北京协和医院
PEKING UNION MEDICAL COLLEGE HOSPITAL

炎性肠病放射影像诊断规范及读片

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福州

概述

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- 炎症性肠病 (inflammatory bowel disease,IBD)是以反复发作的慢性肠道炎症为特点的一组疾病
- 代表性疾病是溃疡性结肠炎(ulcerative colitis,UC)和克罗恩病(Crohn's disease,CD)。

常用影像学方法

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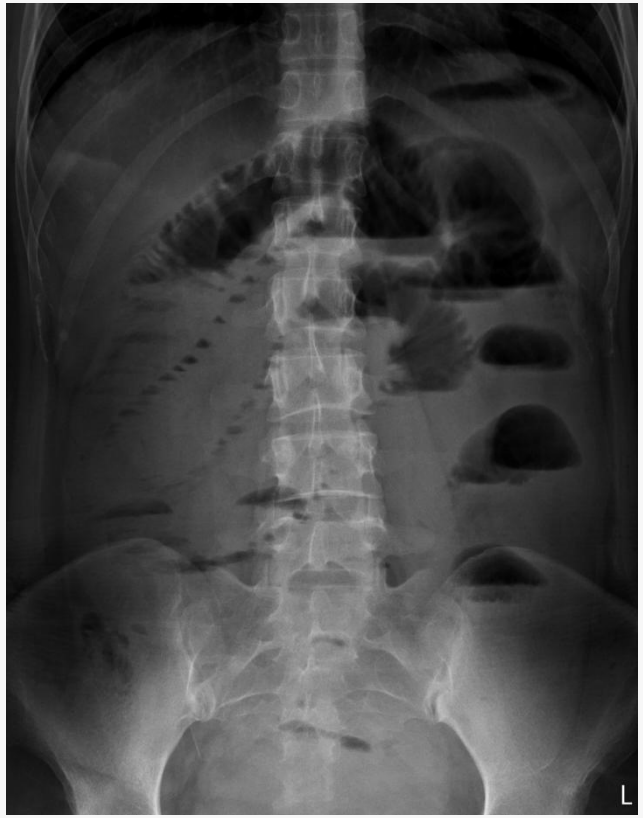
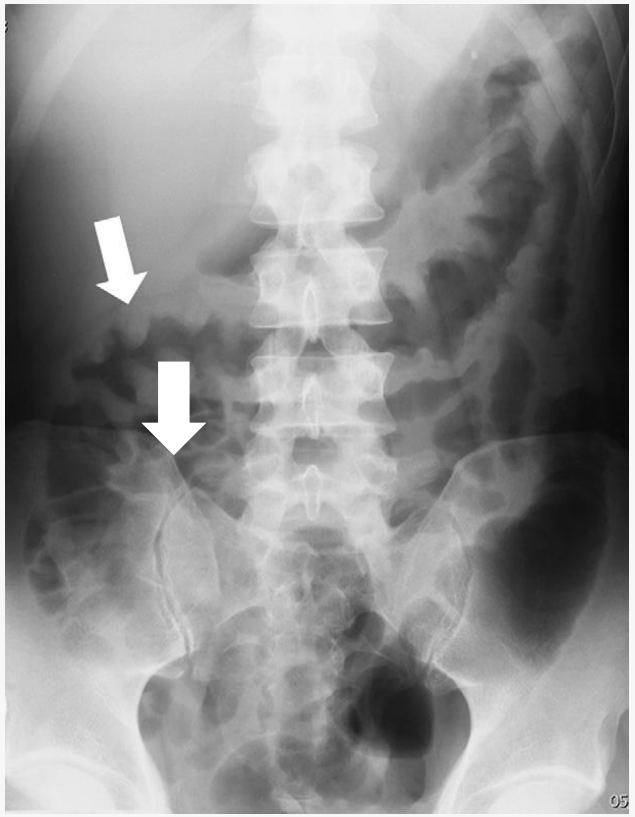
- 腹平片
- 消化道造影（小肠造影；钡灌肠）
- CTE（CT enterography；CT enteroclysis）
- MRE（MR enterography；MR enteroclysis）
- B超

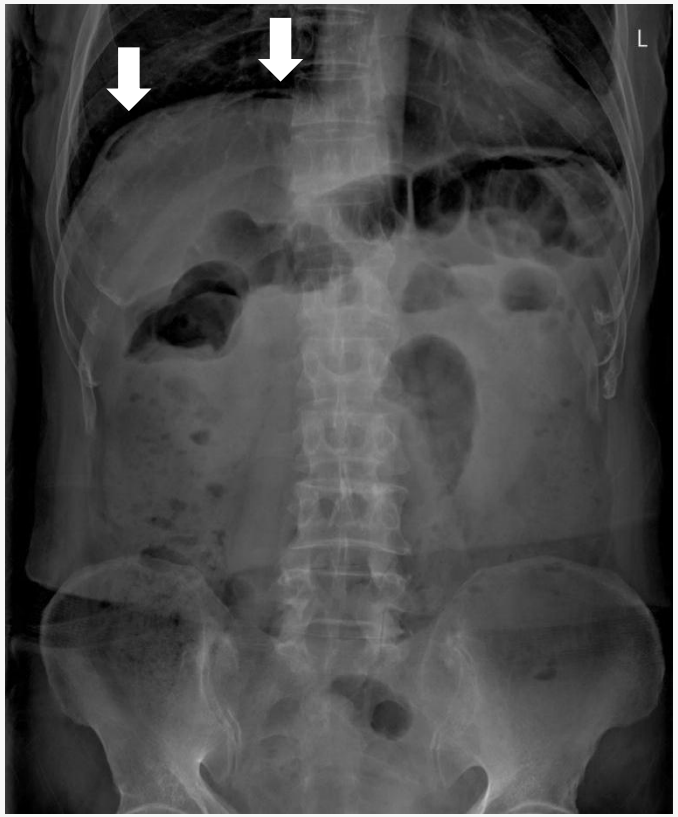
电离辐射

腹部平片

- 约2/3阴性
- 阳性发现：肠梗阻，肠壁增厚，腹腔游离气体，脓肿等







腹部平片

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- 单次剂量约0.7mSv（相当于7张胸片，5%-15%腹盆CT平扫辐射剂量）
- 约占1/3腹部影像检查
- 近年CT发展普及，但腹部平片并未减少（简便、价廉、辐射低）
- **并不改变临床策略**

1992-2008年，177例CD患者，643次PFAs，67.5%阴性结果，42.5%会在5天内接受其他影像学检查， PFAs有无阳性发现诊疗策略无差异*

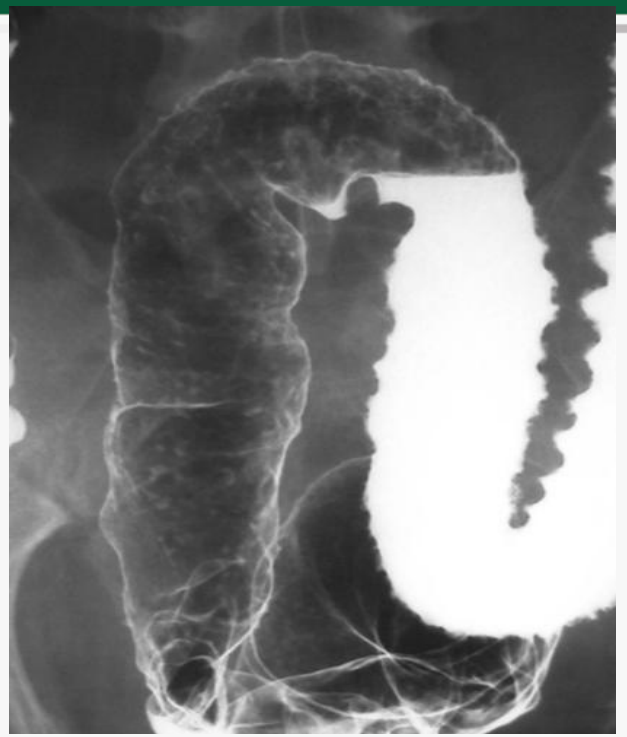
建议由高年资、有经验的医师决定是否行腹部平片

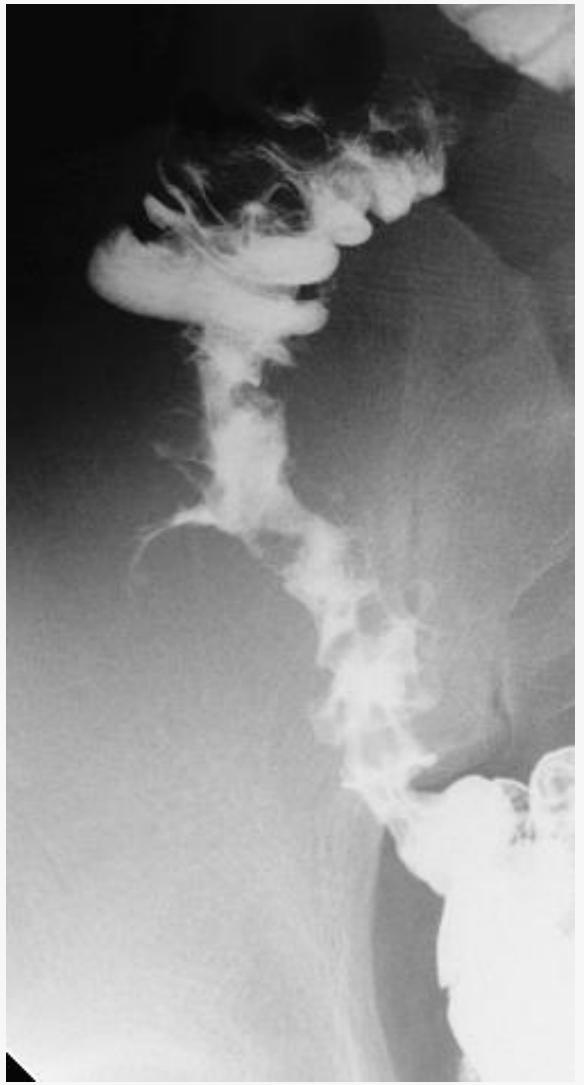
*Plain abdominal radiographs in patients with Crohn‘s disease： radiological findings and diagnostic value. Clinical radiology. 2012, 67: 774-781.

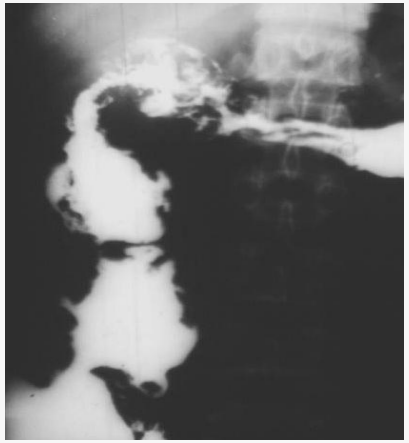
消化道造影

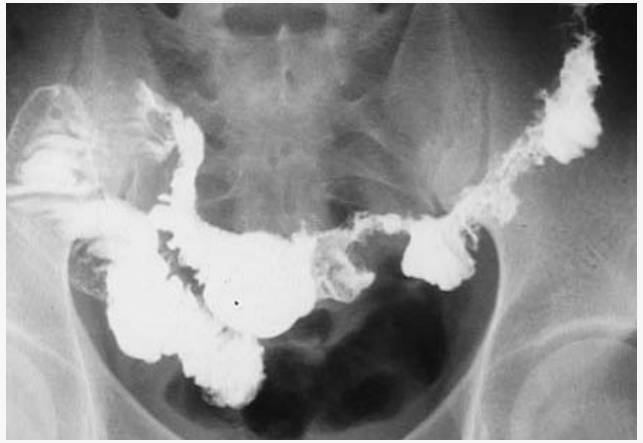
- 口疮样溃疡
  - 尖刺状影（切线位）
  - “靶征”（正面像）
- （肠管）线样征（溃疡）
  - 纵行溃疡，肠系膜侧
- 卵石征

  纵行及横行溃疡，好发于肠系膜侧
- 假憩室样变形









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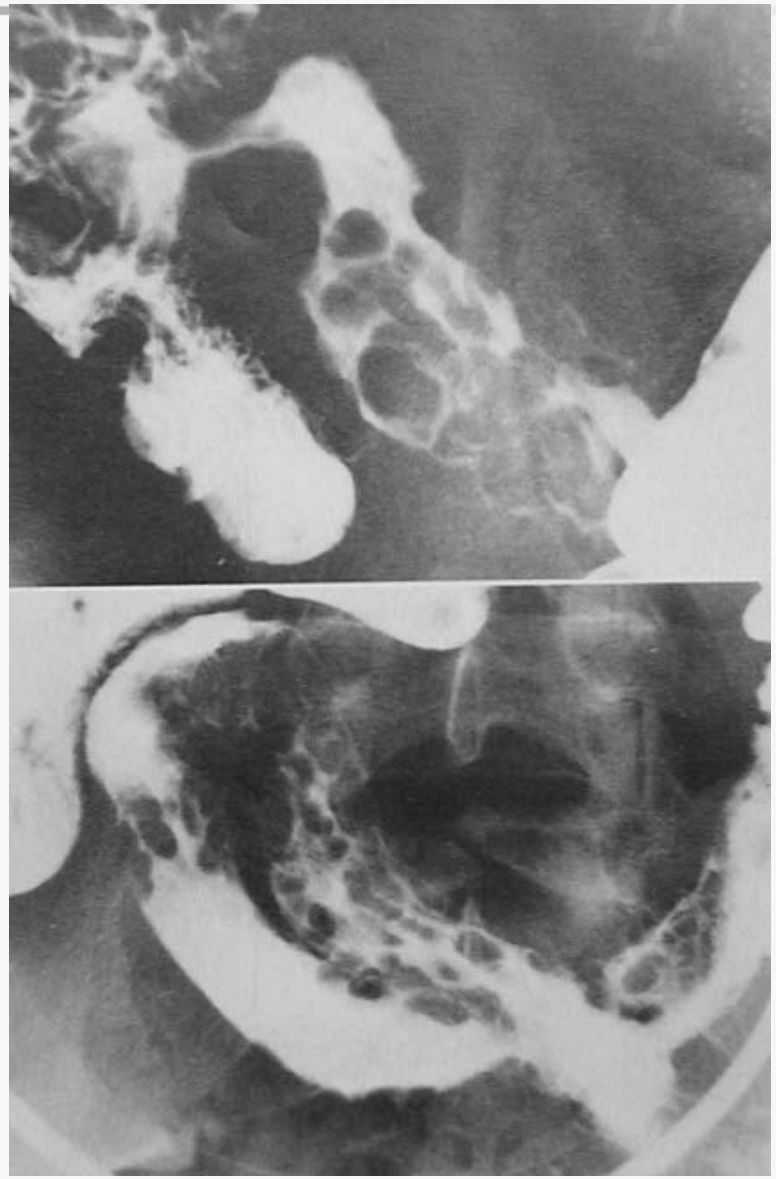

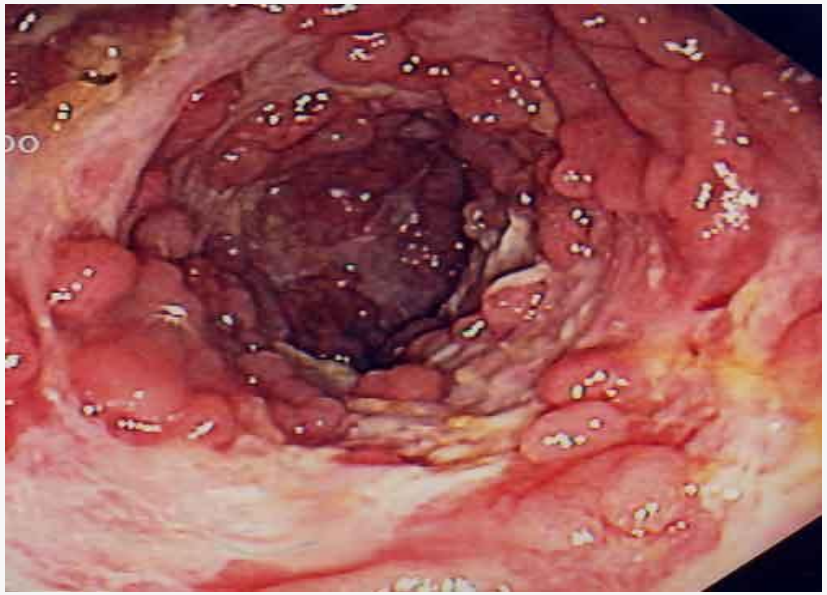

鹅卵石征

消化道造影

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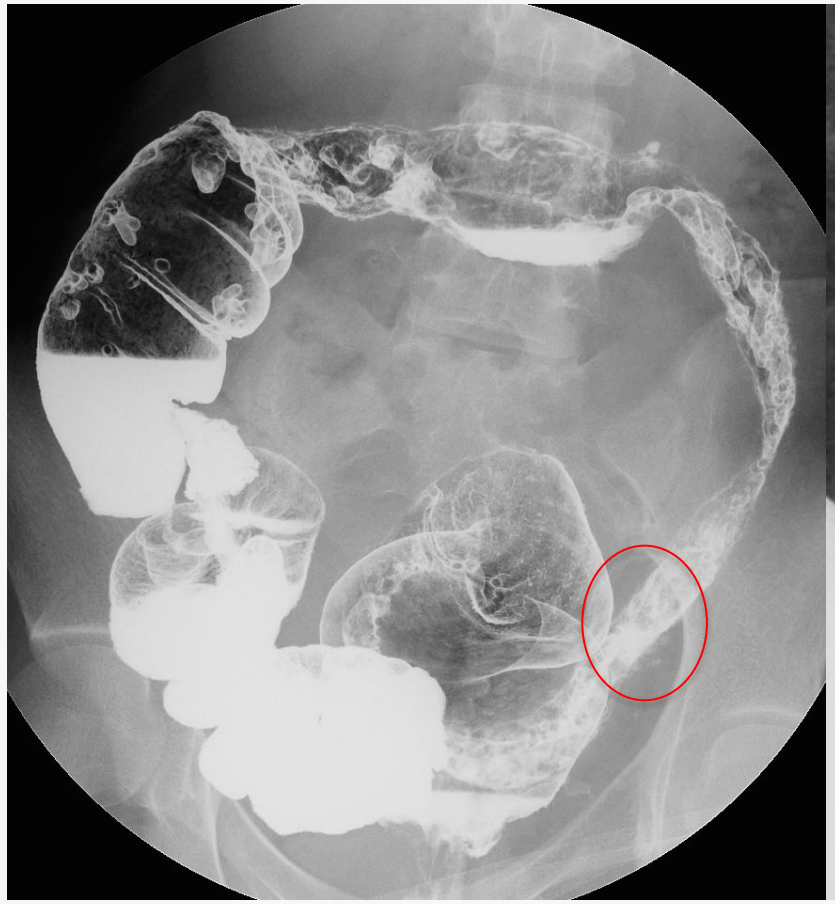
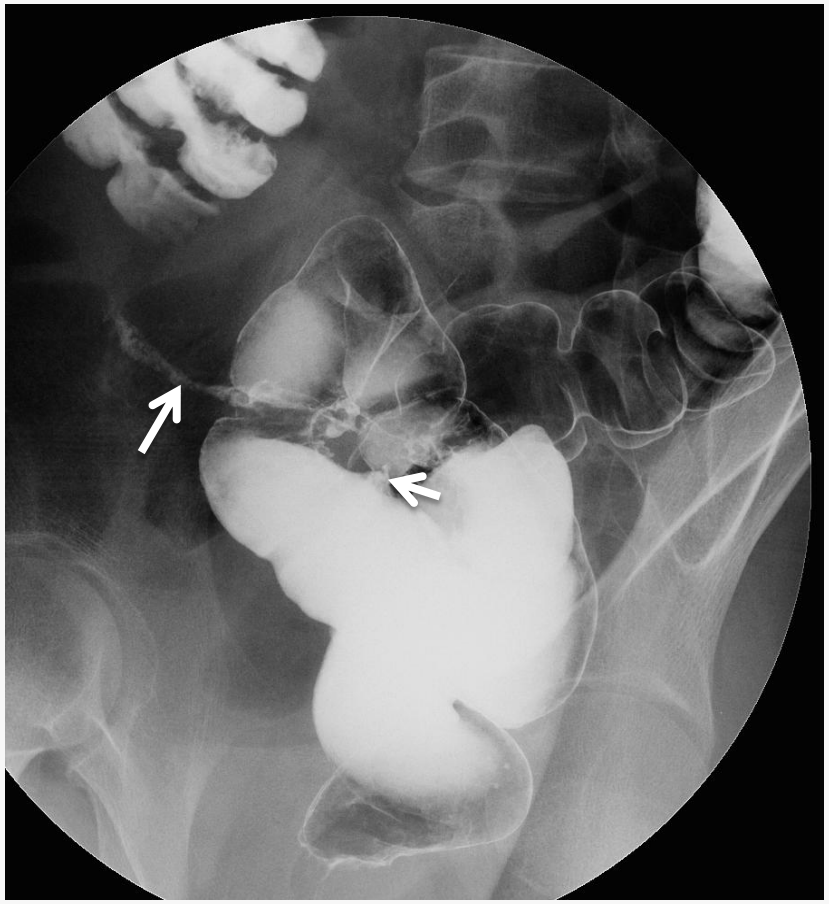
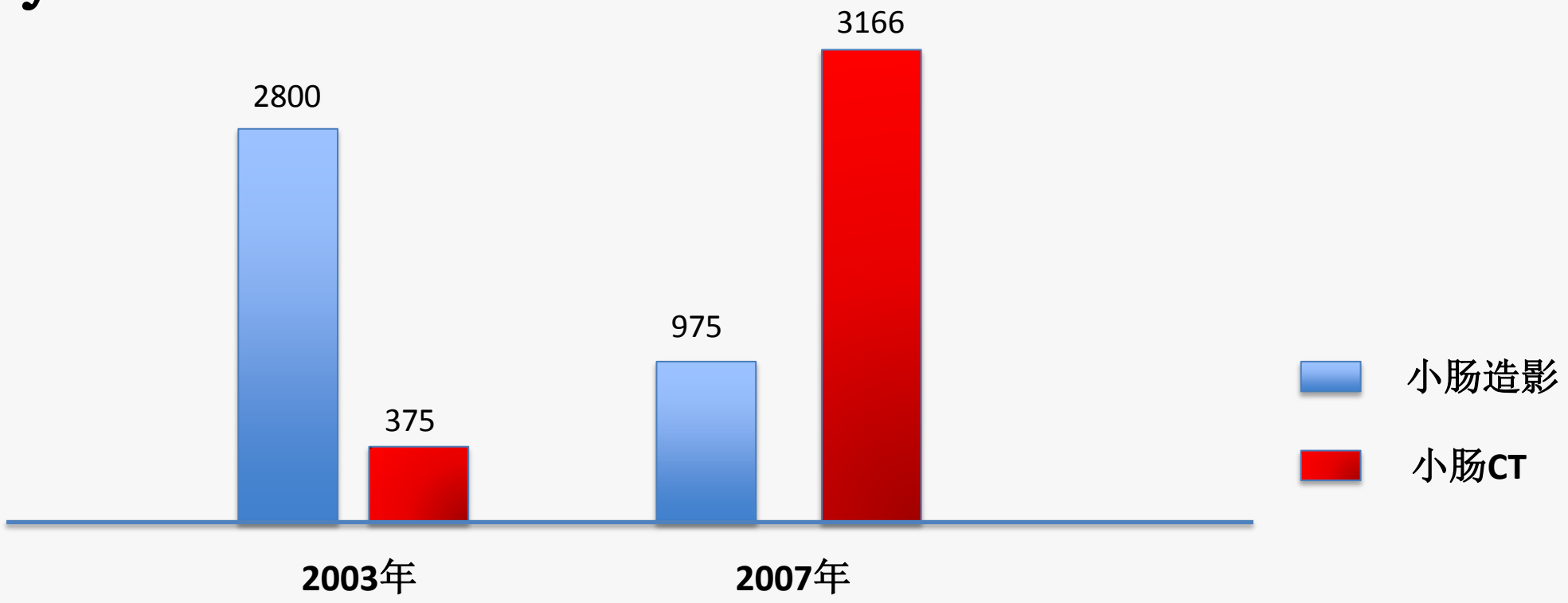


