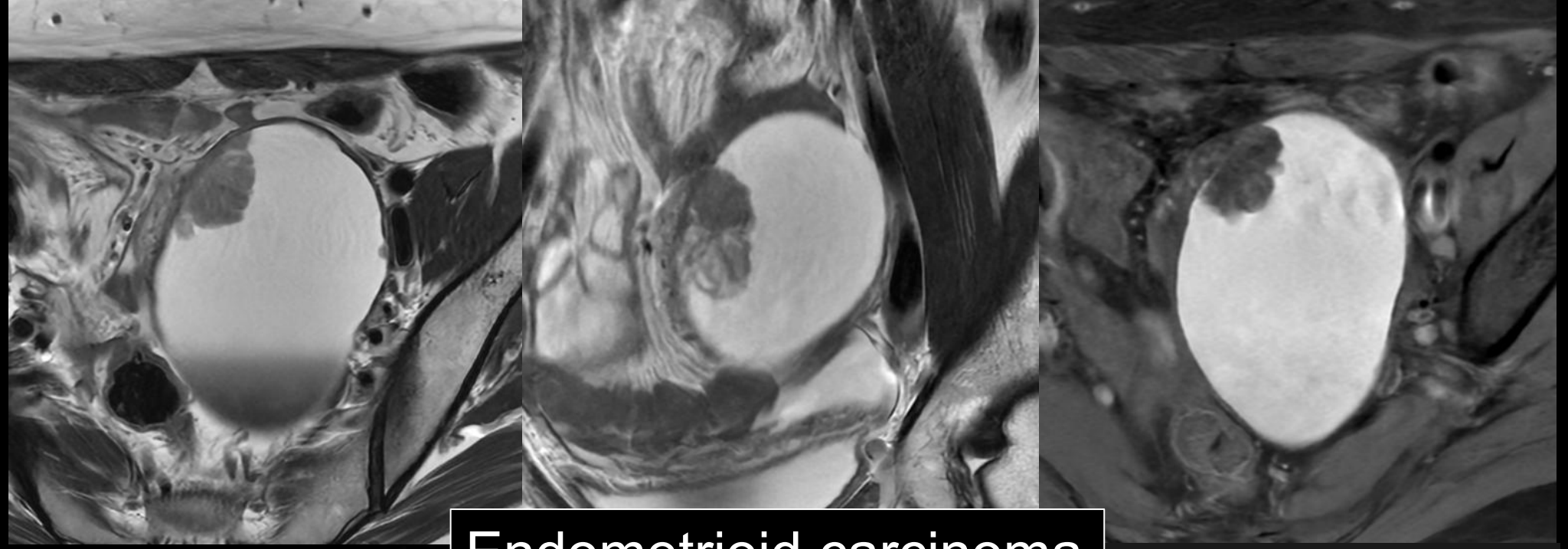
CA-125 15.7
HE4 37.9
CA 19-9 11.8



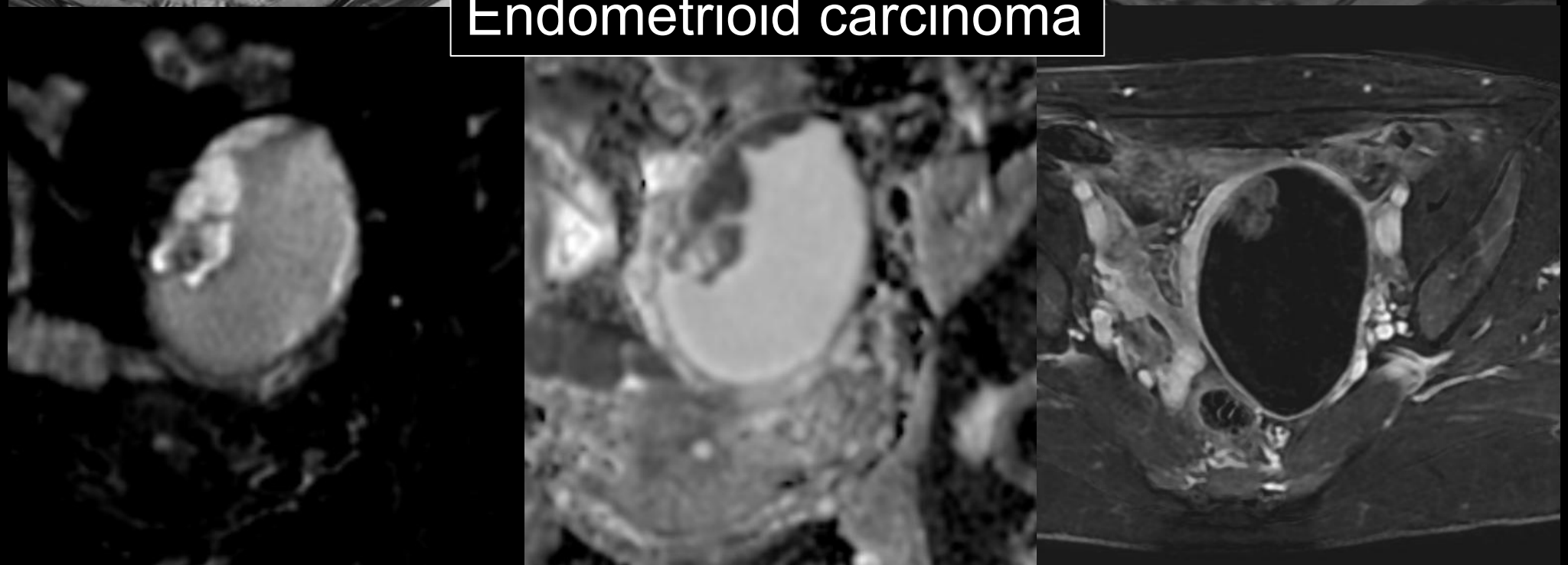
Serous borderline tumor

48/F

CA-125 38
HE4 49.8

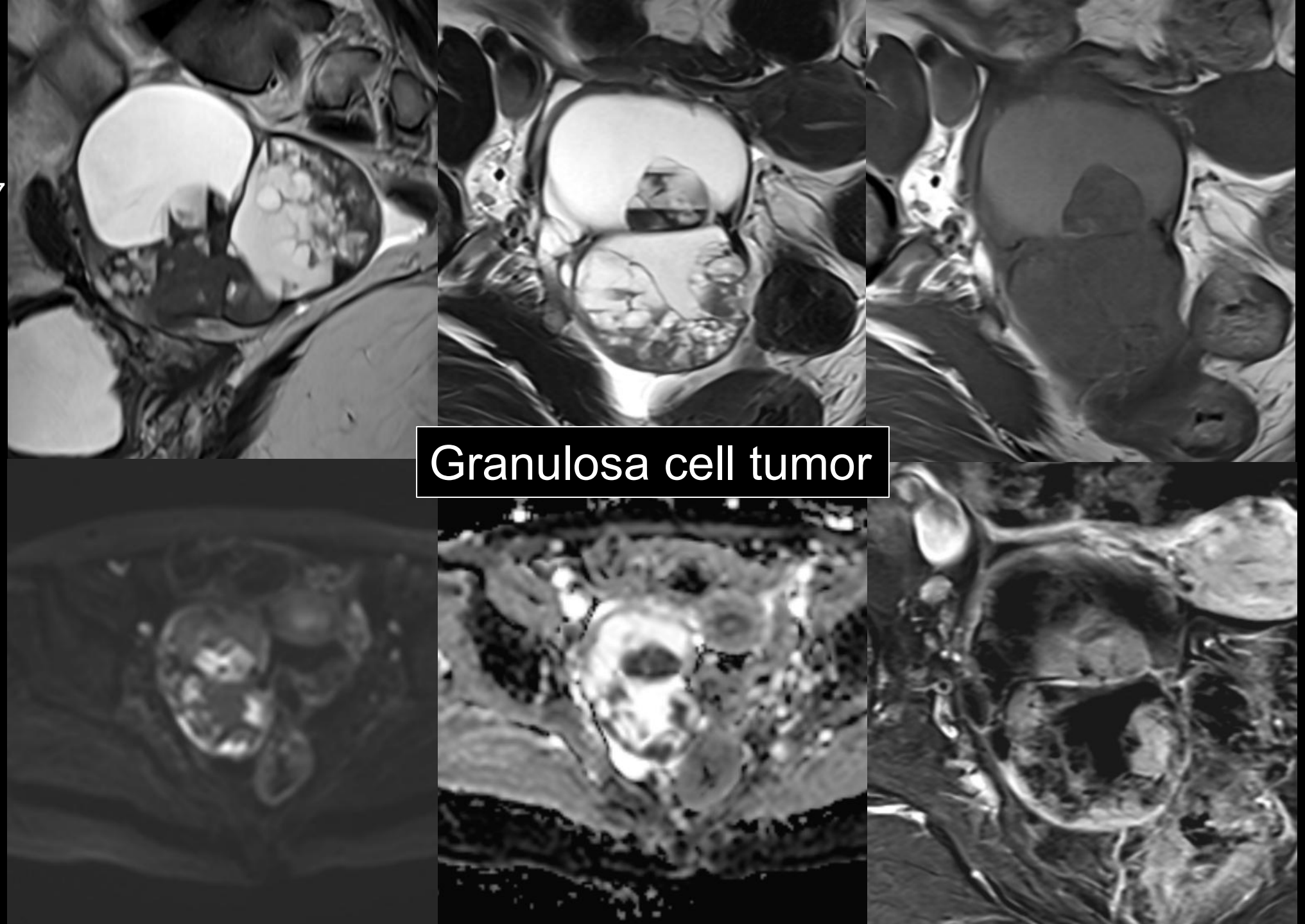


Endometrioid carcinoma



40/F

