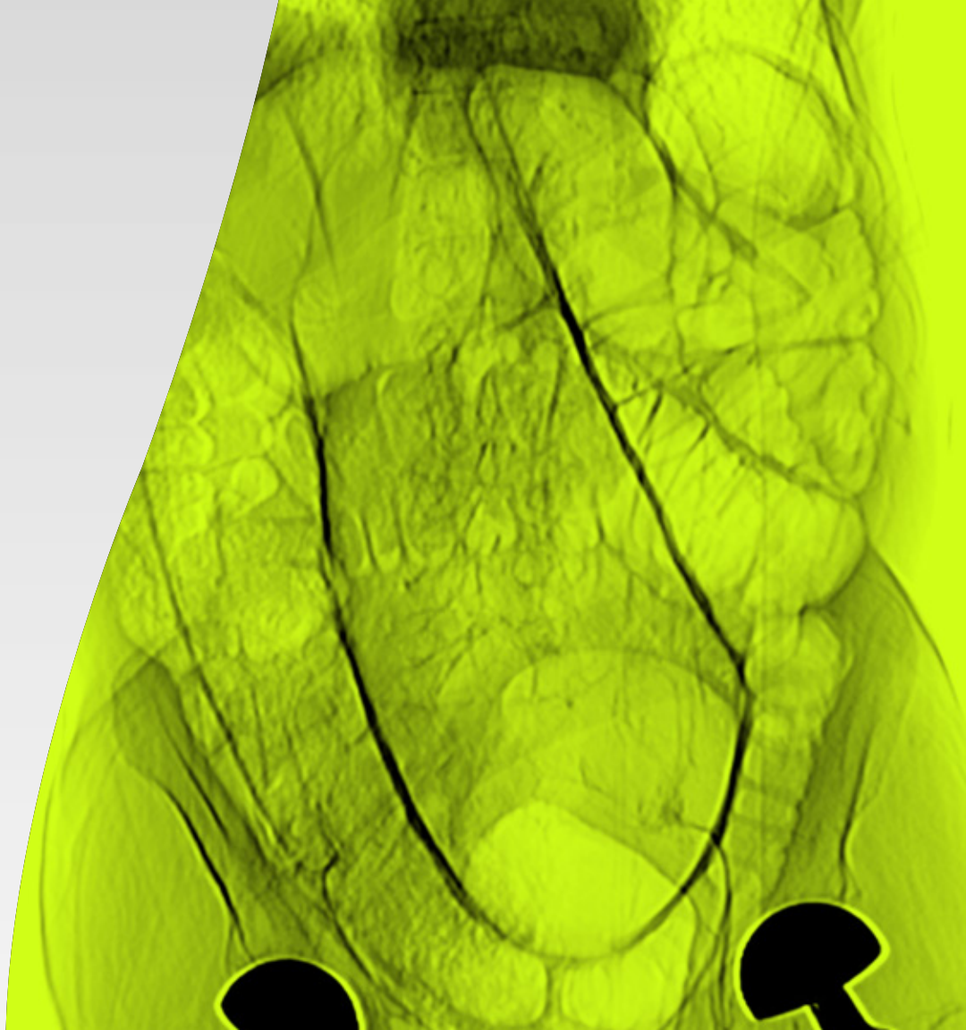
MODERN RADIOLOGY eBook

Large Bowel

大肠



ESR EUROPEAN SOCIETY OF RADIOLOGY

Preface

Modern Radiology is a free educational resource for radiology published online by the European Society of Radiology (ESR). The title of this second, rebranded version reflects the novel didactic concept of the ***ESR eBook*** with its unique blend of text, images, and schematics in the form of succinct pages, supplemented by clinical imaging cases, Q&A sections and hyperlinks allowing to switch quickly between the different sections of organ-based and more technical chapters, summaries and references.

Its chapters are based on the contributions of over 100 recognised European experts, referring to both general technical and organ-based clinical imaging topics. The new graphical look showing Asklepios with fashionable glasses, symbolises the combination of classical medical teaching with contemporary style education.

Although the initial version of the ***ESR eBook*** was created to provide basic knowledge for medical students and teachers of undergraduate courses, it has gradually expanded its scope to include more advanced knowledge for readers who wish to 'dig deeper'. As a result, *Modern Radiology* covers also topics of the postgraduate levels of the *European Training Curriculum for Radiology*, thus addressing postgraduate educational needs of residents. In addition, it reflects feedback from medical professionals worldwide who wish to update their knowledge in specific areas of medical imaging and who have already appreciated the depth and clarity of the ***ESR eBook*** across the basic and more advanced educational levels.

