

女性盆腔病变MRI信号分析与 诊断思路

欧阳汉

中国医学科学院肿瘤医院 影像诊断科

子宫病变

良性

- 内膜增生
- 平滑肌瘤
- 腺肌症
- 内膜息肉
- 宫颈纳氏囊肿

恶性

- 子宫内膜癌（宫体癌）
- 宫颈癌
- 子宫肉瘤及上皮和非上皮混合性肿瘤
- 淋巴瘤

诊断思路

1

病变部位

2

病变形态

3

与周围组织关系

4

信号表现

病变部位

宫体内膜/颈管粘膜

宫体肌层/宫颈基质

浆膜外

内膜增生

内膜息肉

粘膜下肌瘤

宫颈纳氏囊肿

内膜癌

宫颈癌

上皮和非上皮混合性肿瘤
(癌肉瘤、腺肉瘤)

淋巴瘤

肌壁间肌瘤

腺肌症

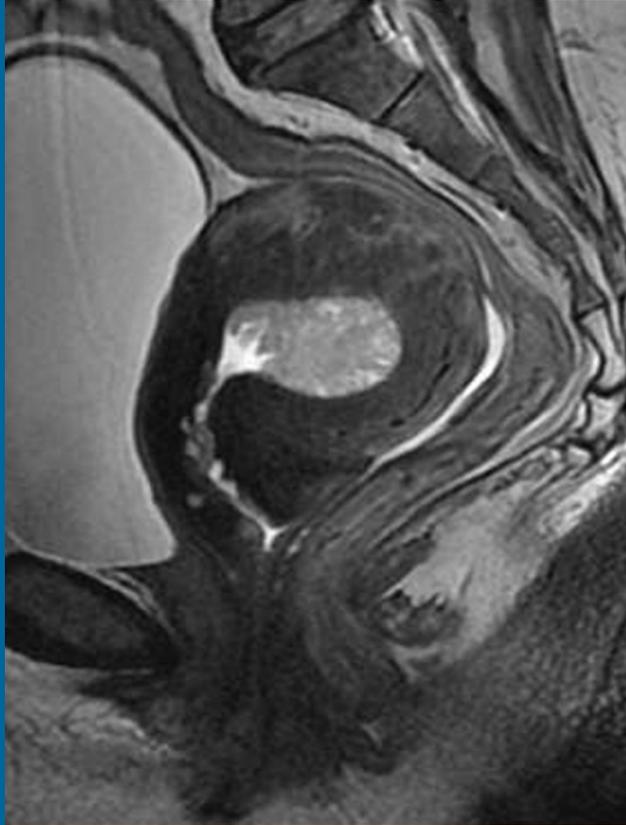
宫颈癌

肉瘤(平滑肌肉瘤、
内膜间质肉瘤)

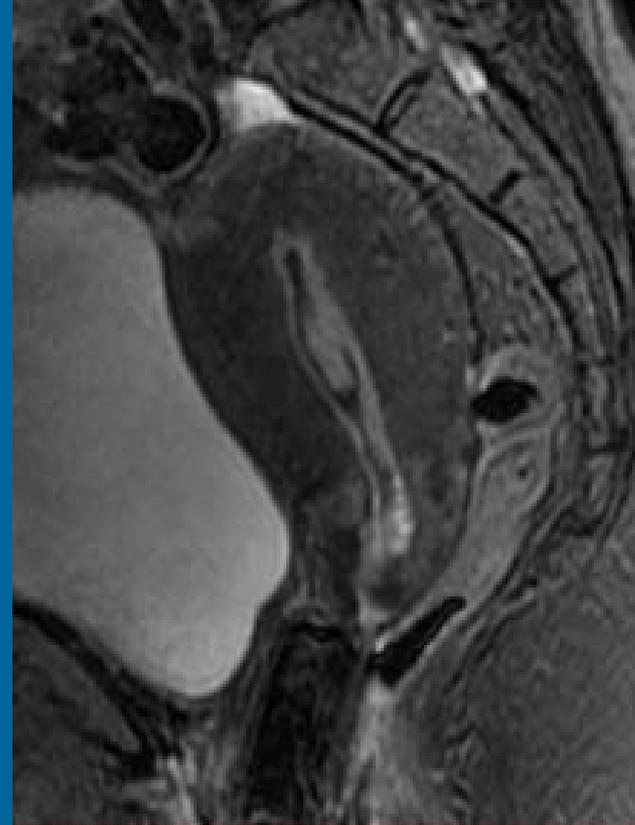
淋巴瘤

浆膜下/阔韧带肌瘤

病变部位



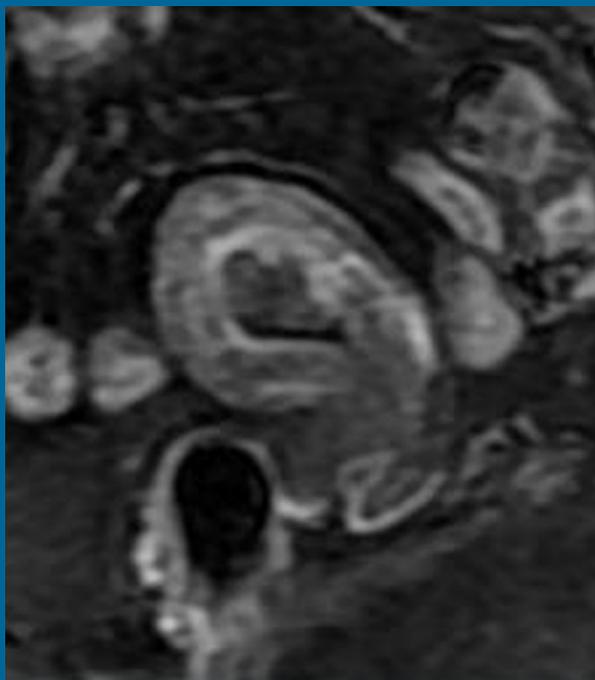
内膜不典型增生



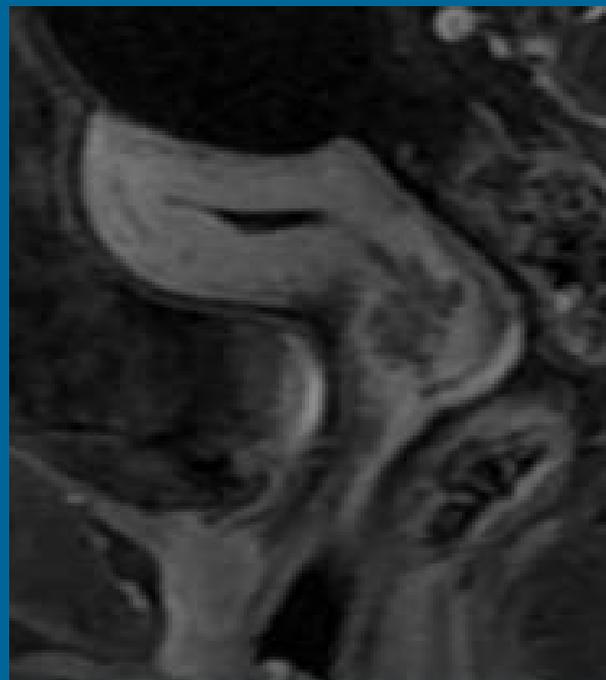
内膜息肉

病变位于宫体内膜

病变部位



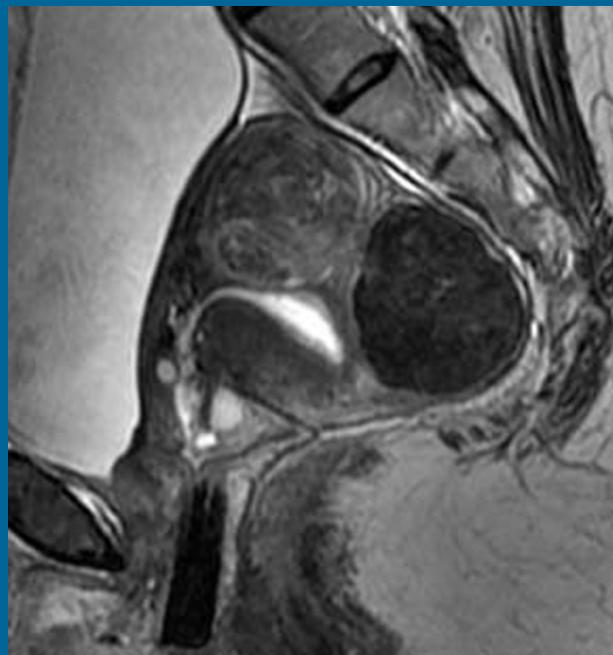
内膜癌



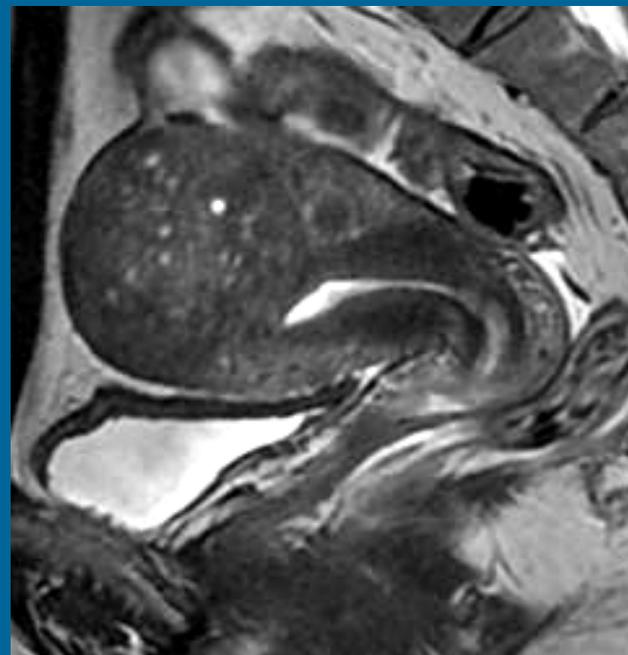
宫颈癌

病变位于宫体内膜/颈管粘膜

病变部位



肌壁间肌瘤



腺肌症（局限型）

病变位于肌层

病变形态

结节/类球形
/不规则肿块伴浸润

弥漫生长

长条形

肌瘤

内膜息肉

内膜癌

宫颈癌

平滑肌肉瘤

上皮和非上皮混合性肿瘤
(癌肉瘤、腺肉瘤)

淋巴瘤

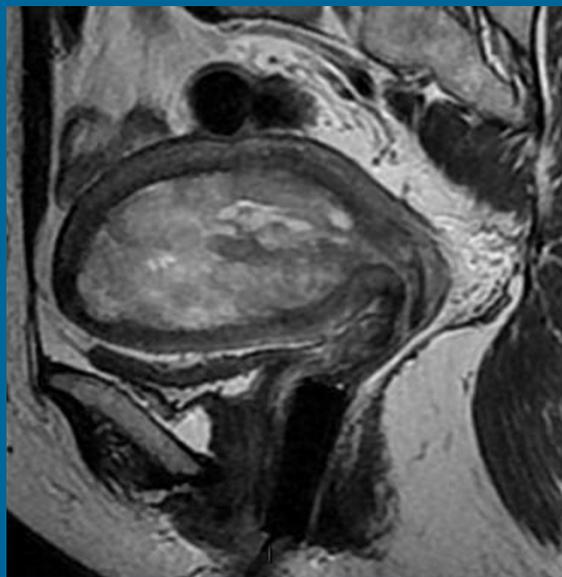
内膜增生

腺肌症

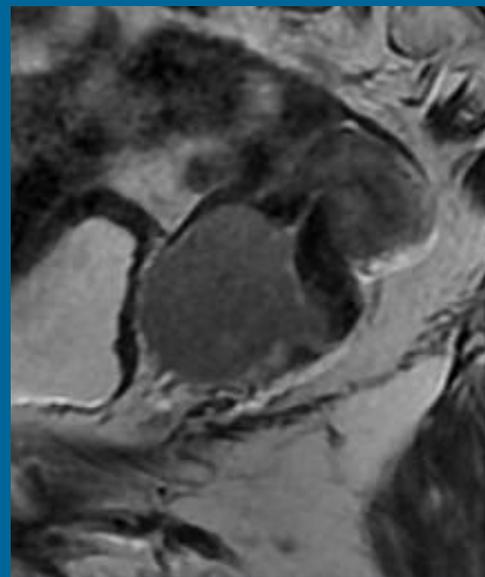
内膜间质肉瘤

内膜息肉

病变形态



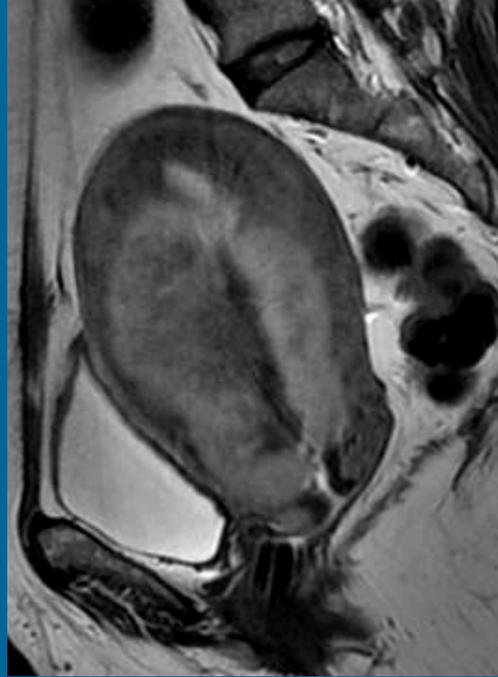
癌肉瘤



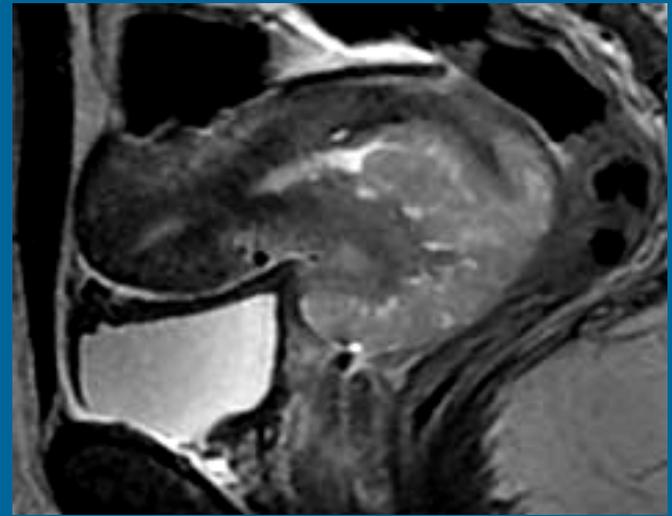
淋巴瘤

类球形

病变形态



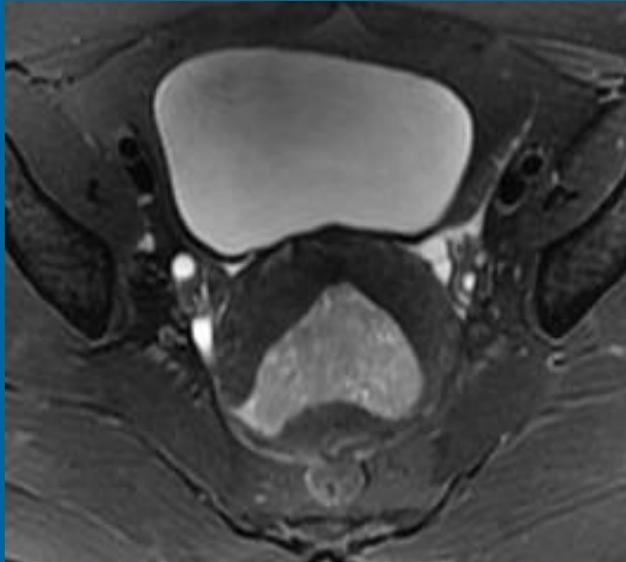
内膜癌



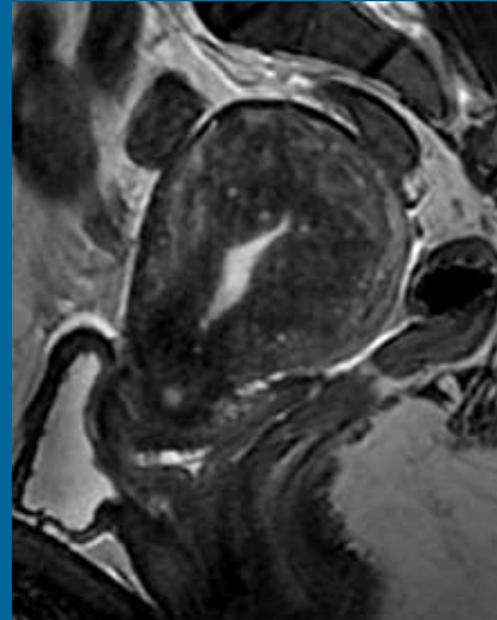
宫颈癌

不规则肿块伴浸润

病变形态



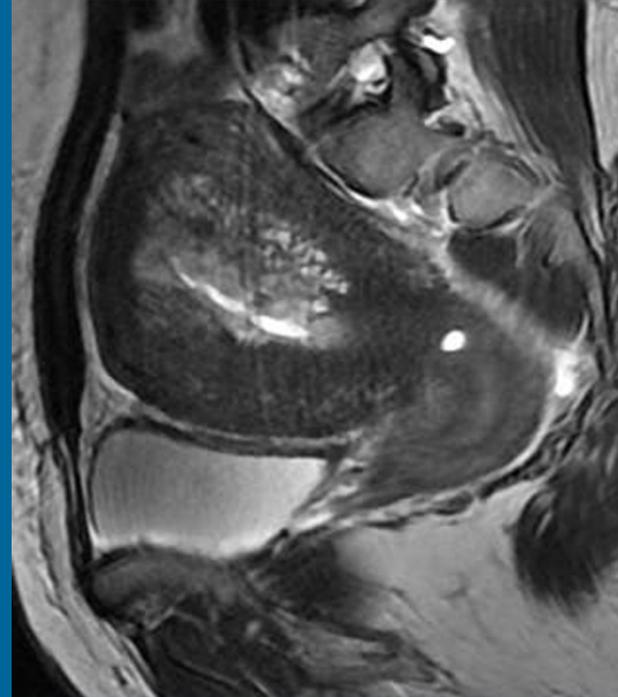
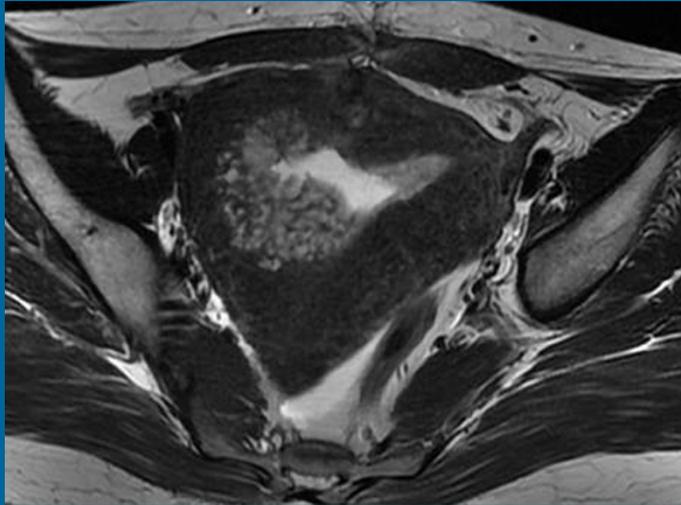
内膜不典型增生