CA-125 6
HE4 41.2
CA 19-9 8.7



Granulosa cell tumor

Contents

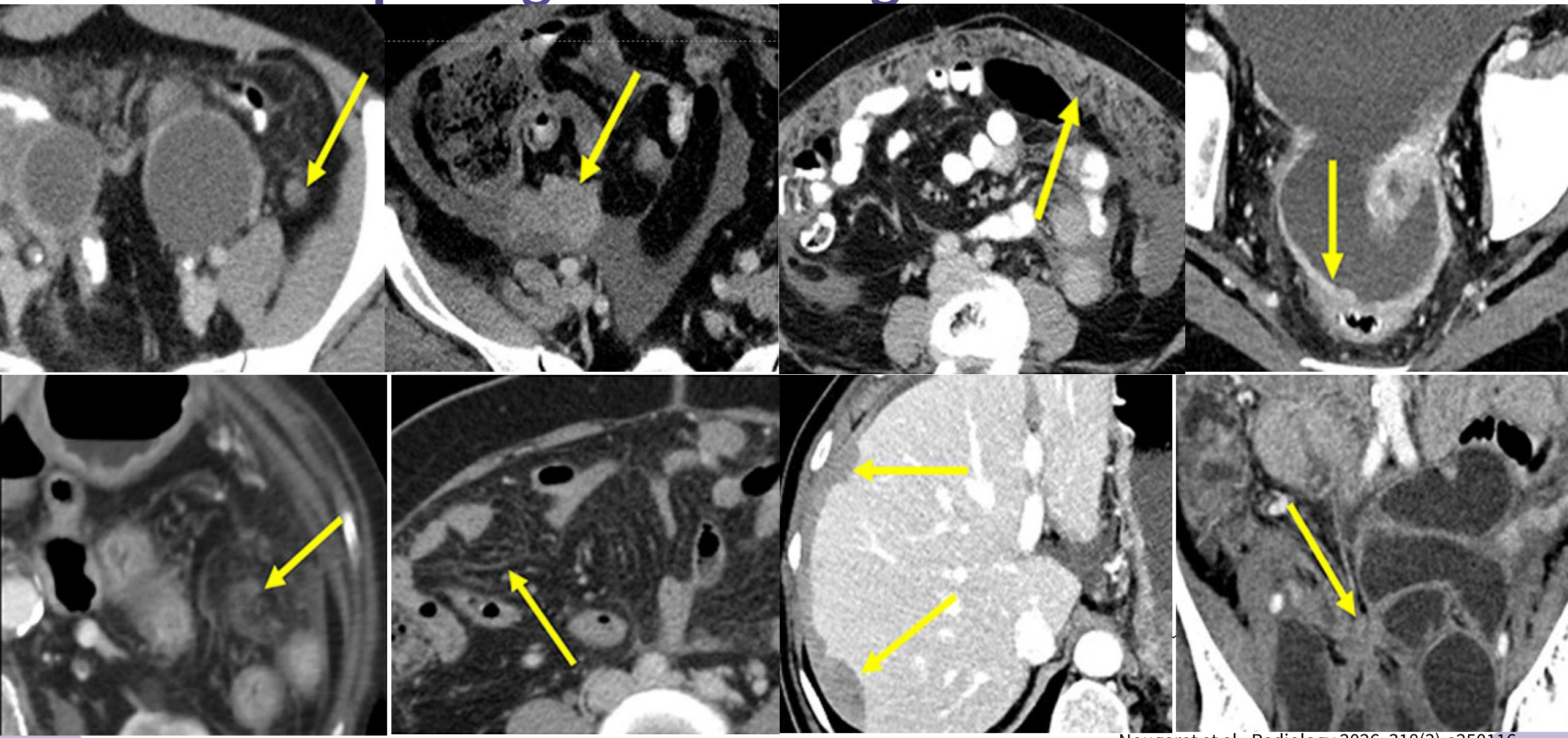
Disease extent evaluation

Evaluation of disease extent

- Detection of peritoneal spread: CT
- High sensitivity for omental involvement (90%–98%)