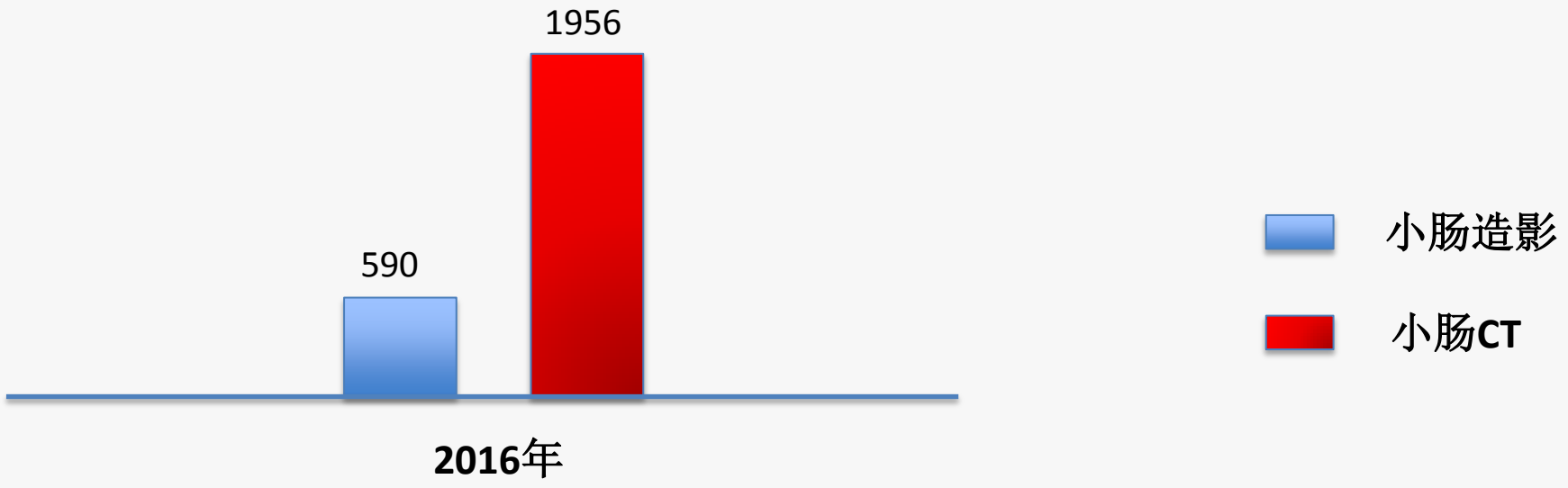


Mayo Clinic



Peloquin JM, Pardi DS, Sandborn WJ, et al. Diagnostic ionizing radiation exposure in a population-based cohort of patients with inflammatory bowel disease. Am J Gastroenterol 2008; 103: 2015

PUMCH



CTE-related Changes to Management Plans			
	Total Patients (n =273)	Established Crohn's Disease (n=145)	Suspected Crohn's Disease (n=128)
Total CTE-related changes	139 (51.0%)	70 (48.3%)	69 (53.9%)
Exclude Crohn's disease	46 (16.8%)	N/A[a]	46 (35.9%)
Exclude active small bowel disease	18 (6.6%)	18 (12.4)	N/A[a]
Add new medication	25 (9.2%)	21 (14.5%)	4 (3.1%)
Remove medication	19 (7.0%)	13 (9.0%)	6 (4.7%)
Increase medication dose	1 (0.04%)	1 (0.7%)	0 (0.0%)
Surgical referral	10 (3.7%)	5 (3.4%)	5 (3.9%)
Cancel surgical referral	7 (2.6%)	6 (4.1%)	1 (0.8%)
Alternate diagnosis	9 (3.2%)	2 (1.4%)	7 (5.5%)
Other[b]	4 (1.5%)	4 (2.8%)	0 (0.0%)

[a]N/A: not applicable.
[b]Other: exclusion of abscess or established new active small bowel disease.

Benefit of computed tomography enterography in Crohn's disease_ effects on patient management and physician level of confidence. Inflamm Bowel Dis,2012, 18(2):219-225.

CT检查技术（1）

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肠腔充盈方法：

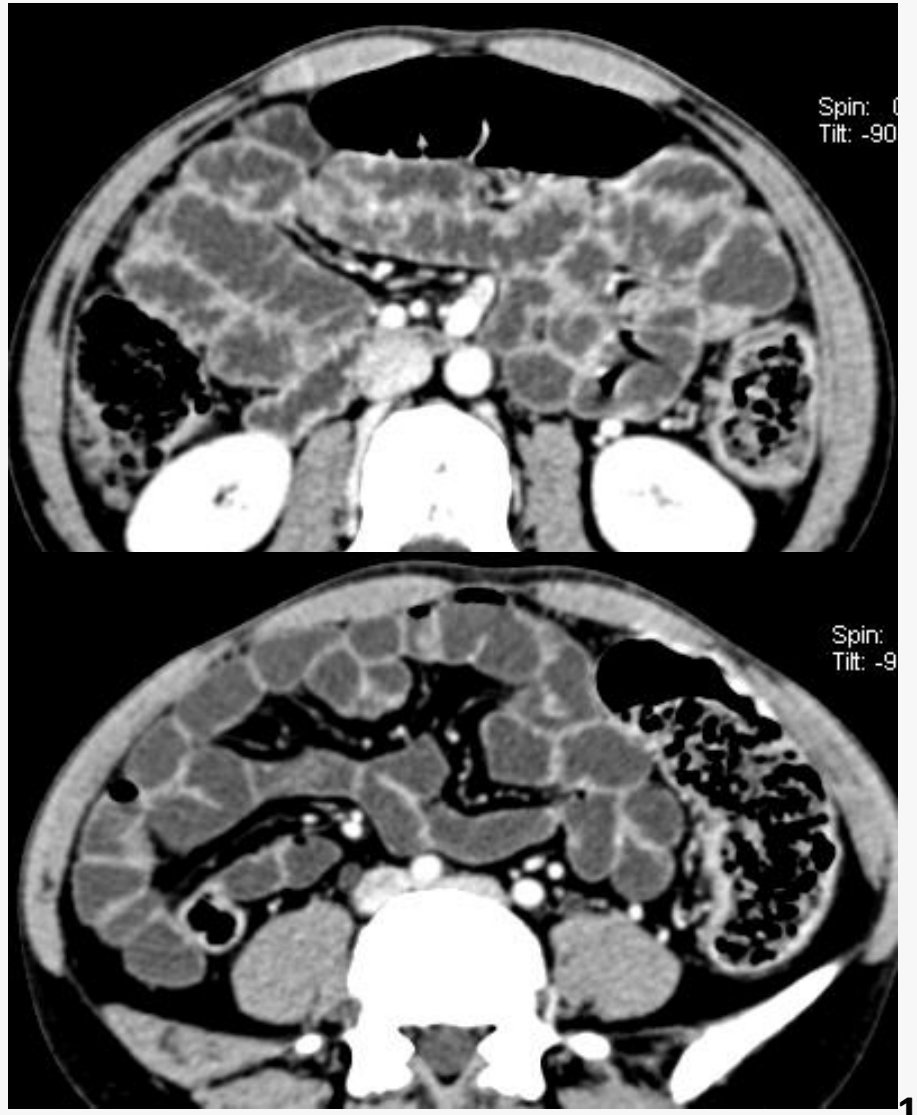
- 阴性对比剂：肠梗阻肠腔的液体

  2.5%甘露醇溶液

- 口服：扫描前45分钟开始口服对比剂

  分3次摄入共1500－2000ml，

  每次摄入500ml，间隔15分钟左右



CT检查技术（2）

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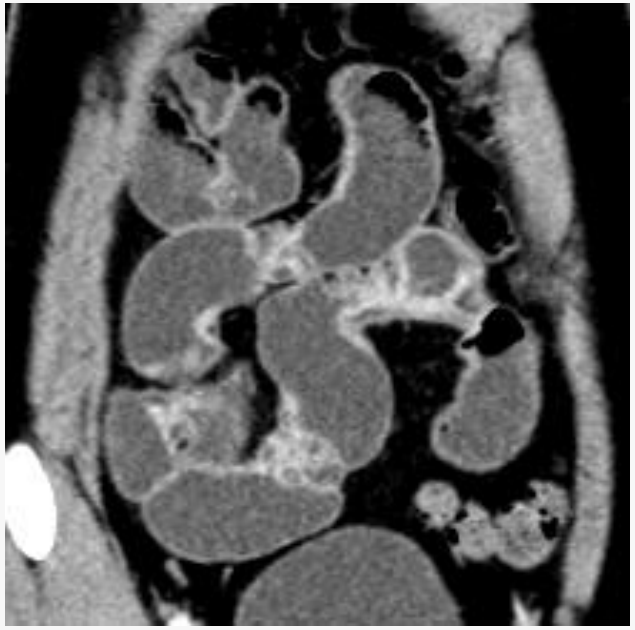
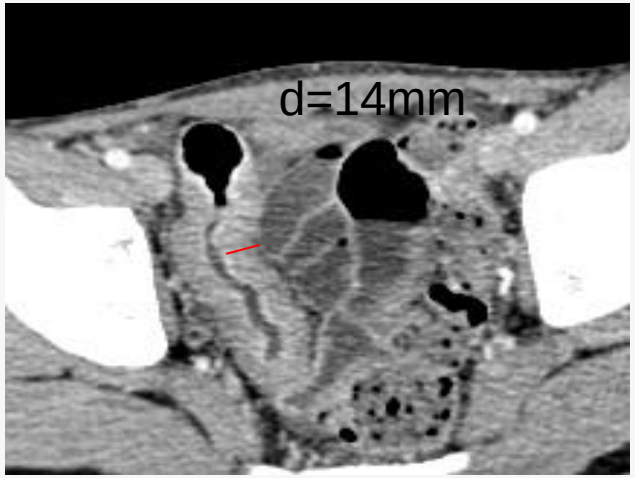
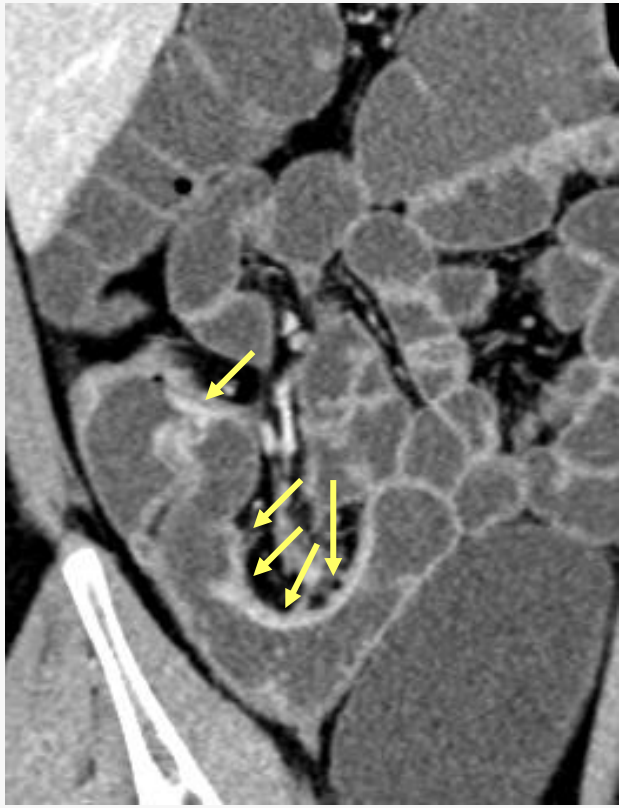
- 管电压：120Kv
- 管电流：160mAs
- 准直：64×0.6 mm
- 旋转速度：0.33 s/转
- 螺距因子：1.2
- 每期扫描时间: 5-6秒
- 平扫，动脉期延迟20-30秒，门脉期延迟45-55秒
- 扫描范围：膈面一盆底
- 造影剂：非离子对比剂300mgI/ml，90-100ml，注射速率3.0-4.0ml/s

CT表现

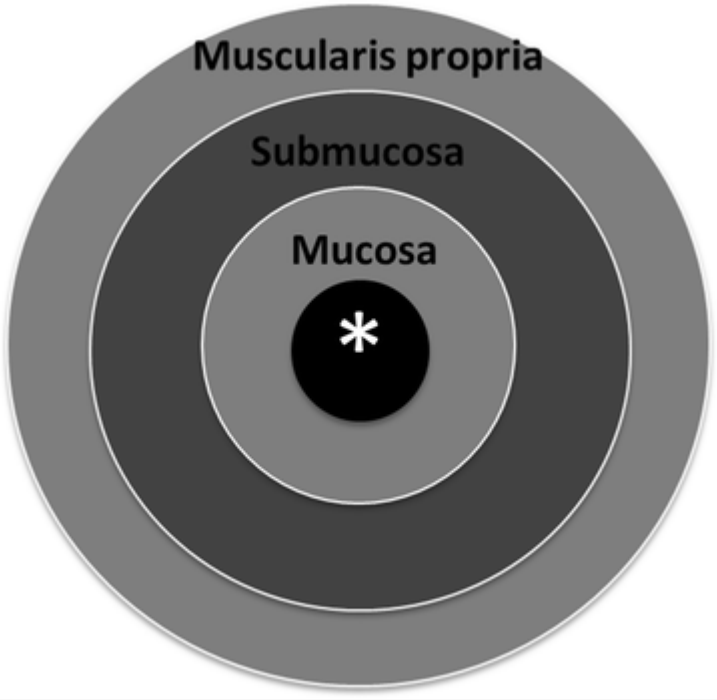
- 节段性肠壁增厚（>3mm）
- 肠壁异常强化
- 肠腔狭窄
- 肠系膜和网膜内脂肪密度增高
- 脓肿、炎性肿块
- 瘘管