腺肌症（弥漫型）

弥漫生长

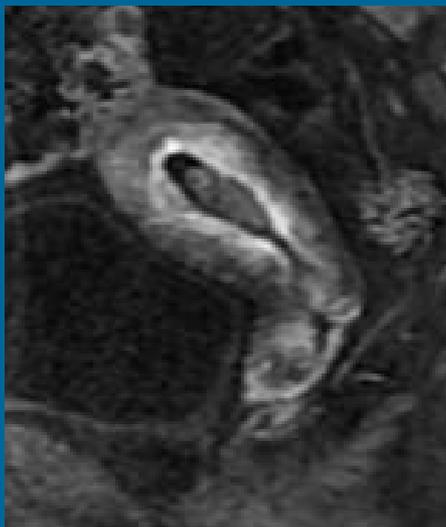
病变形态



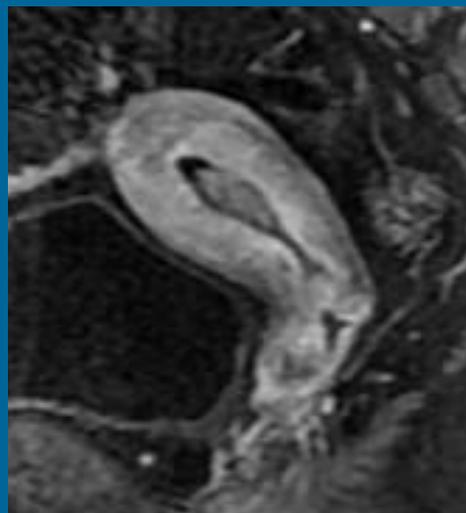
内膜间质肉瘤

弥漫生长

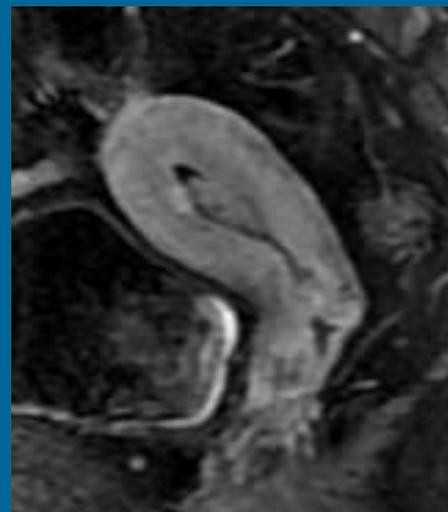
病变形态



长条形



内膜息肉



与周围组织关系

清楚锐利

相对清楚

浸润/不清楚

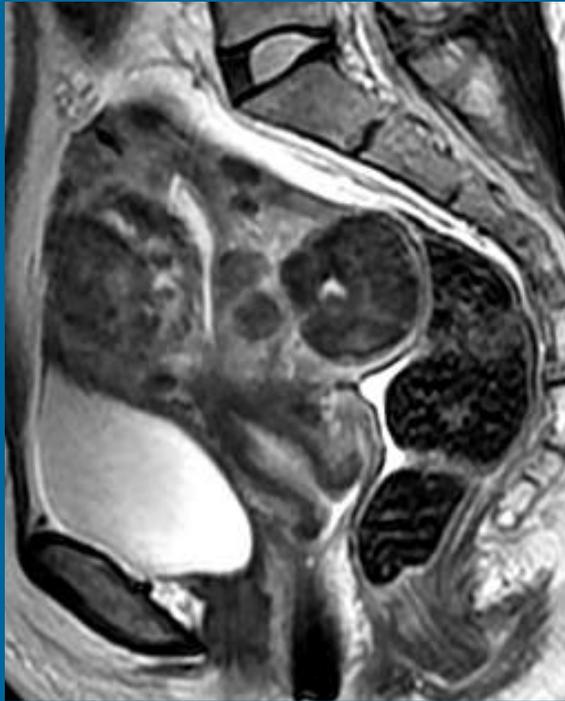
- 肌瘤
- 内膜息肉
- 内膜增生
- 纳氏囊肿

- 淋巴瘤
- 上皮和非上皮混合性肿瘤（癌肉瘤、腺肉瘤）

- 腺肌症
- 内膜癌
- 宫颈癌
- 平滑肌肉瘤
- 内膜间质肉瘤

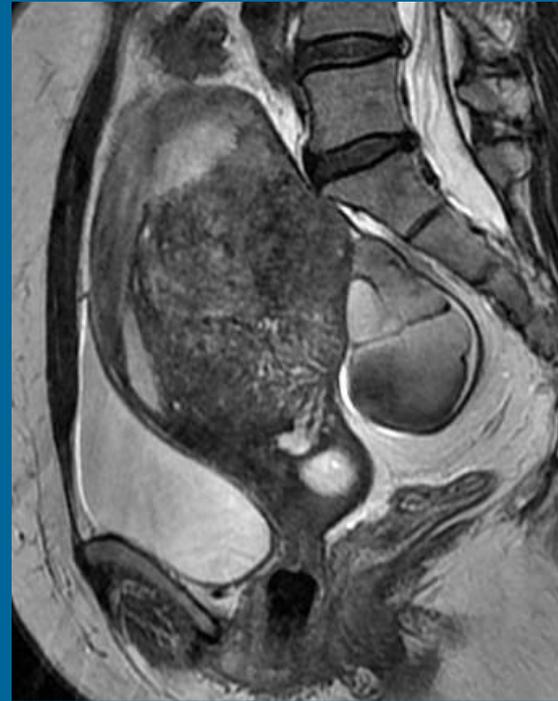
与周围组织关系

多发肌瘤



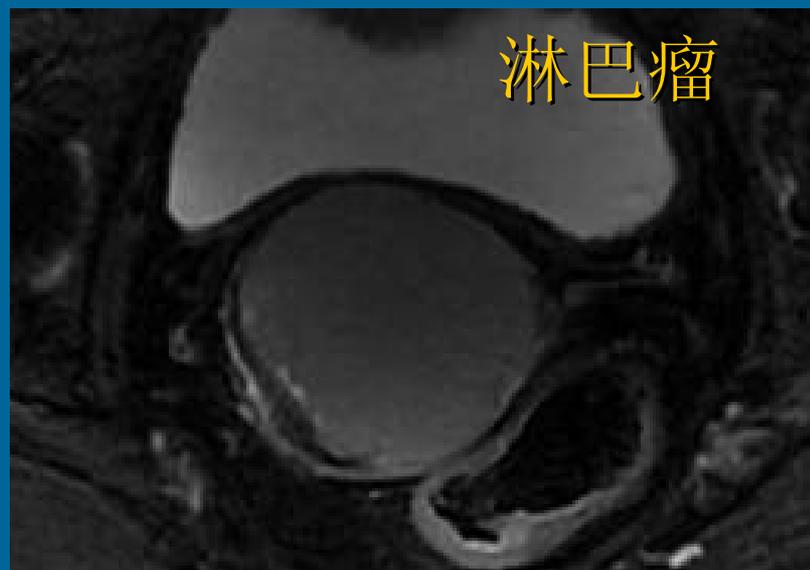
边界清楚锐利

腺肌症（局限型）

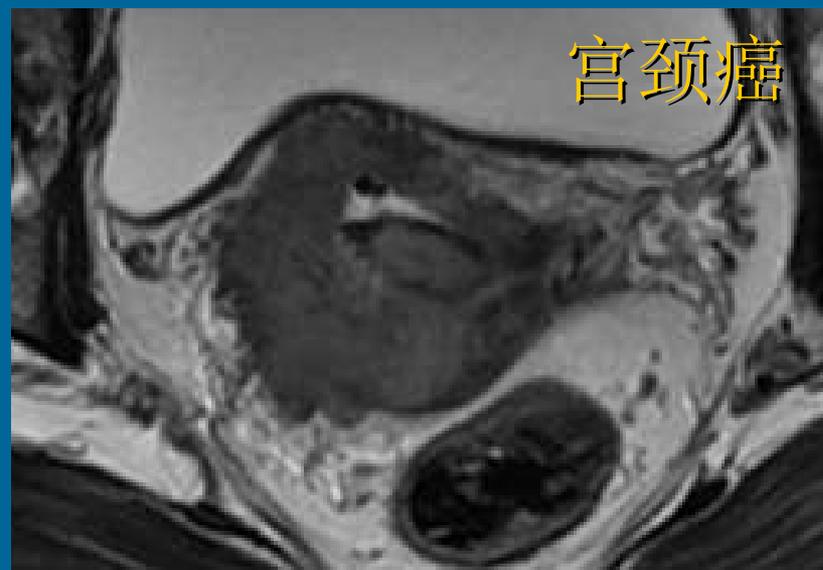


与肌层分界不清楚

与周围组织关系



边界相对清楚



浸润周围组织，边界不清楚

信号表现—平扫

T1高T2高

T1低T2高亮

T1等T2等

T1等T2中高

合并出血

- 腺肌症
- 肌瘤
- 内膜癌
- 癌肉瘤

脂肪成分

- 肌瘤

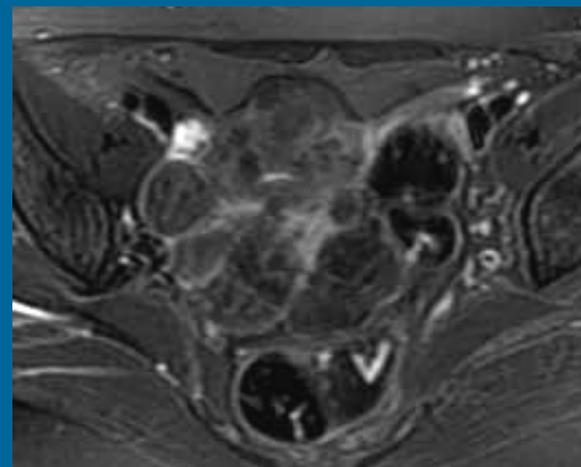
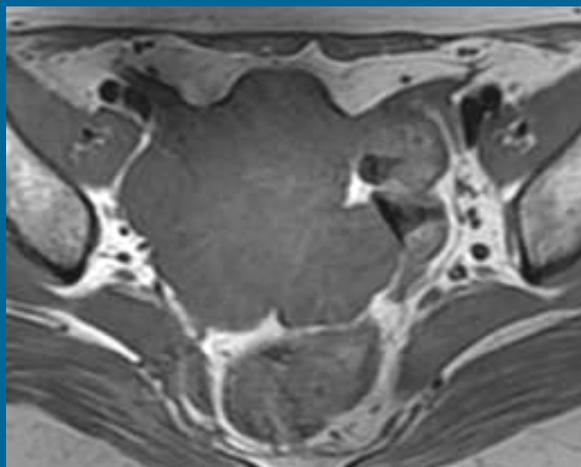
- 腺肌症
- 纳氏囊肿

- 腺肌症
- 肌瘤
- 平滑肌肉瘤

- 内膜增生
- 内膜息肉
- 内膜癌
- 宫颈癌
- 淋巴瘤
- 内膜间质肉瘤
- 癌肉瘤
- 腺肉瘤

信号表现—平扫

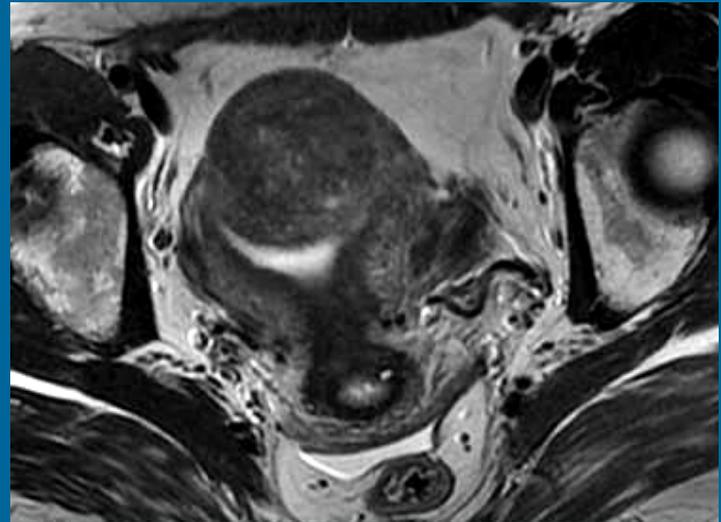
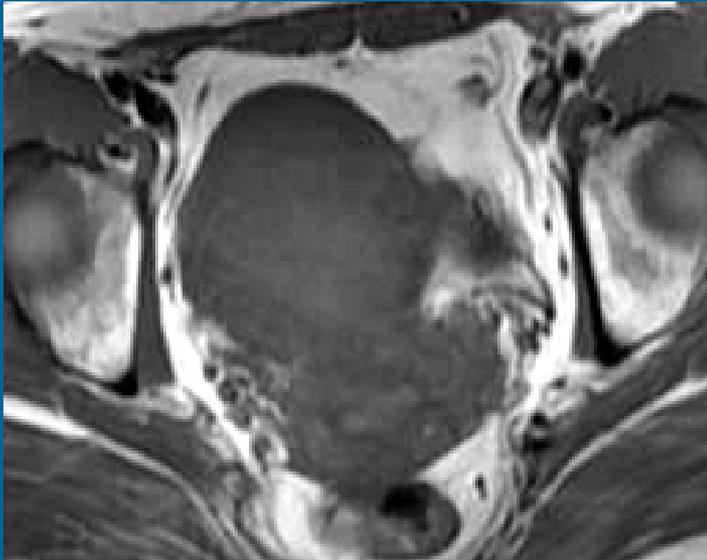
多发肌瘤



宫体多发T1等T2等信号

信号表现—平扫

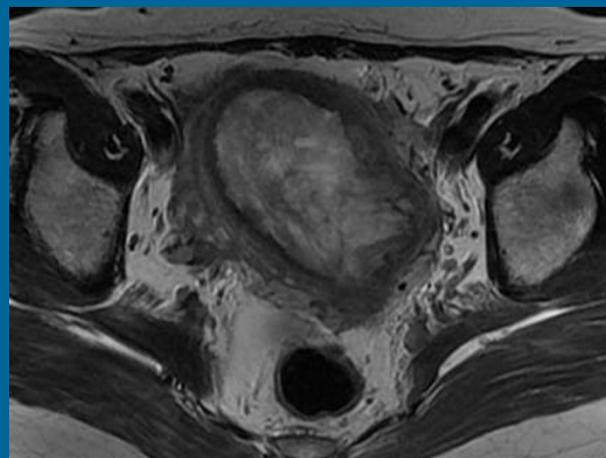
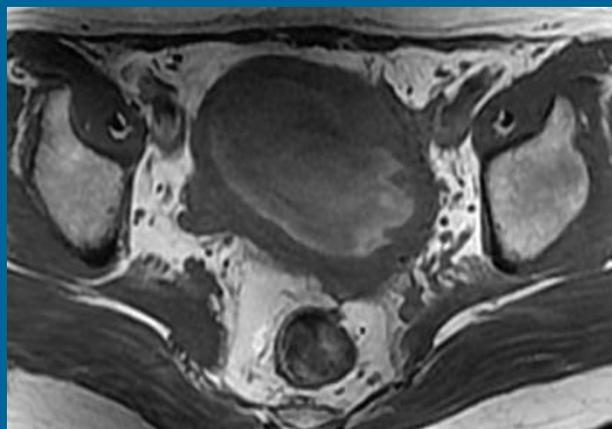
腺肌症（局限型）



宫体连接带增宽，呈T1等T2等信号；其内散在T1低T2高亮信号

信号表现—平扫

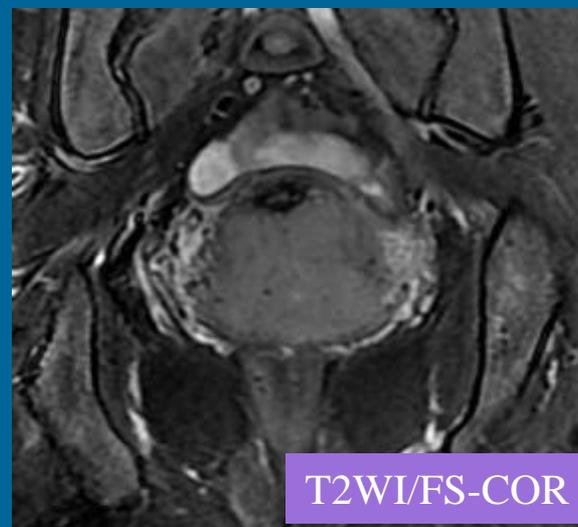
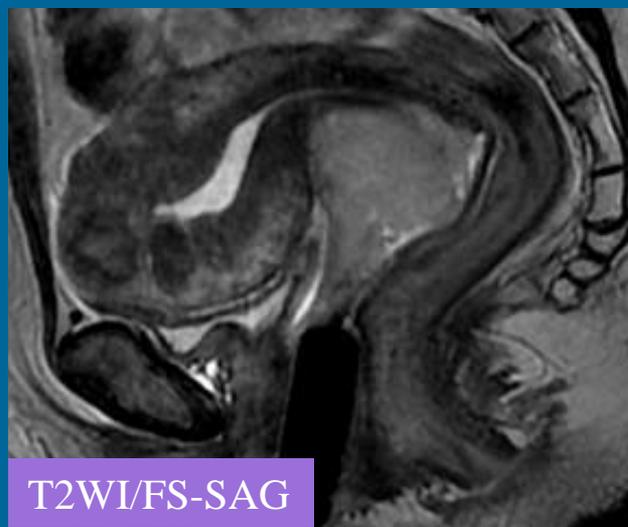
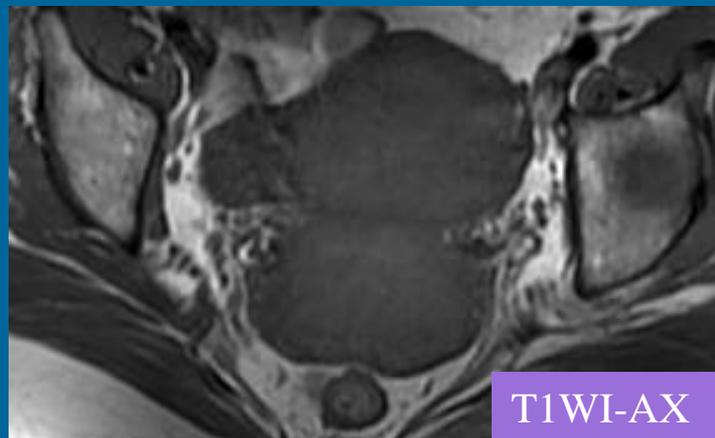
癌肉瘤



实性成分呈**T1**等**T2**中高信号，其内大片出血呈**T1**高**T2**高信号

信号表现—平扫

宫颈癌



T1等T2中高信号

信号表现—增强

无强化

- 纳氏囊肿
- 出血成分
- 脂肪成分

速升速降

- 宫颈癌
- 淋巴瘤

上升平台

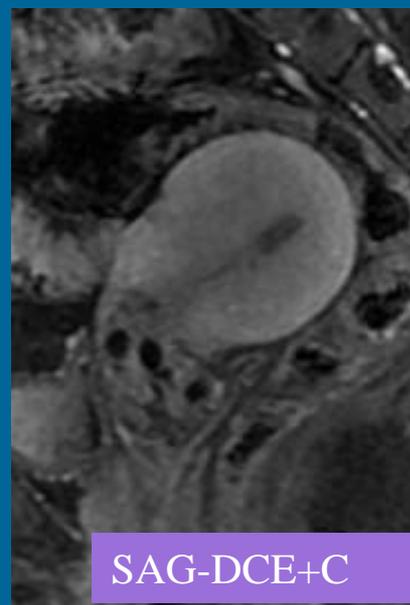
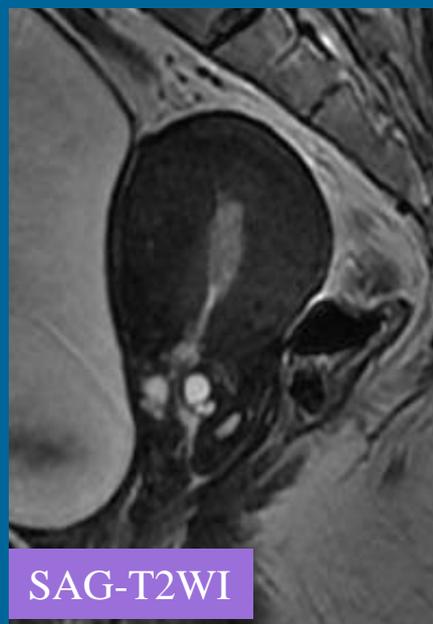
- 内膜癌

持续强化

- 内膜增生
- 内膜息肉
- 腺肌症
- 肌瘤
- 内膜间质肉瘤?
- 癌肉瘤?
- 腺肉瘤?

信号表现—增强

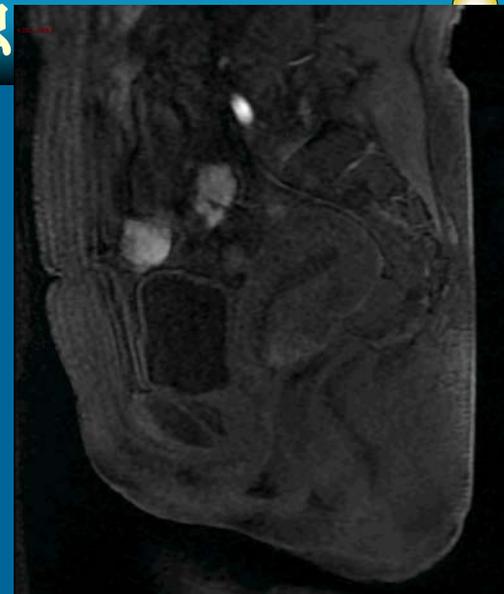
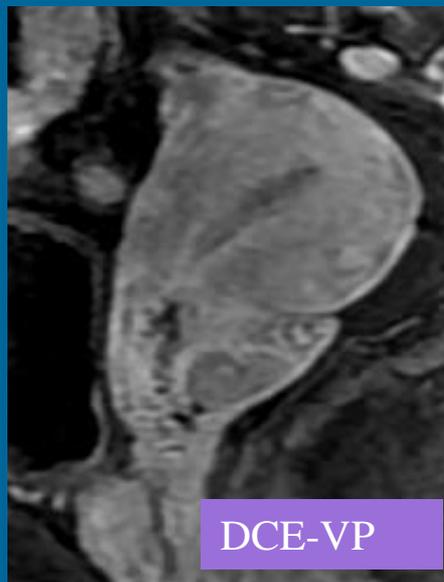
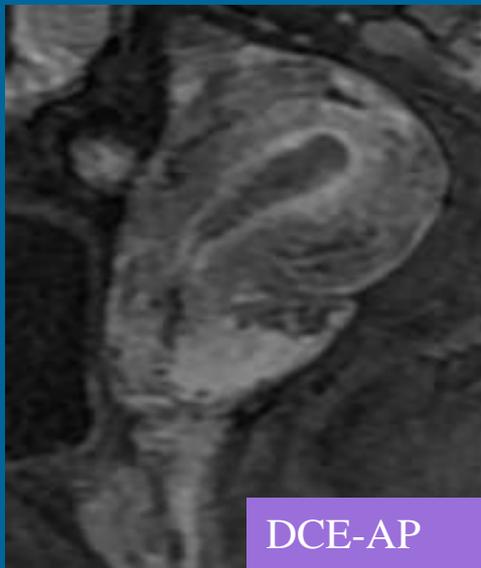
宫颈纳氏囊肿（本例合并内膜癌）



无强化

信号表现—增强

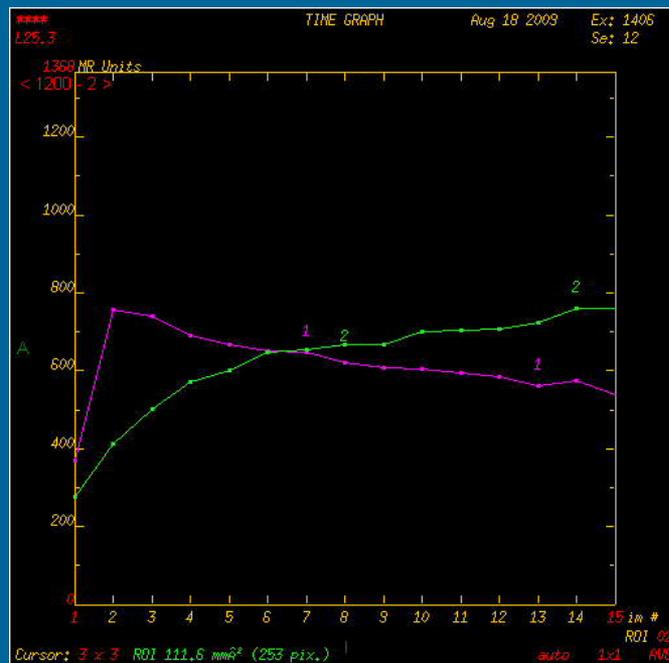
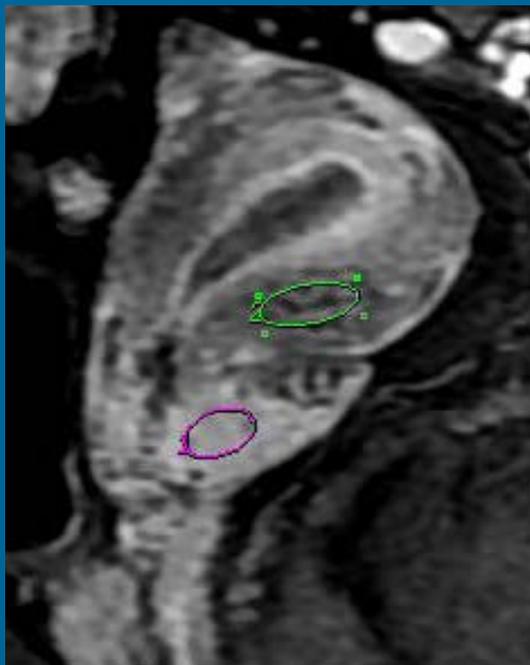
宫颈癌



速升速降

信号表现—增强

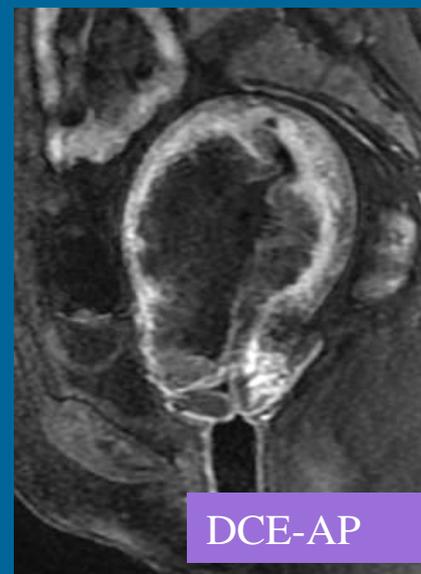
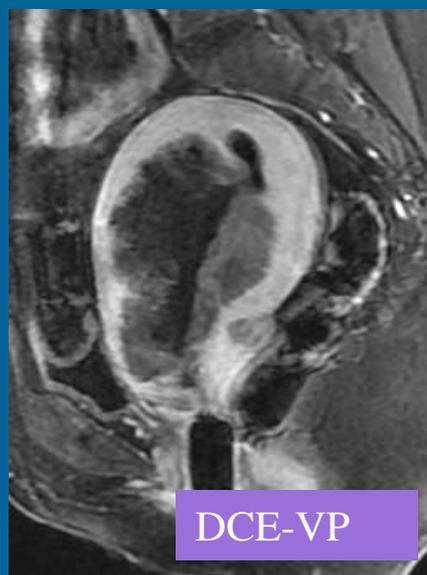
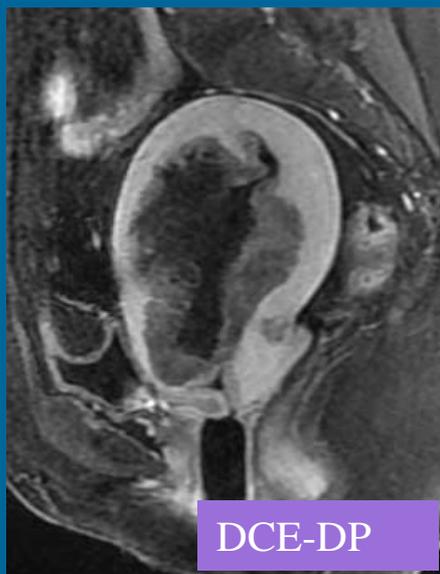
宫颈癌



速升速降

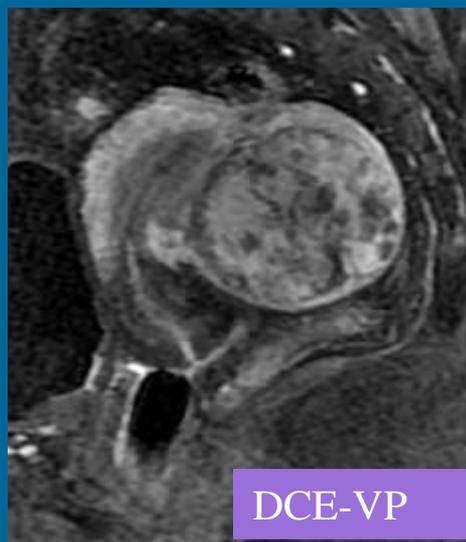
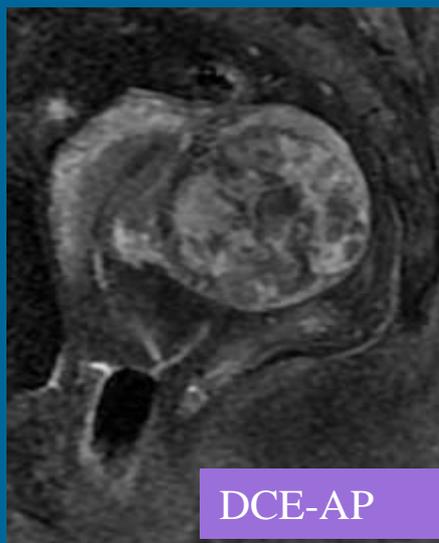
信号表现—增强