- Lower sensitivity for subdiaphragmatic disease (43%–93%) and bowel involvement (38%–55%)
- Often underestimates disease extent
  - Presence of ascites, subcentimeter lesions, or bowel serosal/mesenteric involvement
- Moderately sensitive in detecting lymph node metastases

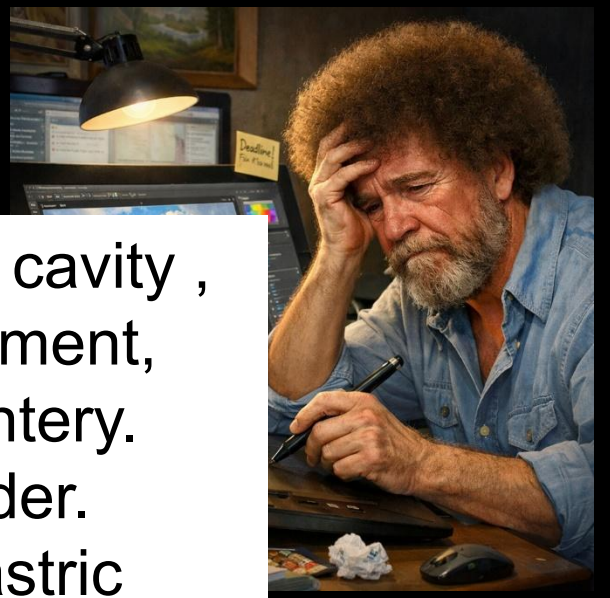
Nougaret et al., Radiology 2026; 318(3):e250116

Various morphologies of seeding



Nougaret et al., Radiology 2026; 318(3):e250116

Professional ‘annotator’