I would like to express my heartfelt thanks to all authors who contributed their time and expertise to this voluntary, non-profit endeavour as well as Carlo Catalano, Andrea Laghi and András Palkó, who had the initial idea to create an ***ESR eBook***, and - finally - to the ESR Office for their technical and administrative support.

Modern Radiology embodies a collaborative spirit and unwavering commitment to this fascinating medical discipline which is indispensable for modern patient care. I hope that this ***educational*** tool may encourage curiosity and critical thinking, contributing to the appreciation of the art and science of radiology across Europe and beyond.

Minerva Becker, Editor
Professor of Radiology, University of Geneva, Switzerland

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章节大纲：

前言

*《现代放射学》*是由欧洲放射学协会 (European Society of Radiology, ESR) 在线发布的免费放射学教育资源。第二版（更名版）标题反映了 ***ESR 电子书***新颖的教学概念，它以简洁页面的形式巧妙地融合文本、图像和示意图，并辅以临床影像学案例、问答部分和内容超链接，使读者能够在各基于器官的部分、更具技术性的章节、摘要以及参考文献之间快速切换浏览。

其章节以 100 多名公认欧洲专家的优秀稿件为根基，涉及各类一般技术和基于器官的临床影像学主题。同时采用了全新的图形外观，展示了佩戴时尚眼镜的 Asklepios，象征着传统医学教学与现代风格教育的结合。

虽然初版 ***ESR 电子书***旨在为医学生和本科生教师提供医学基础知识，但现已逐渐扩充其知识领域，为希望“深入挖掘”的读者提供了更多高阶技术知识。因此，*《现代放射学》*还涵盖了*欧洲放射学培训课程*研究生水平的各类主题，旨在解决住院医师的研究生教育需求。此外，书中还囊括了全球医疗专业人士的反馈，他们希望更新自己在医学影像特定领域的知识，并对 ***ESR 电子书***在基础和高等教育水平上的深度和清晰度表示高度赞赏。

我要衷心感谢所有为这项非营利活动自愿贡献时间和专业知识的作者，以及最初提出创作 ***ESR 电子书***的 Carlo Catalano、Andrea Laghi 和 András Palkó，最后还要感谢 ESR 办公室所提供的技术和行政支持。

*《现代放射学》*充分体现了医者的协作精神和对这门热门医学学科坚定不移的承诺，这是现代患者护理必须具备的优秀精神品质。我希望这款***教育***工具能够激励各位始终保持好奇心和批判性思维，从而促进整个欧洲乃至欧洲以外地区对放射学艺术和科学的认识。

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章节大纲：

Translation Credits

This is a translation of the Chapter of the **Modern Radiology eBook.**

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NOTE FROM THE COORDINATORS:
Thank you to Chinese radiology experts for bridging languages and open the world-class English resource by ESR to every Mandarin-speaking student, fueling global radiology talent with a single click

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翻译致谢

本章节为《现代放射学电子书》的部分译文。

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中华医学会放射学分会

译者寄语：
感谢中国放射学专家们的倾力奉献！你们跨越了语言的鸿沟，将欧洲放射学会 (ESR) 的世界级学术宝库呈献给广大中文学子。如今，前沿智慧一键即达，为全球放射学人才的蓬勃发展注入了强劲动力。

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章节大纲：

/ Signage

<▪> CORE KNOWLEDGE

<!> ATTENTION

<↑> HYPERLINKS

>▪< FURTHER KNOWLEDGE

>|< COMPARE

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<▪> 核心知识

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>▪< 进阶知识

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<?> 问题

MODERN RADIOLOGY eBook

Based on the ESR Curriculum for Radiological Education

Large Bowel

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章节大纲：

基于 ESR 课程的放射学教育

大肠

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Chapter Outline

- Radiological Anatomy
- Radiological Investigations
- Acute Conditions
  - Perforation
  - Diverticulitis
  - Epiploic Appendagitis
  - Appendicitis
  - Volvulus
  - Intussusception
- Tumours
  - Polyps
  - Colorectal Cancer
  - Appendix Tumours
  - Lymphoma
  - Secondary Cancers
- Colitis
  - Inflammatory Bowel Disease
  - Ischaemic Colitis
  - Infectious Colitis
  - Radiation Colitis
  - Neutropenic Colitis
  - Acute Fulminant Colitis
- Functional Disorders of the Anorectum
  - Constipation
  - Difficulty Initiating Evacuation
  - Sensation Of Incomplete Evacuation
  - Anal Fistula
- Take-Home Messages
- References and Further Reading
- Test Your Knowledge