内膜癌

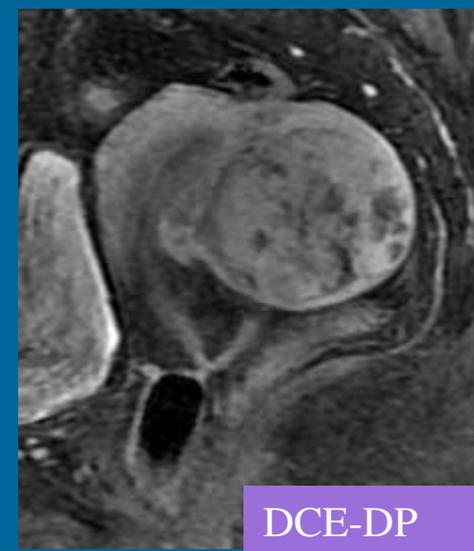


上升平台

信号表现—增强

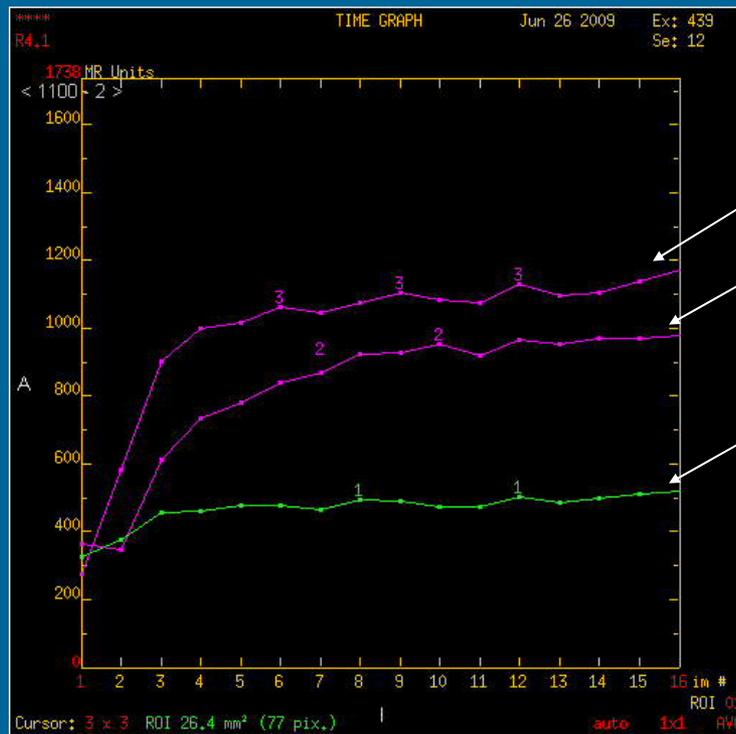


肌瘤（浆膜下）



持续强化

信号表现—增强



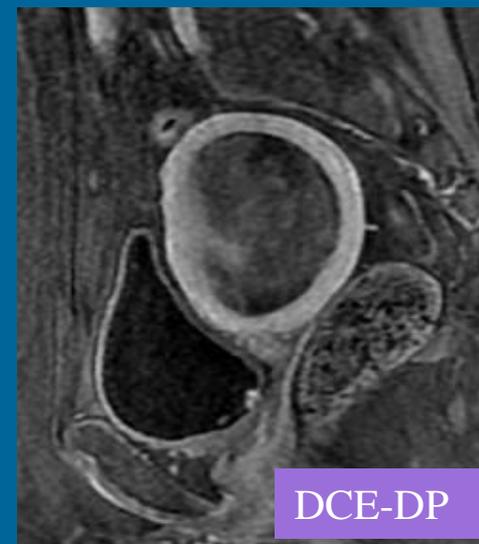
肌层
肌瘤
内膜癌

内膜癌合并肌瘤

信号表现—增强



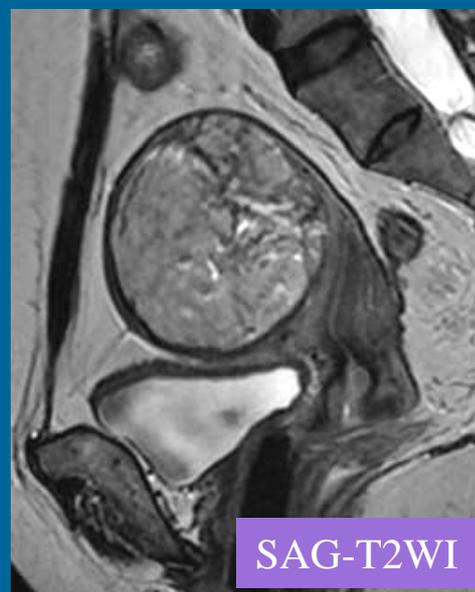
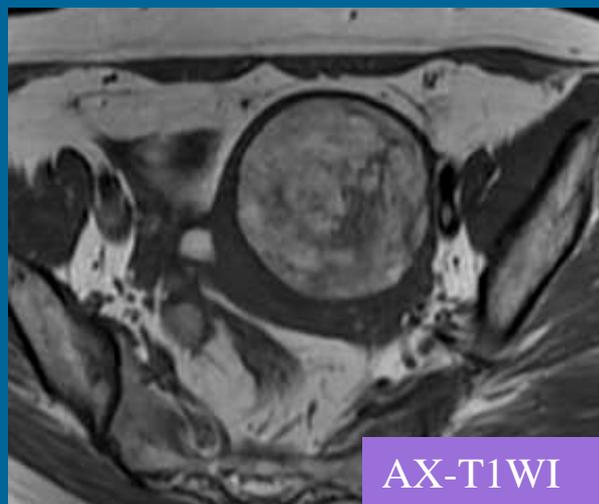
癌肉瘤



渐进强化

病例分析

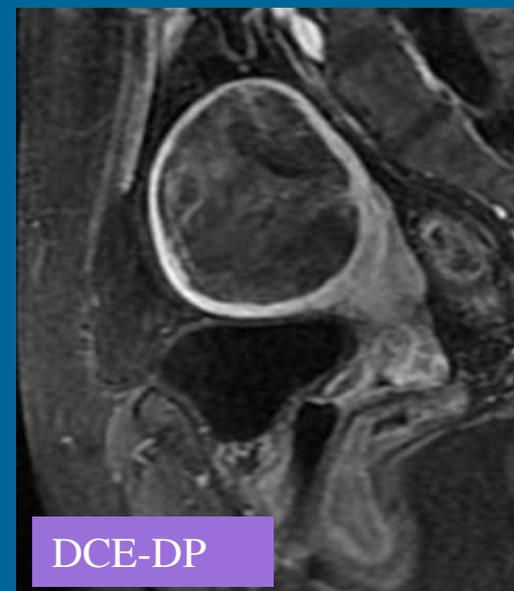
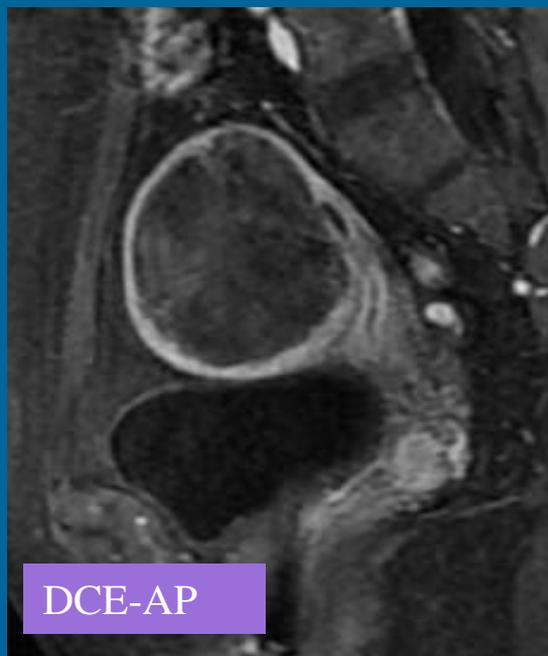
Case1



平扫

病例分析

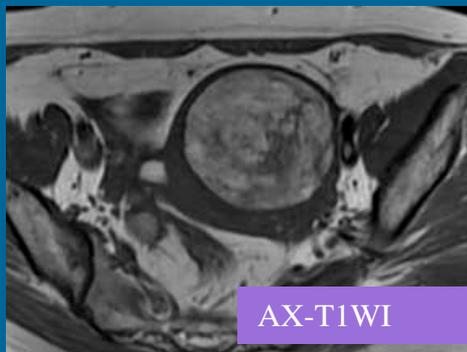
Case1



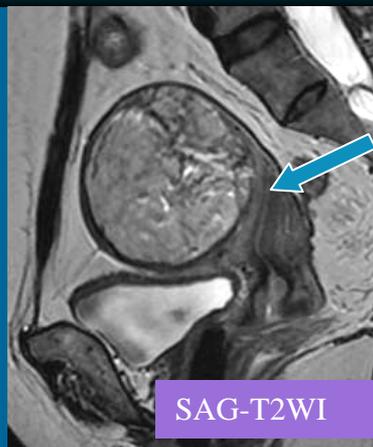
增强

病例分析

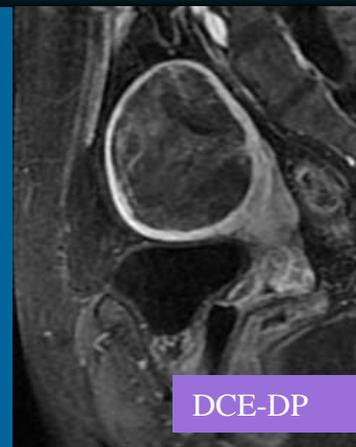
Case1



AX-T1WI



SAG-T2WI



DCE-DP



肌瘤

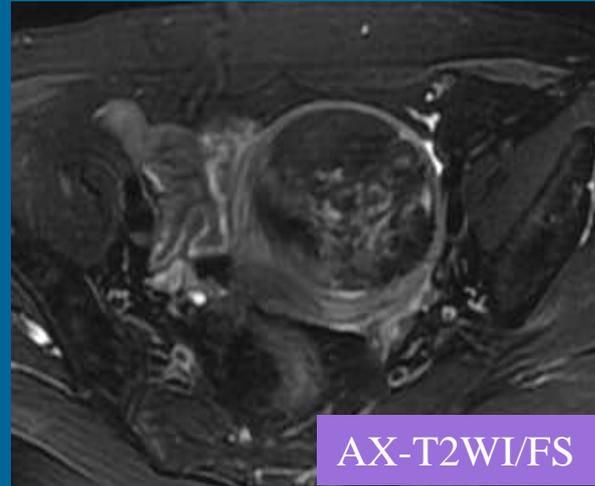
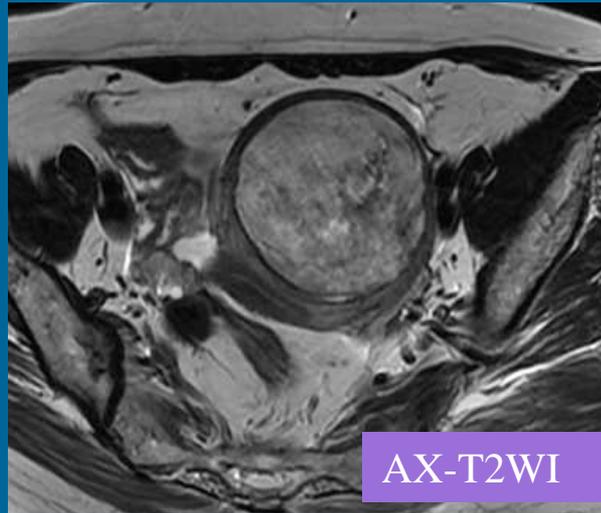
腺肌症

淋巴瘤

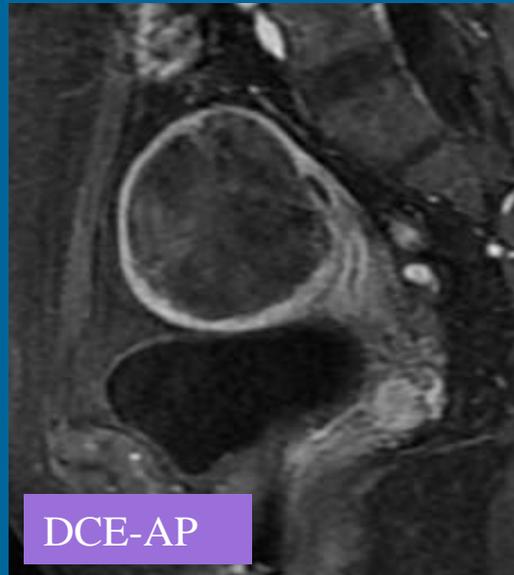
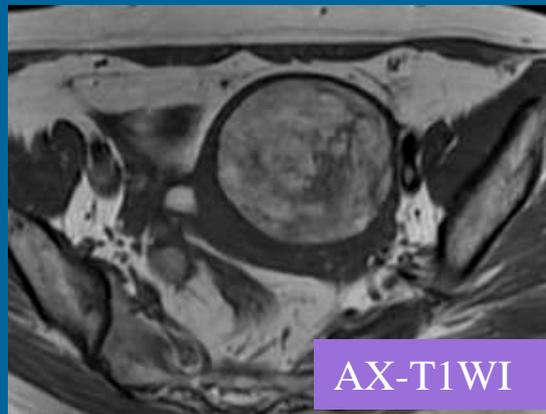
平滑肌肉瘤

内膜间质肉瘤

病例分析



Case1

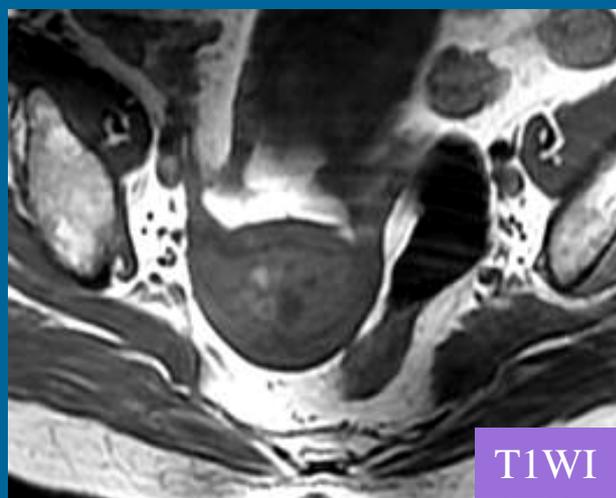
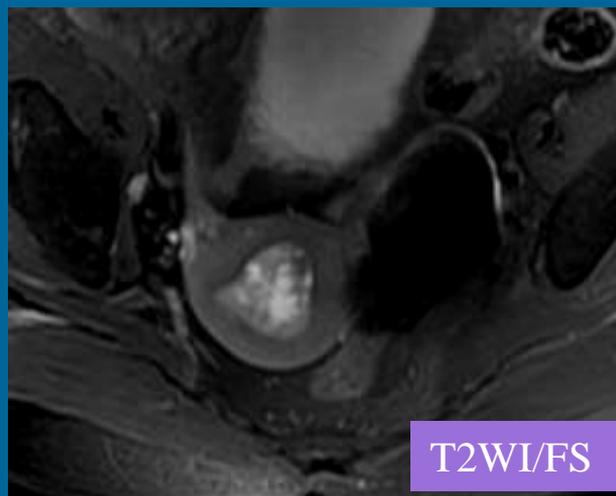


最后诊断:

脂肪平滑肌瘤

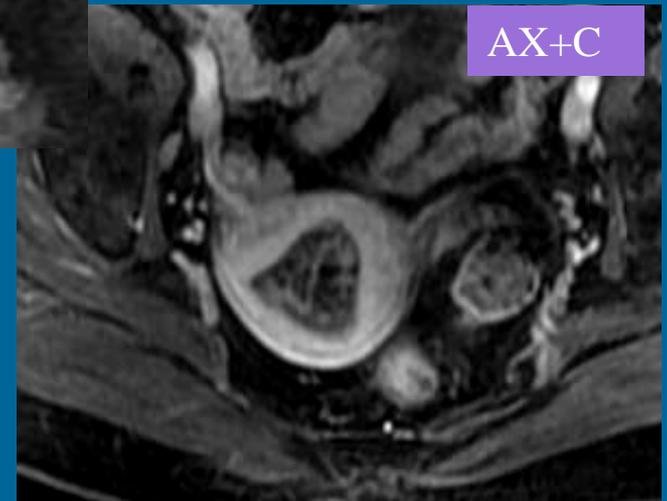
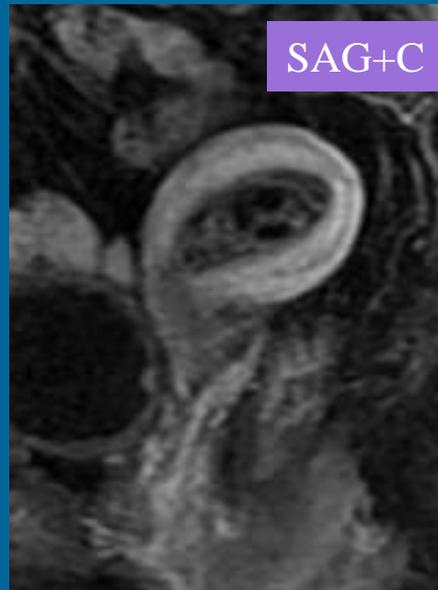
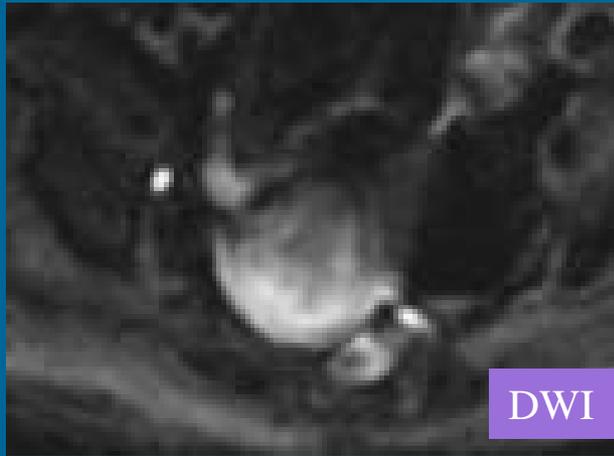
病例分析

Case2



病例分析

Case2



可能诊断:

内膜增生?

内膜息肉?

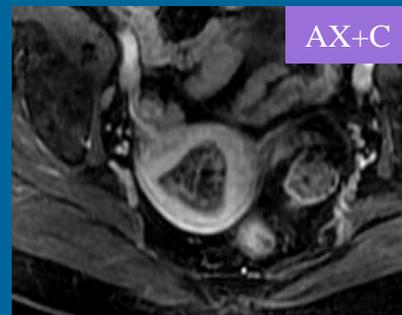
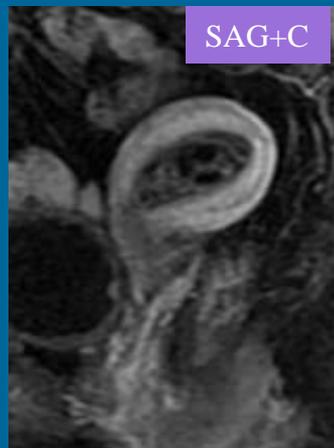
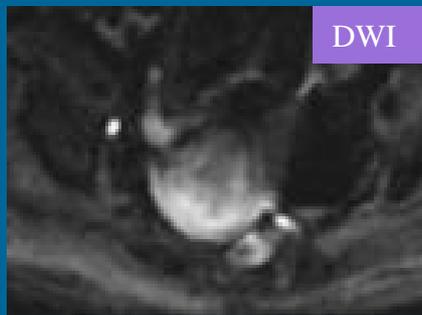
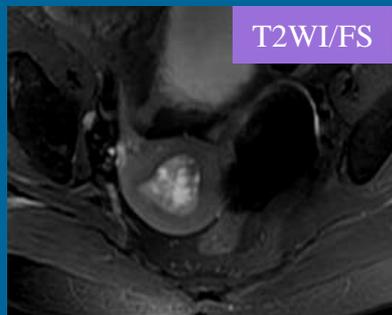
肌瘤?

内膜癌?

肉瘤?

病例分析

Case2



□ 宫腔内长条形肿物

除
外

内膜增生
肌瘤

□ 边界清楚锐利
DWI信号不高

除
外

内膜癌
肉瘤

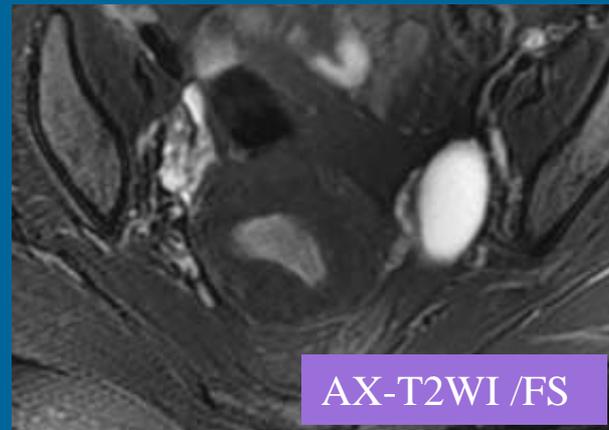
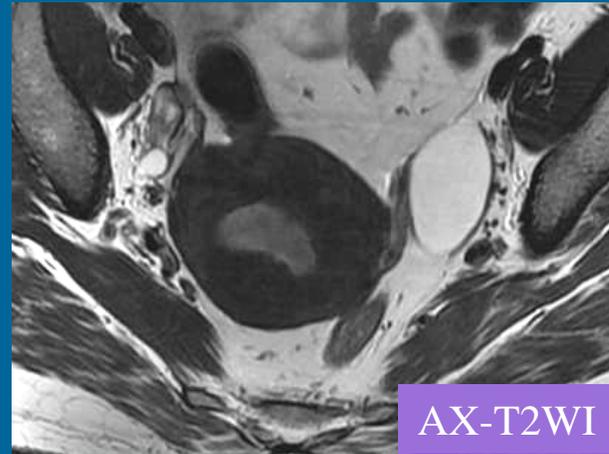
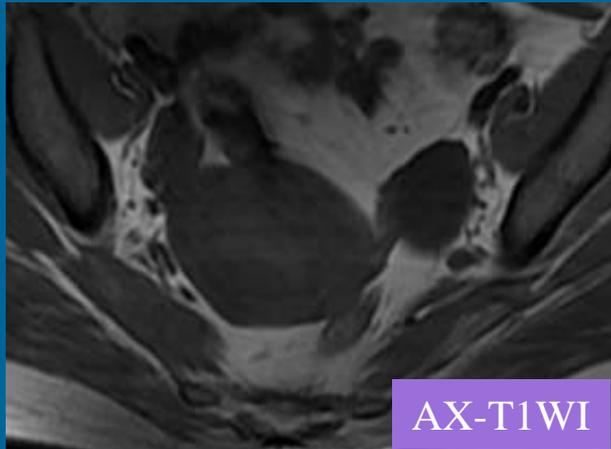
- T2WI信号不均，内见低信号纤维核及高亮信号囊变区
- 网格样强化

最后诊断
→

内膜息肉

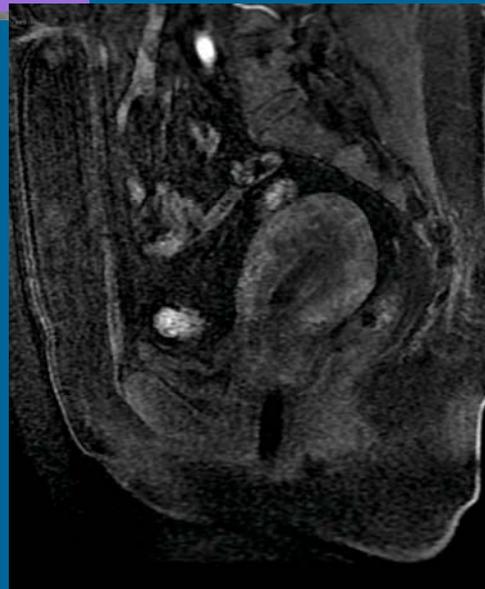
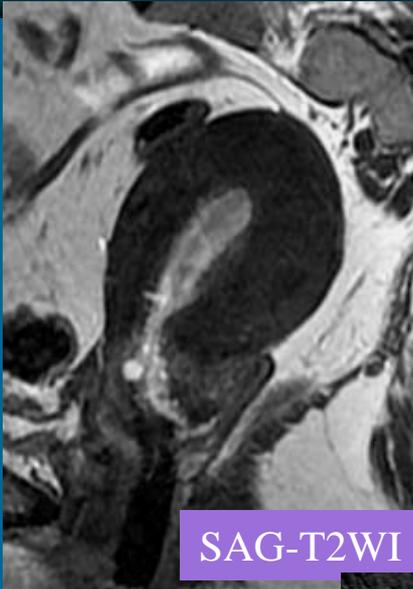
病例分析

Case3



病例分析

Case3



可能诊断:

内膜增生?

内膜息肉?

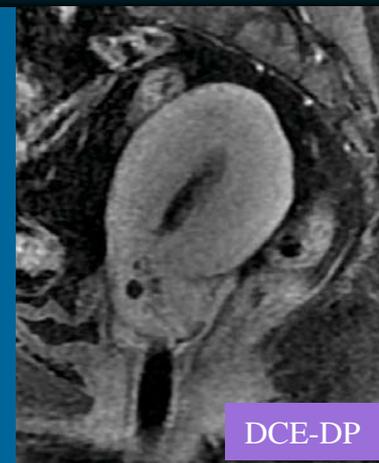
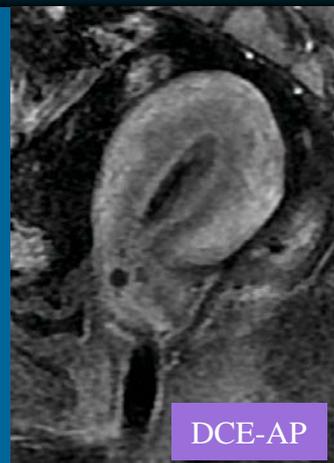
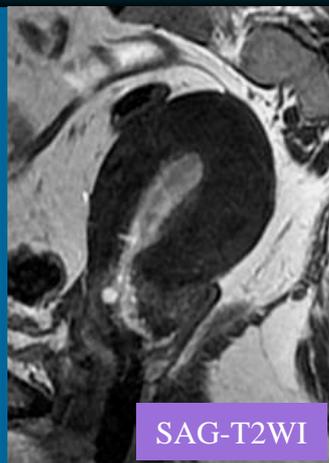
肌瘤?

内膜癌?

肉瘤?