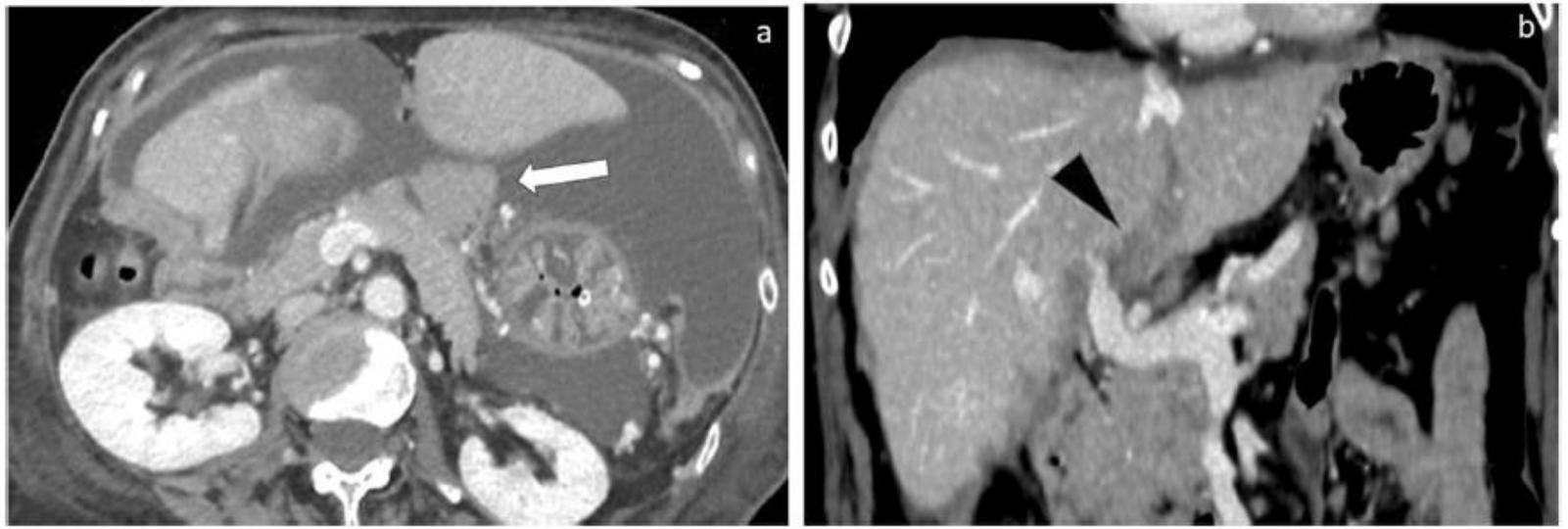


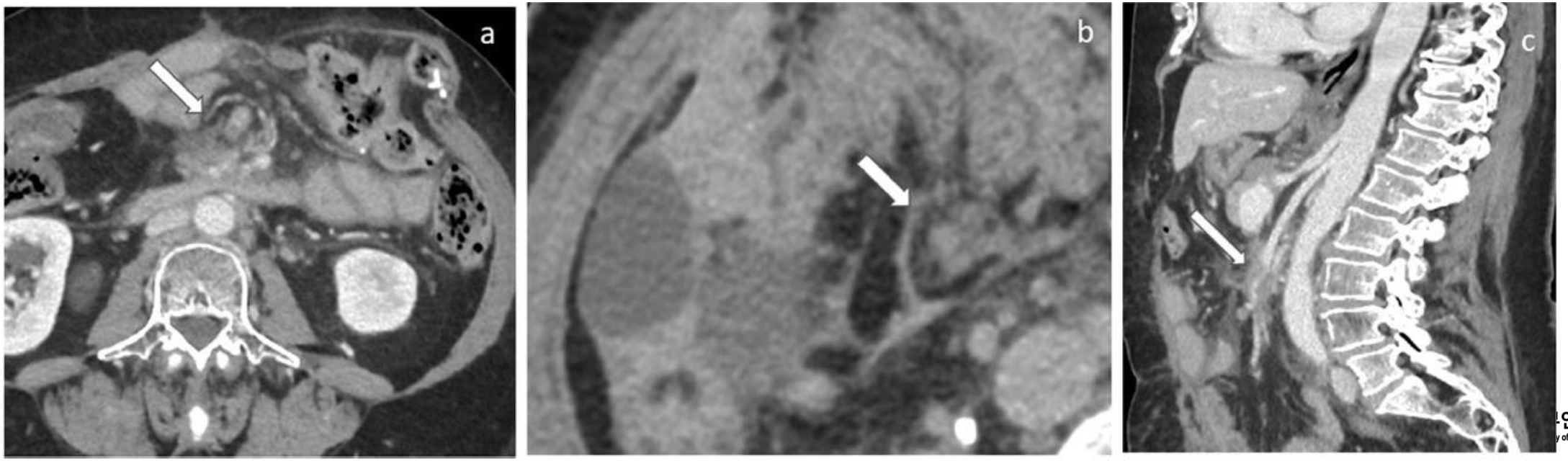
Increased extent of multifocal peritoneal seeding at pelvic cavity , vaginal stump, perihepatic, subhepatic area, falciform ligament, paracolic gutters, ant/post. parietal peritoneum and mesentery.
- pelvic seeding lesions invade RS colon, ileum, and bladder.
Newly developed 8.6cm loculated fluid collection in perigastric area.
Increased Rt. periureteral mets
- no change of Rt. hydronephrosis.
Increased size of metastatic lesions in abdominal wall and around Lt. quadratus lumborum muscle.
Increased size of metastatic LNs, paraaortic and aortocaval areas.
No change of cardiophrenic LNs.