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章节大纲：

章节大纲

- 影像解剖学
- 影像学检查
- 急性疾病
  - 穿孔
  - 憩室炎
  - 肠脂垂炎
  - 阑尾炎
  - 肠扭转
  - 肠套叠
- 肿瘤
  - 息肉
  - 结直肠癌
  - 阑尾肿瘤
  - 淋巴瘤
  - 继发性癌症
- 结肠炎
  - 炎症性肠病
  - 缺血性结肠炎
  - 感染性结肠炎
  - 放射性结肠炎
  - 中性粒细胞减少性结肠炎
  - 急性暴发性结肠炎
- 肛门直肠功能性疾病
  - 便秘
  - 排便启动困难
  - 排便不尽感
  - 肛瘘
- 核心要点
- 参考文献和拓展资料
- 知识测试

Radiological Anatomy

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章节大纲：

影像解剖学

/ Anatomy

The **large bowel** is a muscular tube that is divided into the:

- / caecum and appendix
- / ascending colon
- / hepatic flexure
- / transverse colon
- / splenic flexure
- / descending colon
- / sigmoid colon
- / rectum
- / anus

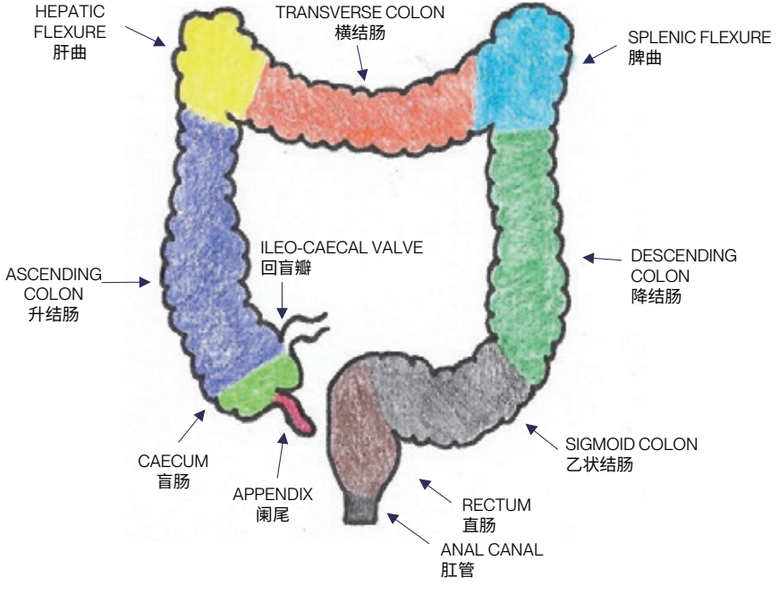

FIGURE 1

Schematic illustration of the large bowel.

/ Large Bowel

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/ 解剖结构

/ 大肠

章节大纲：

大肠是一条肌性管道，分为以下几个部分：

- / 盲肠和阑尾
- / 升结肠
- / 肝曲
- / 横结肠
- / 脾曲
- / 降结肠
- / 乙状结肠
- / 直肠
- / 肛门

图 1

大肠结构示意图。

The peritoneum is a continuous membrane that lines the abdominal cavity and abdominal organs. It consists of two layers that are continuous with each other: **the parietal and visceral peritoneum**.

The parietal peritoneum lines the inner surface of the abdominopelvic wall. The visceral peritoneum covers the majority of the abdominal viscera.

The **peritoneal cavity** is a potential space between the parietal and visceral peritoneum.

Intraperitoneal organs are lined by visceral peritoneum both anteriorly and posteriorly. The **caecum, appendix, transverse colon and sigmoid colon are intraperitoneal structures**.

Retroperitoneal organs lie posterior to the peritoneum and are only covered only by peritoneum anteriorly – **the ascending and descending colon are retroperitoneal structures and the rectum is extra-peritoneal**.

Mesenteries are double layers of peritoneum which attach the intestine to the posterior abdominal wall and allow blood vessels, nerve and lymphatics to supply the intestine. **The transverse and sigmoid colon** have mesenteries called the **transverse mesocolon** and **sigmoid mesocolon**.