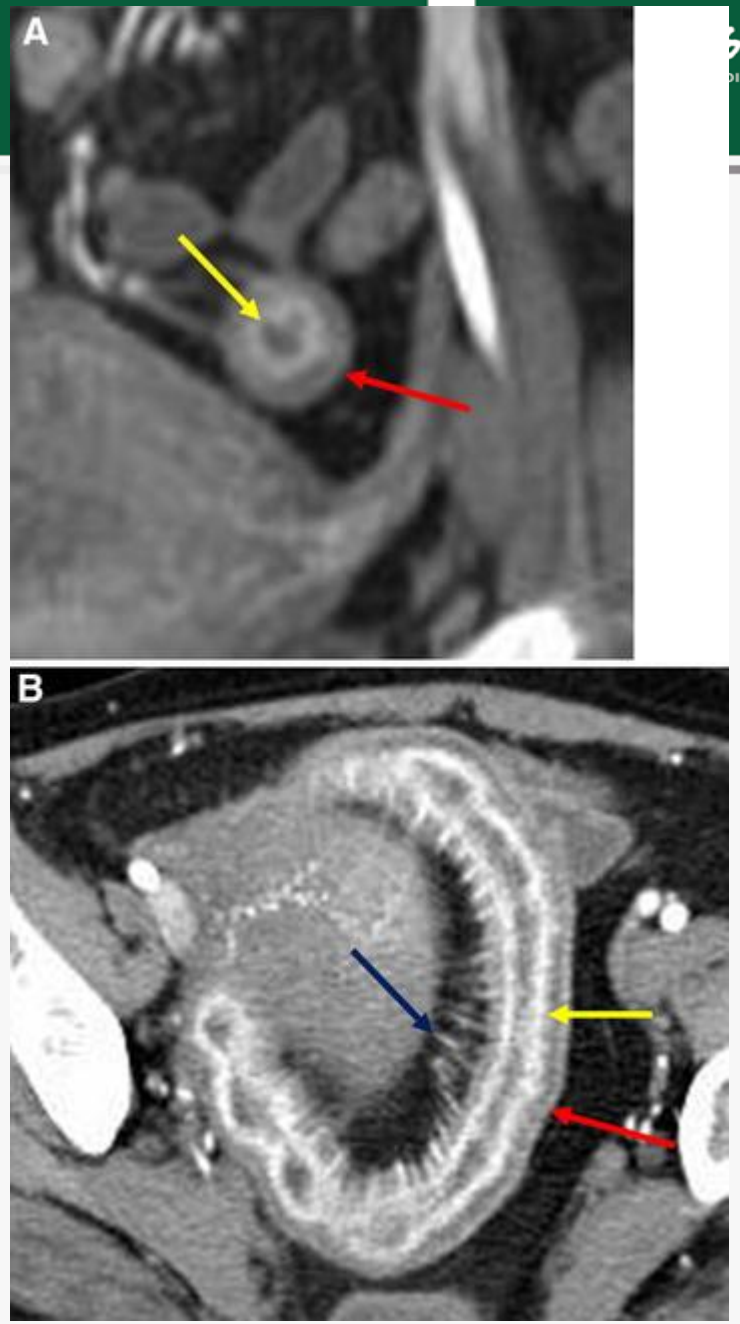






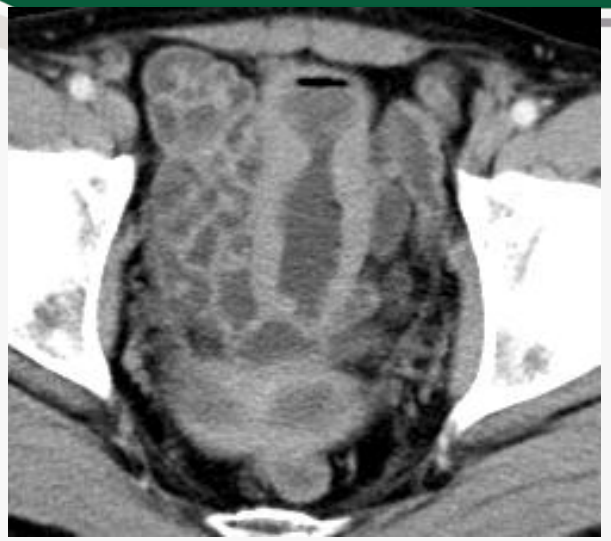
靶征（target sign）



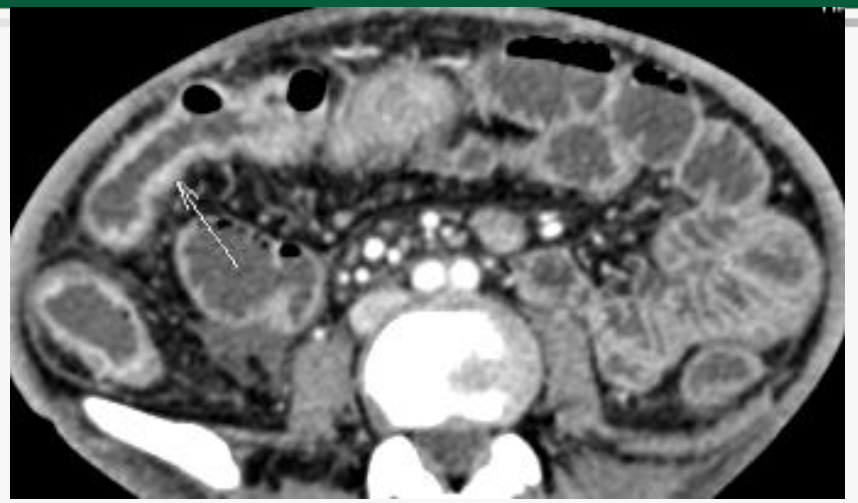


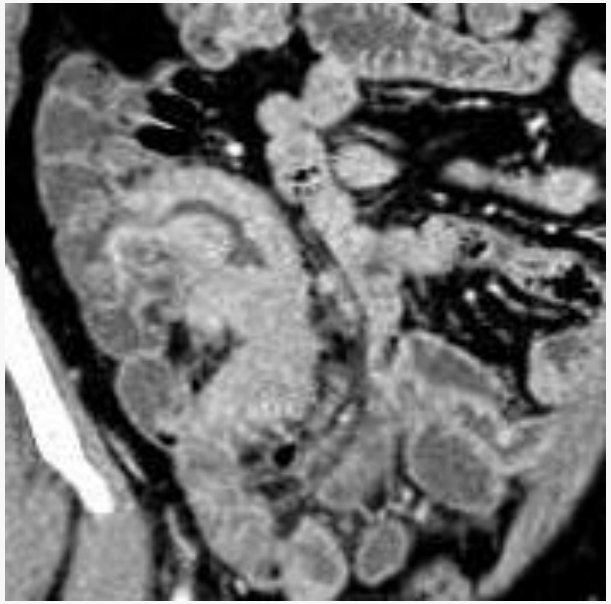
非CD特异性表现，还可见于感染、炎症、缺血、肠休克、放疗后等。

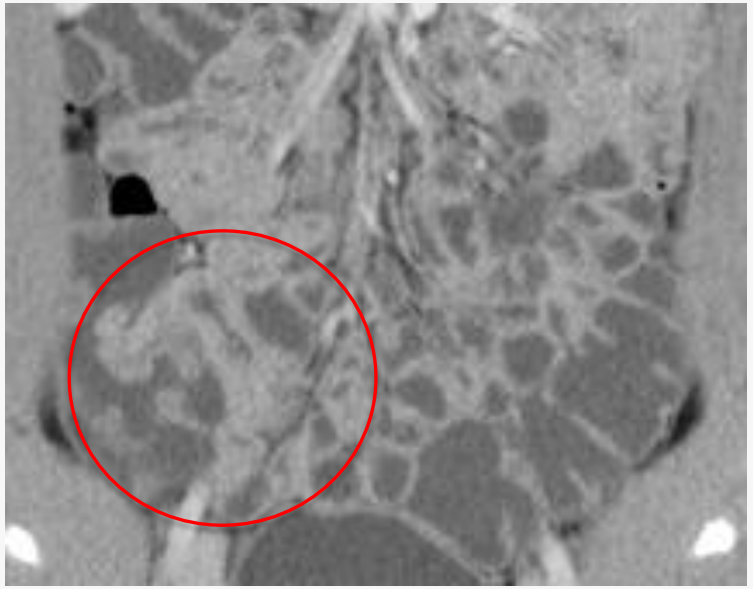
几种不同类型病变肠壁形态特点

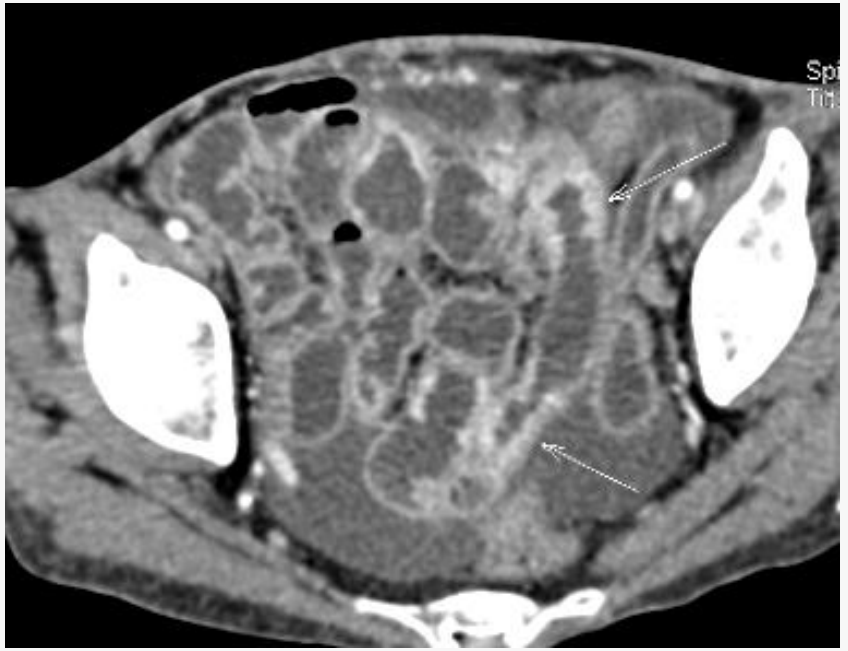


淋巴瘤		肠结核
淋巴瘤	淋巴滤泡增生	肠结核

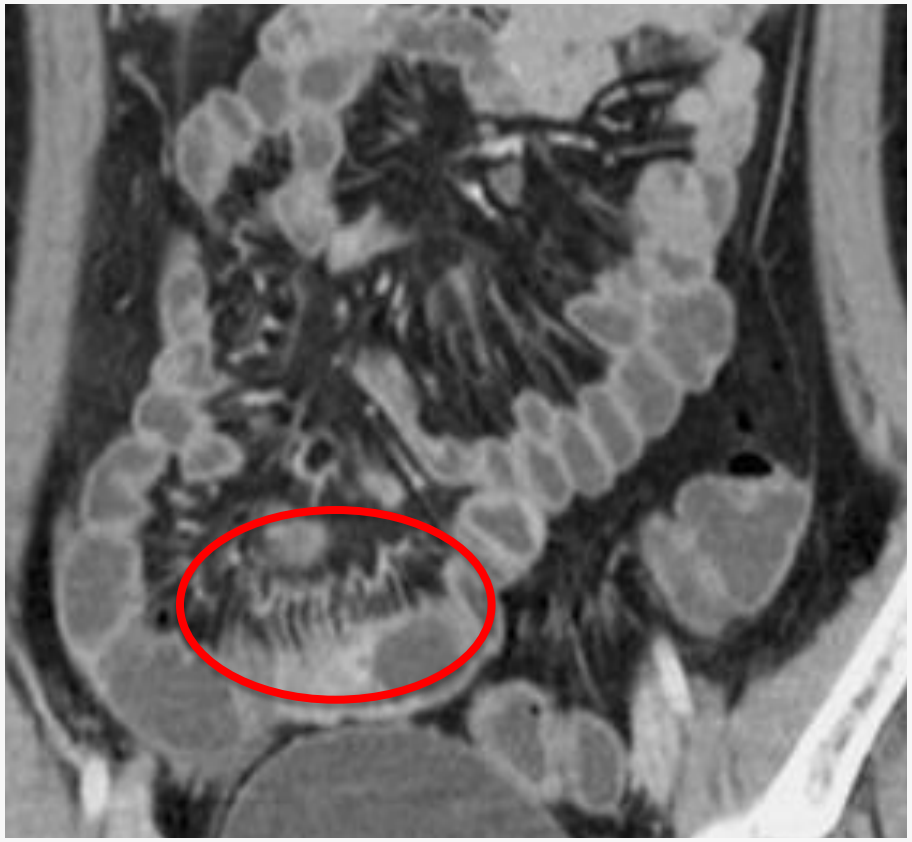








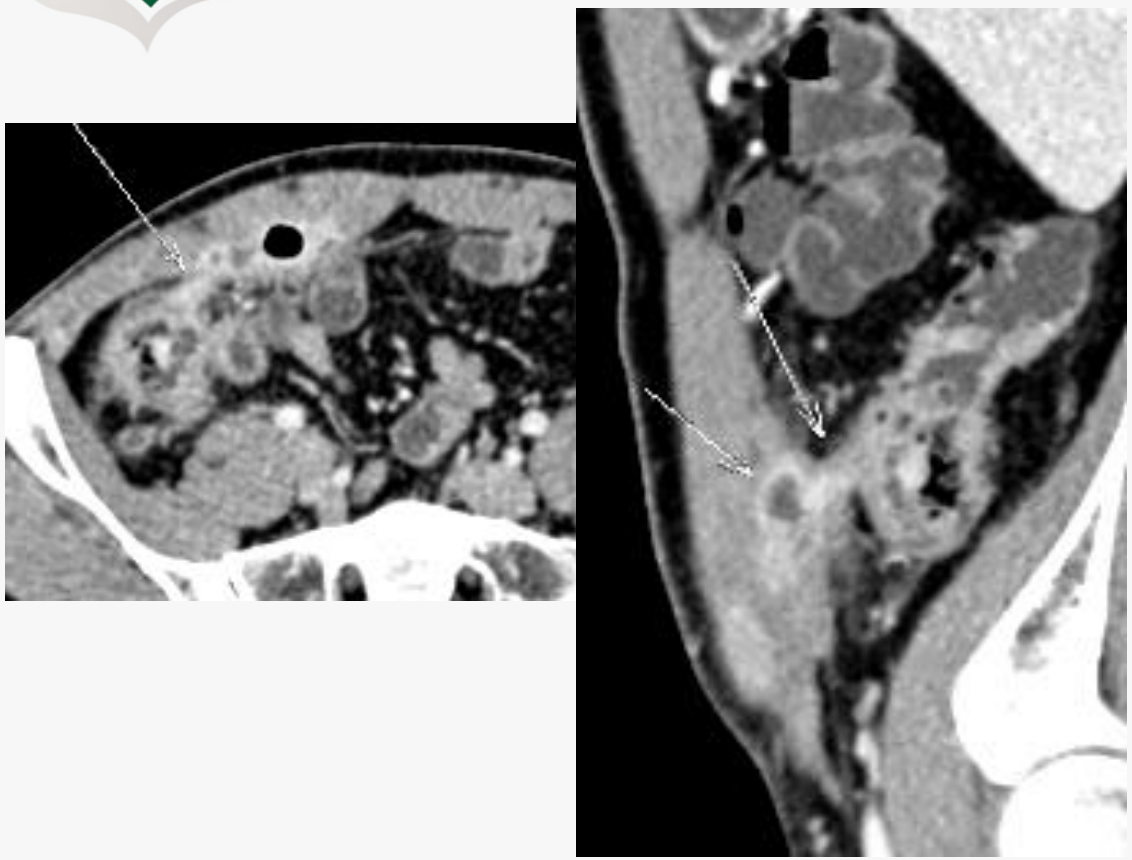
木梳征（comb sign）



- 提示CD疾病活动
- 非CD特异性表现
- 罕见于肿瘤性疾病

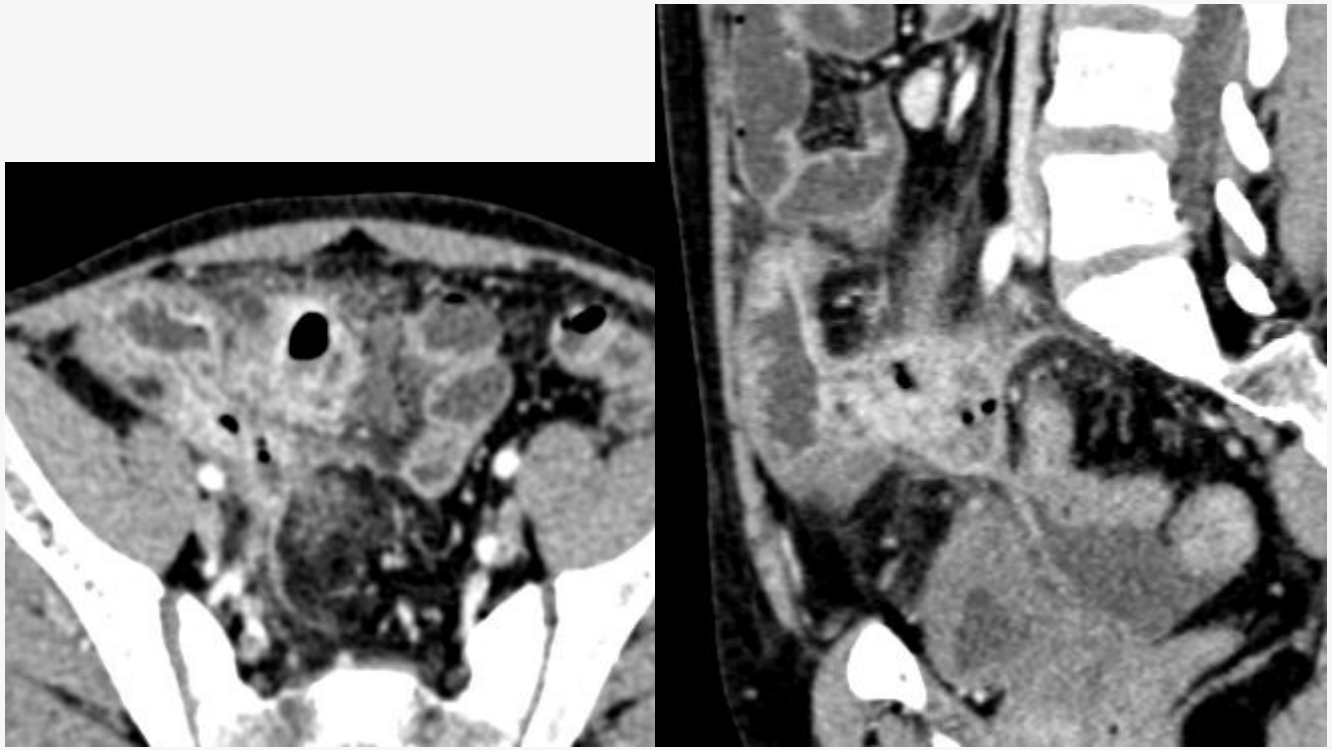
  （淋巴瘤、转移瘤）

瘘及脓肿

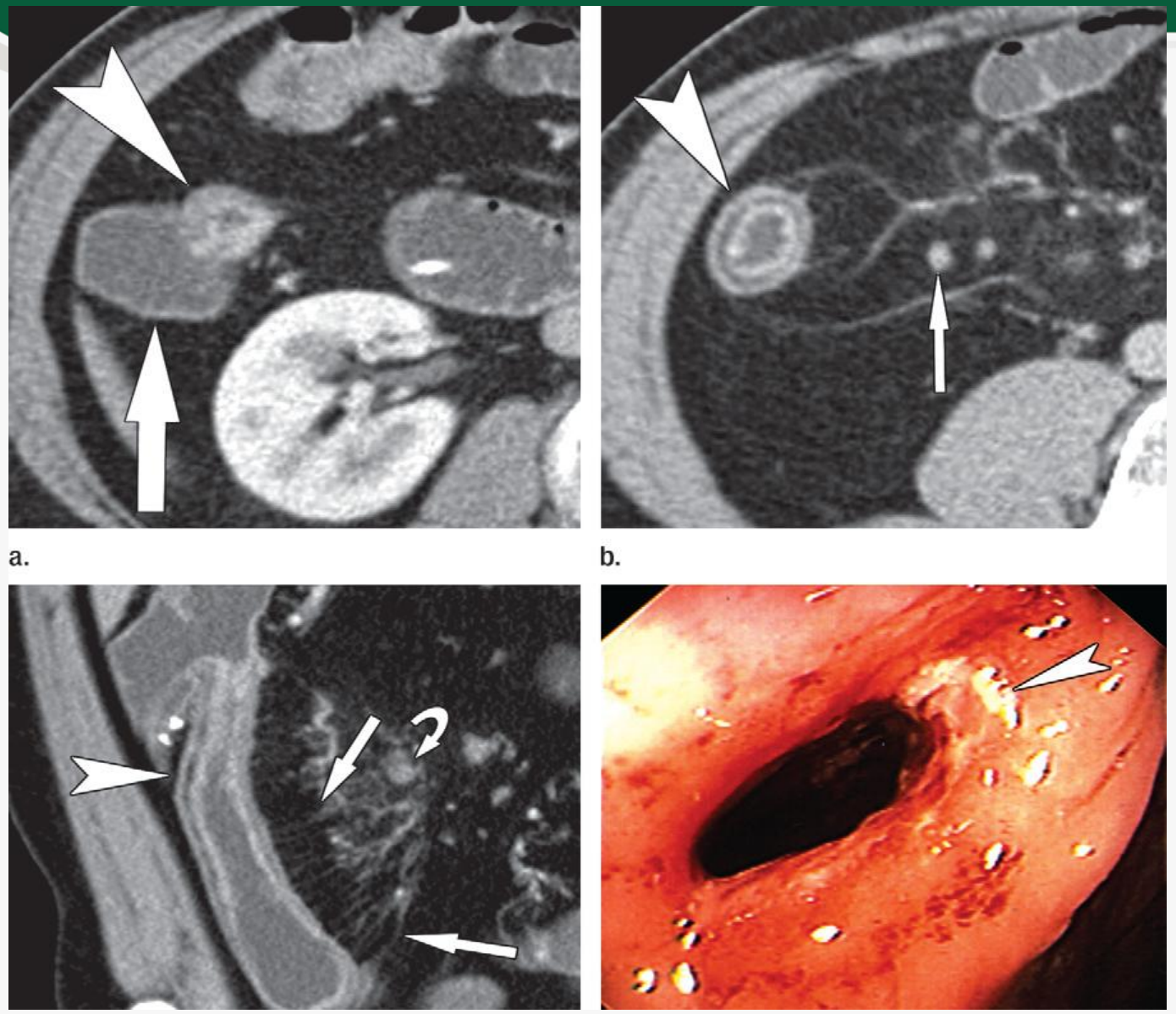


盲肠-腹壁瘘

小肠-盆腔瘘

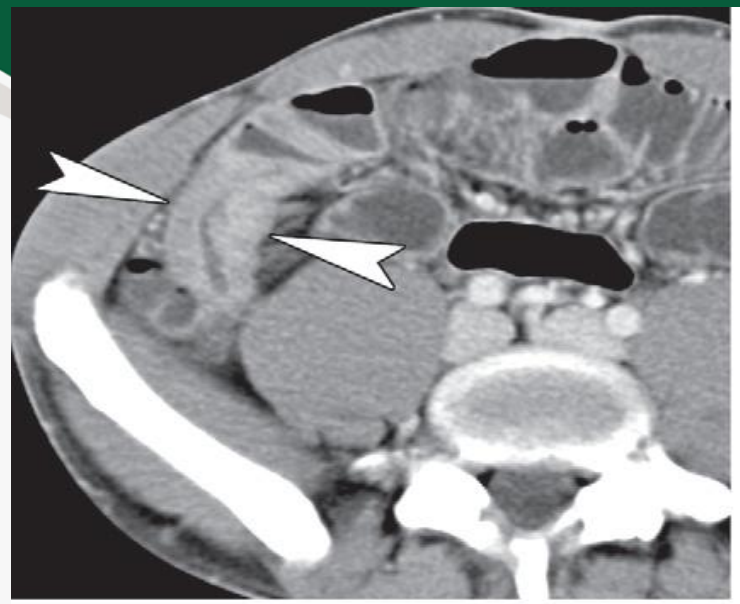


区分吻合口炎性狭窄/复发



Radiology. 2010 ,254(3):755

区分吻合口炎性狭窄/复发



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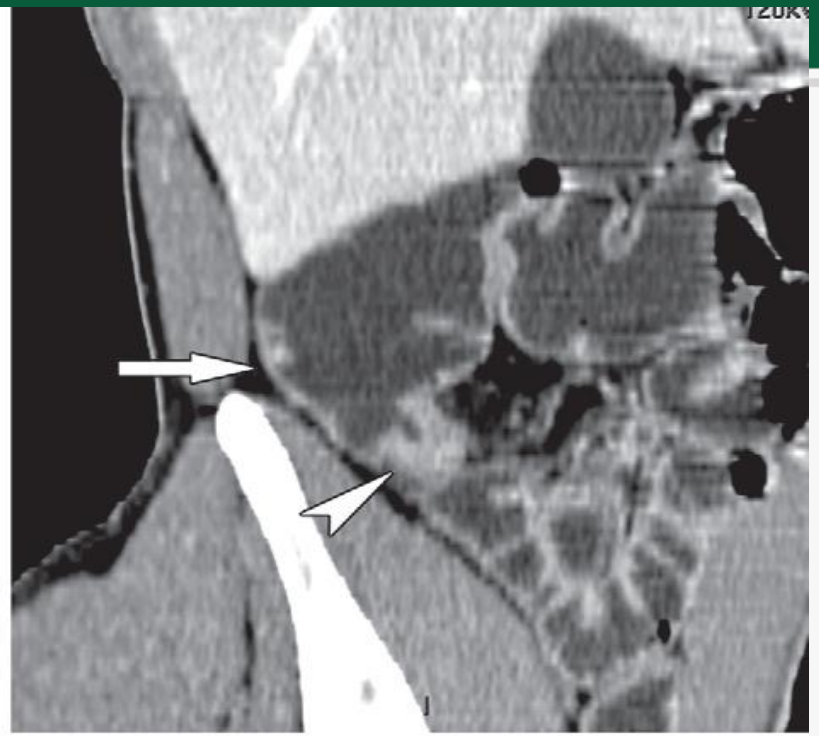