病例分析

Case3



- ▣ 边界模糊，欠锐利
- ▣ T1等T2中高信号
DWI明显高信号
- ▣ 强化呈上升平台型

除外

除外

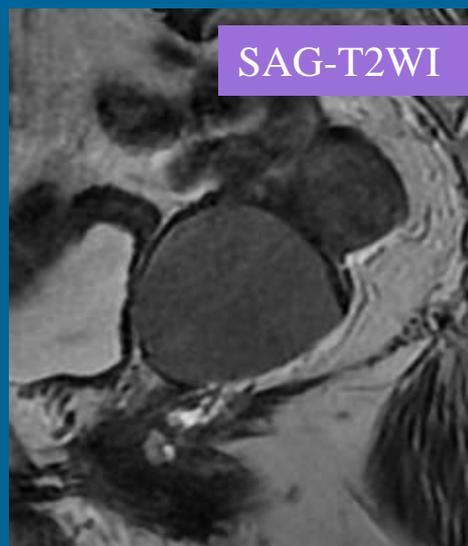
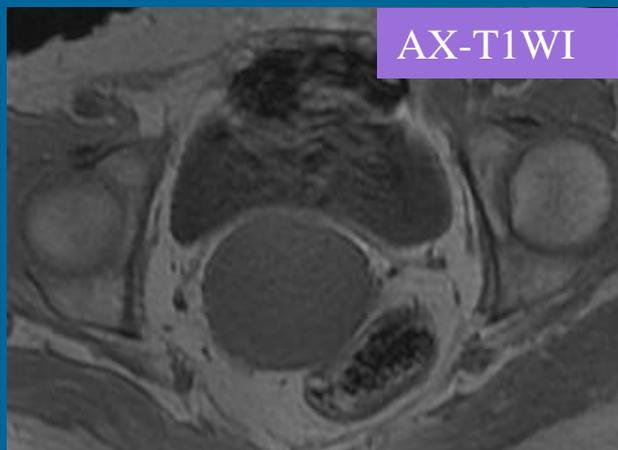
最后诊断

- 内膜增生
- 内膜息肉
- 肌瘤
- 肉瘤

内膜癌（局限于内膜）

病例分析

Case4



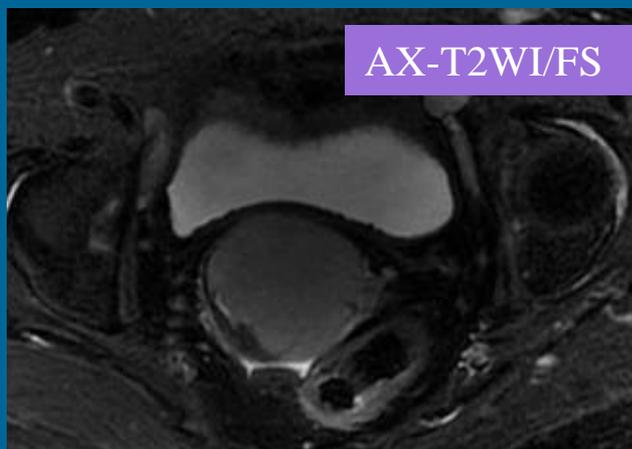
部位 → 宫颈

与周围组织关系 → 相对清楚

信号 → T1等T2中高信号

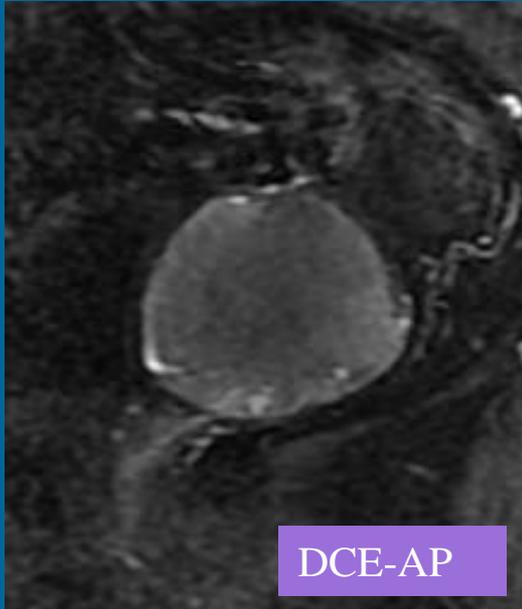
DWI明显高信号

均匀

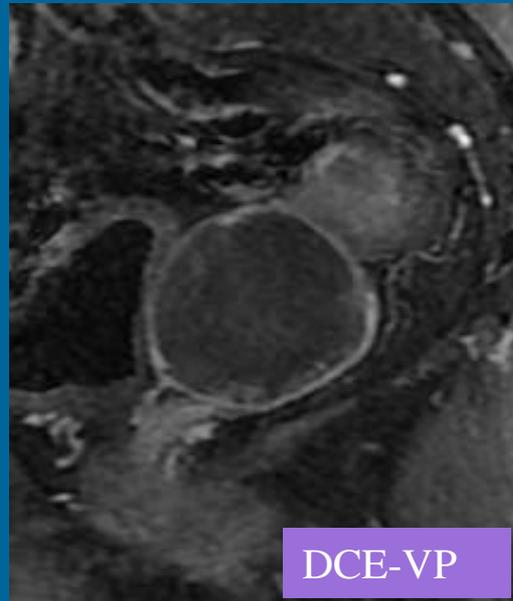


病例分析

Case4



增强呈速升速降



可能诊断:

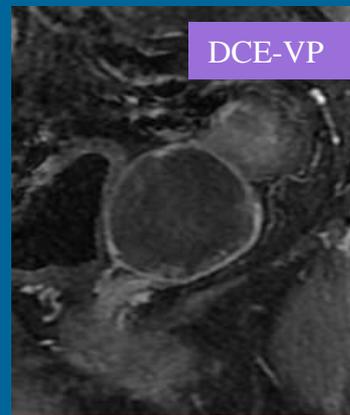
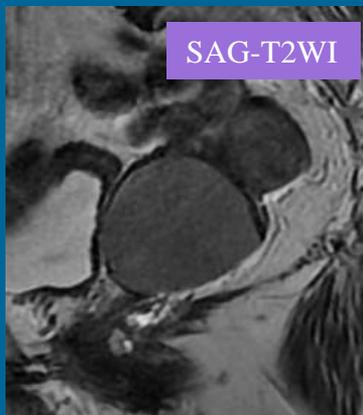
肌瘤?

宫颈癌?

肉瘤?

淋巴瘤?

病例分析



Case4

- 增强呈速升速降
DWI明显高信号

除外

肌瘤

- 边界相对清楚
信号均匀

除外

宫颈癌
肉瘤

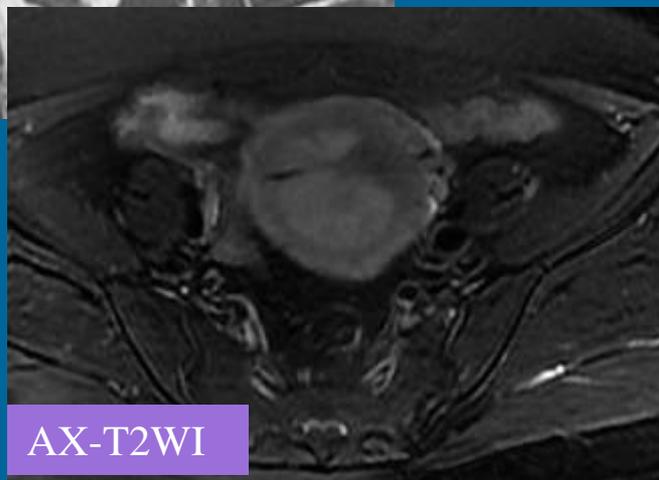
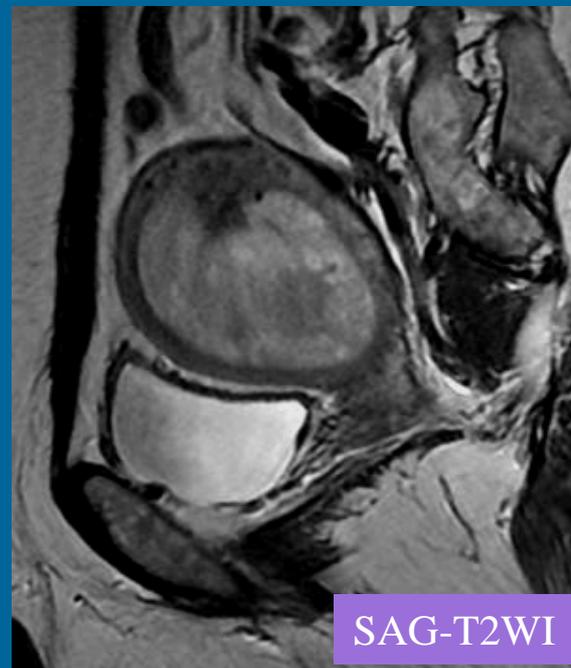
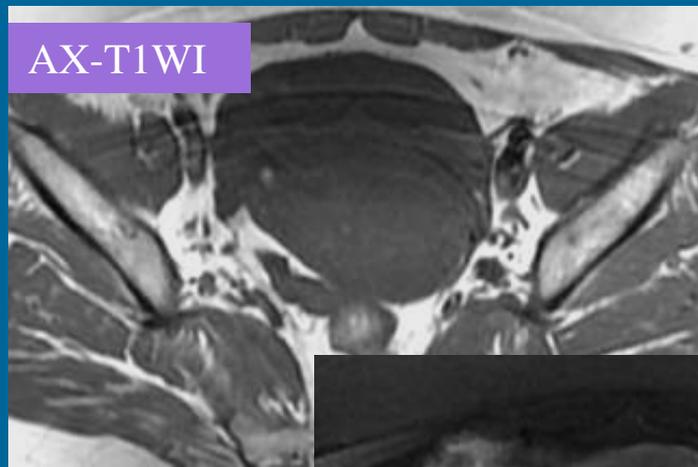
最后诊断

→

淋巴瘤

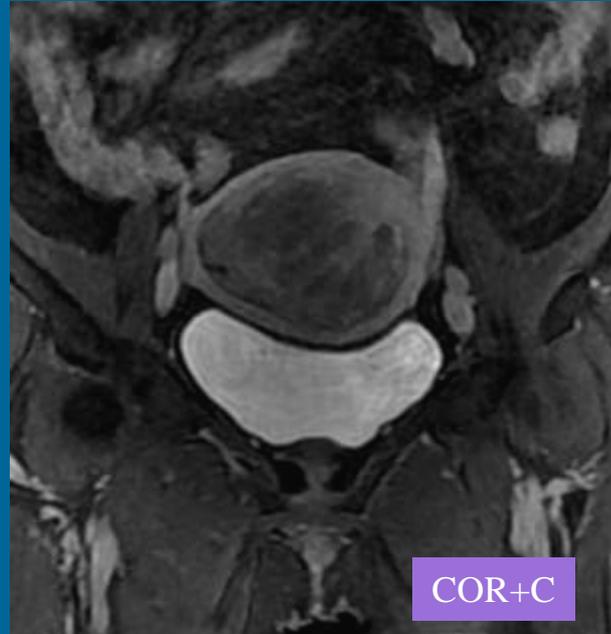
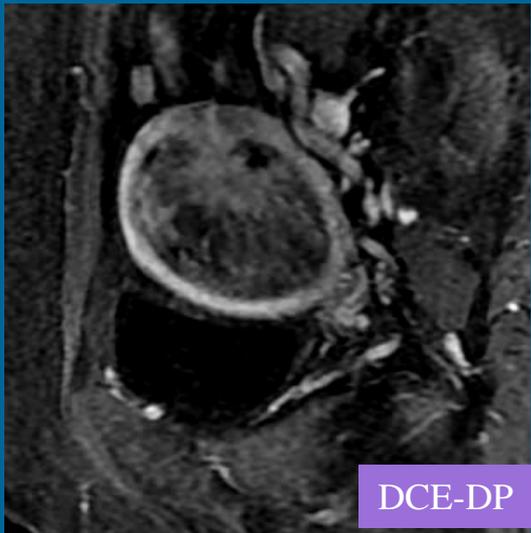
病例分析

Case5



病例分析

Case5



可能诊断:

内膜息肉?

肌瘤?

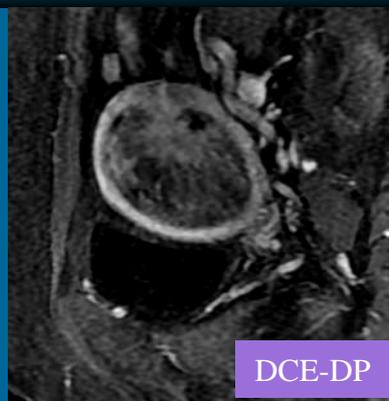
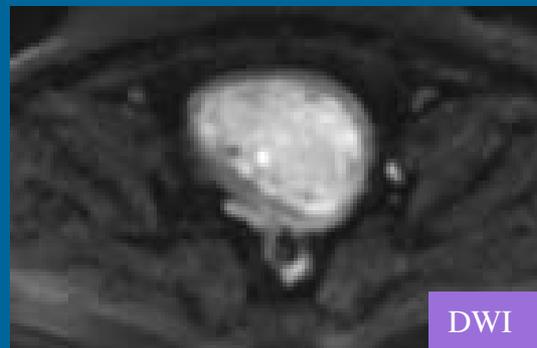
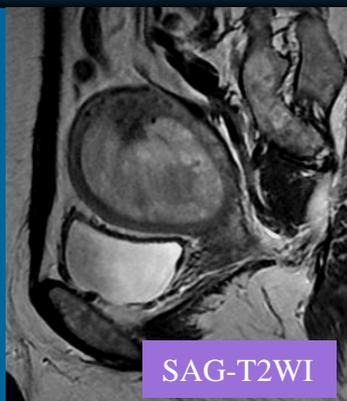
内膜癌?

肉瘤?

淋巴瘤?

病例分析

Case5



- 宫腔带蒂肿物，DWI高信号
- 蒂不规则，DWI高信号
- 蒂、信号不均匀
- 边界大部分清楚，无明显侵犯肌层

除外

除外

除外

除外

最后诊断

肌瘤

内膜息肉

淋巴瘤

内膜癌

肉瘤

手术证实：癌肉瘤

卵巢病变MR诊断思路

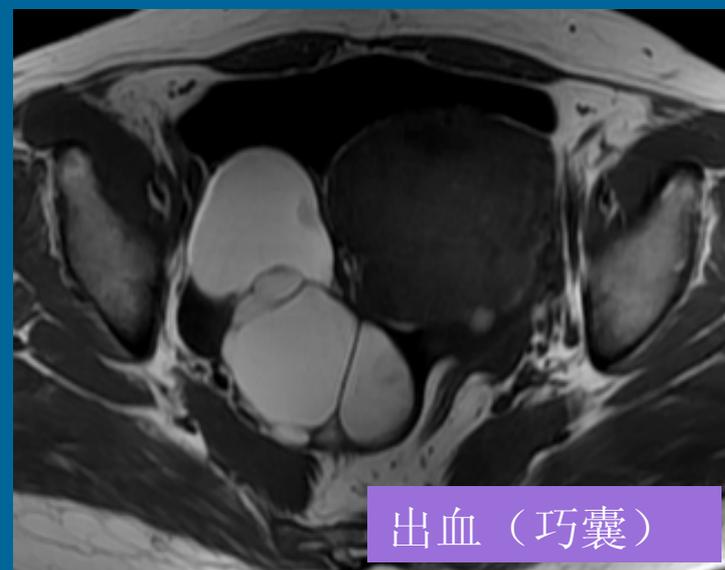
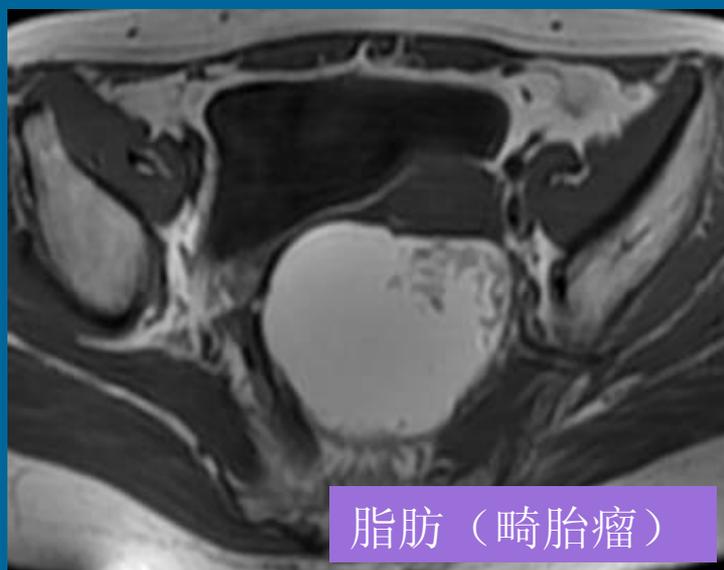
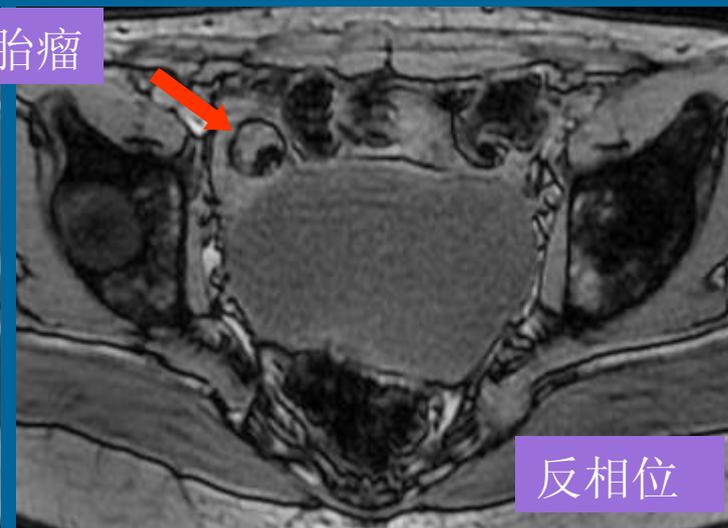
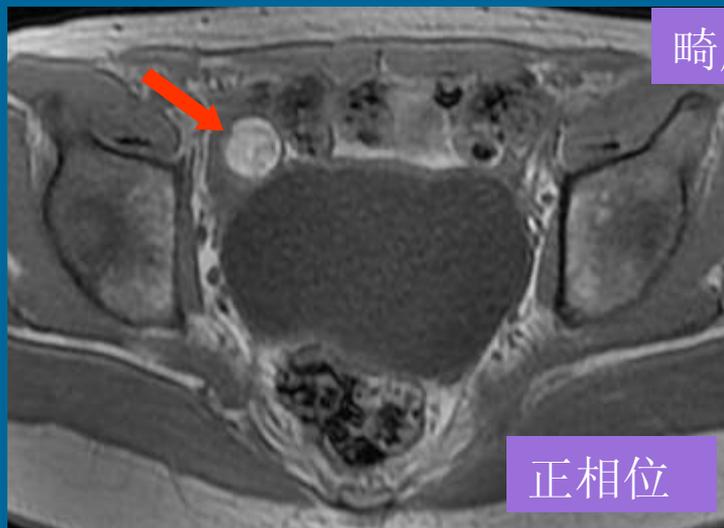
卵巢疾病常规序列

- ❖ 横轴位T1WI（FSE或双回波）
- ❖ 横轴位T2WI（AX-FSE-T₂WI）及其脂肪抑制序列
- ❖ 矢状位T2WI（Sag-FSE-T₂WI）
- ❖ 冠状位T2WI脂肪抑制（Cor-FSE-T₂WI/FS）
- ❖ 横轴位扩散加权成像（DWI）
- ❖ 横轴位多期动态增强成像（DCE）
- ❖ 延迟扫描

T₁ WI

- ❖ 显示正常解剖结构
- ❖ 检出病变内出血、脂肪等特异性的成分，有助于明确诊断
- ❖ 软组织分辨率较低，对病变的显示效果不佳

T₁WI

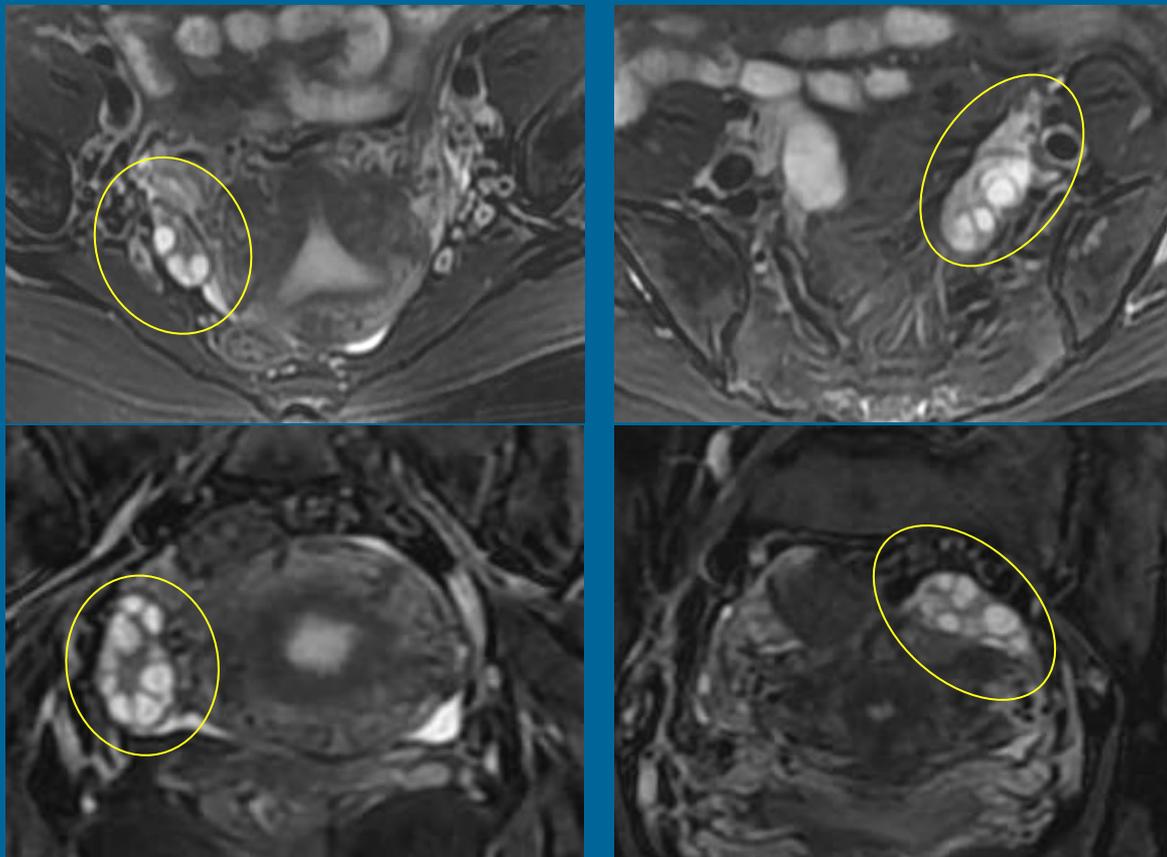


T₂ WI

- ❖ 为主要检查序列：横、冠、矢状位
- ❖ 显示卵巢正常结构
- ❖ 鉴别病变囊实性
- ❖ 检出病变内脂肪、钙化、平滑肌、纤维组织等，有助于明确诊断
- ❖ 软组织分辨力高，显示病变范围清楚
- ❖ 脂肪抑制序列能够提高病变与周围组织的对比度、显示腹水