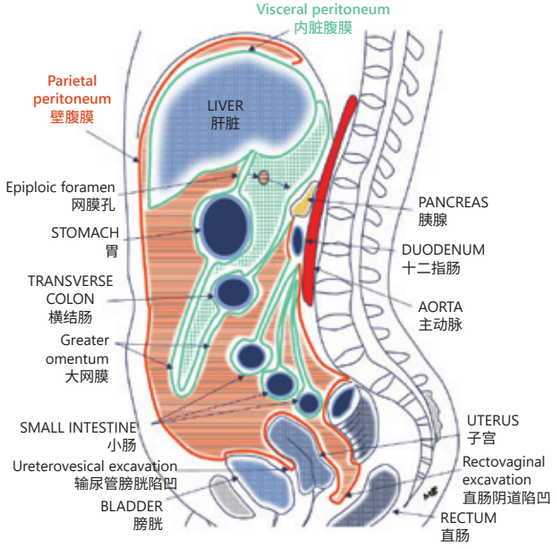

FIGURE 2

Schematic illustration of the peritoneum. Visceral peritoneum (**green**), parietal peritoneum (**red**). Main cavity (**red texture**), omental bursa (**green texture**).

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章节大纲：

腹膜是一层连续的膜，衬覆腹腔并覆盖腹腔内的器官。它由两层彼此相连的结构组成：**壁腹膜和脏腹膜**。

壁腹膜衬覆腹盆腔内壁。脏腹膜覆盖大部分腹腔脏器。

腹膜腔是壁腹膜和脏腹膜之间的潜在腔隙。

腹膜内器官的前后均被脏腹膜包裹。**盲肠、阑尾、横结肠和乙状结肠均为腹膜内结构**。

腹膜后器官位于腹膜之后，仅前方被腹膜覆盖 - **升结肠和降结肠是腹膜后结构，直肠是腹膜外结构**。

肠系膜是由两层腹膜构成的结构，将肠道固定于腹后壁，并为血管、神经和淋巴管提供通道以供应肠道。**横结肠和乙状结肠**都有各自的肠系膜，分别称为**横结肠系膜和乙状结肠系膜**。

图 2

腹膜示意图。脏腹膜（绿色）、壁腹膜（红色）。主腔（红色纹理填充），网膜囊（绿色纹理填充）。

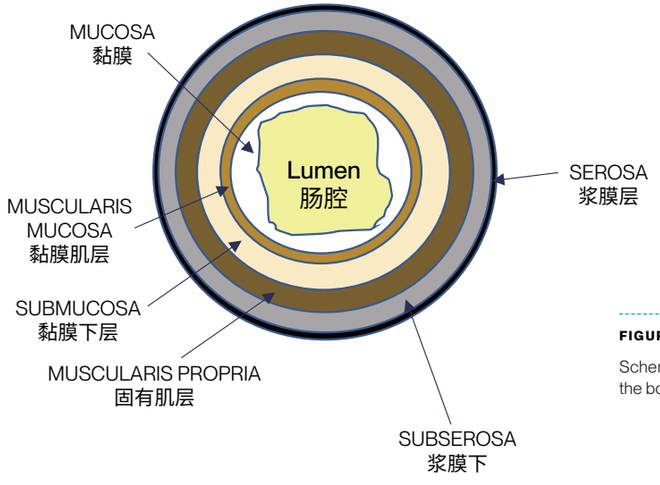

FIGURE 3

Schematic illustration of the bowel wall layers.

The **layers of bowel wall** are illustrated in the schematic diagram above.

The **mucosa** consists of epithelium, intestinal glands, the lamina propria and muscularis mucosa.

The **submucosa** consists of nerves, blood vessels and elastic fibers with collagen.

The **muscularis propria** consists of inner circular and outer longitudinal smooth muscle layers, with the myenteric (Auberbach) nerve plexus in between.

The outermost layer is the **serosa**. The serosa is a synonym for the **visceral peritoneum** and covers the intra-peritoneal transverse and sigmoid colon. The ascending and descending colon are retroperitoneal and the outer layer on their posterior surface is the **adventitia**.

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图 3

肠壁各层示意图。

上述示意图中展示了**肠壁的各层结构**。

黏膜层由上皮、肠腺、固有层和黏膜肌层组成。

黏膜下层由神经、血管及含胶原的弹性纤维组成。

固有肌层由内部环形和外部纵向平滑肌层组成，两层之间为肌间 (Auerbach) 神经丛。

最外层为**浆膜层**。浆膜层是**脏腹膜**的同义词，覆盖腹膜内的横结肠和乙状结肠。升结肠和降结肠位于腹膜后，其后表面的外层为**外膜**。

The **superior mesenteric artery** supplies the colon proximal to the splenic flexure via the **ileocolic, right and mid-colic branches**. The distal colon is supplied by the **inferior mesenteric artery via the left colic, sigmoid and superior rectal artery branches**. The mid and inferior rectum are supplied via the **internal iliac artery**.