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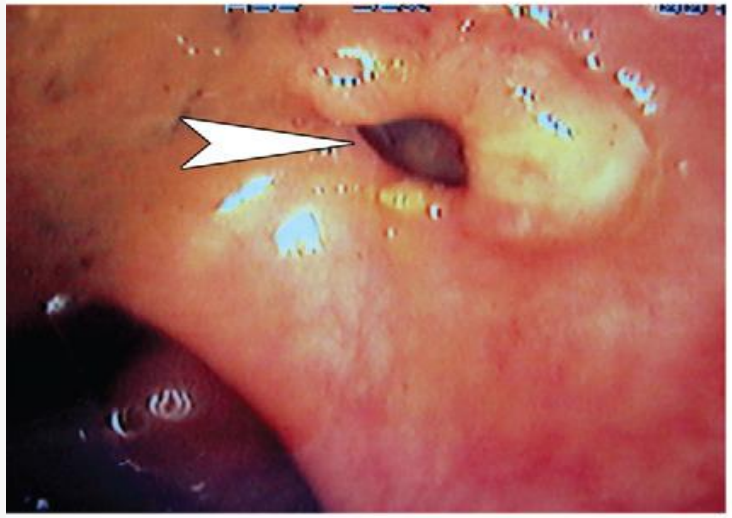
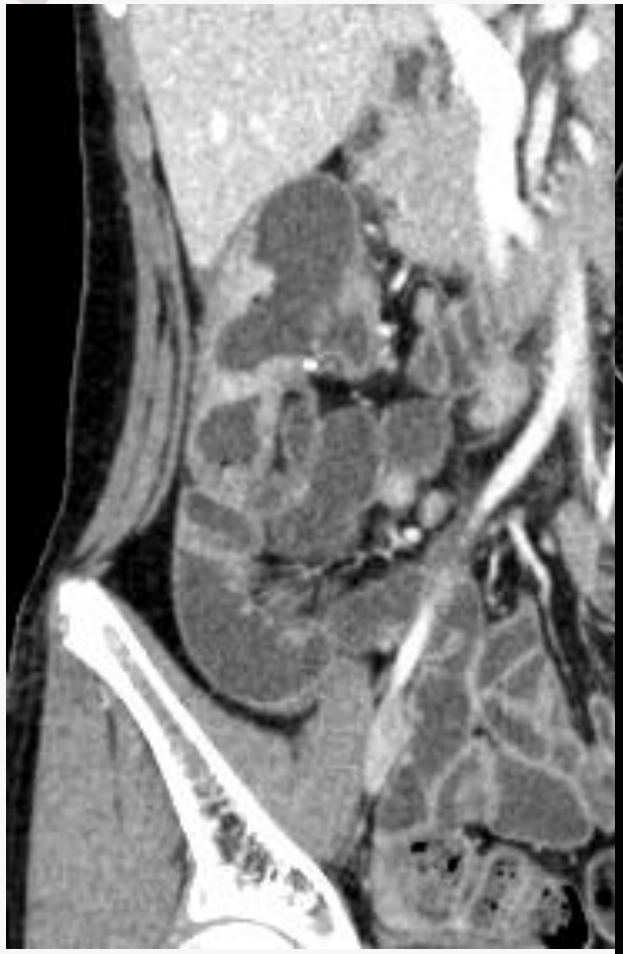


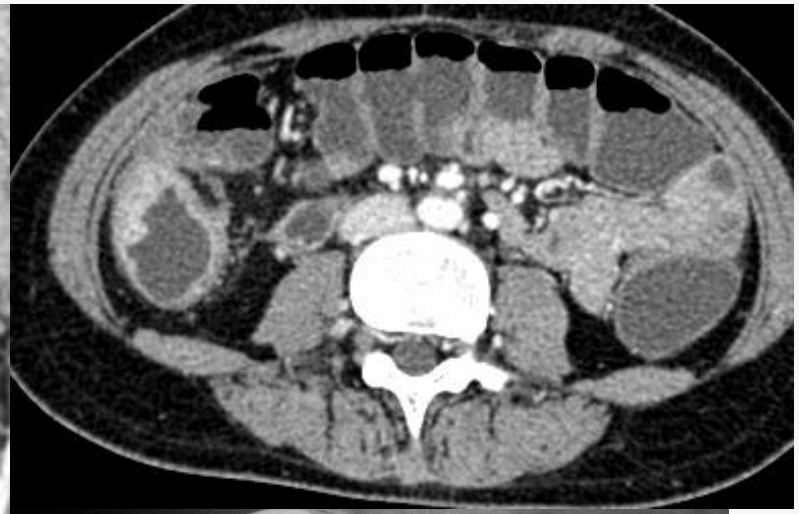
c.

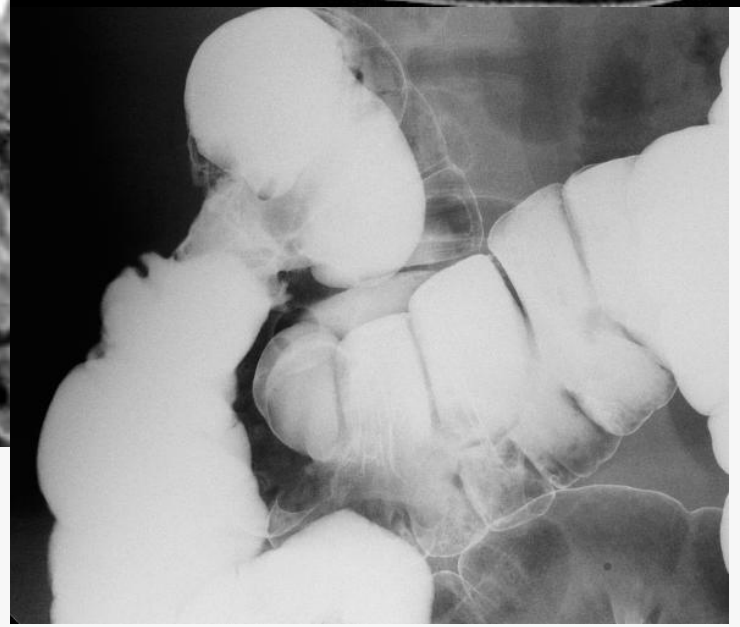
纤维性狭窄

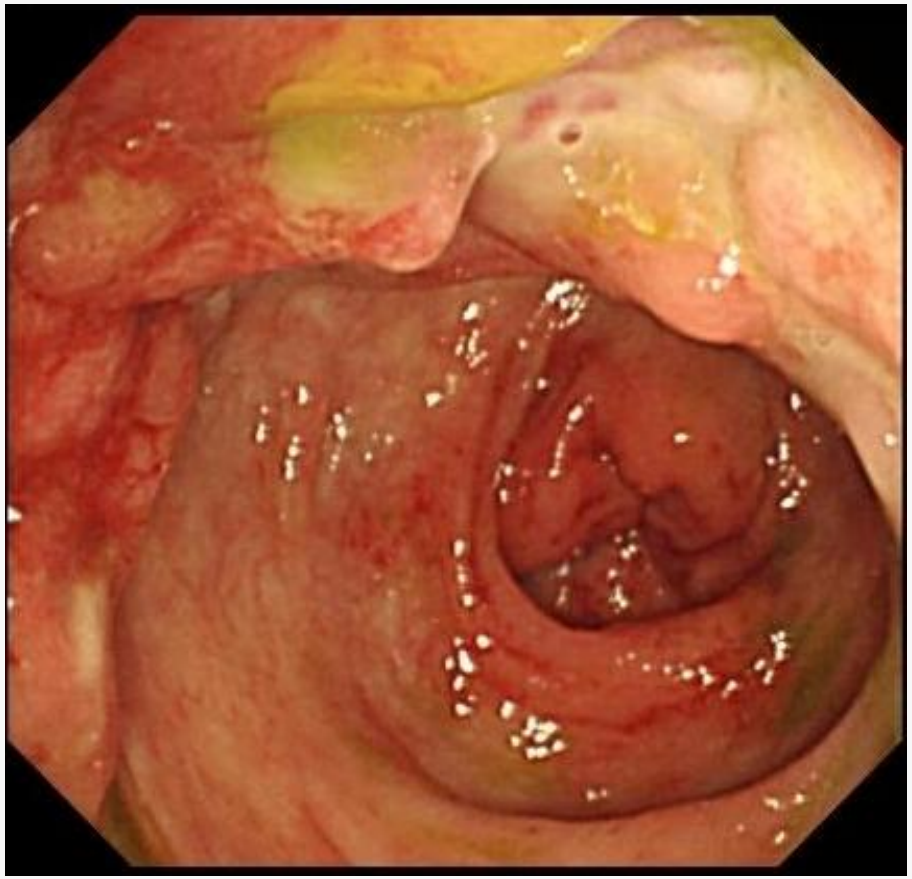
Radiology. 2010 ,254(3):755

区分吻合口炎性狭窄/复发

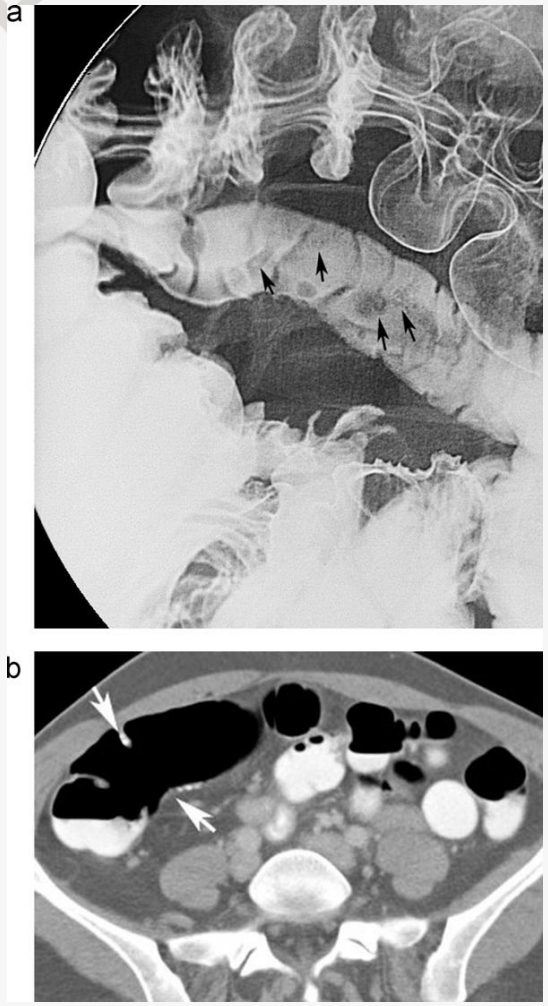




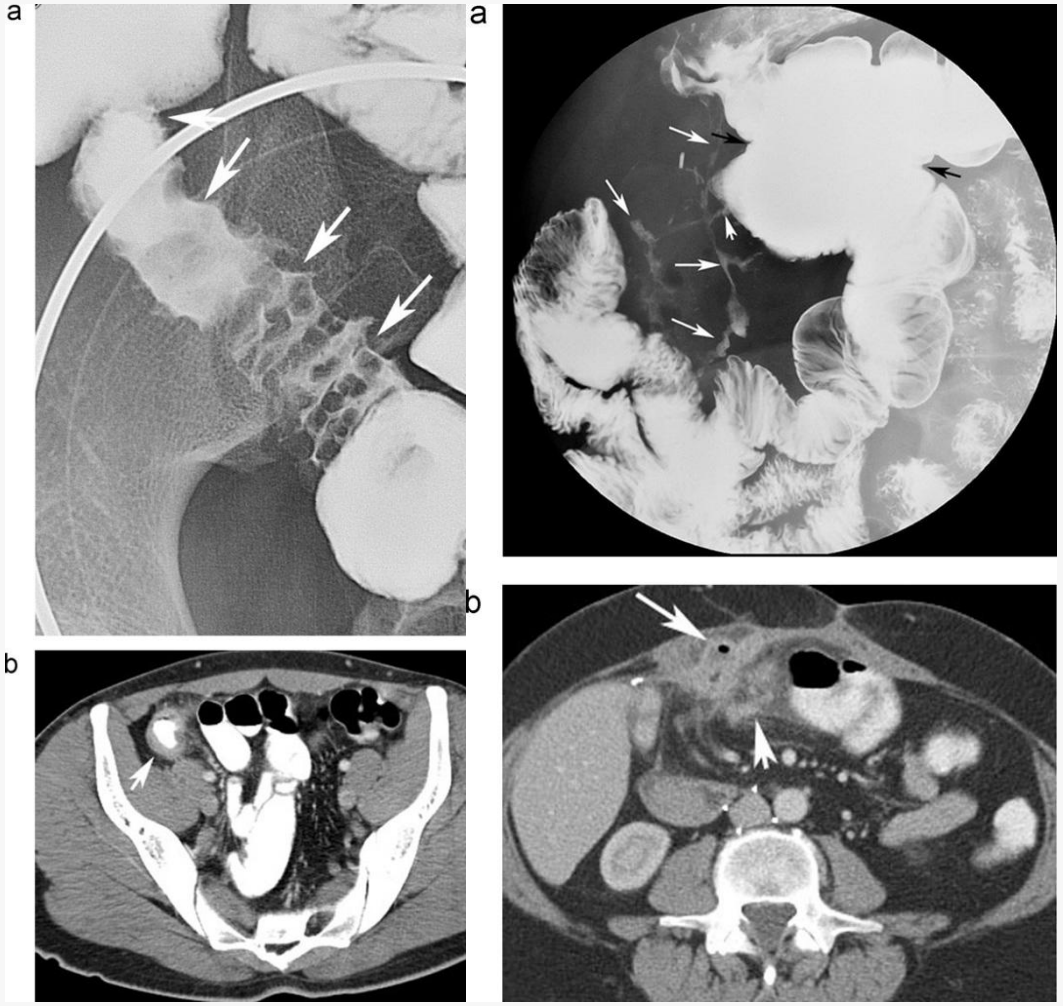




区分吻合口炎性狭窄/复发



true-positive SBFT and false-negative CT



true-positive SBFT and CT

消化道造影对阿弗他溃疡检出敏感性高于CT，判断吻合口复发较CT更敏感。

European Journal of Radiology.82 (2013) :464– 471

电离辐射

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- IBD患者超过2/3的医疗辐射来源于CT检查
- 每位患者平均接受CT辐射剂量为10.2-36.1mSv
- 8.0%-34.7%患者超过50mSv
- CD患者较UC患者更多地接受CT检查

Ionizing radiation exposure is still increasing in Crohn's disease: Who should be blamed? Scandinavian Journal of Gastroenterology. 2015; 50: 1214–1225.

Diagnostic imaging and radiation exposure in inflammatory bowel disease. World J of Gastroenterology. 2016,22(7): 2165-2178.

CT方法改进以降低辐射剂量

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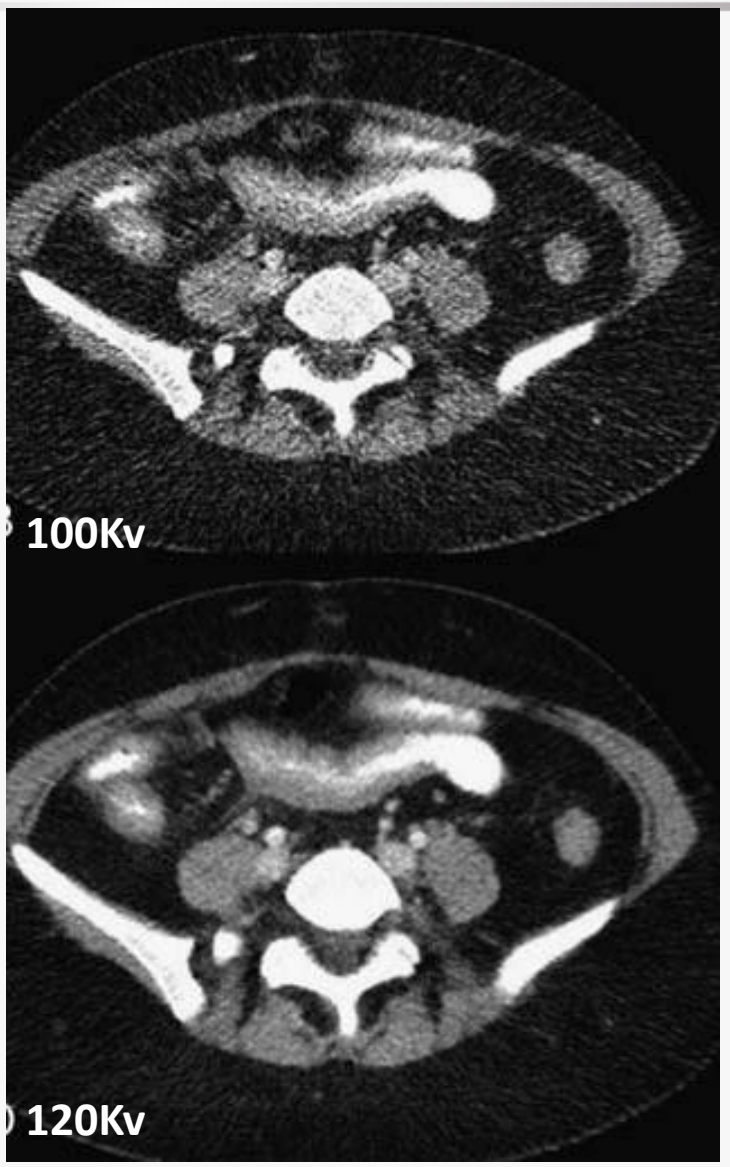
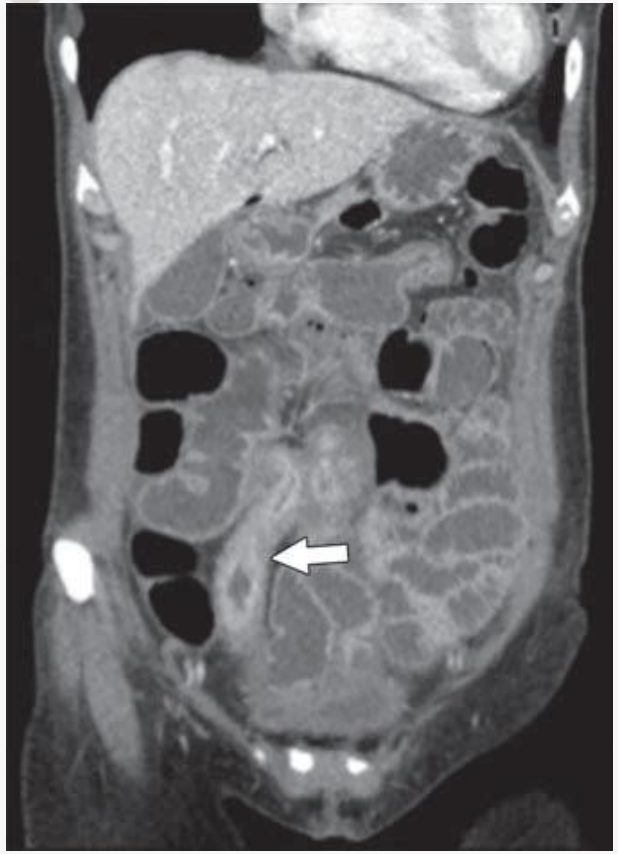
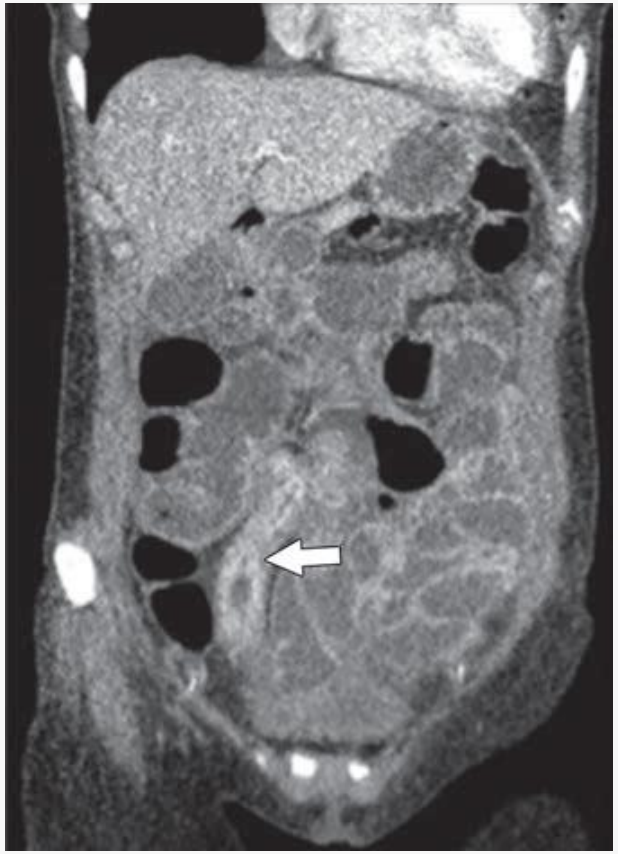
- 降低管电压扫描
- 实时电流调节
- 迭代重建算法的应用
- 减少扫描期相