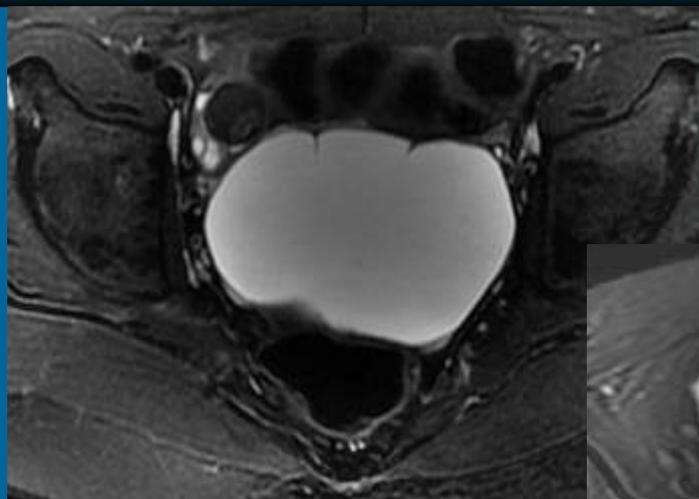
T₂ WI

正
常
卵
巢

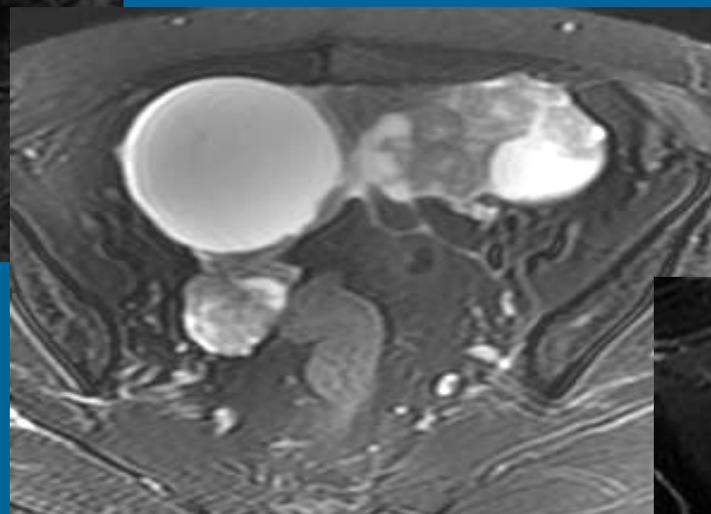


T₂ WI

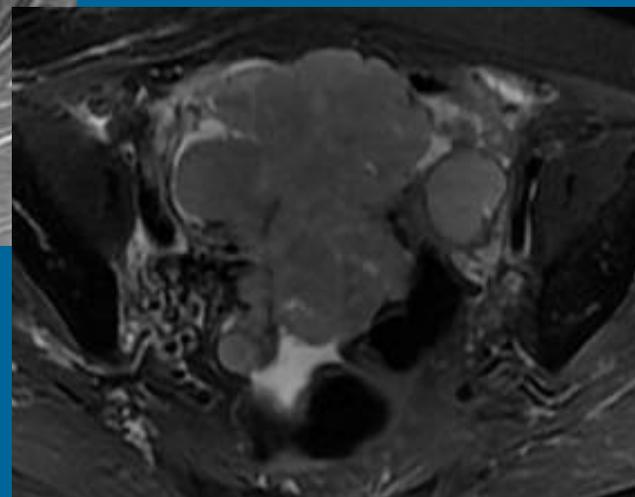
鉴别病变囊实性



囊性



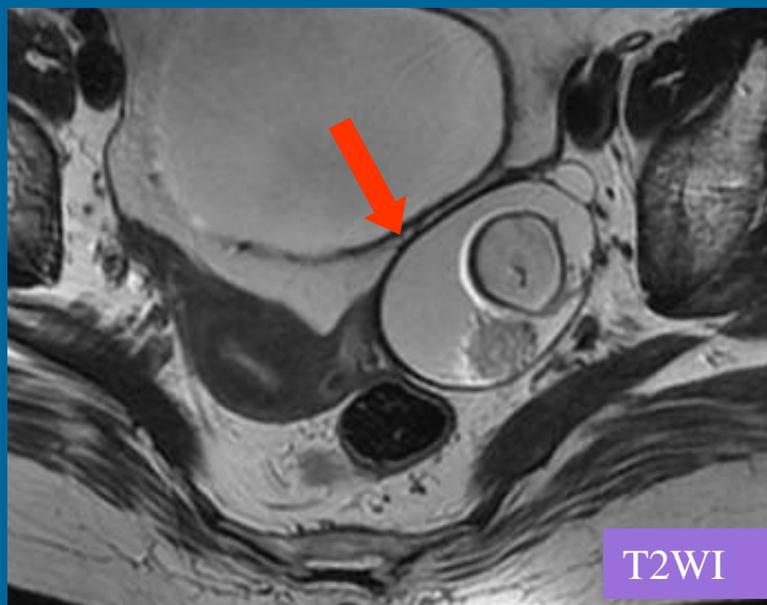
囊实性



实性

T₂ WI

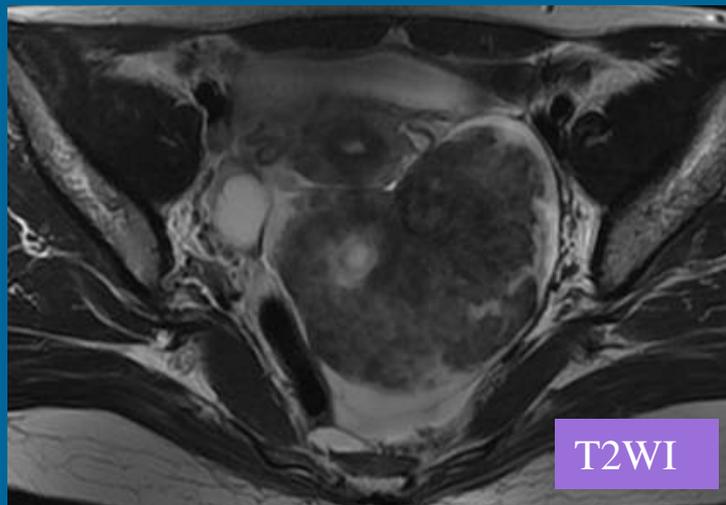
畸胎瘤



检出脂肪组织

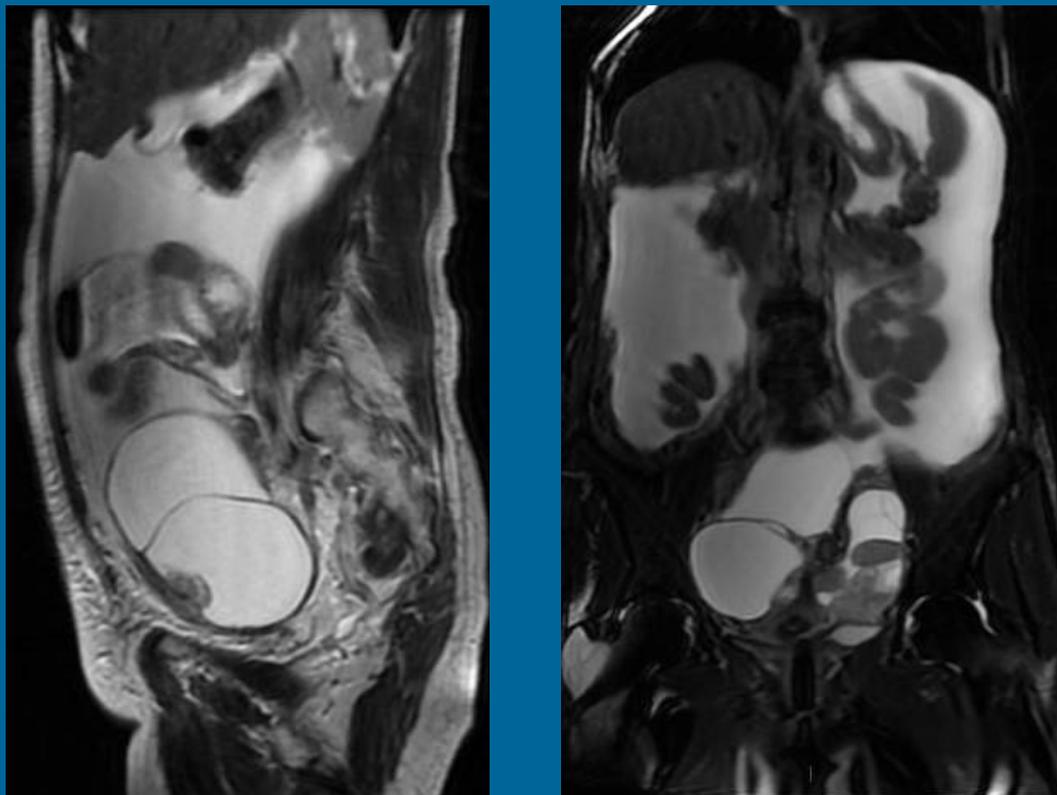
T₂ WI

卵泡膜纤维瘤



纤维组织

T₂ WI

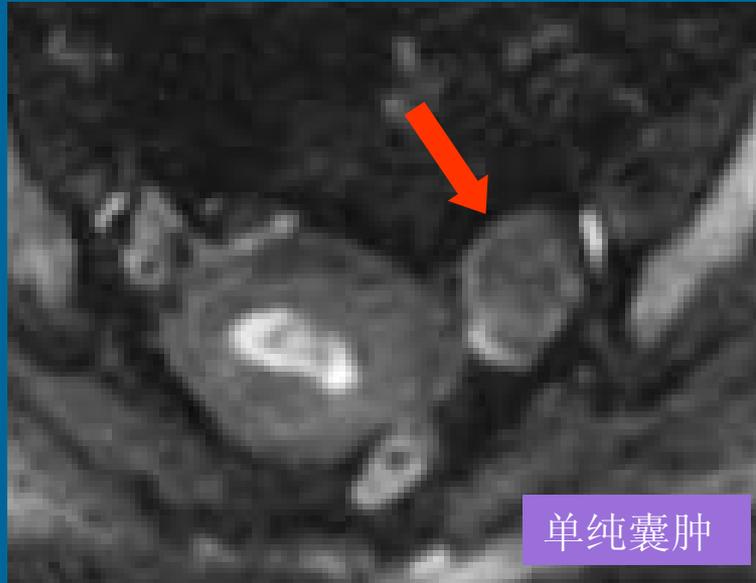


腹水（卵巢癌）

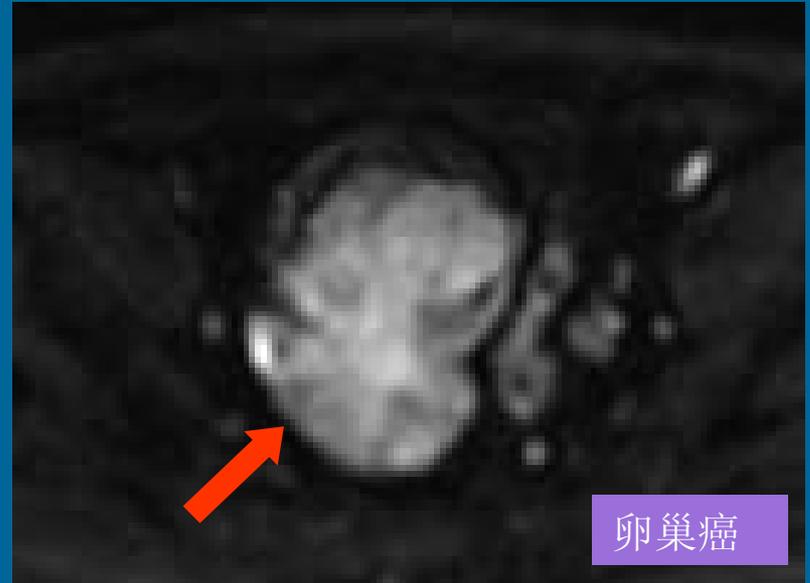
DWI

- ❖ 常规采用轴位，扫描范围与T2WI一致
- ❖ 自旋回波-平面回波序列（SE-EPI）
- ❖ b值选用800~1000s/mm²
- ❖ 病变与正常组织对比度高，信噪比低
- ❖ 可用于对卵巢病变及盆腔淋巴结的检出
- ❖ 卵巢良恶性病变的鉴别诊断和评价卵巢病变的囊性成分一定作用

DWI



良性，扩散不受限

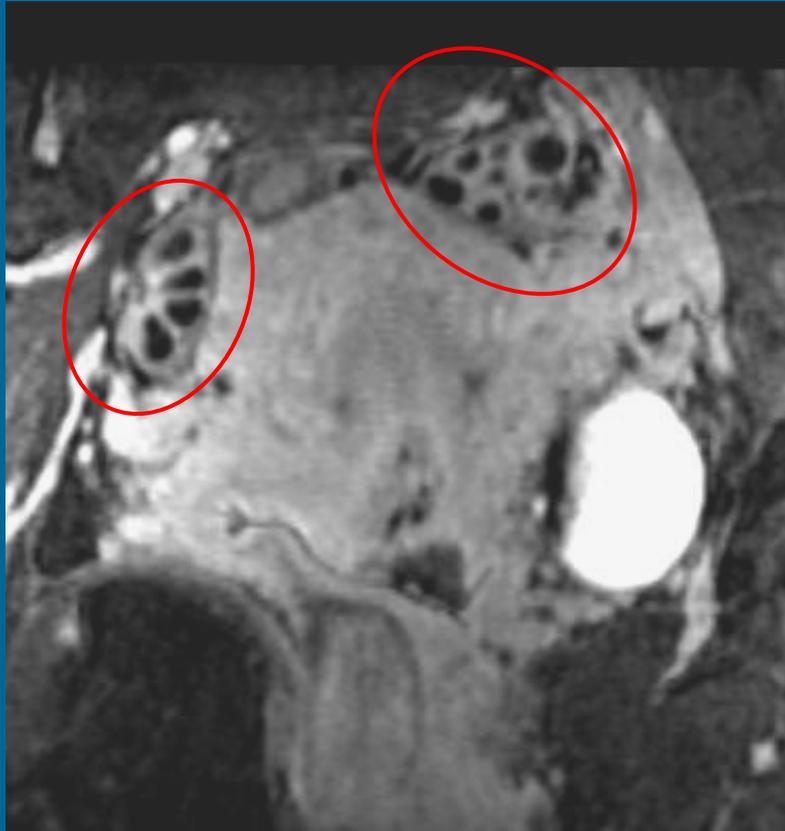


恶性，扩散明显受限

增强扫描

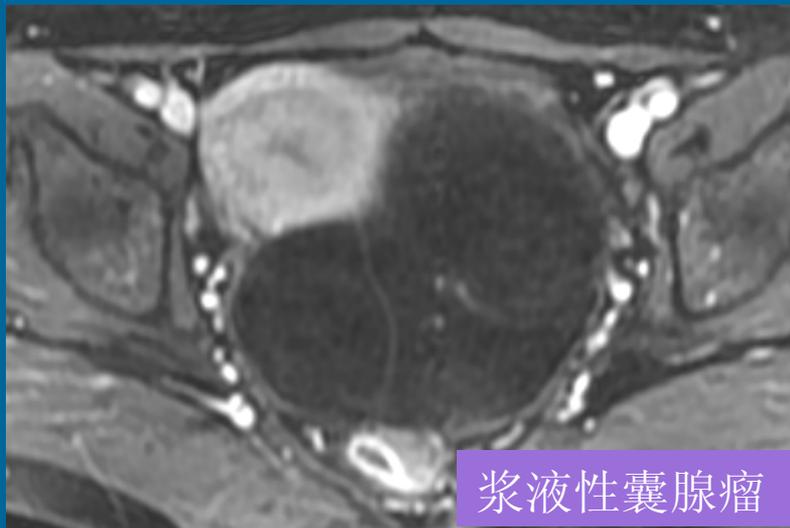
- 观察病变在注射对比剂前、后不同时相的一系列连续变化
- 通过观察内部结构的血流灌注特征，有助于肿瘤的定性诊断

增强扫描

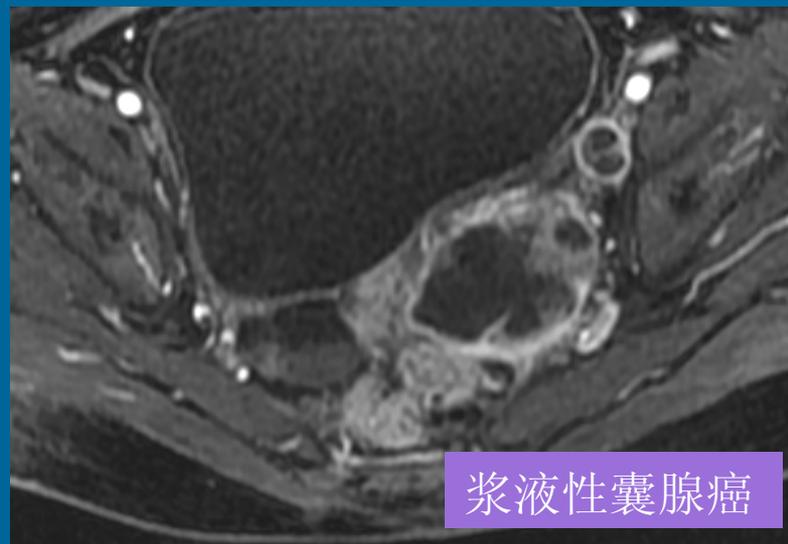


正常卵巢

增强扫描



分隔纤细



强化的实性成分

卵巢病变 — 肿瘤分类

占有所有卵巢恶性肿瘤的40-60%

表面上皮-间质肿瘤

占有所有卵巢肿瘤75%

占有所有卵巢恶性肿瘤 > 95%

浆液性肿瘤：囊腺瘤，交界性囊腺瘤，**囊腺癌**

粘液性肿瘤：囊腺瘤，交界性囊腺瘤，**囊腺癌**

子宫内膜样肿瘤：子宫内膜样癌等

移行细胞肿瘤：**Brener瘤**

占有所有卵巢肿瘤的10-25%

畸胎类肿瘤：**成熟性畸胎瘤**，未成熟性畸胎瘤，等

原始生殖细胞肿瘤：无性细胞瘤，卵黄囊瘤，等

单胚层畸胎瘤：卵巢甲状腺肿，类癌，等

生殖细胞肿瘤

性索-间质肿瘤

粒层-间质细胞肿瘤：颗粒细胞瘤，卵泡膜纤维瘤，等

支持细胞-间质细胞肿瘤：支持-间质细胞瘤，等

转移瘤

.....

卵巢及附件区其他病变

- ❖ 囊肿
- ❖ 巧囊
- ❖ 卵巢炎症
- ❖ 输卵管：炎症，肿瘤，宫外孕，癌
- ❖ 浆膜下/或阔韧带肌瘤
- ❖ 盆腔其他肿瘤：间质瘤，神经源肿瘤，阑尾来源肿瘤

诊断思路



囊/实性



信号表现



临床病史及实验室检查

病变囊实性

囊性

囊实性

实性

炎症

囊肿，巧囊

上皮来源：囊腺瘤

交界性囊腺瘤

生殖来源：囊性成熟性畸胎瘤

输卵管炎症

炎症

上皮来源：交界性囊腺瘤
囊腺癌

子宫内膜样癌

Brenner瘤

生殖来源：未成熟畸胎瘤

卵黄囊瘤

卵巢甲状腺肿

性索间质：颗粒细胞瘤

支持-间质细胞瘤

转移瘤

输卵管癌

浆膜下/或阔韧带肌瘤

上皮来源：囊腺癌

Brenner瘤

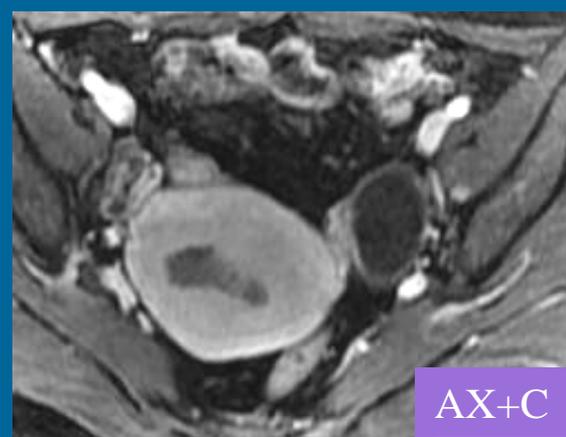
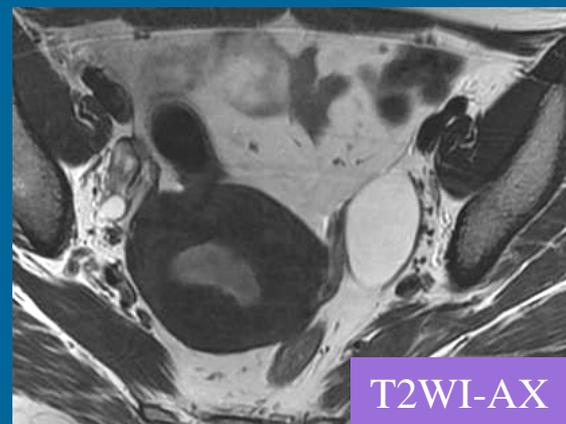
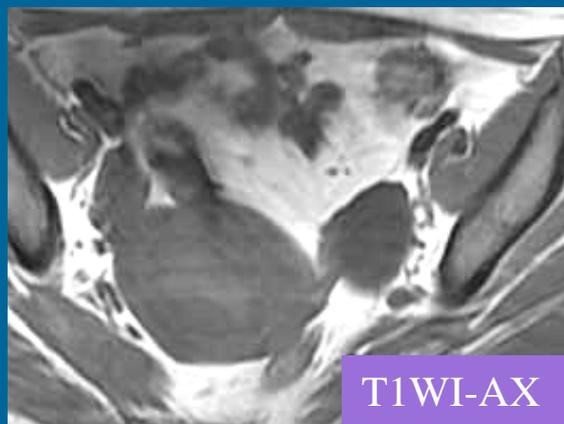
生殖来源：无性细胞瘤

性索间质：卵泡膜-纤维瘤

转移瘤

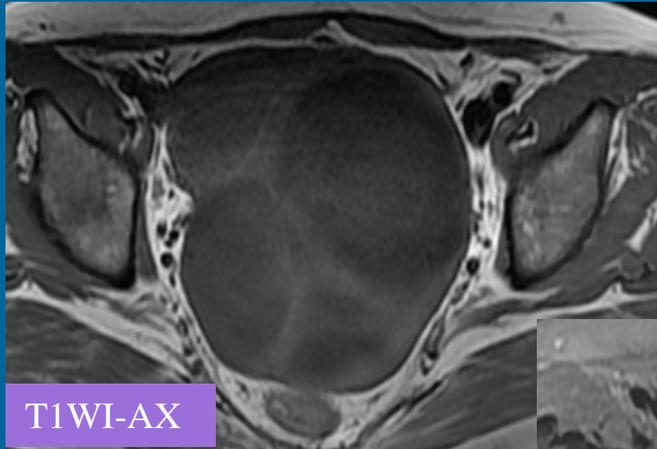
病变囊实性

单纯囊肿

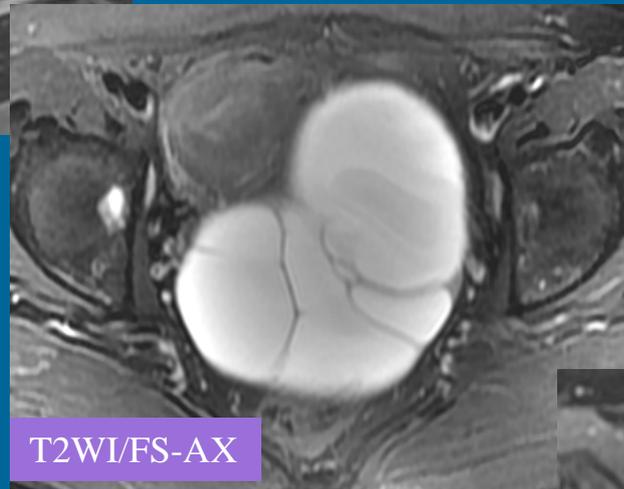


囊性

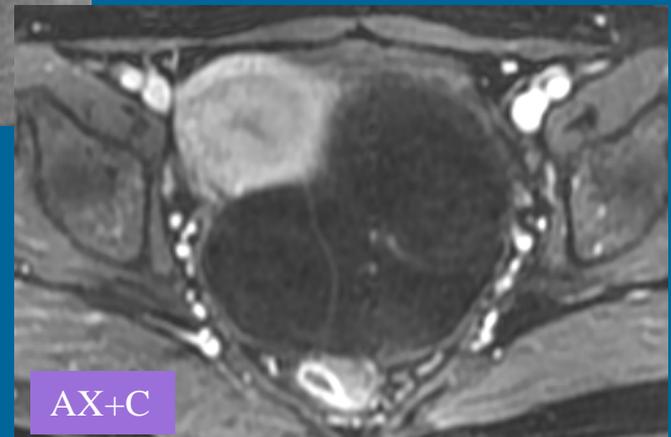
病变囊实性



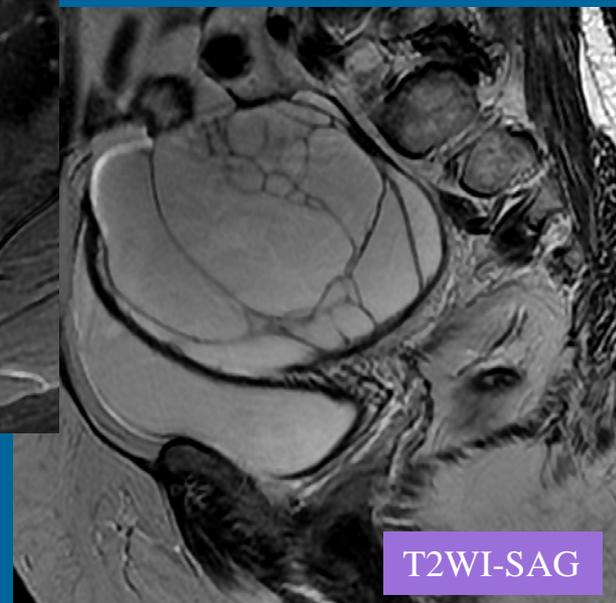
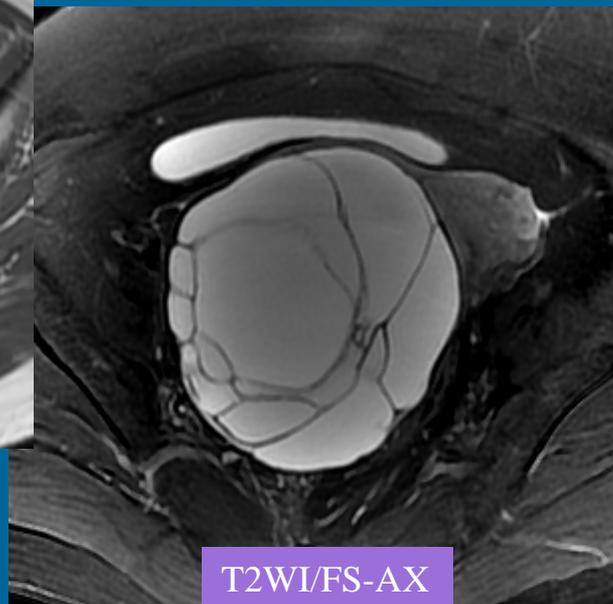
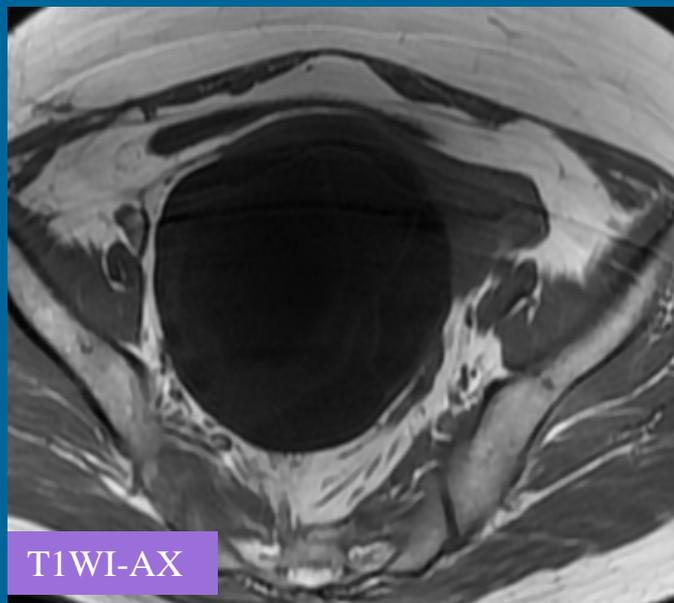
浆液性囊腺瘤