The **marginal artery of Drummond** is a vascular arcade running along the mesocolonic border formed by the terminal branches of the superior and inferior mesenteric arteries.

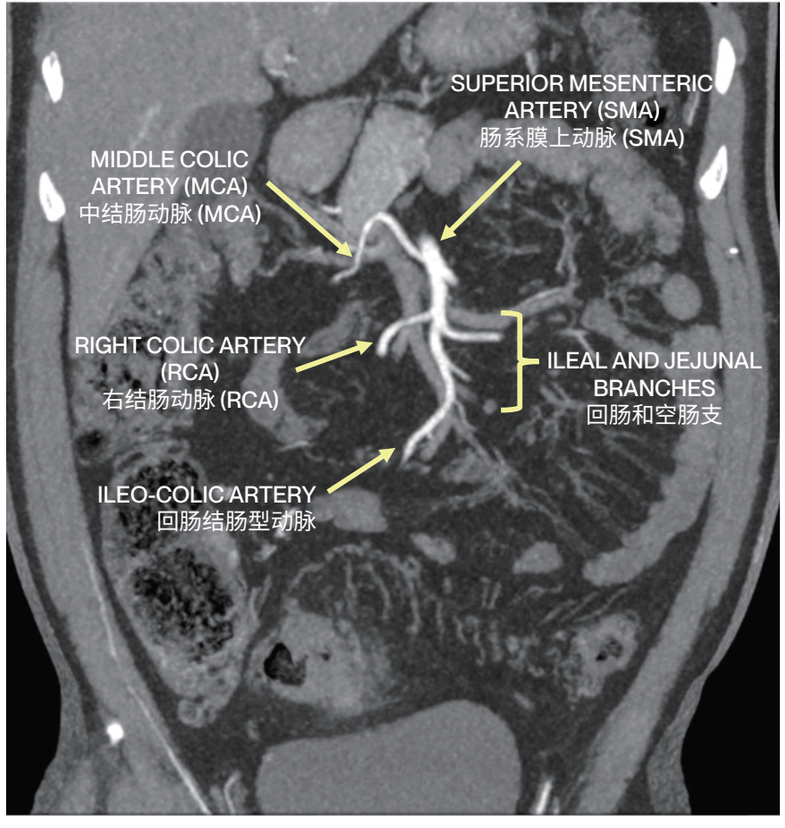

FIGURE 4

Coronal maximum intensity projection (MIP) image of a CT angiogram demonstrating the branches of the superior mesenteric artery.

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章节大纲：

肠系膜上动脉通过**回结肠动脉、右结肠动脉和中结肠动脉分支**，为脾曲近端的结肠供血。远端结肠由**肠系膜下动脉通过左结肠动脉、乙状结肠动脉和直肠上动脉分支供血**。中段和下段直肠由**髂内动脉**供血。

Drummond **边缘动脉**是一条沿结肠系膜缘走行的血管弓，由肠系膜上、下动脉的末端分支组成。

图 4

CT 血管成像的冠状位最大密度投影 (MIP) 图像显示了肠系膜上动脉的分支。

The veins follow the arteries with the right colon draining into **the superior mesenteric vein** and the left colon into the **inferior mesenteric vein** which drains into **the portal vein**, via the splenic vein. The middle and inferior rectal veins drain into the **internal iliac vein**.

The **lymphatic drainage** of the colon also follows the course of the arteries, draining ultimately into the **coeliac nodes**. From the proximal rectum, lymph drains superiorly via superior rectal artery nodes to the inferior mesenteric chain, posteriorly by nodes around the median sacral artery and laterally around the middle rectal artery to the internal iliac chain.