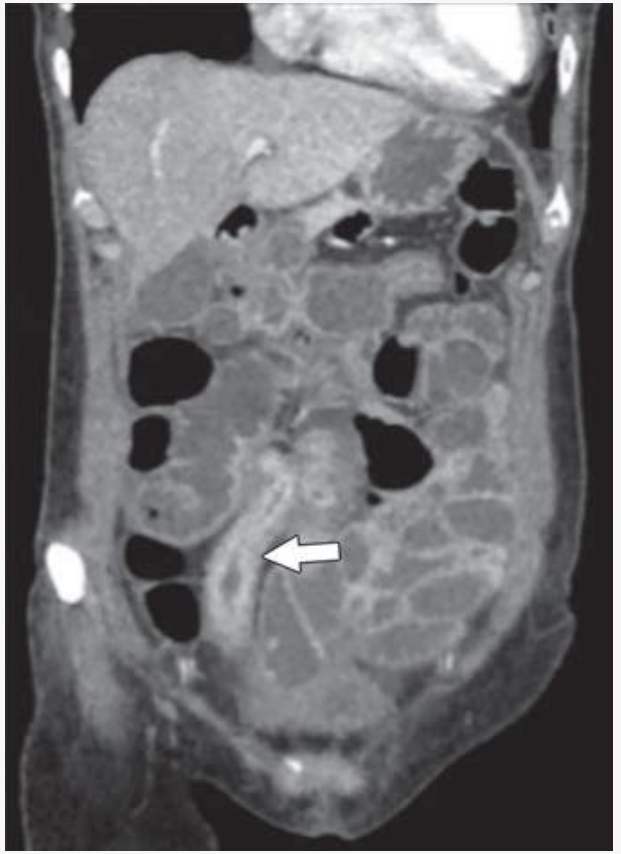
迭代重建算法的应用



120Kv
滤波反射法（FBP）



100Kv
FBP



100Kv
迭代重建算法（IR）

辐射剂量1.4mSv，降低约75%
图像噪声减低，对比噪声比增加

鉴别诊断

- 肠结核
- 淋巴瘤
- 肠白塞
- CMUSE
- 其他（肠系膜血管缺血性疾病，NSAID相关肠炎、肠道感染等）

肠结核

- 多数继发于肠外结核病
- 病变部位:主要位于回盲部，其他部位为升结肠、空肠、横结肠、降结肠等，偶见于胃、食管和直肠
- 病理改变：随人体对结核杆菌的免疫力和过敏反应而定

过敏反应强，以渗出为主

TB量大，毒力强→干酪样坏死→形成溃疡

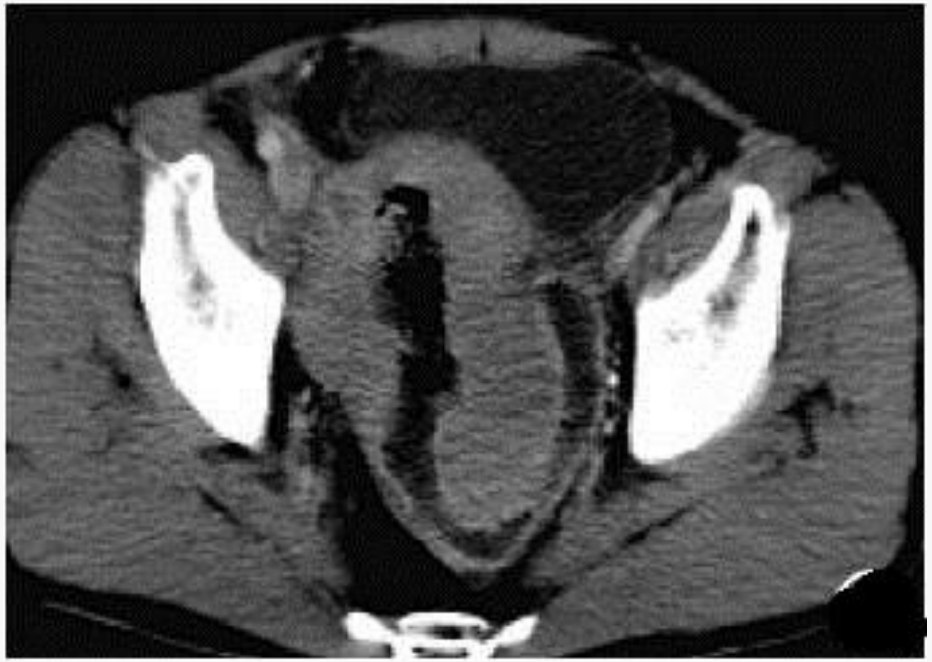
感染轻、免疫反应良好→增生型肠结核

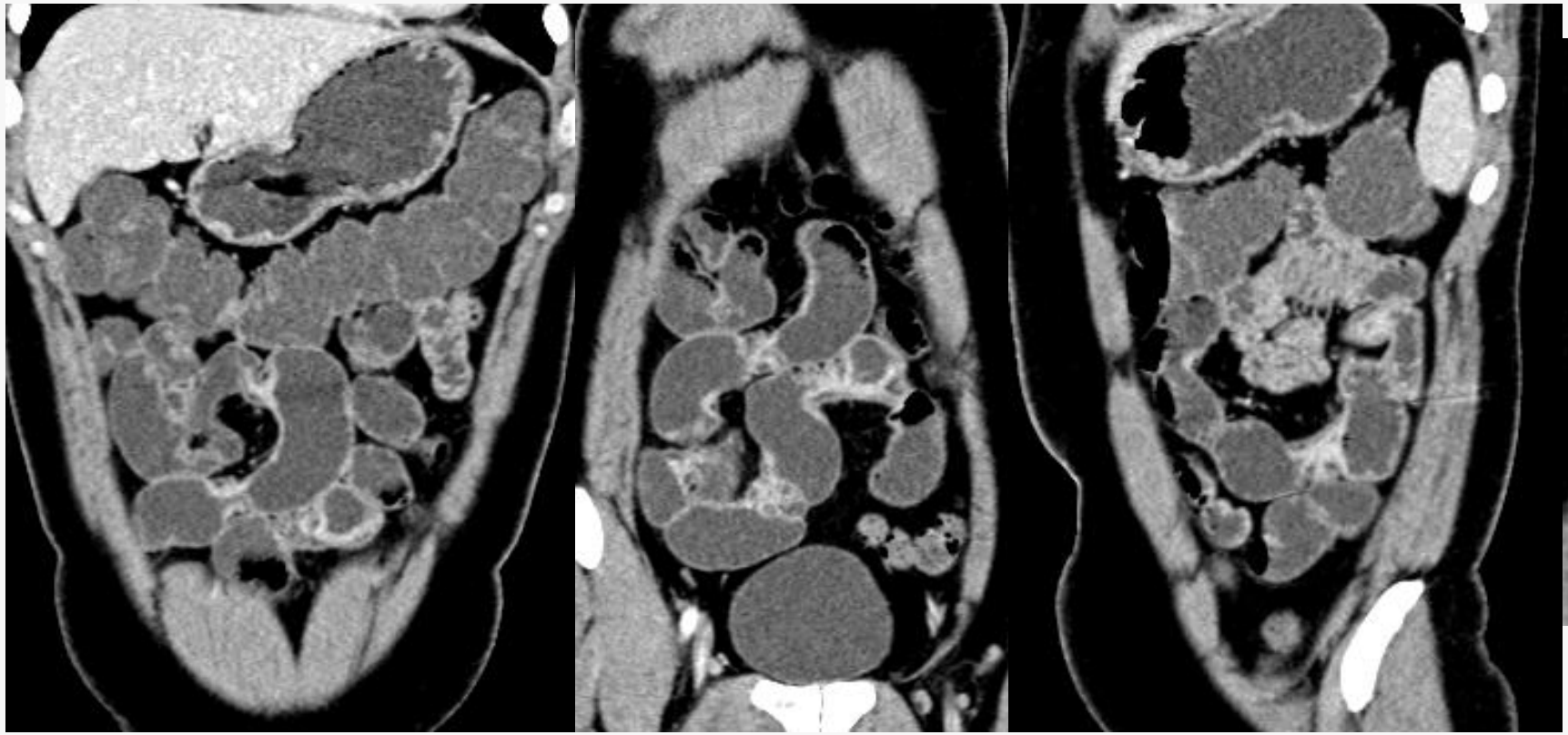
肠结核和Crohn病CT表现比较

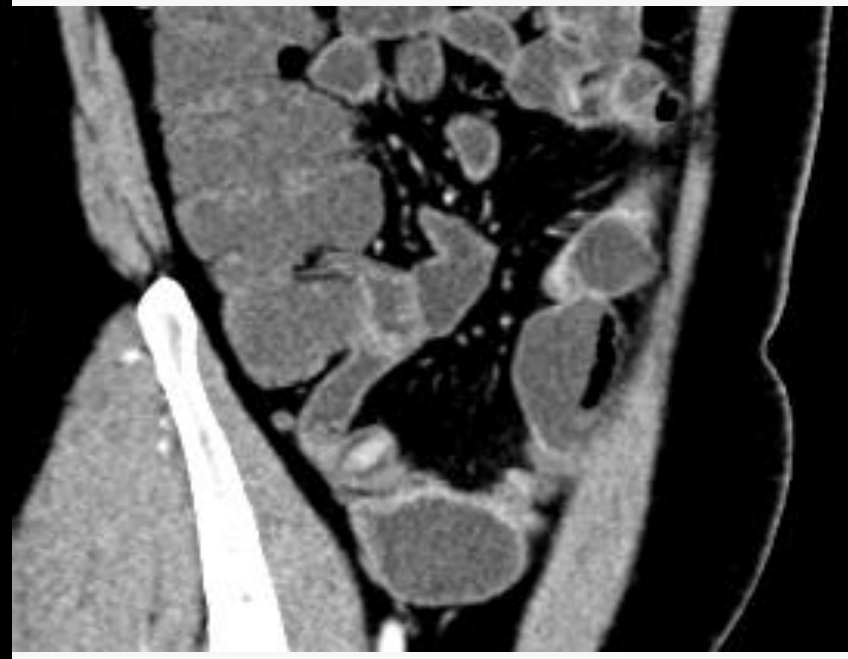
CT表现	肠结核	Crohn病
肠壁改变		
环形均匀增厚超过6mm	少	多见
环形均匀增厚不超过6mm	多见	少见
不均匀增厚，形成外凸肿块影	多见	少
壁不厚	可见	少
壁分层	罕见	多见
肠管分离原因		
淋巴结肿大	多见	
肠系膜纤维脂肪浸润		多见
肠系膜改变		
木梳征	无	多见
淋巴结		
增大，超过1cm	常见	少见
中心低密度坏死	约1/3病例	无
腹膜		
壁腹膜增厚、腹水	可见	无
其他腹腔脏器受累	可见	无

淋巴瘤

- 常见于末段回肠
- 肠壁明显增厚，肠壁厚度常>1cm
- 病变肠腔侧或外侧缘分叶状
- 肠腔动脉瘤样扩张
- 周围多发肿大淋巴结
- 增强扫描呈轻度均匀强化







39/F，反复腹痛、肠梗阻6年，发现贫血1年

隐源性多灶性溃疡性狭窄性小肠炎（CMUSE）

肠白塞

北京协和医院
PEKING UNION MEDICAL COLLEGE HOSPITAL

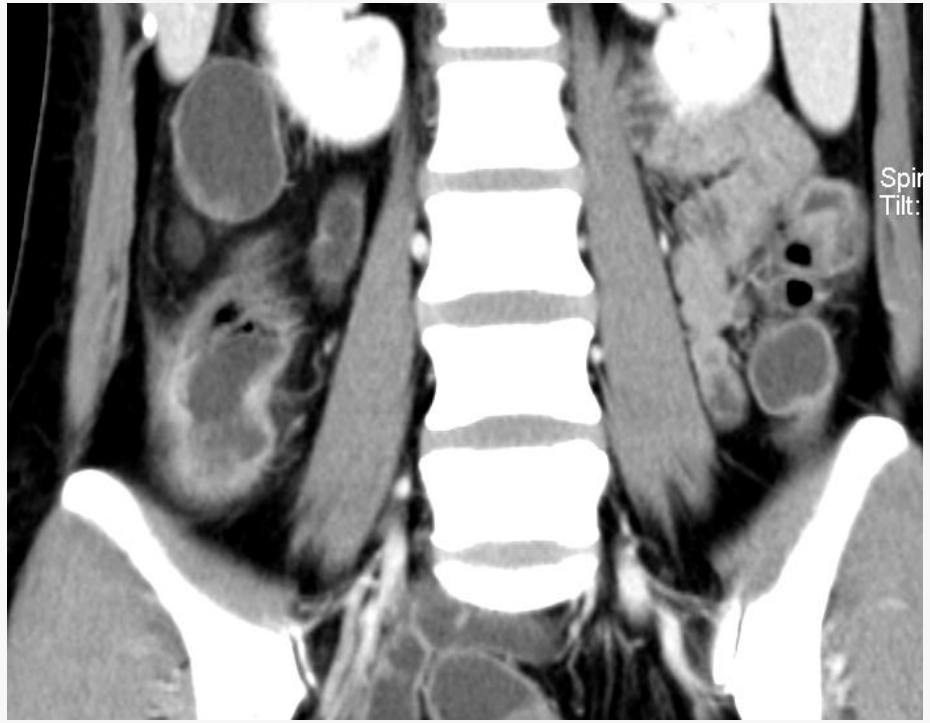
- 发生率:10-40%
- 病变部位: 末段回肠、盲肠、升结肠、横结肠
- CT表现:

  息肉样/肠壁增厚

  异常强化（71%）

  很少有肠管狭窄，一般系膜对侧明显

  淋巴结增大，通常<10mm

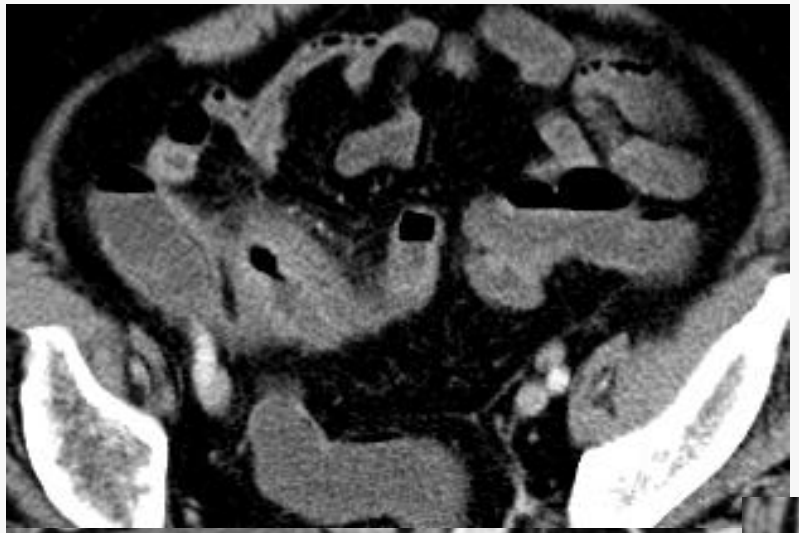


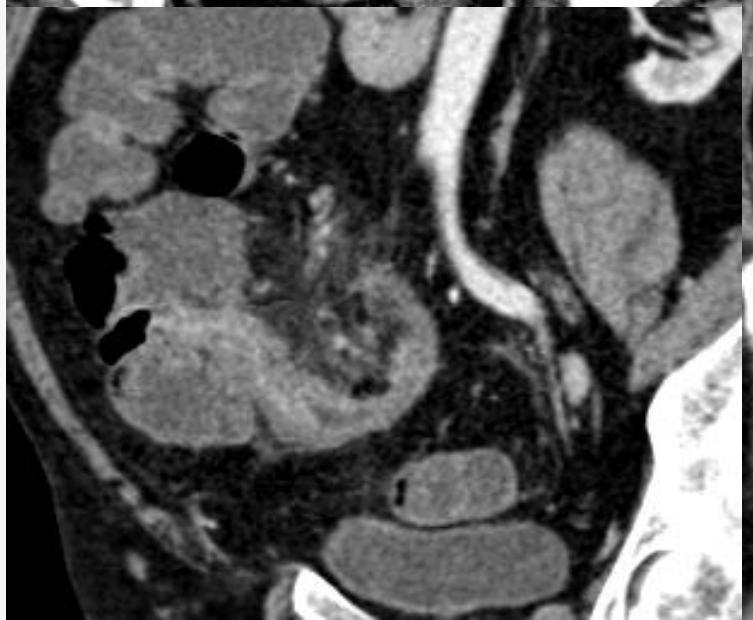
CMUSE

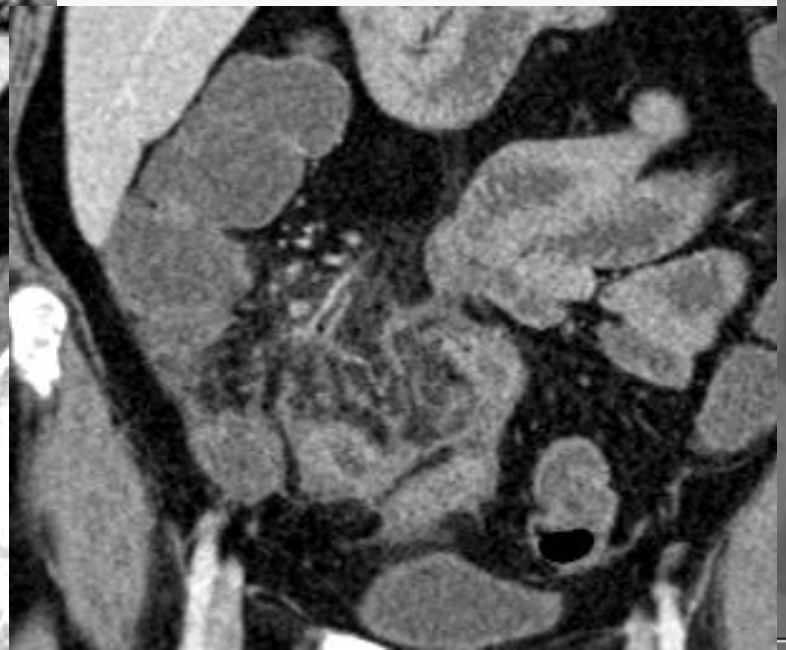
北京协和医院
PEKING UNION MEDICAL COLLEGE HOSPITAL

- 隐源性多灶性溃疡性狭窄性肠炎（Cryptogenic multifocal ulcerous stenosing enteritis,CMUSE）
- 病变部位:空肠及近段回肠
- 病理改变：粘膜及粘膜下病变，无透壁损伤，有慢性炎性细胞包括嗜酸细胞浸润
- CT表现:肠管多发节段性狭窄，范围短，肠壁增厚不明显，可轻度强化
- 治疗：手术切除，激素依赖