囊性



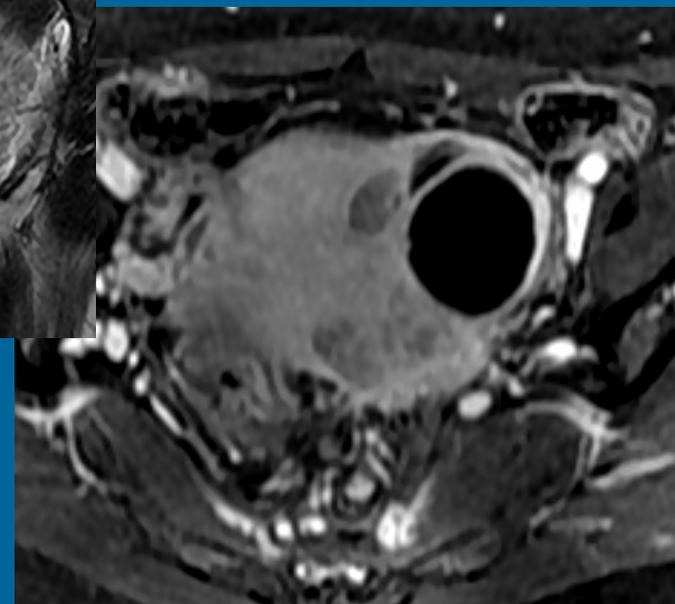
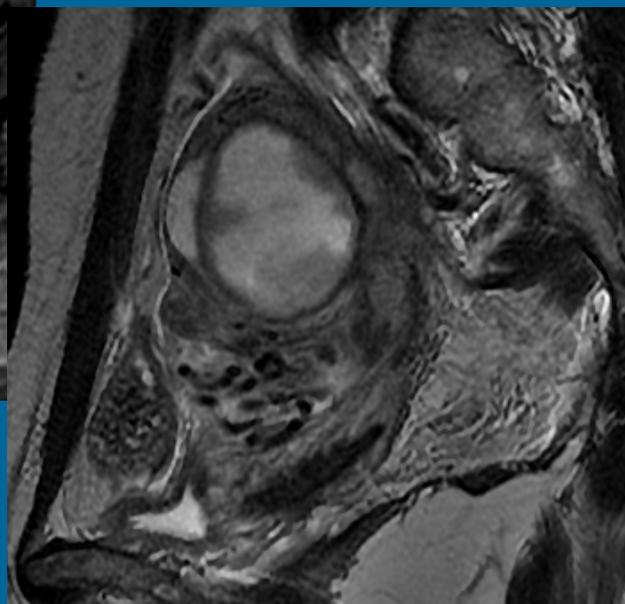
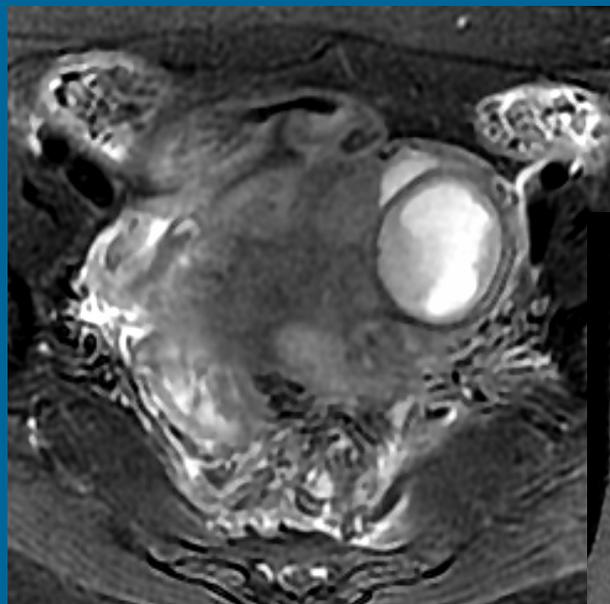
病变囊实性



粘液性囊腺瘤

囊性

病变囊实性

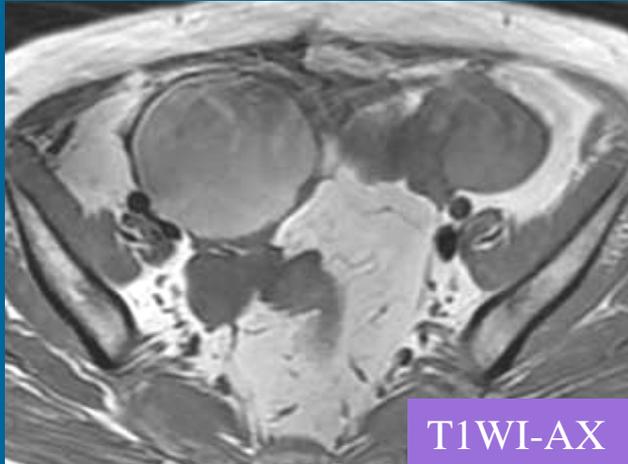


输卵管炎症

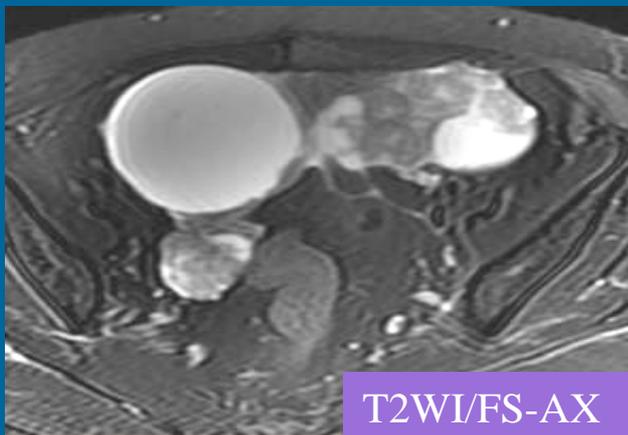
50Y, 左下腹痛2月

囊实性

病变囊实性



浆液性乳头状囊腺癌

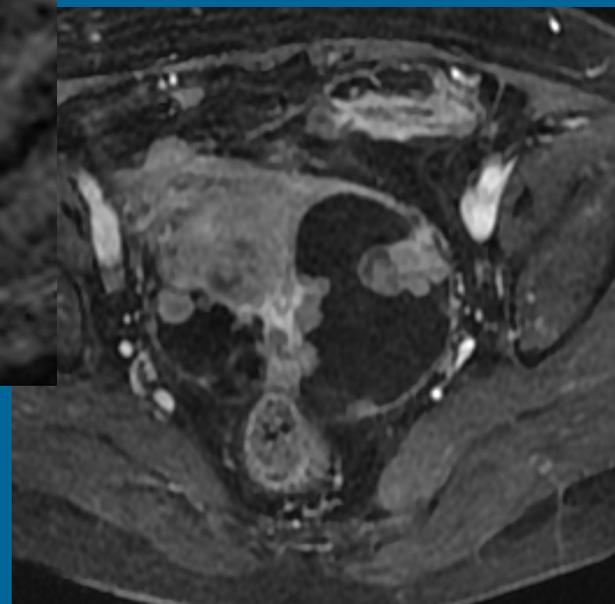
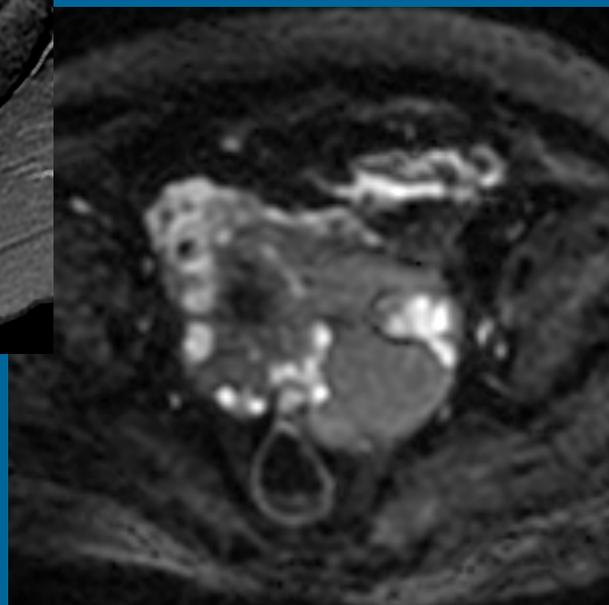


囊实性

病变囊实性

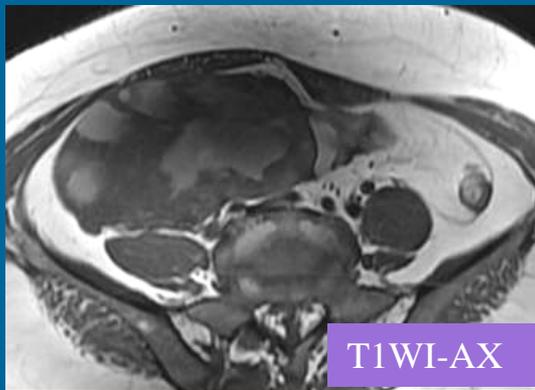
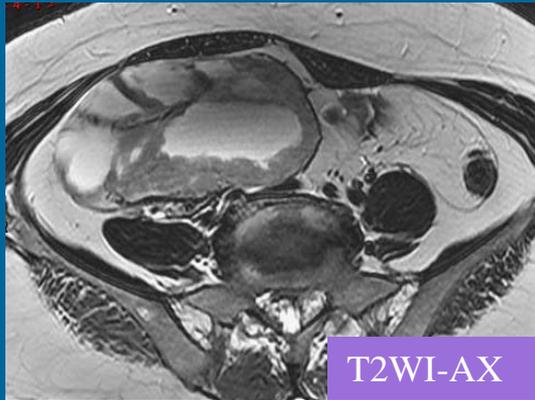


双侧卵巢中-低分化浆液性
乳头状囊腺癌

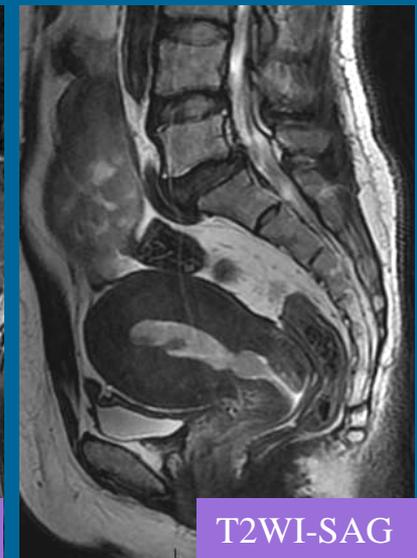
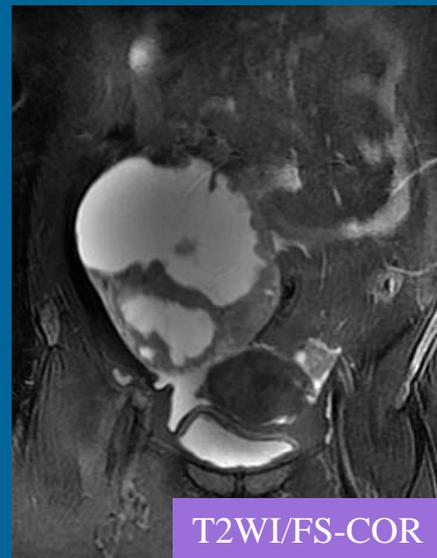


56Y, 间断性下腹痛2月

病变囊实性



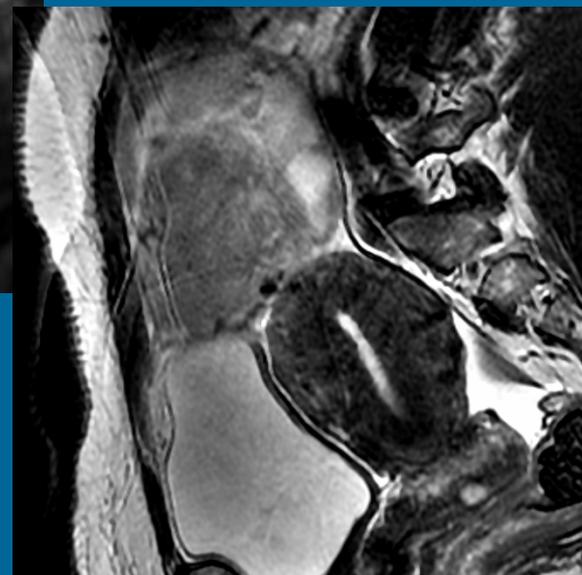
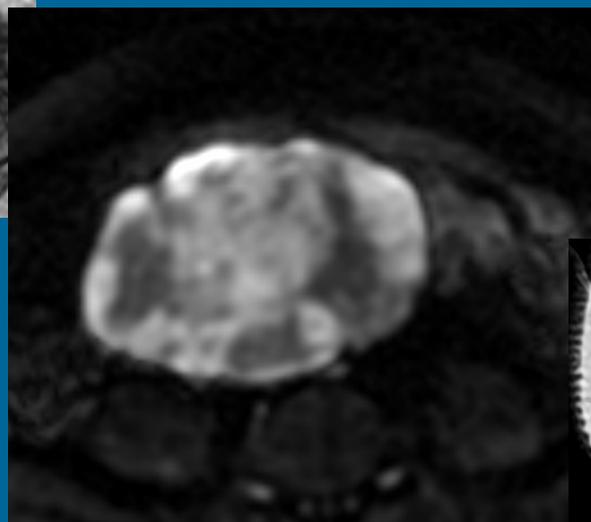
右卵巢子宫内膜样腺癌
合并子宫内膜宫内膜样腺癌



囊实性

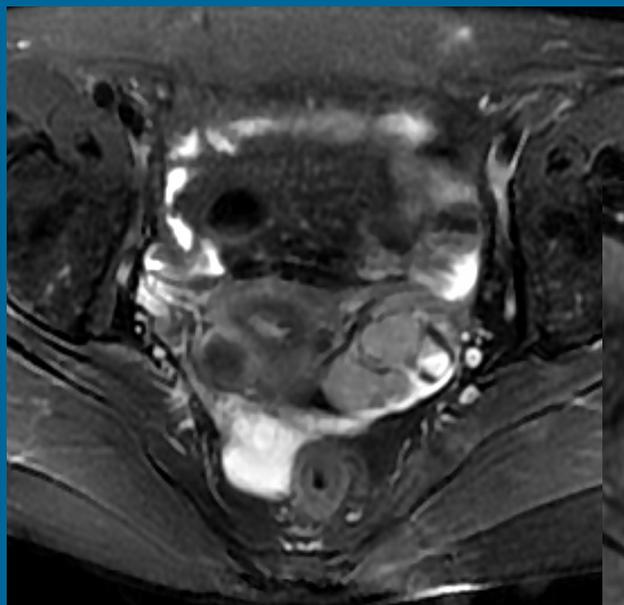
病变囊实性

卵巢颗粒细胞瘤

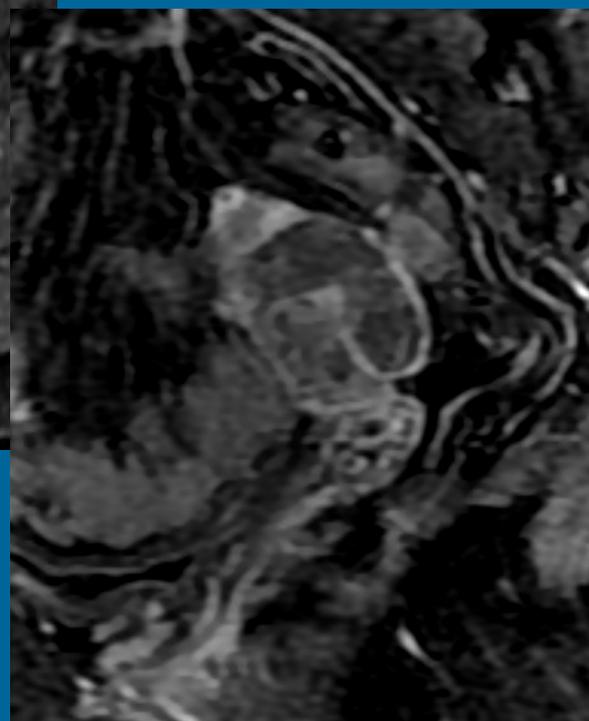
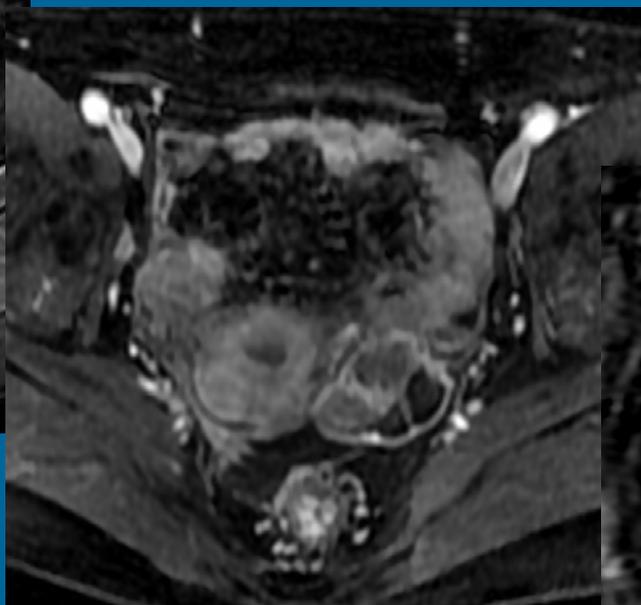


59Y, 阴道流血20余天

病变囊实性

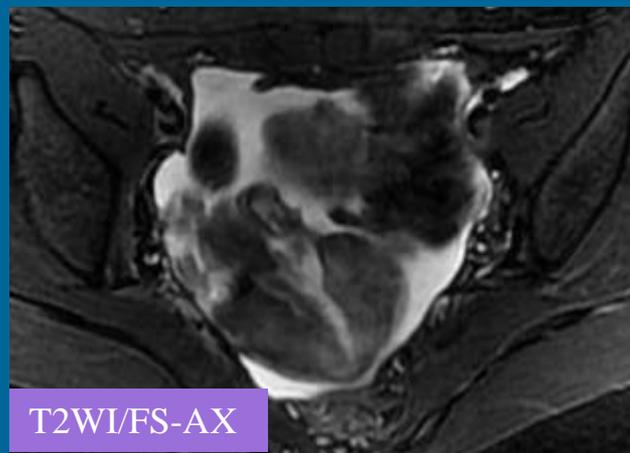
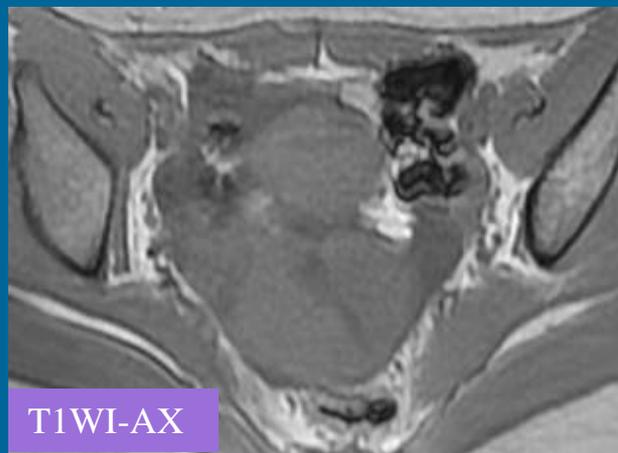


左侧输卵管癌

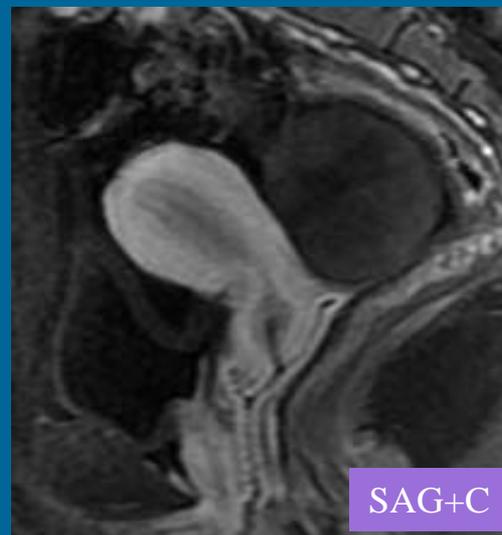
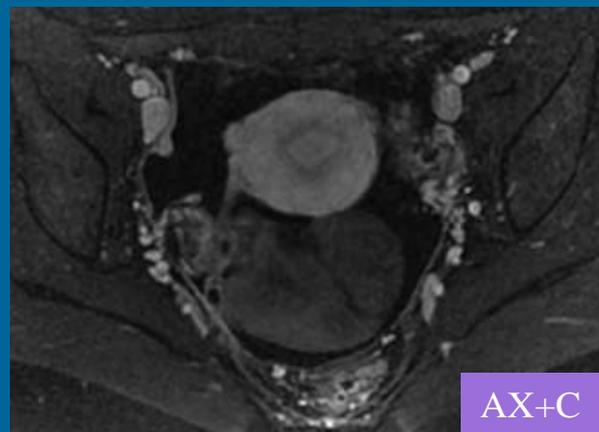


57Y, 间断性阴道排液出血半年

病变囊实性

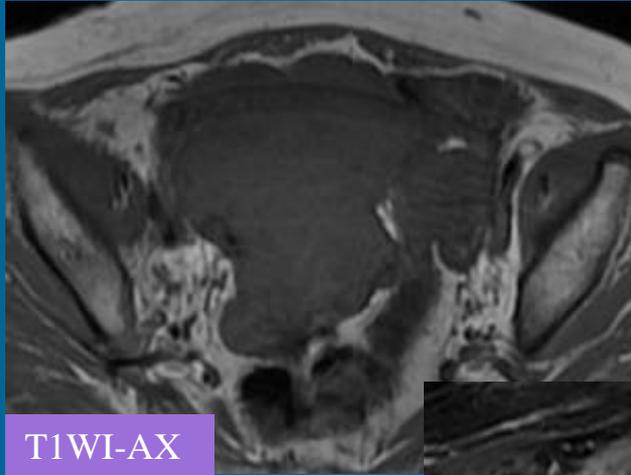


卵泡膜纤维瘤

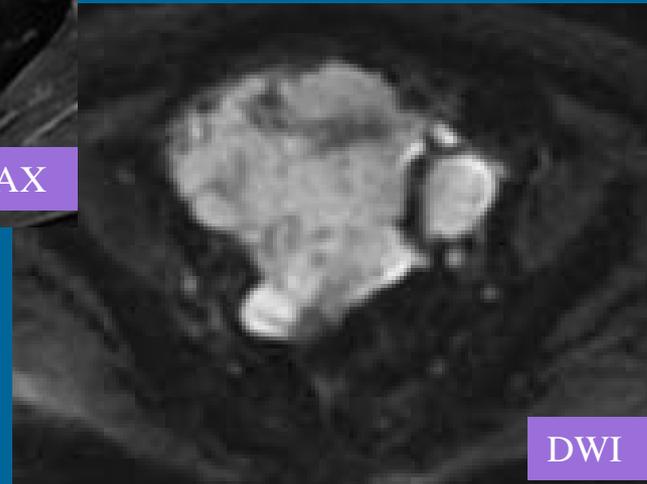
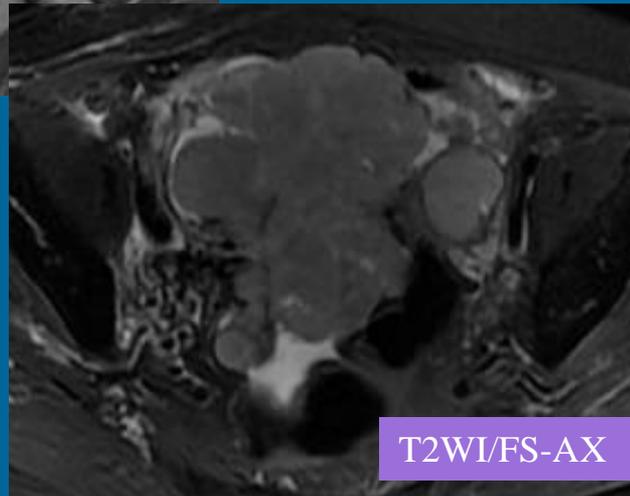
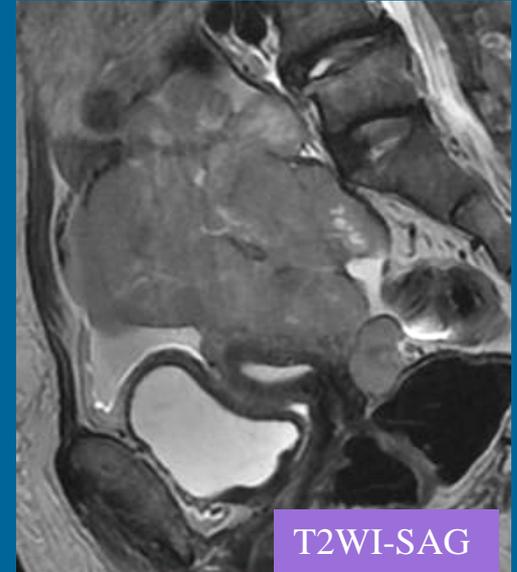


实性（边界清楚、锐利）

病变囊实性



浆液性乳头状癌



实性（边界不清，形态不规则）

病变信号

T1高信号

出血

出血性囊肿

巧囊

肿瘤合并出血
(如颗粒细胞瘤, 卵黄
囊瘤, 等)