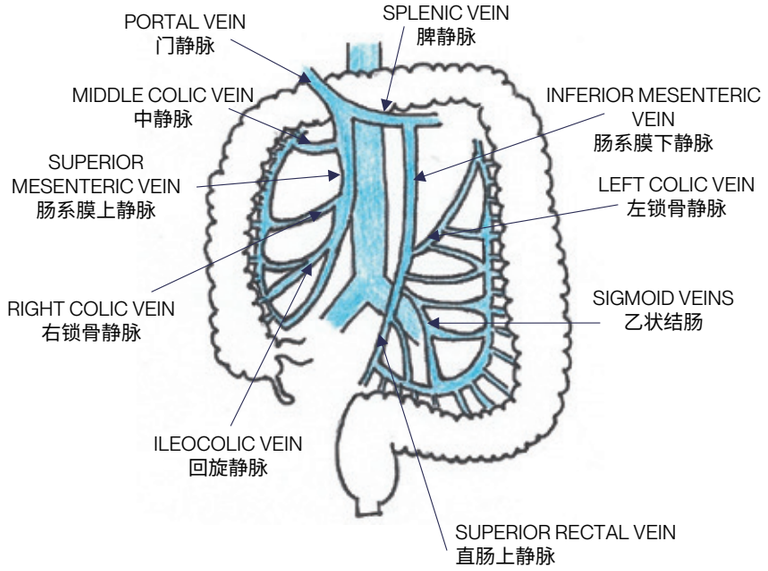

FIGURE 5

Schematic illustration of the venous drainage of the large bowel.

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章节大纲：

静脉走向与动脉相同，右结肠静脉汇入**肠系膜上静脉**，左结肠静脉则汇入**肠系膜下静脉**，并通过脾静脉汇入**门静脉**。直肠中静脉、直肠下静脉则汇入**髂内静脉**。

结肠的**淋巴引流**同样沿动脉走行，最终汇入**腹腔淋巴结**。近端直肠的淋巴可经直肠上动脉旁淋巴结向上引流至肠系膜下淋巴链，向后经骶正中动脉周围的淋巴结引流，以及向侧方沿直肠中动脉周围的淋巴结引流至髂内淋巴链。

图 5

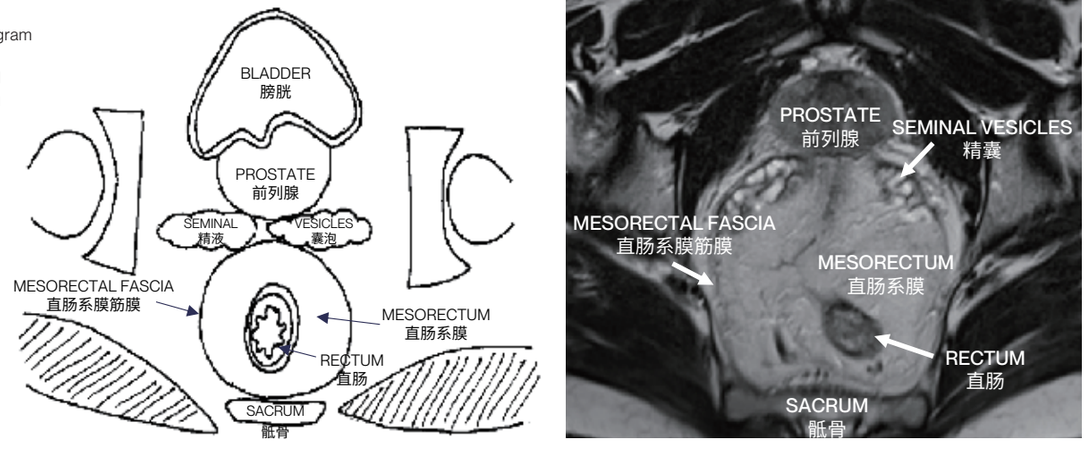
大肠静脉引流示意图。

The **rectum** is defined as the distal 15 cm of large bowel proximal to the anus. Anteriorly the rectum is covered by peritoneum to the level of the junction of the upper two-thirds and lower one-third.

The lateral and posterior aspects of the upper rectum and all the lower one-third are surrounded by the **mesorectum**, which is composed of loose adipose connective tissue containing the small perirectal lymph nodes and the superior rectal vessels. The mesorectum itself is enclosed by the mesorectal fascia. Posteriorly the **mesorectal fascia** is separated from the presacral fascia by the thin retrorectal space; anteriorly it blends with the rectovesical (Denonvillier) fascia; superiorly it is contiguous with the sigmoid mesentery; and inferiorly it terminates close to the anus in the parietal fascia covering the levator ani.

FIGURE 6

Schematic diagram of the male pelvis (left) and corresponding T2-weighted MRI image (right) in the axial plane.