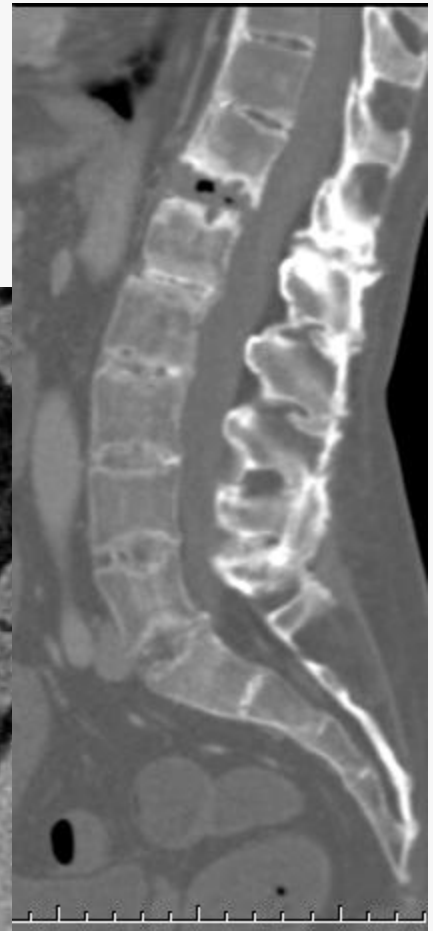
NSAID类相关肠炎



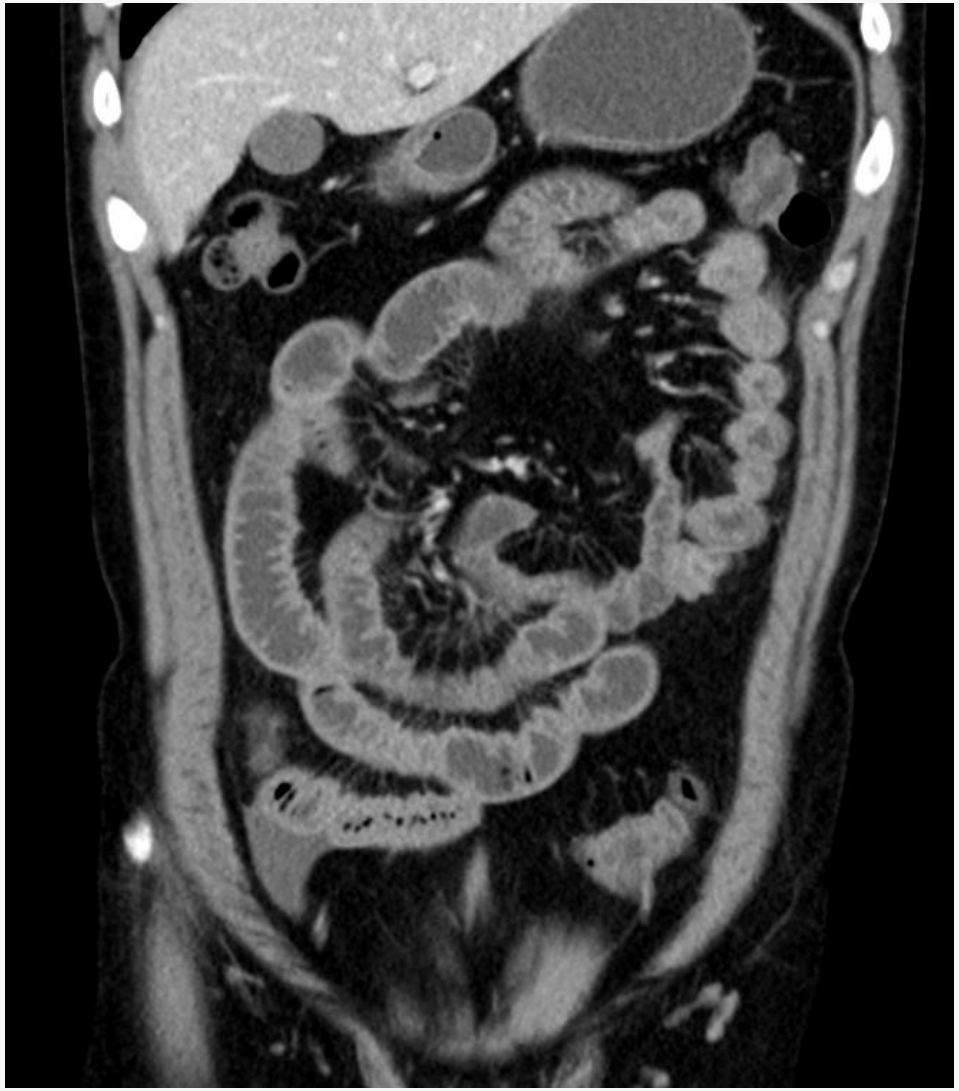




46/M，诊断强直性脊柱炎24年，长期服用NSAID类药物



嗜酸性粒细胞胃肠炎



- 胃肠道的嗜酸粒细胞浸润，胃肠道水肿增厚
- 通常累及胃窦和近端空肠，一旦结肠受累，则以盲肠及升结肠多见
- 还可累及食管、肝脏、胆道系统、输尿管、膀胱等

- 对于初诊Crohn病的患者，应至少两名以上有经验的放射科医生进行诊断
- 需结合患者临床、内镜结果进行综合分析
- 多学科协作（multiple disciplinary team，MDT）的重要性

小肠磁共振

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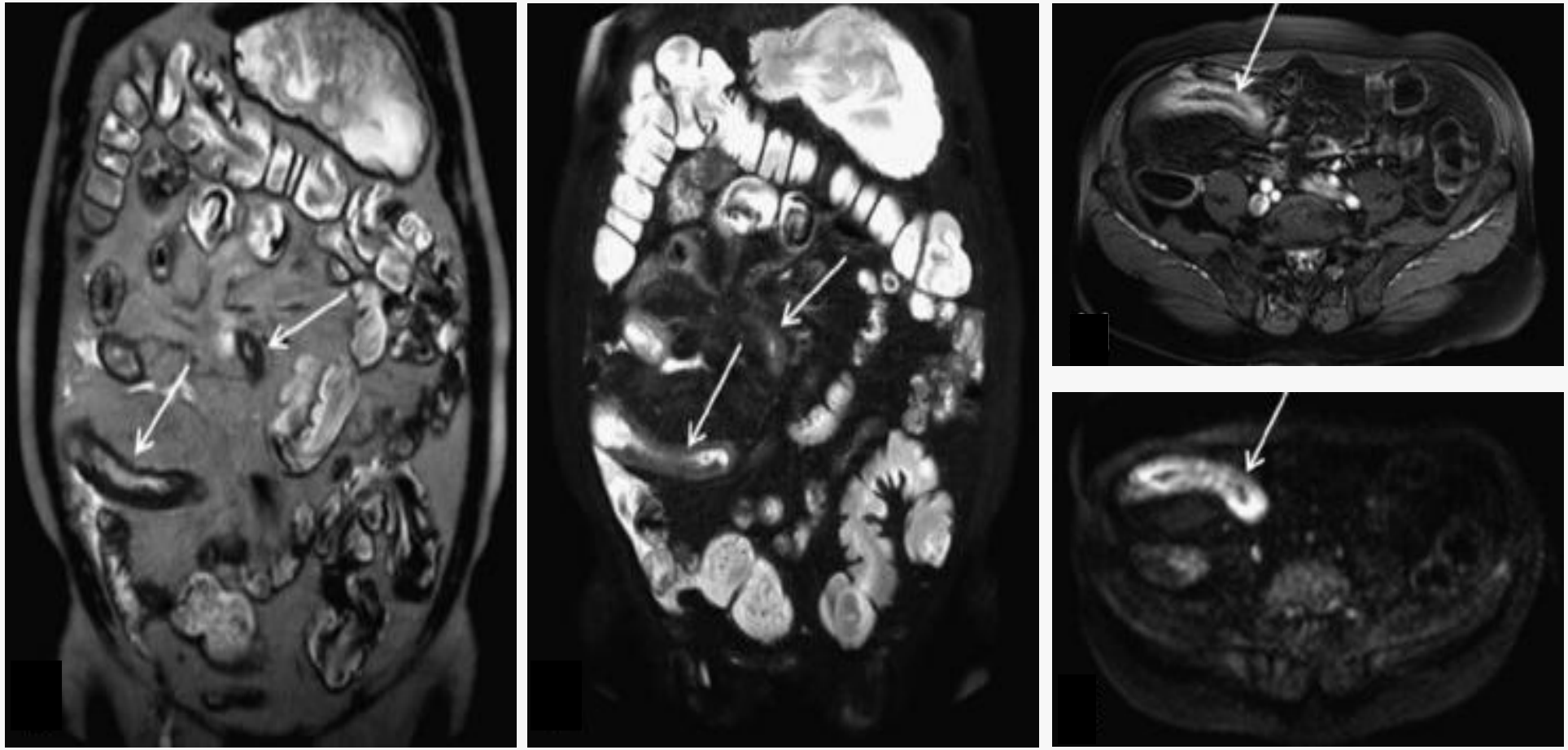
MR activity index

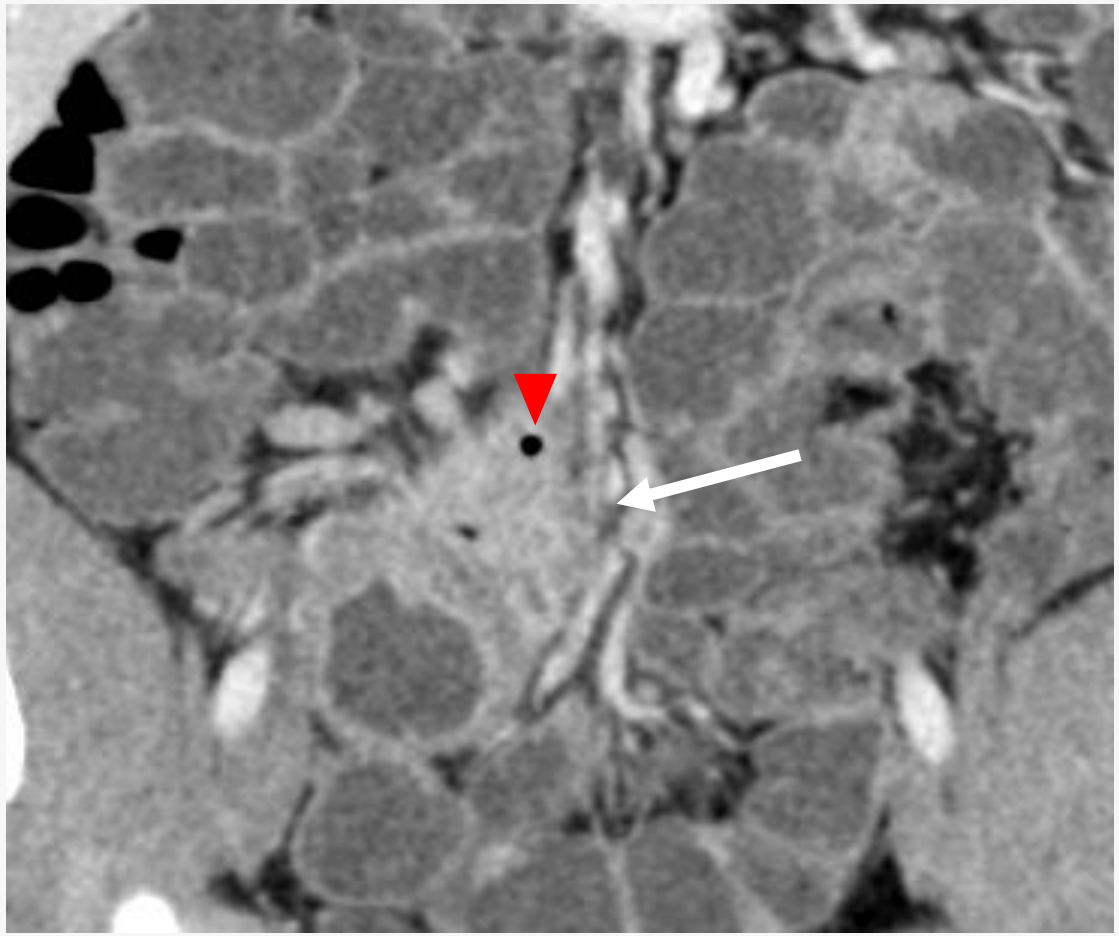
- **肠壁厚度**
- 肠壁T2信号强度
- 强化程度
- 强化形式（正常/均匀/粘膜强化/分层强化）
- 受累肠段（长度/节段）
- 并发症（瘘/蜂窝织炎/脓肿）
- 系膜评分（梳样征+淋巴结+肠周T2信号）

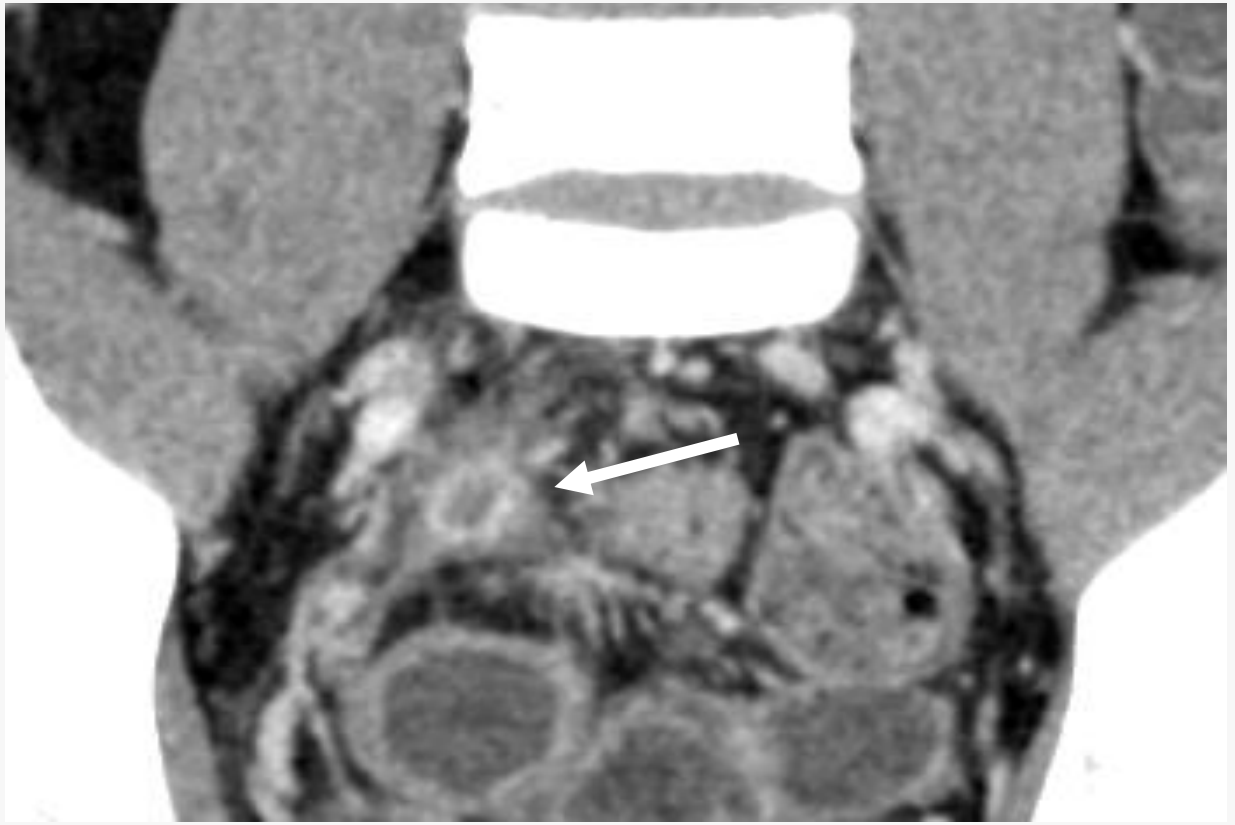
病例（1）



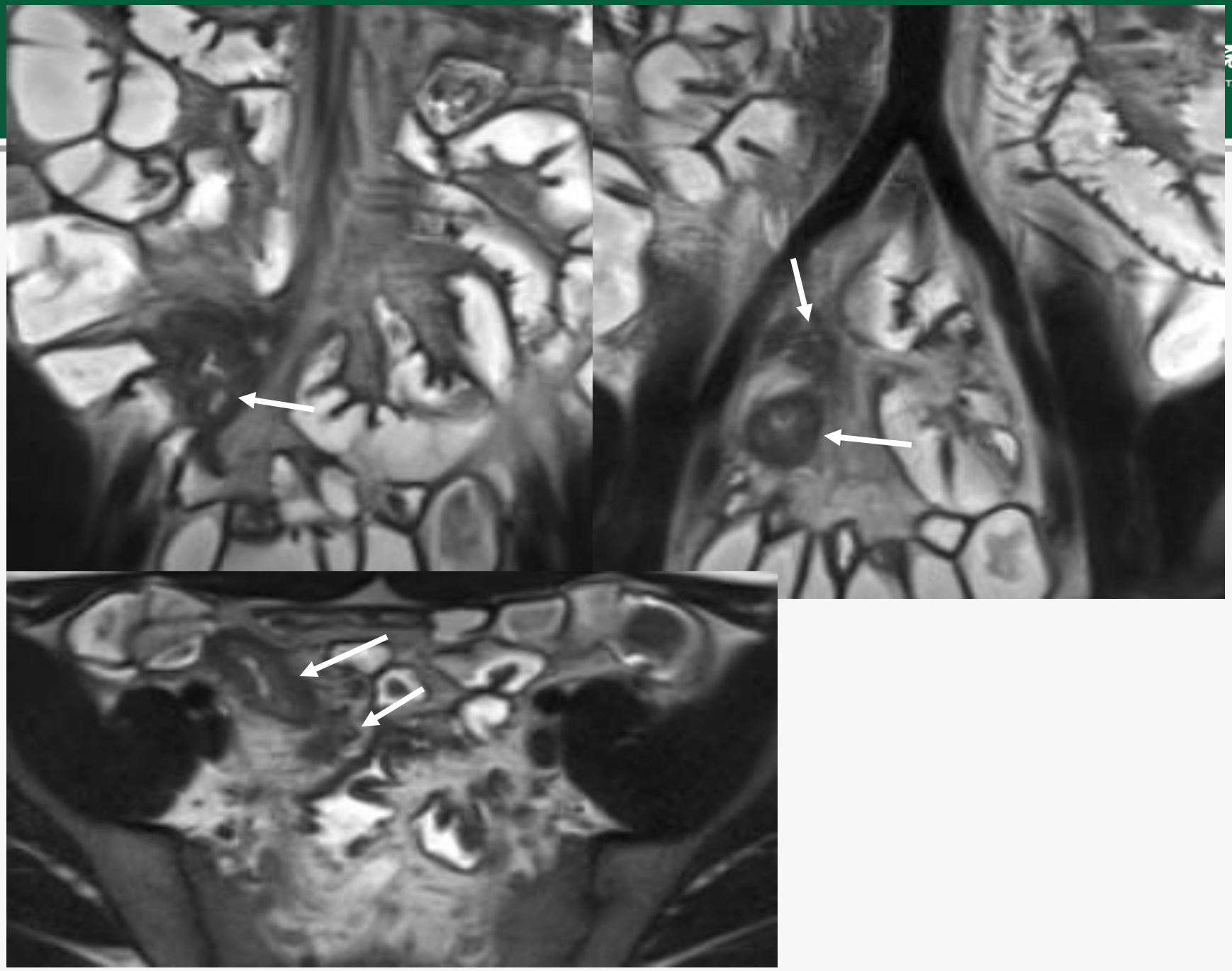
病例（2）

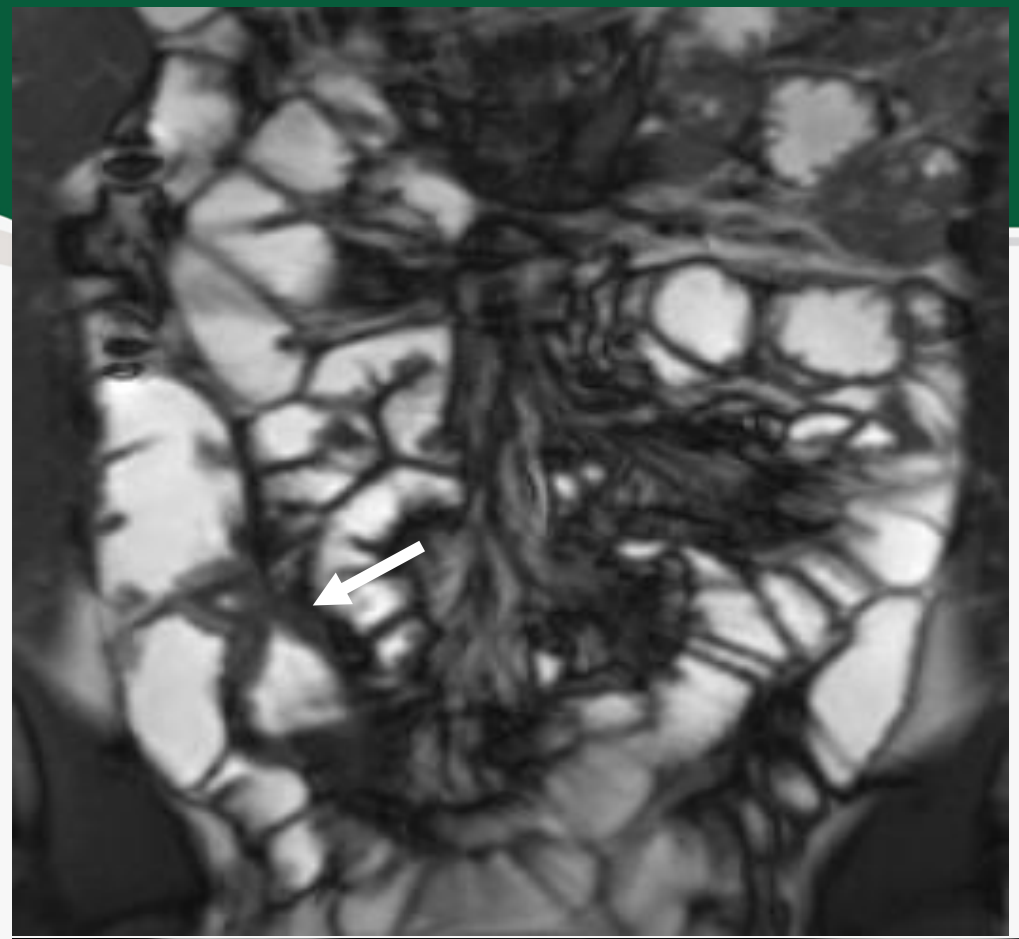
男，17岁，腹痛、腹泻1年，发现右下腹包块伴发热3月。既往结肠镜诊断末段回肠克罗恩病。