Sites of disease that should be mentioned

Rizzo et al. European Radiology (2025) 35:4029–4039

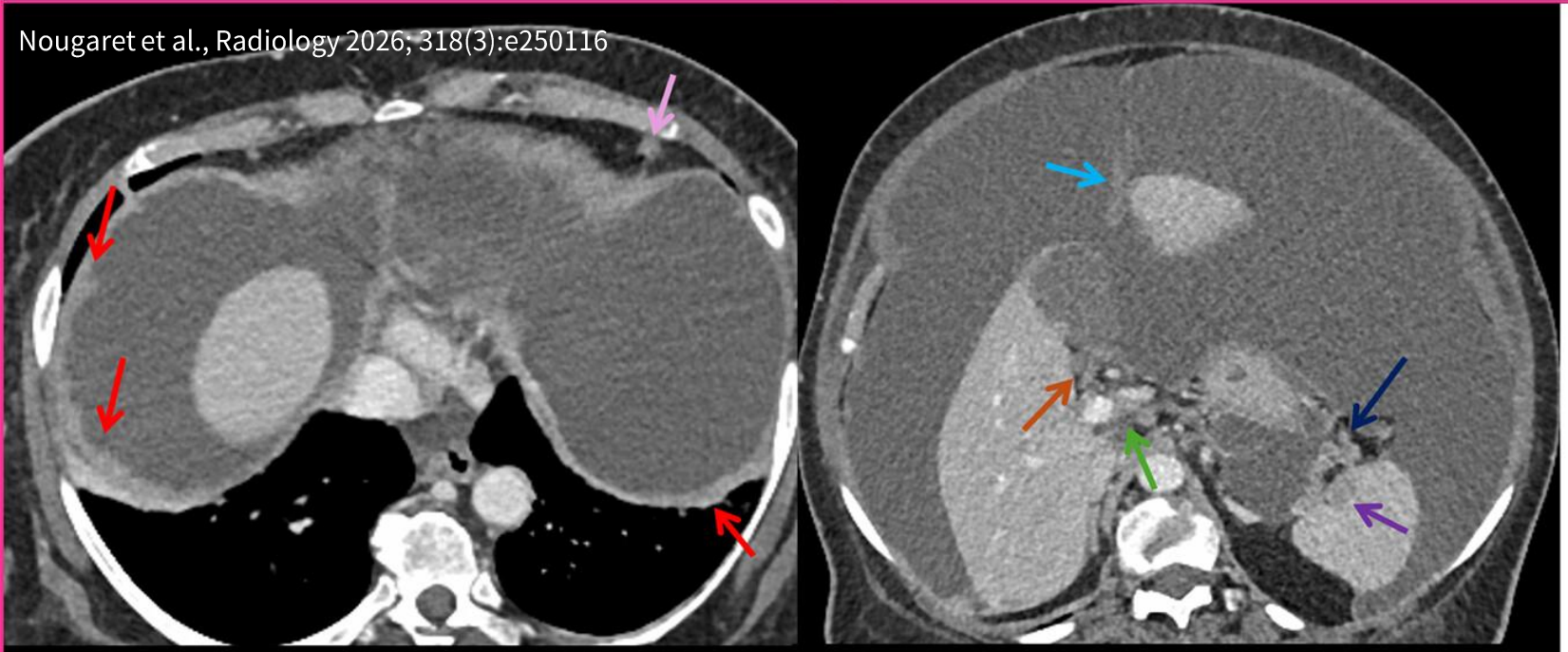
Sites of disease that should be mentioned