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直肠定义为大肠远端、靠近肛门 15 cm 的大肠部分。直肠前壁有腹膜覆盖，至上 2/3 与下 1/3 交界处为止。

直肠上段的侧面和后面，以及直肠下三分之一的全部被**直肠系膜**包绕。直肠系膜由疏松的脂肪结缔组织构成，其中包含直肠周围小淋巴结和直肠上动静脉。直肠系膜本身被直肠系膜筋膜包裹。在后方，**直肠系膜筋膜**与骶前筋膜之间为薄薄的直肠后间隙；在前方，则与直肠膀胱筋膜 (Denonvillier) 相融合；在上方，与乙状结肠系膜相连；在下方，在肛门附近终止于覆盖肛提肌的壁筋膜。

图 6

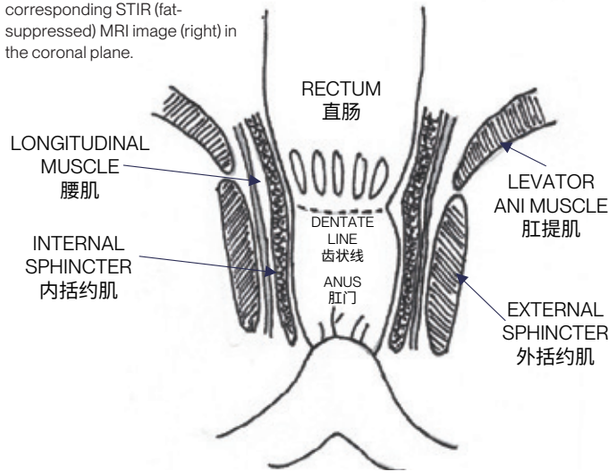
男性骨盆的示意图（左）及相应的 T2WI MRI 轴位平面图像（右）。

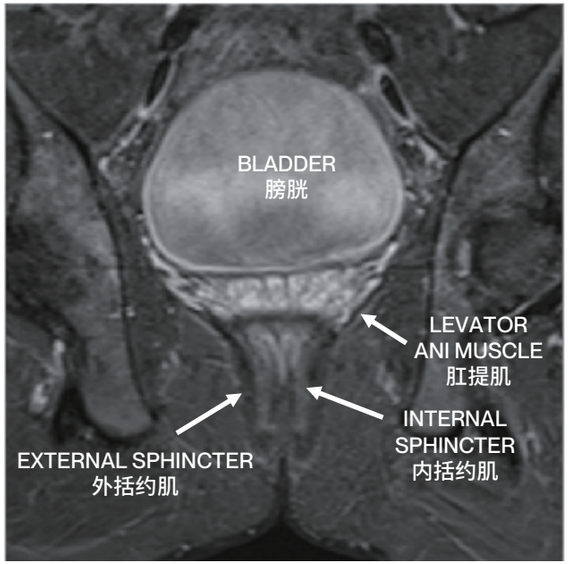
The anus has a complex sphincter arrangement with an **internal sphincter** comprised of smooth muscle (a continuation of the circular muscle of the distal rectum) and an **external sphincter** of striated muscle.

Longitudinal muscle lies between the internal and external sphincters, consisting of striated and smooth muscle with extensive fibroelastic tissue, which anchors the anus in position.

FIGURE 7

Schematic diagram of the anal sphincter anatomy (left) and corresponding STIR (fat-suppressed) MRI image (right) in the coronal plane.





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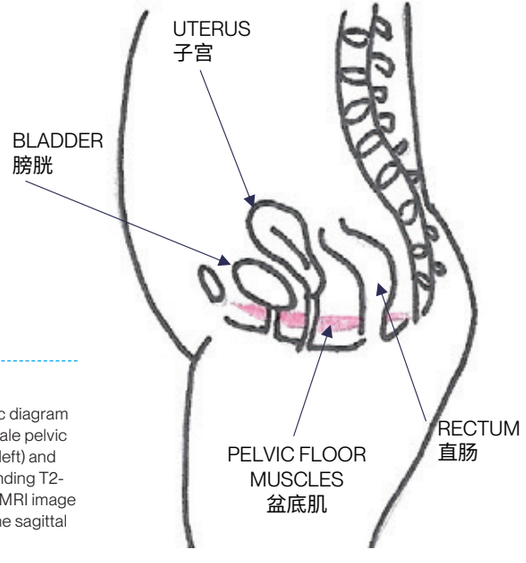
章节大纲：

肛门括约肌结构复杂，由两部分组成：**内括约肌**为平滑肌（远端直肠环形肌的延续），**外括约肌**为横纹肌。**纵行肌**位于内括约肌和外括约肌之间，由横纹肌和平滑肌组成，并伴有丰富的纤维弹性组织，用于固定肛门的位置。

图 7

肛门括约肌解剖结构示意图（左）和相应冠状位 STIR（脂肪抑制）MRI 图像（右）。

The **pelvic floor** consists of muscle and connective tissue that forms a 'sling' across the base of the pelvis. It consists of three contiguous supporting layers – the **endopelvic fascia**, the **muscular pelvic diaphragm** and the **urogenital diaphragm**. These support the pelvic floor organs and assist in urinary and faecal continence. The muscular pelvic floor consists mainly of the **levator ani complex** along with the **coccygeus** and **puborectalis** muscles.