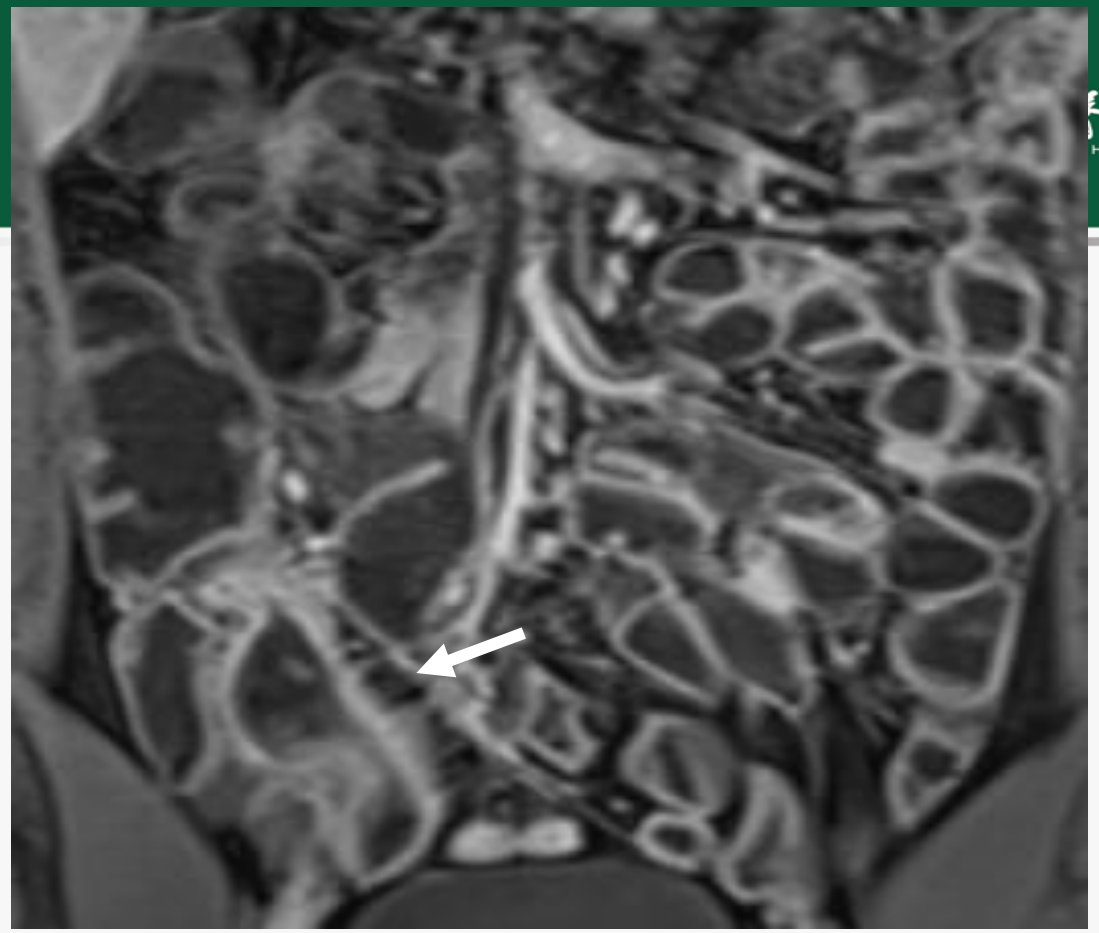


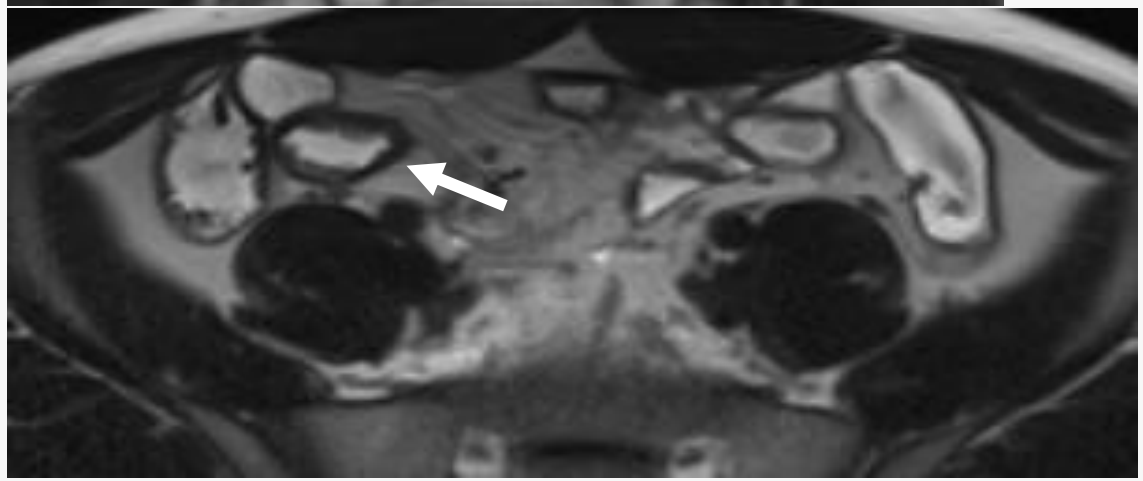


类克治疗
37天后复查

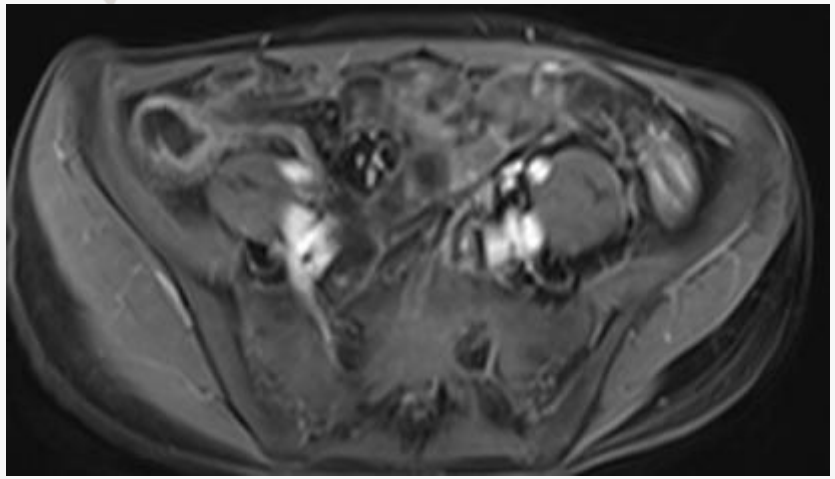
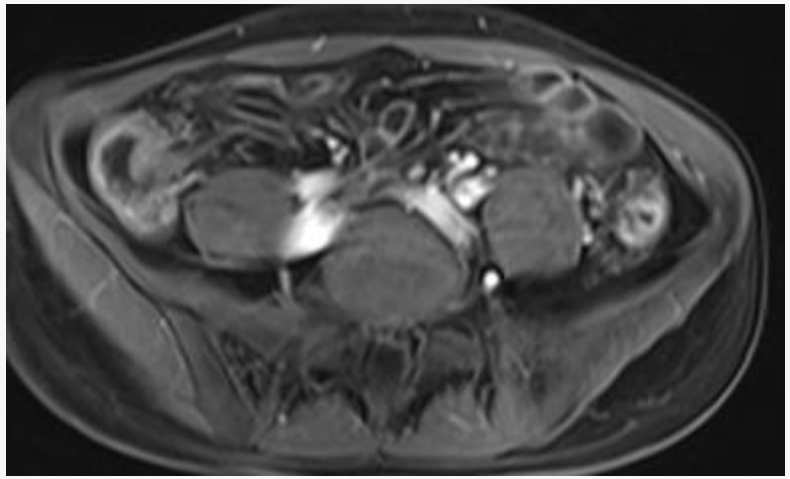
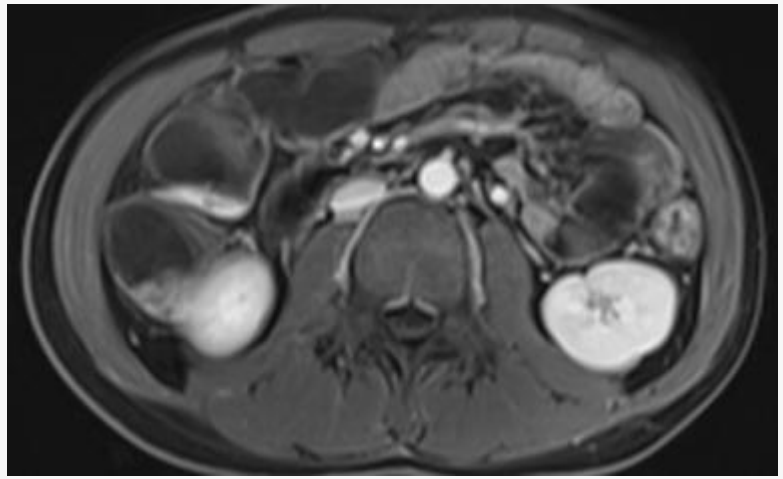
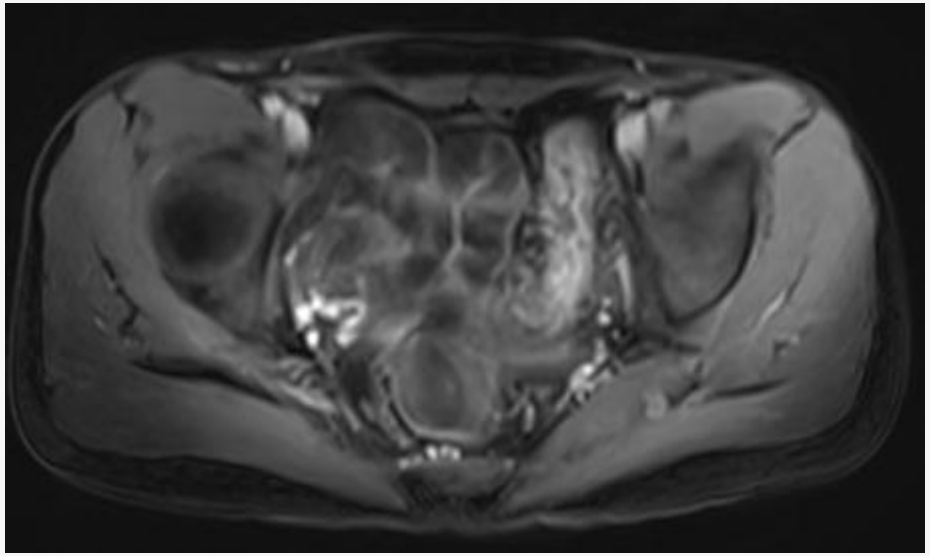
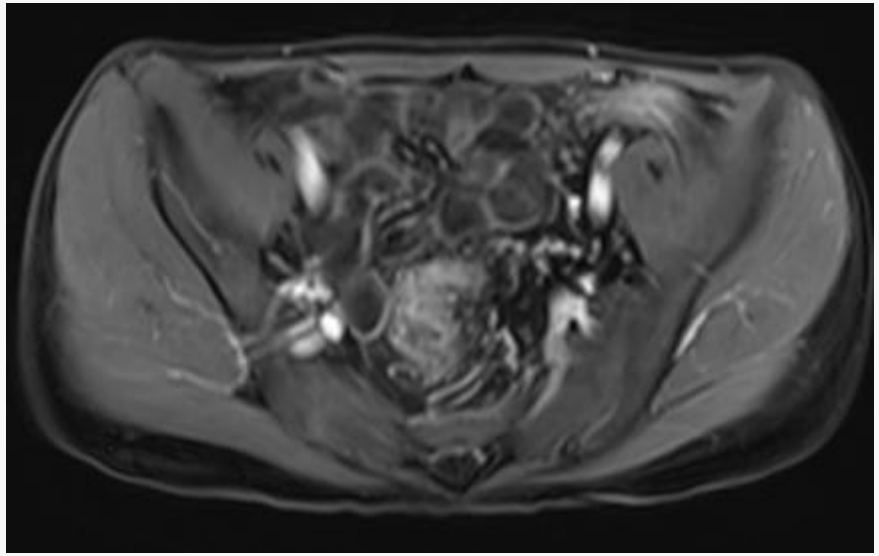




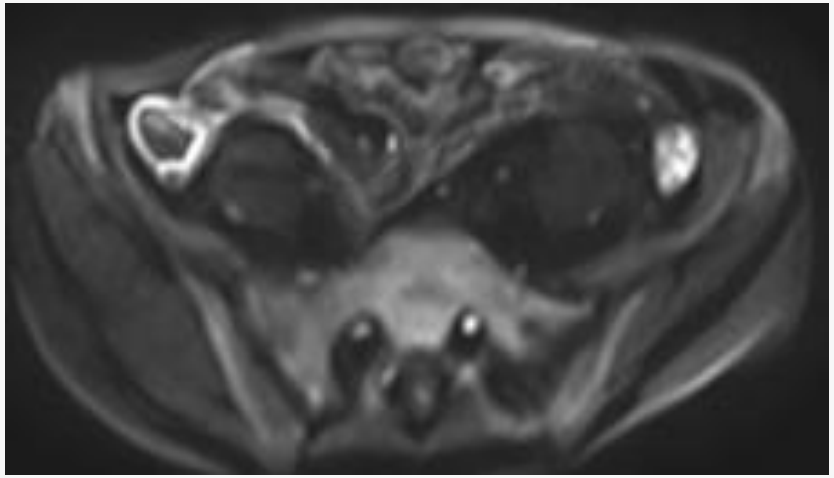
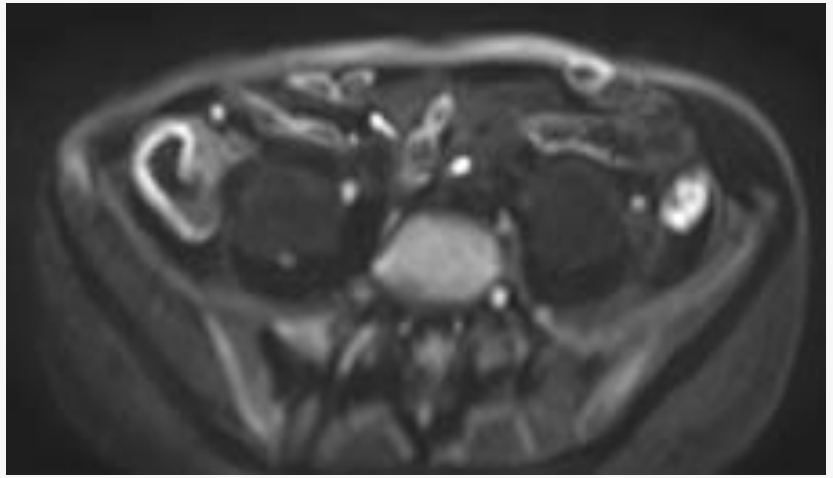
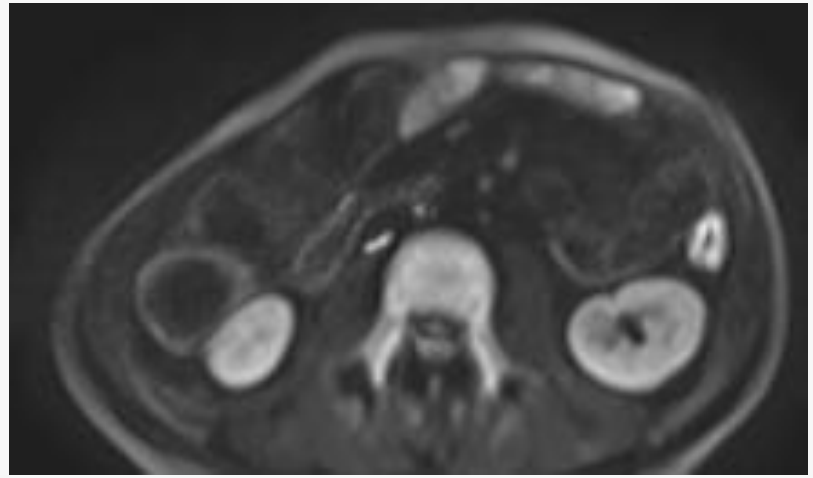
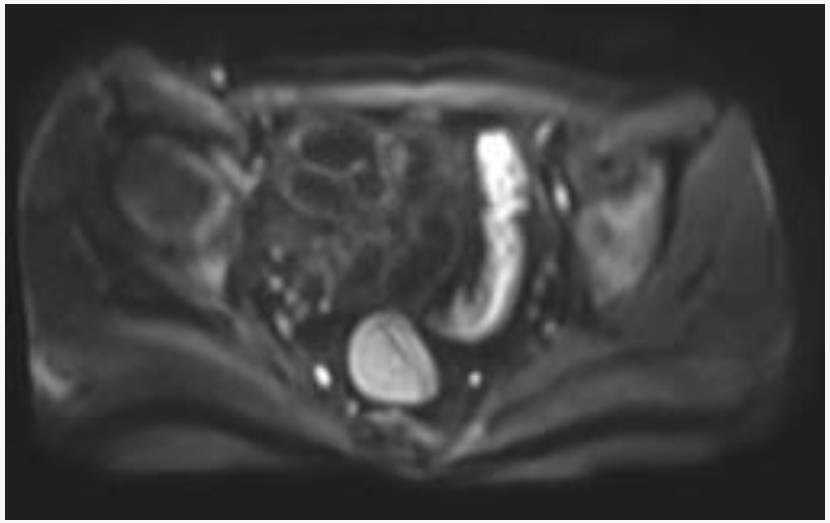
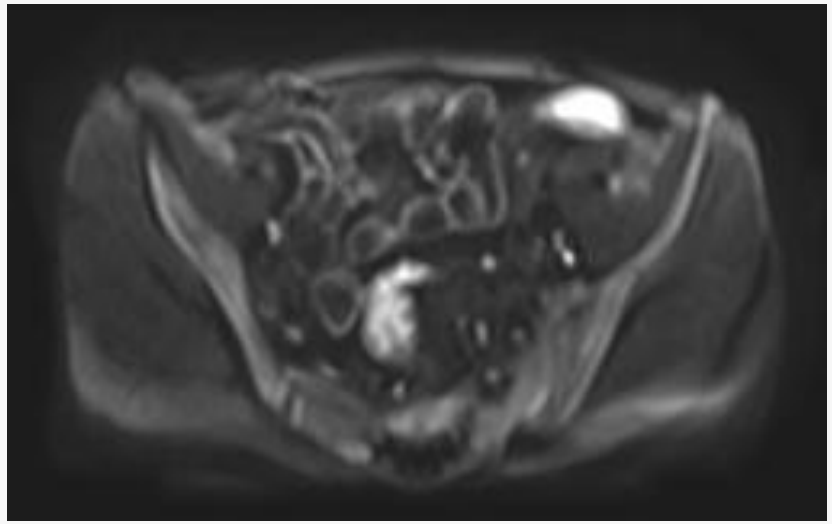