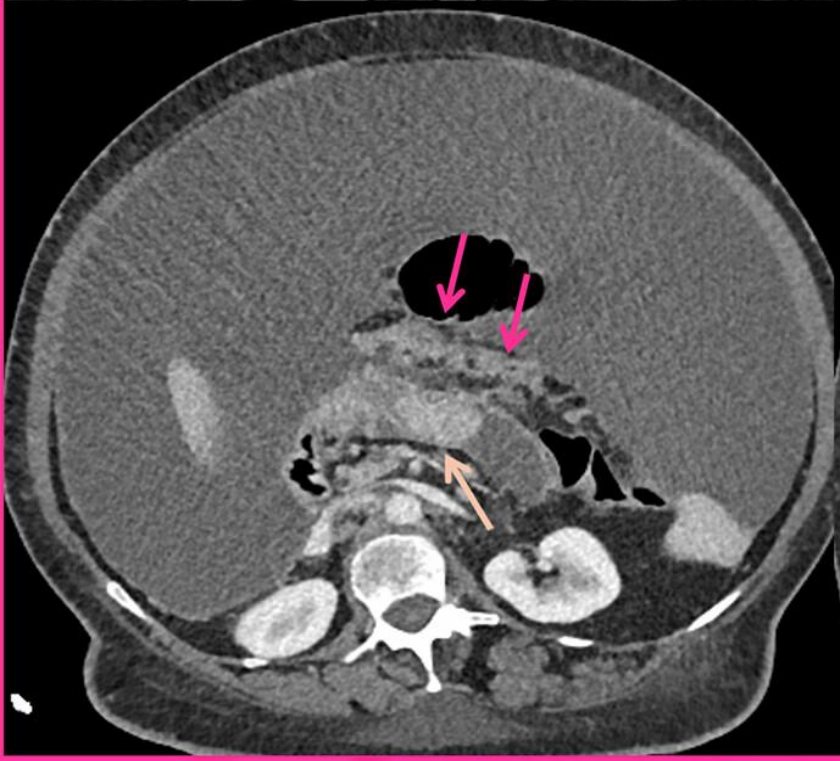


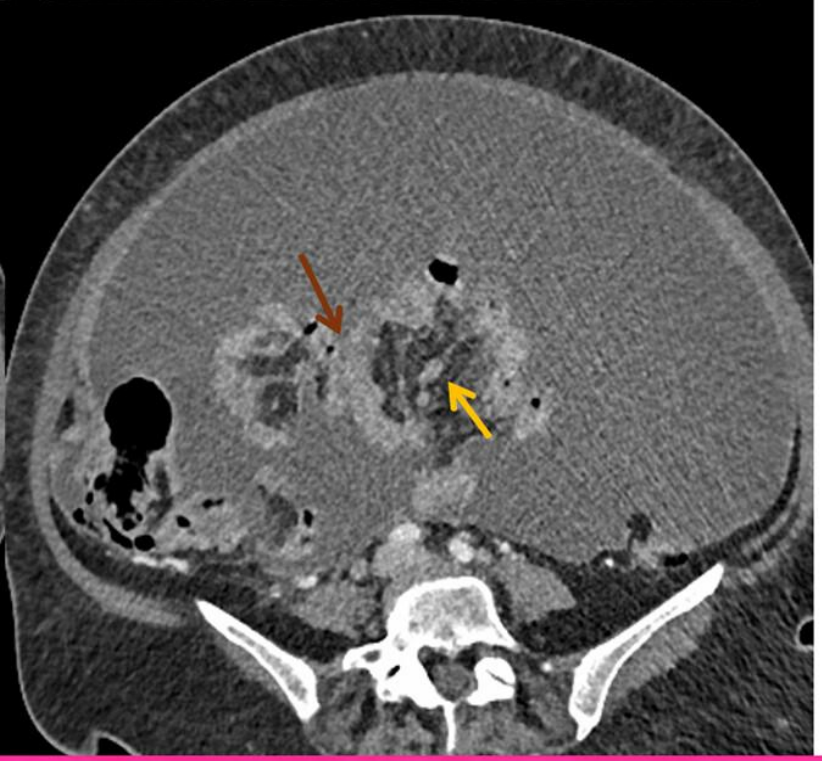


Rizzo et al. European Radiology (2025) 35:4029–4039

Nougaret et al., Radiology 2026; 318(3):e250116







SYNOPTIC REPORT

HEPATOBILIARY:
Parenchymal metastases: ABSENT
Capsular implants:
* Subdiaphragmatic: **PRESENT**
* Perihepatic: ABSENT
* Hepatorenal recess: ABSENT
* Fissure for ligamentum venosum: ABSENT
* Falciform ligament: **PRESENT**
* Porta hepatis: **PRESENT**
* Gallbladder fossa: **PRESENT**