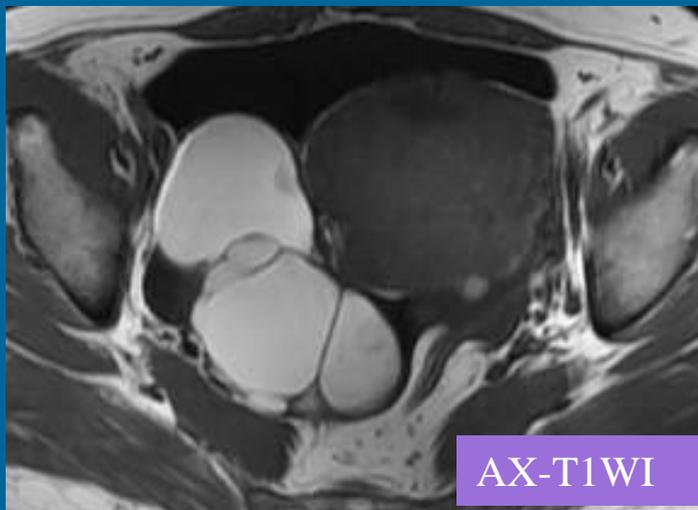
脂肪

畸胎瘤

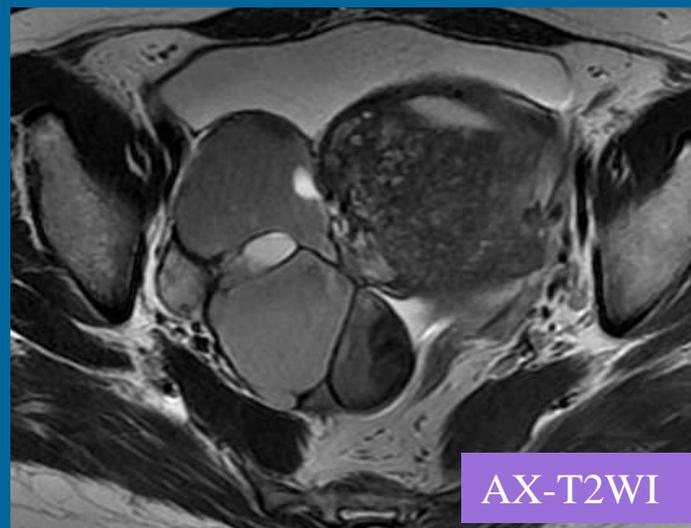
粘液

粘液性囊腺类肿瘤

病变信号

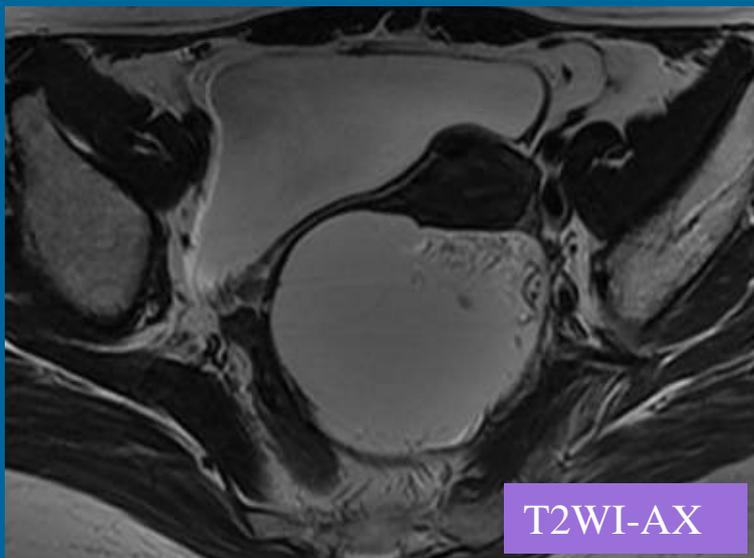
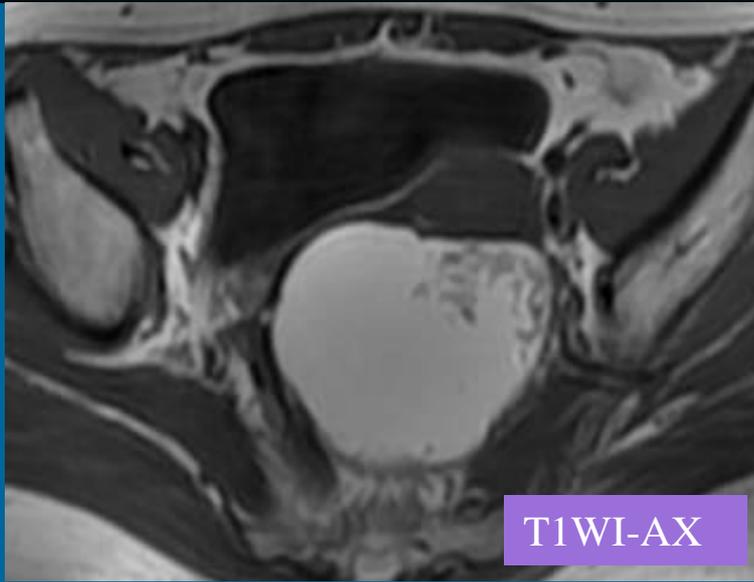


巧囊
(合并子宫腺肌症)

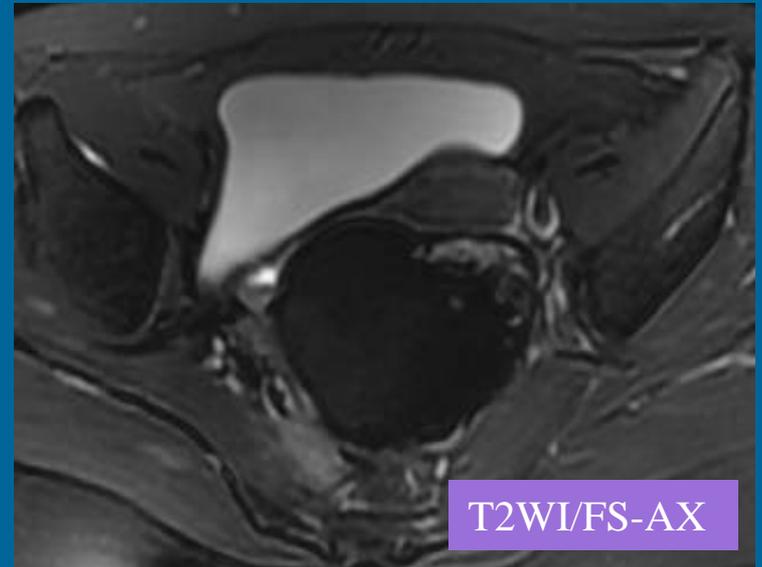


T1高信号—出血

病变信号



囊性成熟性畸胎瘤



T1高信号—脂肪

信号表现—平扫

T2低信号

血液成分

出血性囊肿

巧囊

输卵管积血

平滑肌

肌瘤

纤维组织

纤维瘤

卵泡膜纤维瘤

囊腺纤维瘤

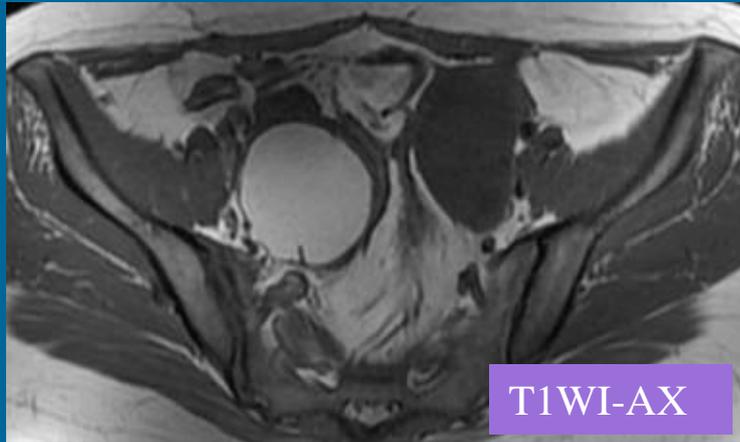
混合细胞结构

Brenner瘤

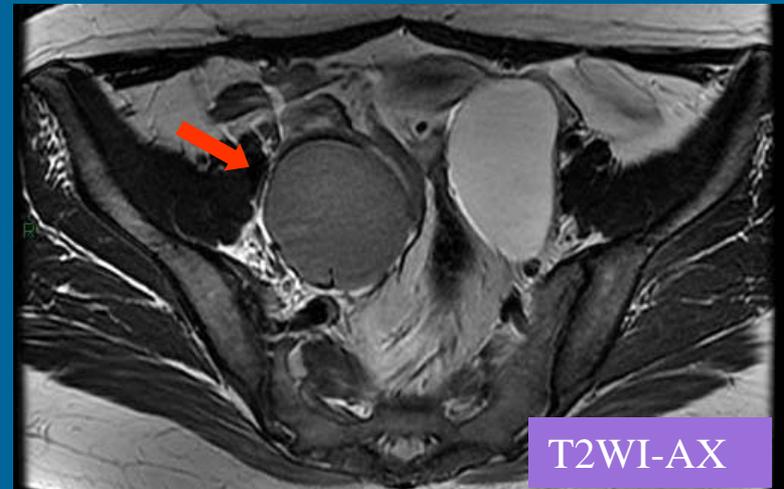
卵巢甲状腺肿

转移瘤
(Krukenberg tumor)

信号表现



右侧卵巢出血性囊肿
(左侧卵巢单纯囊肿)

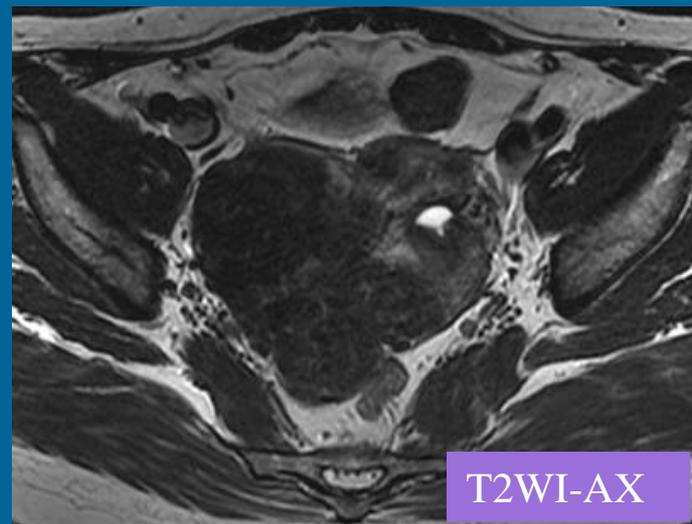


T2低信号—出血

信号表现



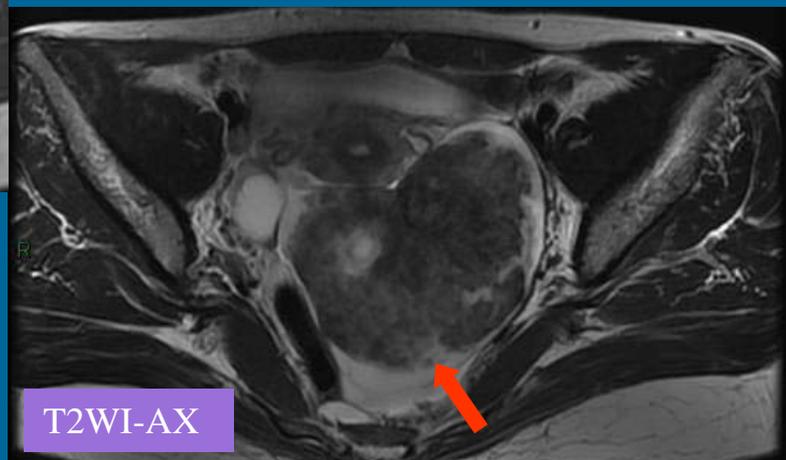
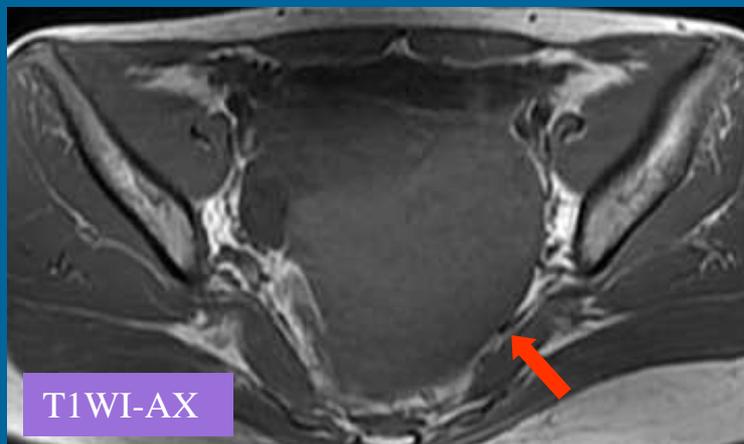
阔韧带肌瘤



T2低信号—平滑肌

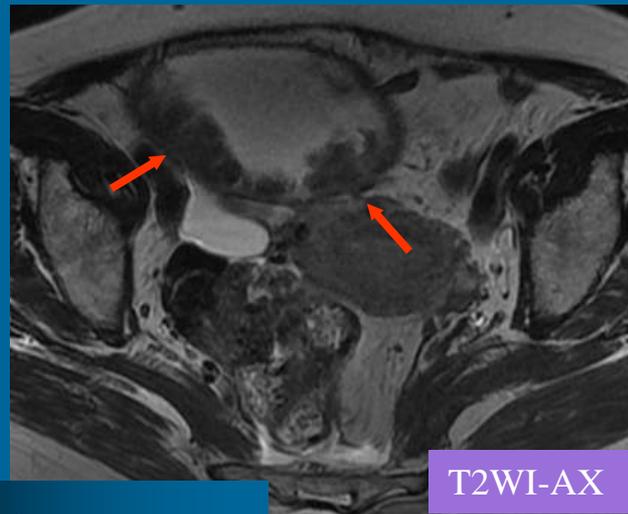
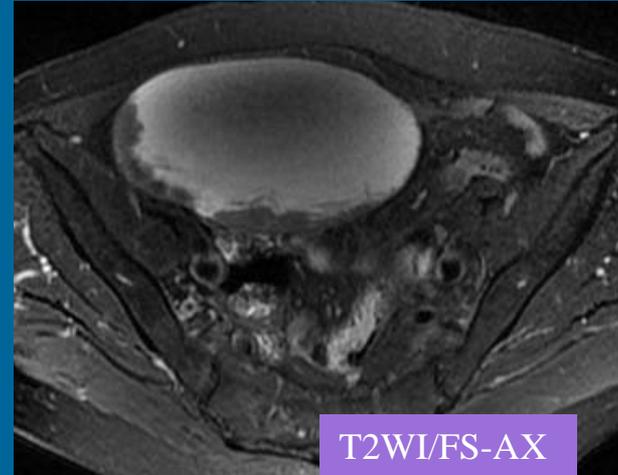
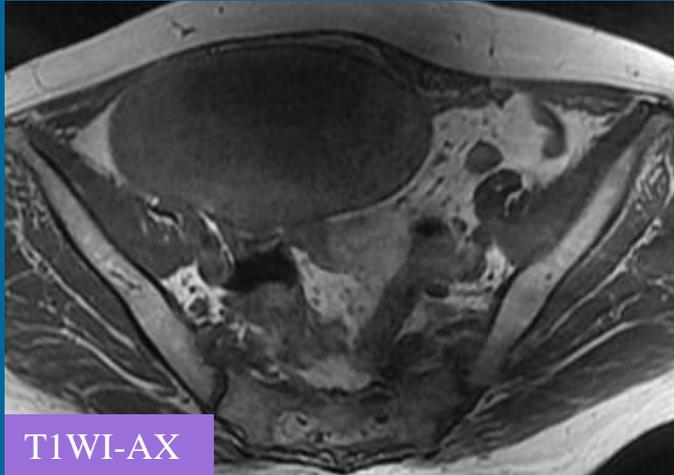
病变信号

卵泡膜纤维瘤



T2低信号—纤维组织

病变信号



Krukenberg tumor
来源于结肠

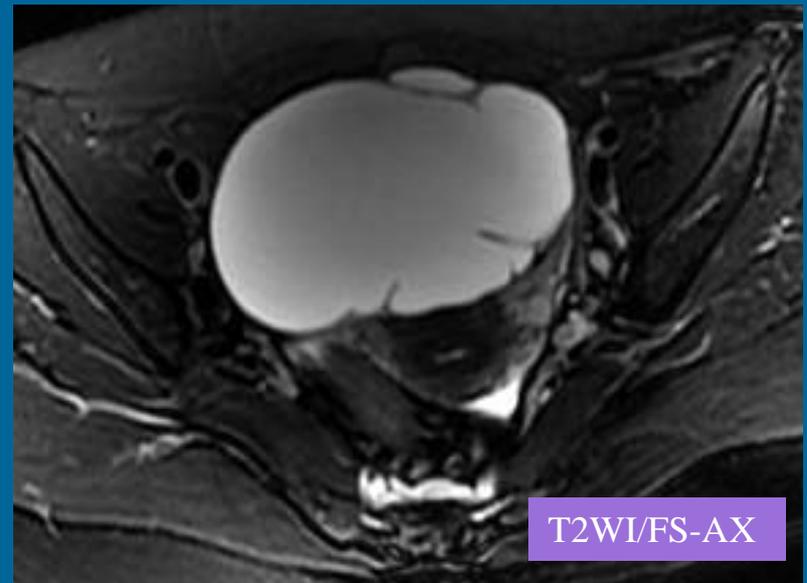
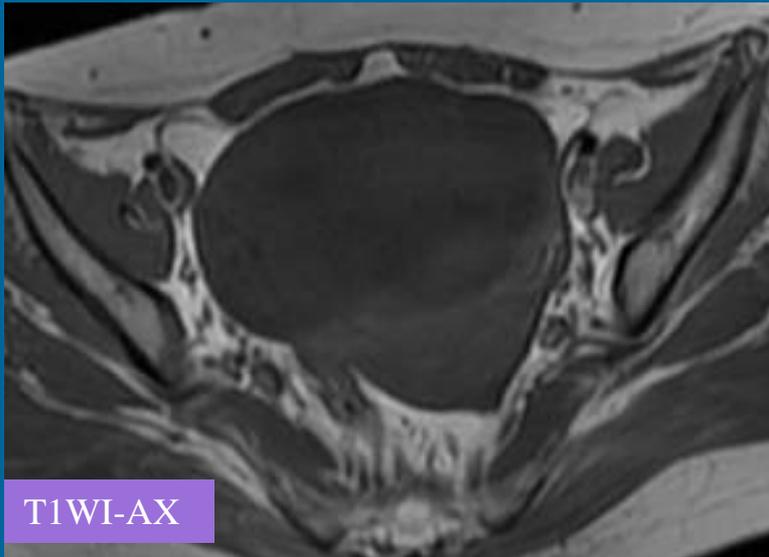
T2低信号—混合细胞

临床及实验室检查

- 颗粒细胞瘤、卵泡膜瘤 ---- 雌激素过多
- 支持-间质细胞瘤、间质细胞瘤 ---- 雄激素过多（男性化）
- 卵黄囊瘤----AFP升高
- 绒癌 ----HCG 升高
- 卵巢甲状腺肿 ---- 甲状腺素升高（甲亢）

病例分析

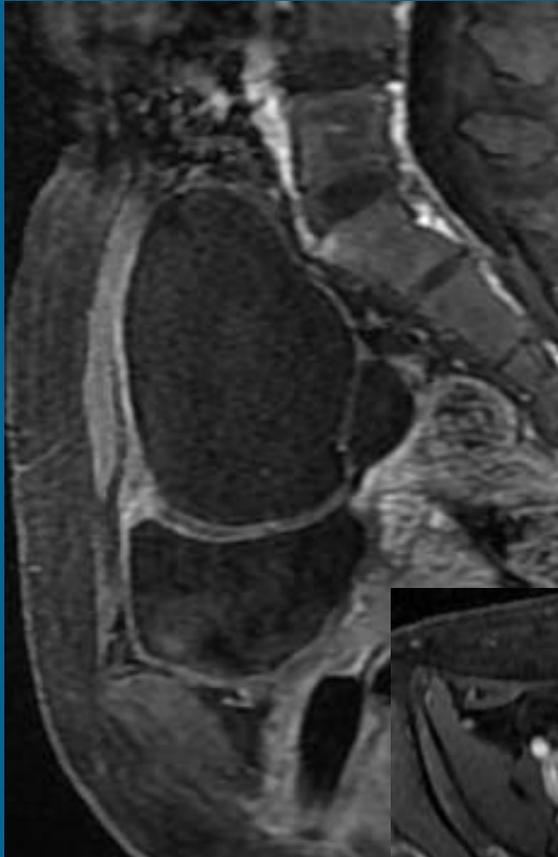
Case1



F48，查体发现附件肿物
囊性肿物，内见分隔
囊内信号均匀、一致

病例分析

Case1



囊性肿物
分隔纤细、均匀
无实性结节

可能诊断:

炎症

囊肿, 巧囊

上皮来源: 囊腺瘤

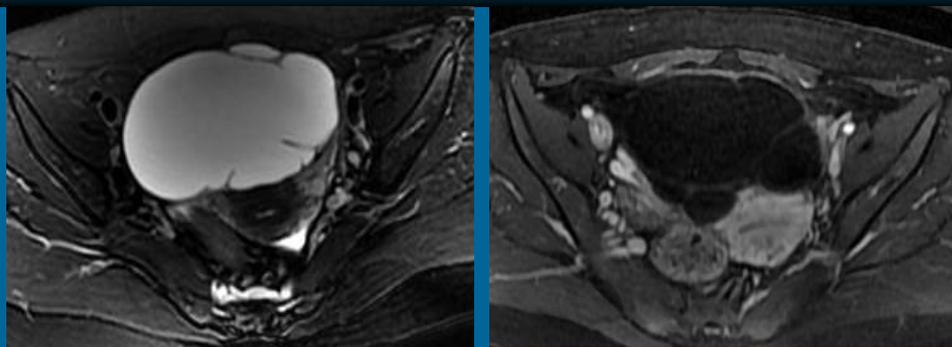
交界性囊腺瘤

生殖来源: 囊性成熟性畸胎瘤

性索间质: 颗粒细胞瘤

病例分析

Case1



- 临床无发热等症状
- 其内分隔
- 囊内信号一致、无出血
- 分隔均匀一致，无实性结节
- 未检出脂肪组织
- 信号均匀，无实性成分
- 囊内分隔少

除外



除外



除外



除外



除外



除外



最后诊断



炎症（脓肿）

单纯囊肿

巧囊

恶性或交界性囊腺瘤

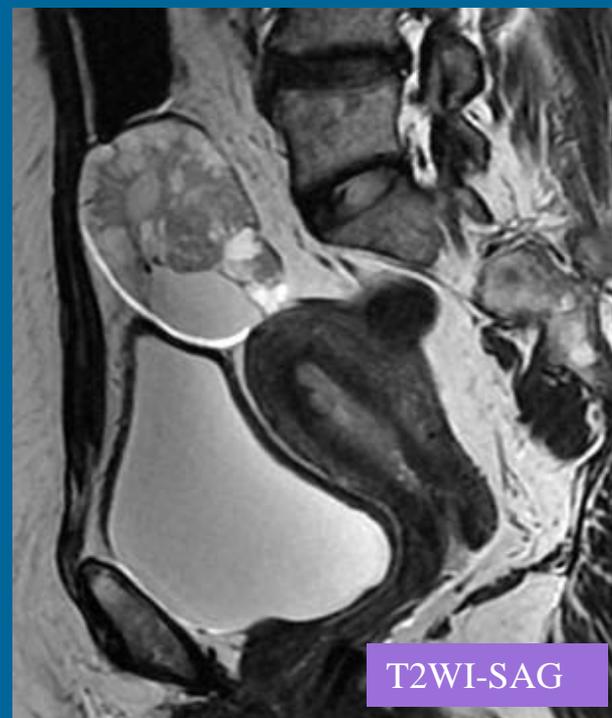
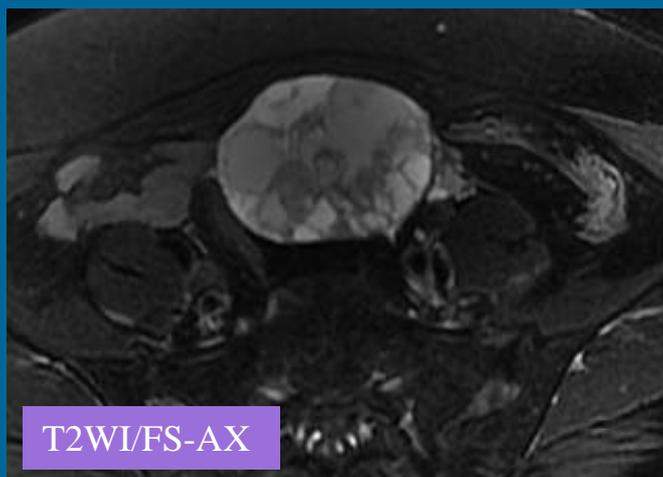
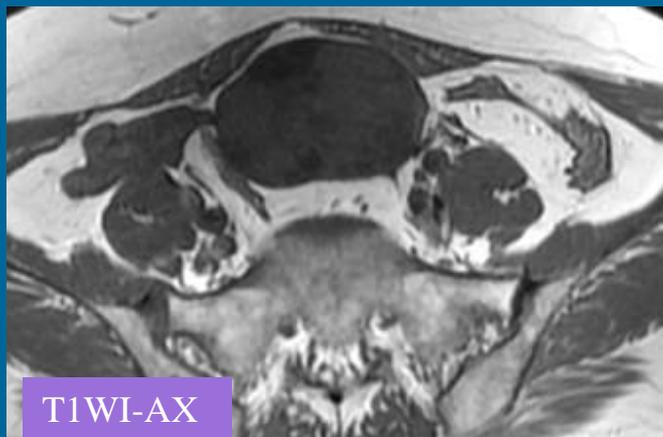
畸胎瘤

颗粒细胞瘤

浆液性囊腺瘤

病例分析

Case2



F55, 绝经10年, 阴道不规则出血半年

病例分析

Case2



附件区囊实性肿物

可能诊断:

上皮来源: 囊腺癌?