继续治疗2个半月后复查，脓肿基本消失，末段回肠肠壁略厚，轻度异常强化。

DWI技术

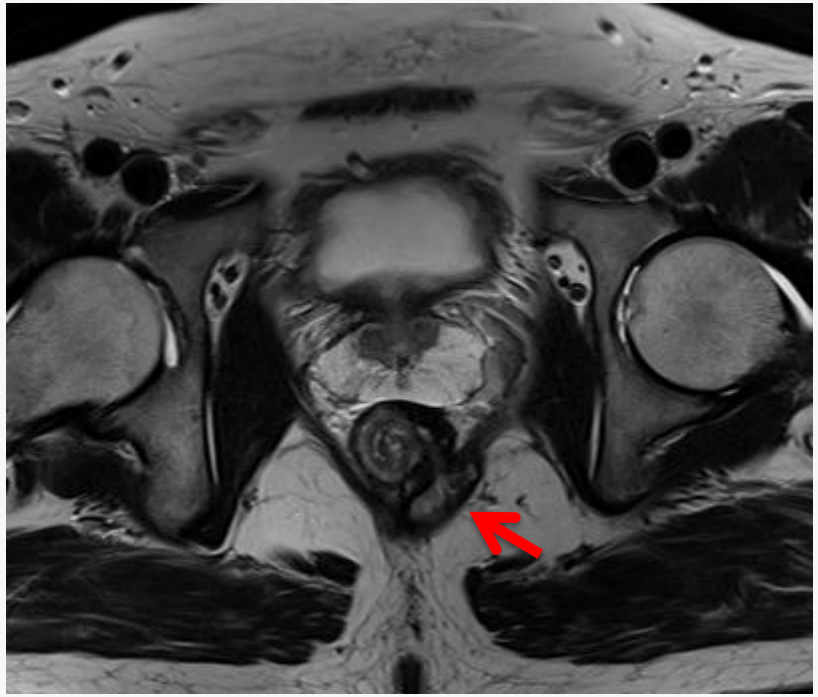
DWI技术

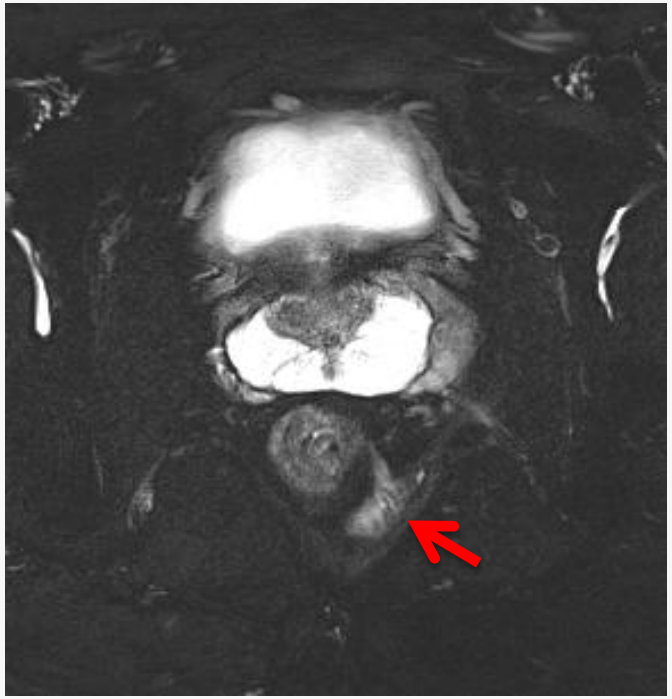
- 磁共振弥散加权成像(diffusion-weighted imaging,DWI)基于水分子的布朗运动，无需注入对比剂，即可得到细胞构成、细胞膜完整性等分子水平的信息，通过测量表面扩散系数(apparent diffusion coefficient,ADC) 还能得到定量参数。
- 炎性病变肠壁DWI信号增高，ADC值下降，造成这一表现的原因尚不明确。可能存在的病理机制为细胞水肿和细胞密集导致细胞外间隙减小。

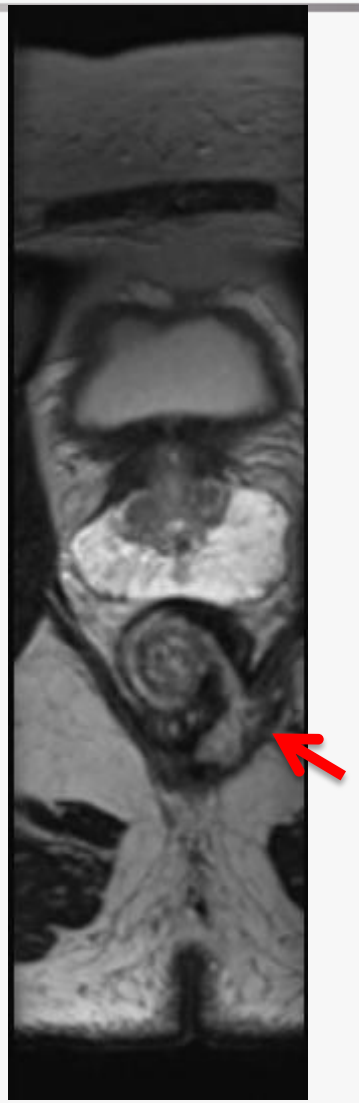
直肠磁共振

- 准确的肛瘘分型有助于决定手术治疗的方式
- MRI指导的手术可减少大约75％复杂肛瘘术后的复发率
- MRI对显示瘘管的敏感度和特异度分别为84%~100％和68%~92％
- 高分辨MRI对内口显示的敏感度和特异度分别达91％~96%和85%~90%

病例（1）



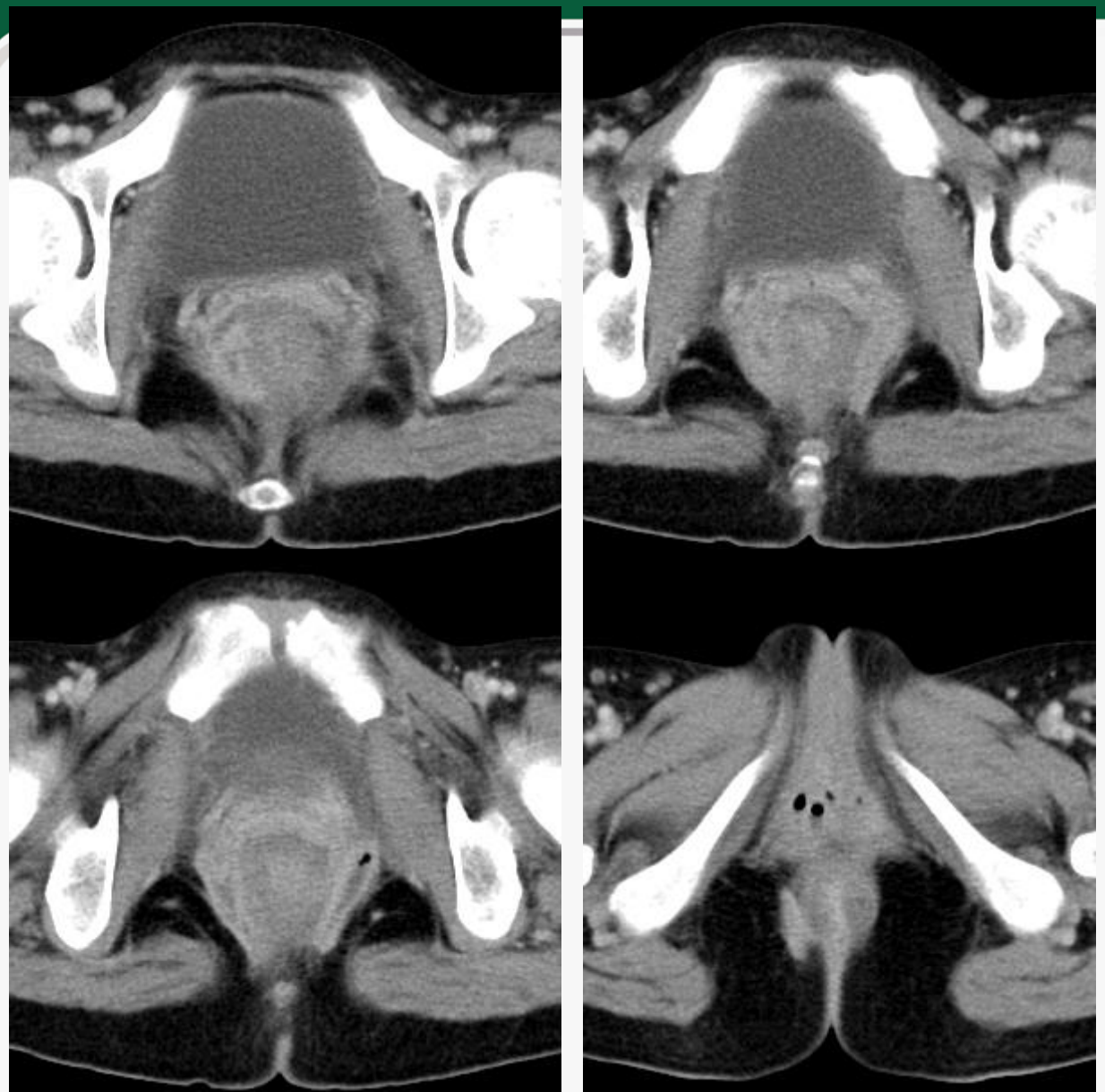




直肠左侧壁粘膜下层长T2信号，穿透肌层向壁外左后方延伸，于左侧肛提肌周围形成团块影，与左侧提肛肌分界不清。

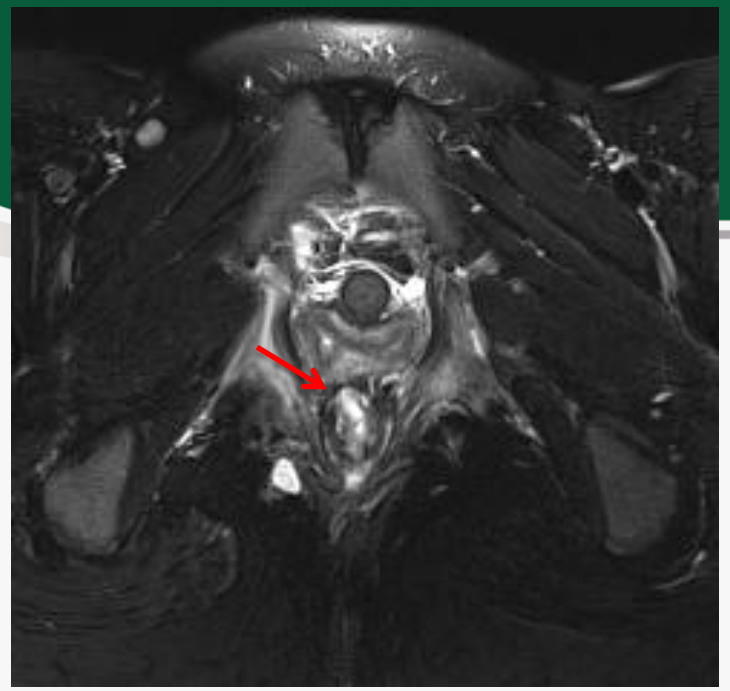
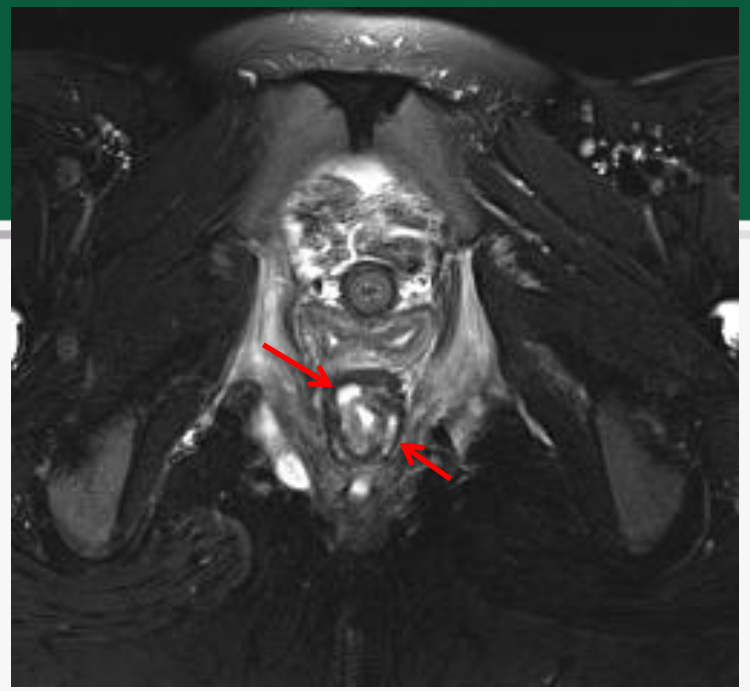
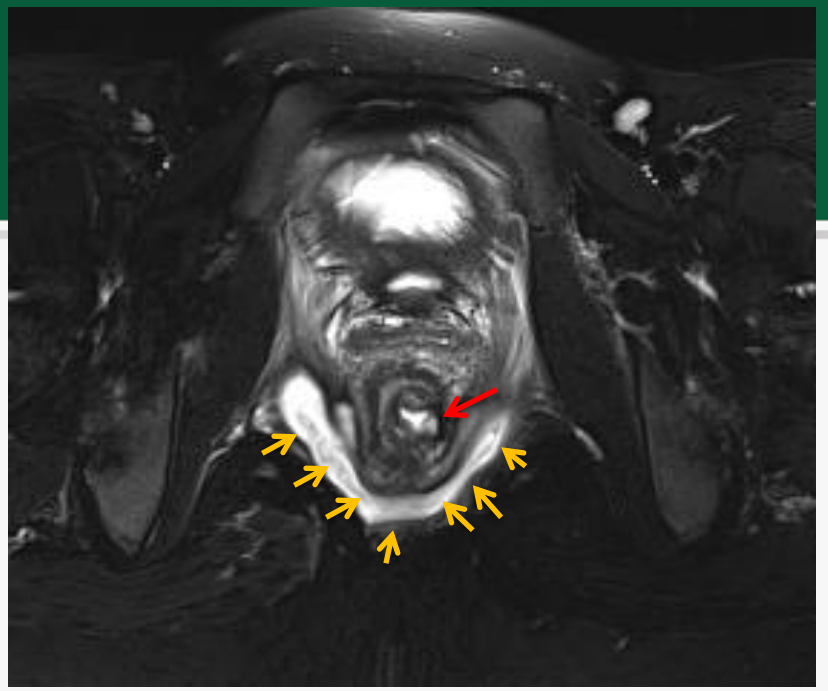
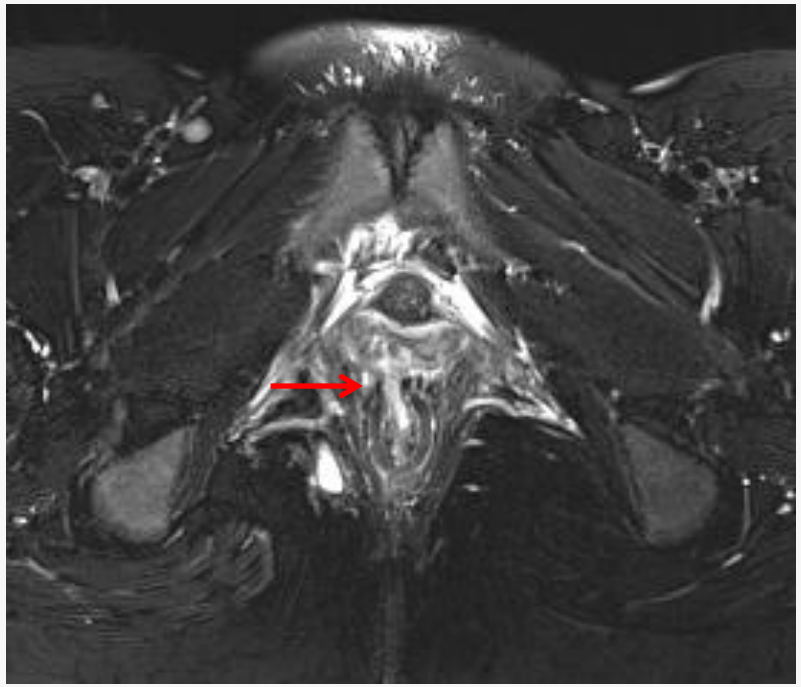
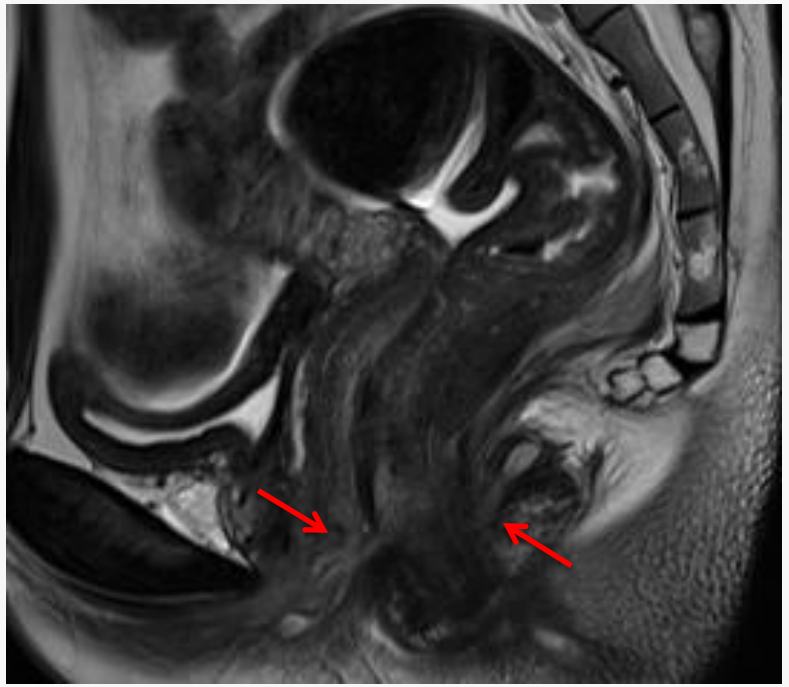
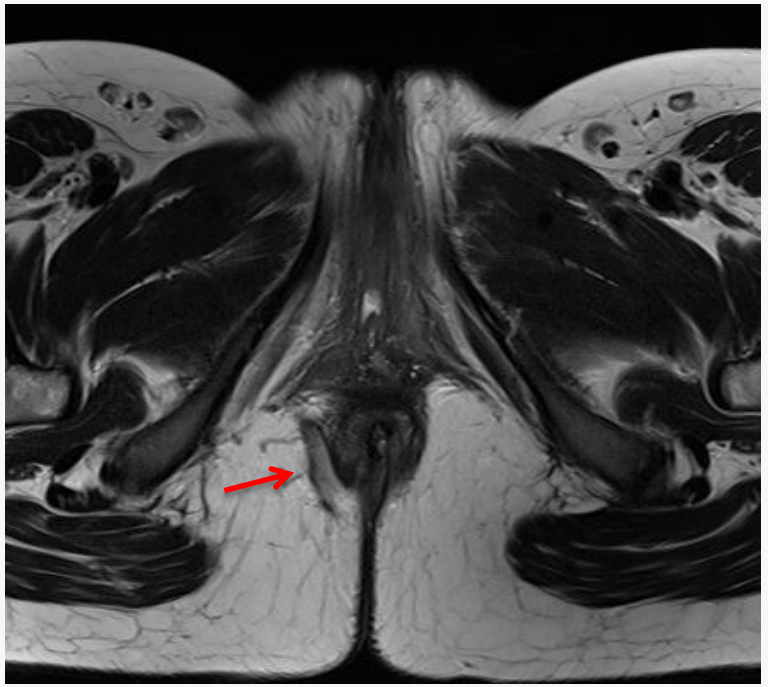
- **T2WI显示解剖结构清晰**
- **T2WI FS更清晰地显示窦道、脓肿**
- **高分辨磁共振成像显示内口效果更佳**

病例（2）



F/20，确诊CD3年，1月前发热，肛周疼痛，出现阴道脓液状分泌物。

有直肠及肛周脓肿
瘘口位置？
有无直肠/肛管-阴道瘘？

小 结

- 腹部平片如非必需，慎做
- 气钡双重造影显示吻合口溃疡敏感性高
- CTE简便、快速，诊断准确性高，但应注意电离辐射危害
- MRE无电离辐射，诊断准确性和CTE接近
- DWI技术无需使用静脉对比剂，更易于发现病变
- 直肠MRI显示直肠、肛管周围病变优势明显

感谢您的聆听！

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