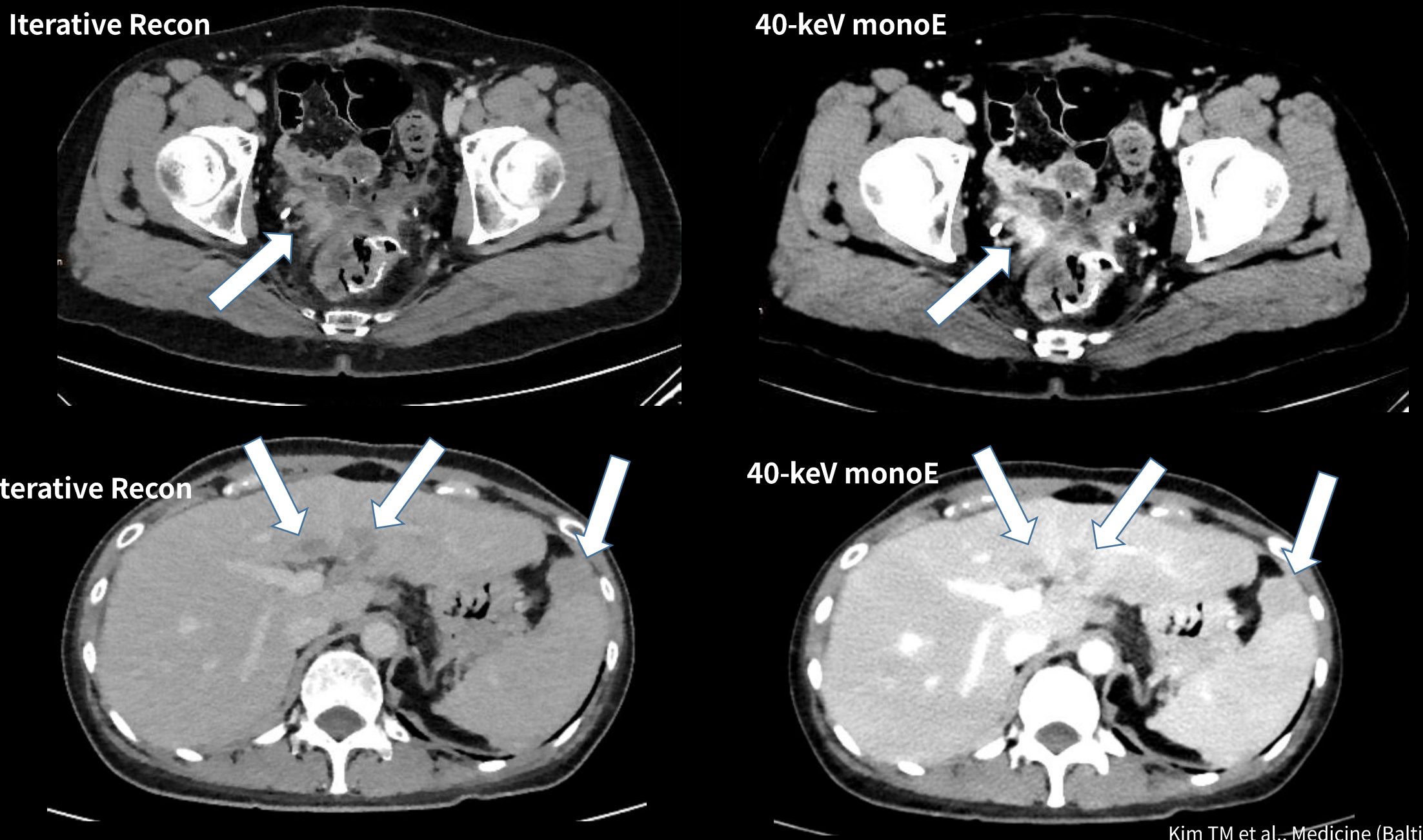
SPLEEN:
Parenchymal metastases: ABSENT
Capsular implants:
* Subdiaphragmatic: **PRESENT** (
* Hilar: **PRESENT**
* Gastrosplenic ligament: **PRESENT**
* Splenocolic ligament: ABSENT
* Splenorenal ligament: ABSENT

ABDOMINOPELVIC NODES:
* Supradiaphragmatic nodes : **PRESENT**
* Retrocrural nodes: ABSENT
* Abdominal nodes: ABSENT

PERITONEUM /MESENTERY/BOWEL:
Implants:
* Omental: **PRESENT** (not seen on the picture)
* Right paracolic gutter: ABSENT
* Left paracolic gutter: ABSENT
* Lesser sac: ABSENT
* Gastrocolic ligament: **PRESENT**
* Small bowel mesentery: **Tethering** and **discrete nodules**
* Root of small bowel mesentery: ABSENT
* Small bowel serosa: PRESENT (duodenum here)
* Gastric wall: ABSENT
* Colonic wall: ABSENT
* Cul de sac:
Ascites: **PRESENT**

IMPRESSION: Diffuse peritoneal carcinomatosis with notably involvement of the small bowel, mesentery and porta hepatis

Virtual 40-keV monoE images significantly increase **the contrast of peritoneal implants**.



Kim TM et al., Medicine (Baltimore) 2020

Take Home Message

- Imaging modalities
  - CT – 높은 공간해상도, 넓은 부위 커버 가능. Disease extent 평가
  - MR – 높은 조직대조도. Adnexal mass characterization
  - Pelvis MRI 기본 sequence 이해: T2WI, T1WI, DWI, DCE
- Recommend MRI for indeterminate adnexal masses
  - Signs of borderline-malignancy: solid component, papillary projection
  - O-RADS MRI
- Challenges in detecting peritoneal seeding

Korean Society of
Gynecologic Oncology

2026년
대한부인종양학회 하계학술대회
제20차 젊은의사 워크숍
제9차 분과전문의 연수강좌
제1차 부인종양간호사 연수강좌
& 카데바 워크숍

일자 2026년 8월 8일(토) - 9일(일)

장소 위례 밀리토피아 마린 호텔 / 가톨릭대학교 응용해부연구소

대한부인종양학회
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