子宫内膜样癌?

生殖来源: 畸胎类肿瘤?

卵黄囊瘤?

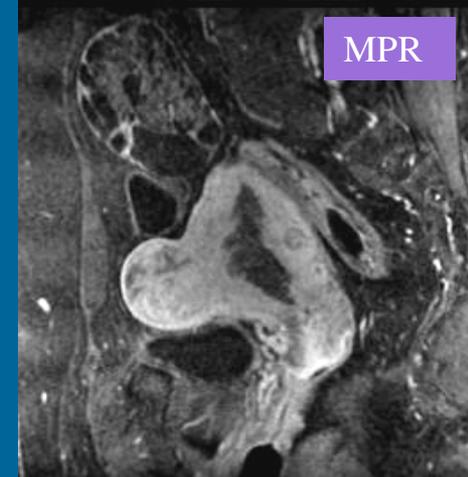
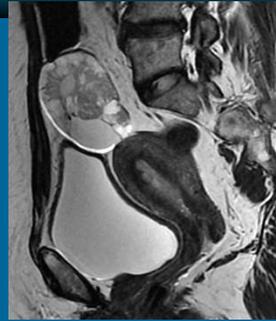
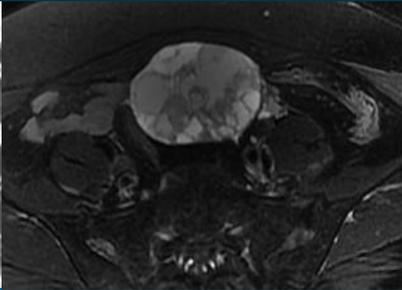
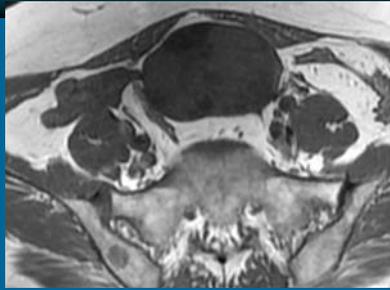
性索间质: 颗粒细胞瘤?

支持-间质细胞瘤?

转移瘤?

F55, 绝经10年, 阴道不规则出血半年

病例分析



- T1低信号，未检出脂肪成分 除外
- 老年女性，无AFP升高 除外
- 无男性化征象 除外
- 无雌激素增高 除外
- 无胃肠道肿瘤病史 不首先考虑
- 首先考虑上皮来源肿瘤
与囊性癌需鉴别 倾向
- 因同时合并子宫内膜癌 最后病理

畸胎类肿瘤

卵黄囊瘤

支持-间质细胞瘤

颗粒细胞瘤

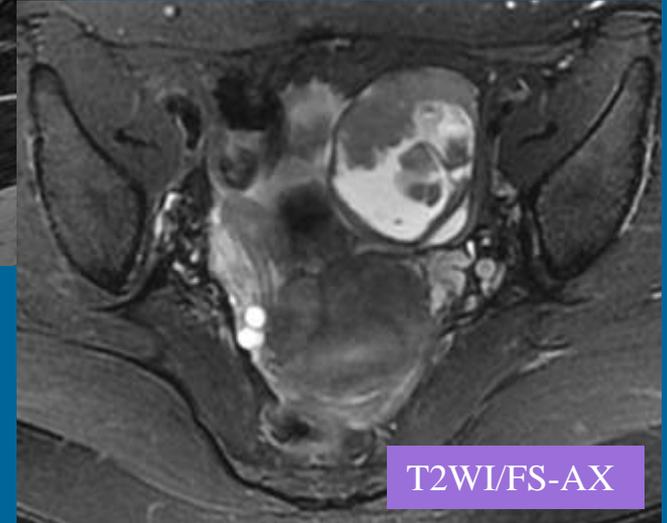
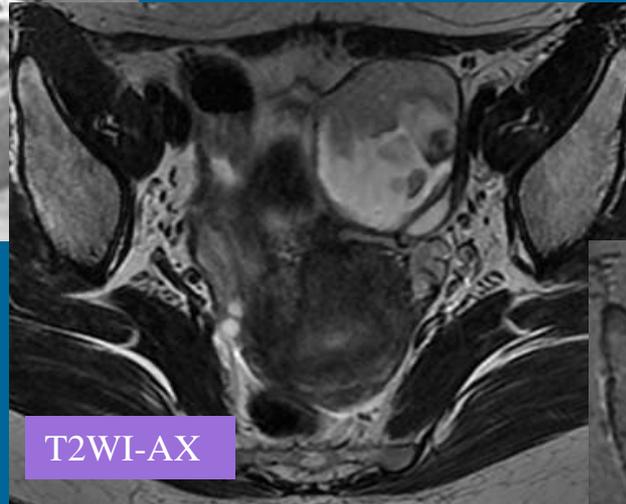
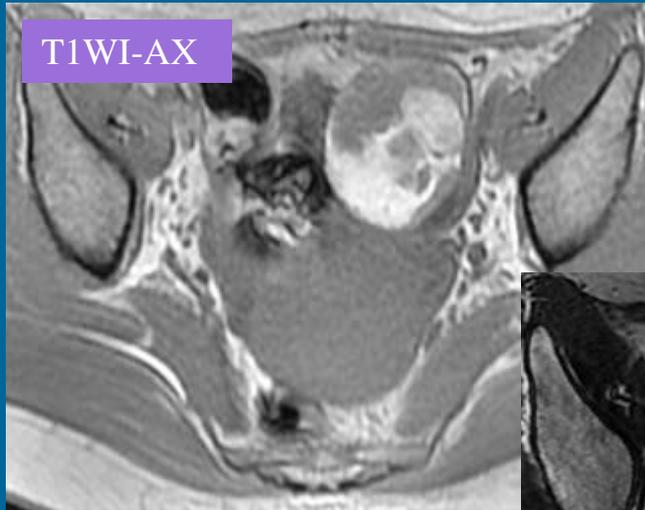
转移瘤

子宫内膜样癌

子宫内膜样癌

病例分析

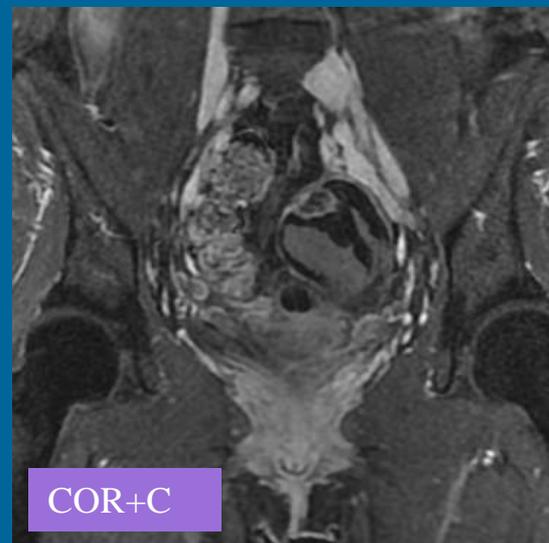
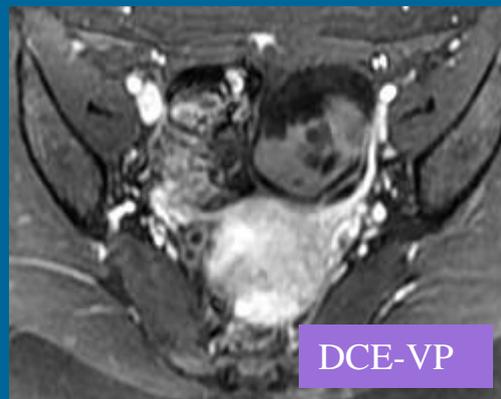
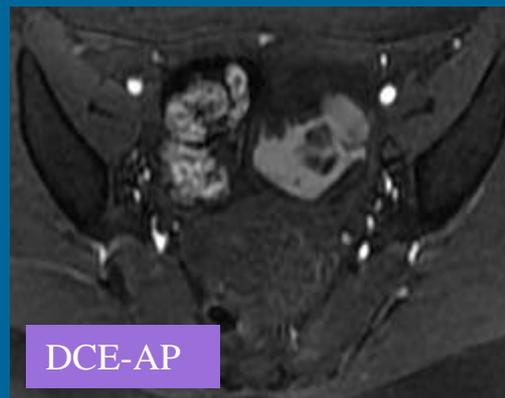
Case3



左侧附件区囊实性肿物
内见T1高T2高信号，T1等T2低信号

病例分析

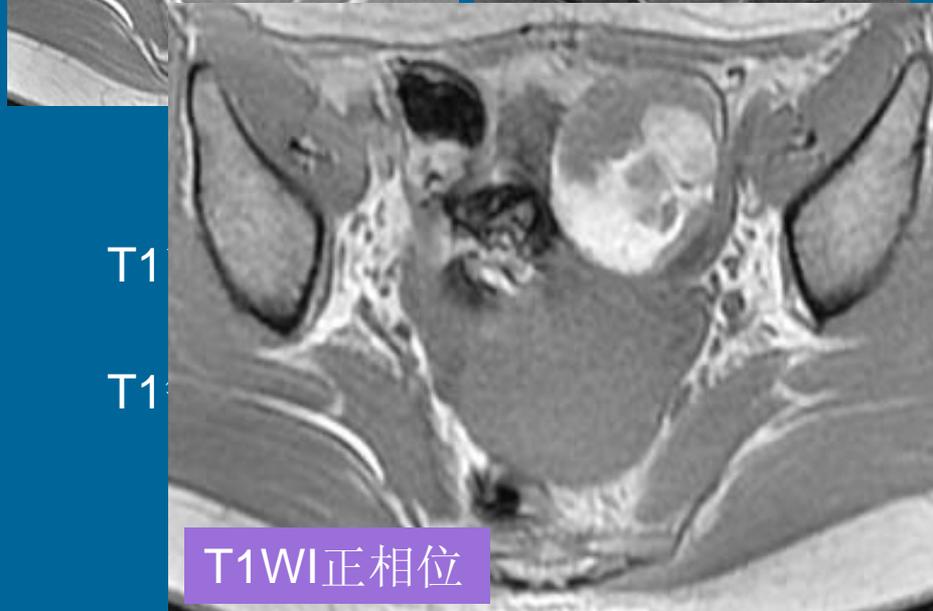
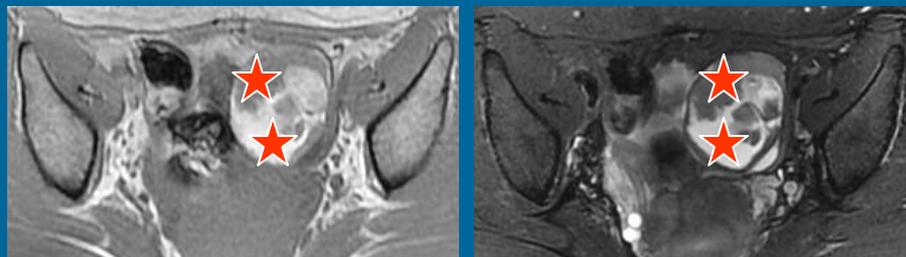
Case3



内见实性组织

病例分析

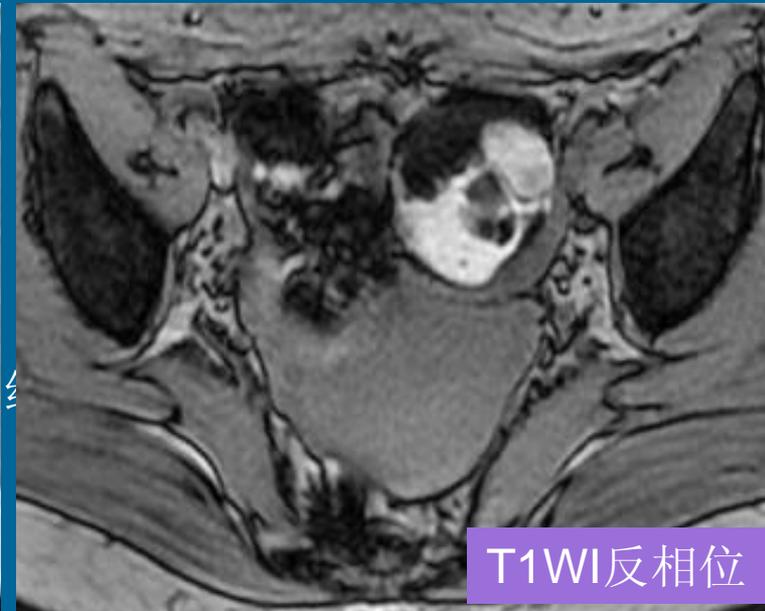
Case3



T1

T1

T1WI正相位



T1WI反相位

诊断：畸胎瘤

病例分析

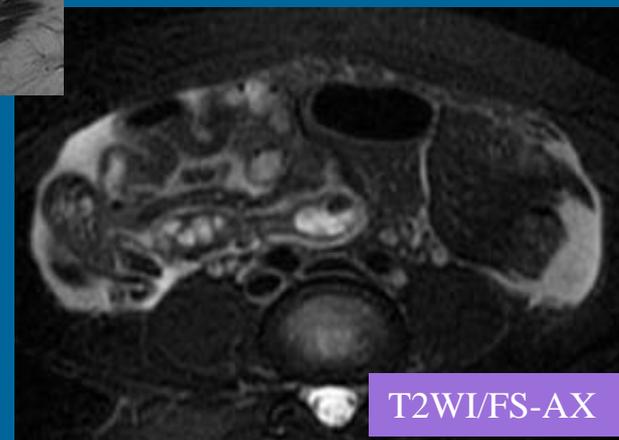
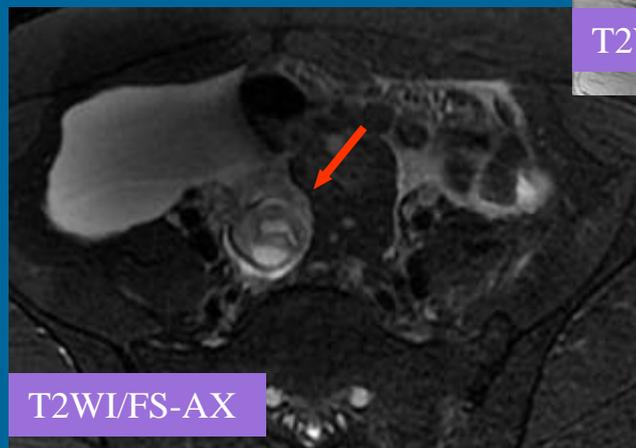
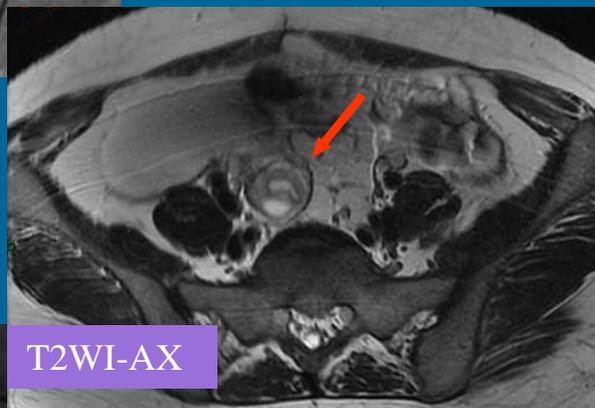
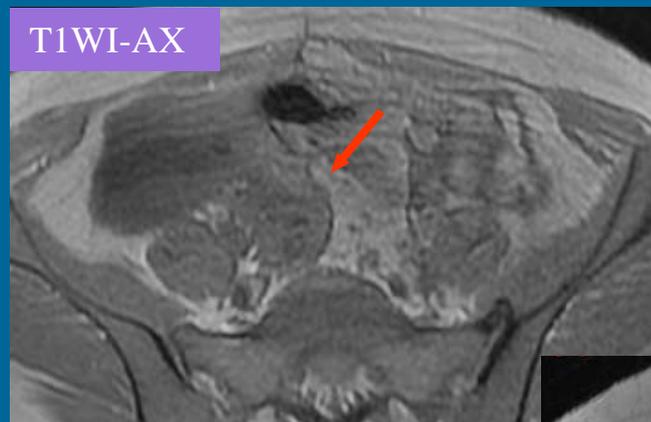
Case4

F39停经半年，HCG不高

右侧附件区囊实性结节

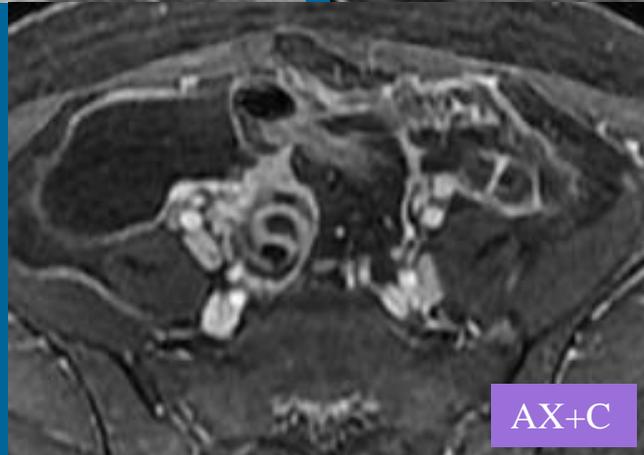
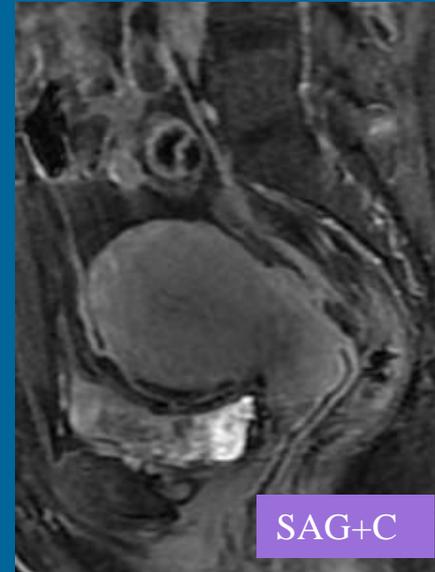
T1低T2高

伴有腹水



病例分析

Case4



可能诊断:

宫外孕?

炎症?

上皮来源: 交界性囊腺瘤/囊腺癌?

生殖来源: 卵黄囊瘤?

性索间质: 颗粒细胞瘤?

转移瘤?

结节内可见分隔, 强化

病例分析

Case4



- 停经，但HCG不高
除外
→ 宫外孕
- 中年女性，无AFP升高
除外
→ 卵黄囊瘤
- 无雌激素增高
除外
→ 颗粒细胞瘤
- 无胃肠道肿瘤病史
不首先考虑
→ 转移瘤
- 有腹水，但囊壁光滑
分隔均匀，无明显实性结节
其内似形成窦道
→ 考虑炎症较囊腺癌可能大

病理：结核

病例分析

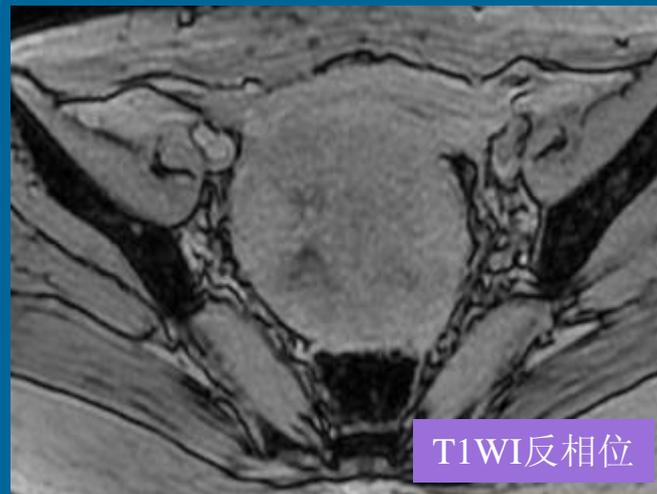
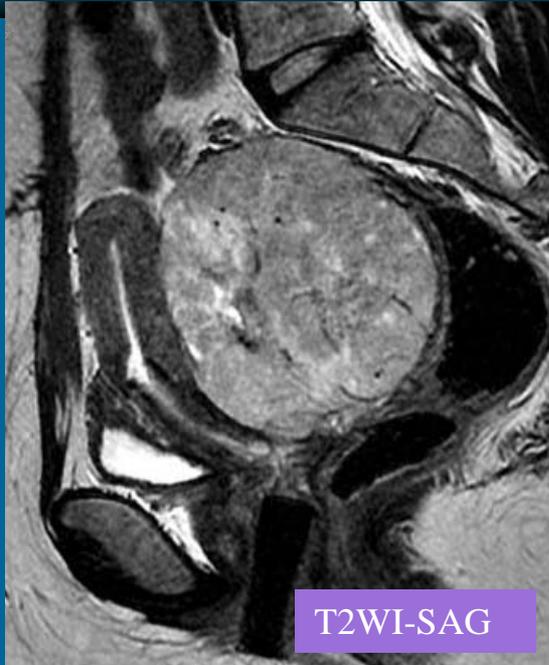
Case5

F30

剖腹产后6月

查体发现

盆腔实性肿物，
内见散在囊变区
未检出脂肪成分



病例分析

可能诊断:

浆膜下/或阔韧带肌瘤

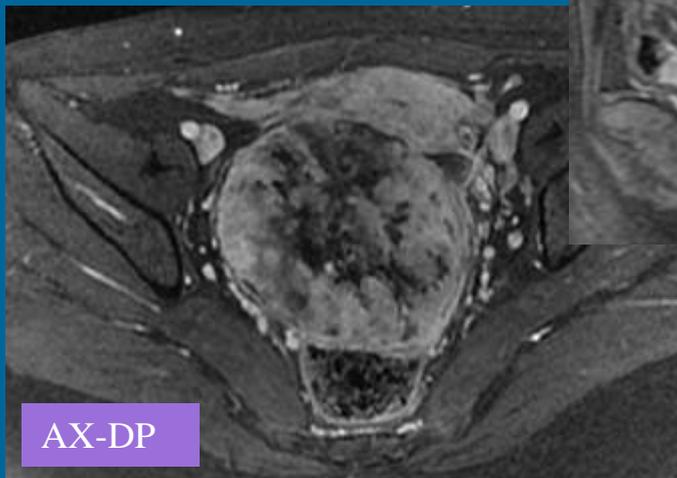
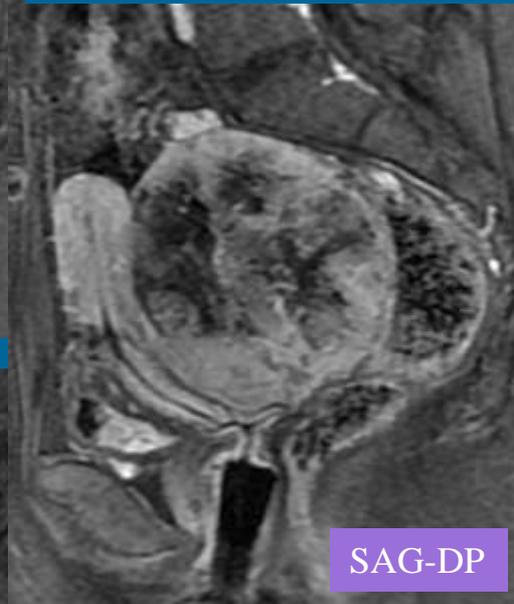
上皮来源: 囊腺癌

生殖来源: 无性细胞瘤

卵黄囊瘤

性索间质: 卵泡膜-纤维瘤

转移瘤

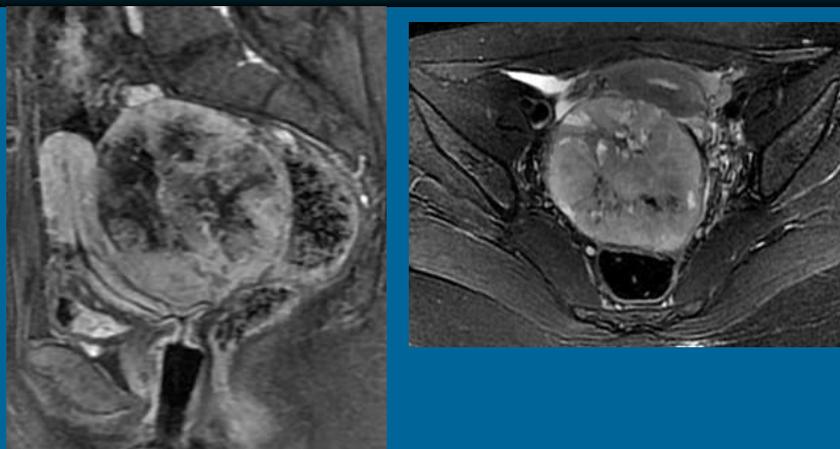


不均匀强化

Case5

病例分析

Case5



□ T2中高信号、强化不均匀

除外



肌瘤、卵泡膜纤维瘤

□ 年轻患者，既往无肿瘤病史

不首先考虑



转移瘤

□ 囊腺癌？

□ 生殖系统来源肿瘤？



难以诊断

□ **AFP: 104252ng/ml**
(nor: 0~7)

最后诊断



卵黄囊瘤

小 结

- 卵巢疾病种类繁多，表现复杂
- 临床病史及实验室检查有助于诊断
- MR通过多种序列能够检出特异性的成分（如出血、脂肪、纤维组织等）、以及囊实性的鉴别，对诊断有独特的优势

Thank You!