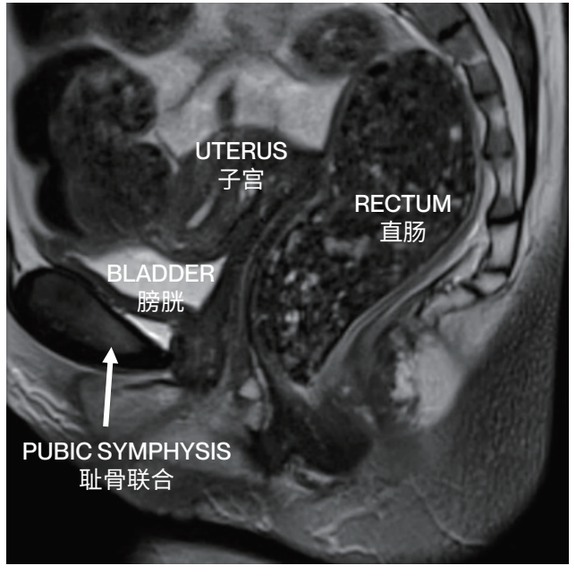


FIGURE 8

Schematic diagram of the female pelvic anatomy (left) and corresponding T2-weighted MRI image (right) in the sagittal plane.

Large Bowel

CHAPTER OUTLINE:

大肠

盆底由肌肉和结缔组织构成，形成一个横跨骨盆底部的“吊带”结构。其结构包括三层相连的支持层 - **盆腔筋膜**、**肌性盆膈**和**泌尿生殖膈**。这些结构共同支撑骨盆底器官，辅助于排尿和排便控制。盆底肌主要由**肛提肌群**以及**尾骨肌**和**耻骨直肠肌**组成。

章节大纲：

图 8

女性盆腔解剖示意图（左）和相应的矢状位 T2WI MRI 图像（右）。

On **normal plain radiographs**, the large bowel tends to be peripheral whereas the small bowel tends to be central. The large bowel has a larger caliber than the small bowel.

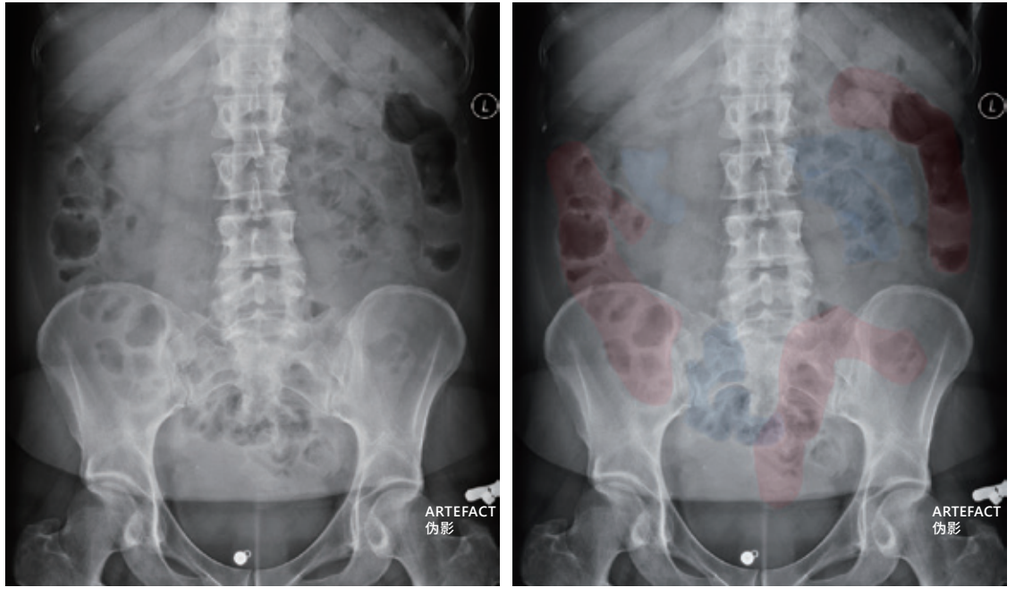


FIGURE 9

Normal bowel gas pattern as seen on an abdominal plain radiograph. Most often gas shadows are not continuous. The course of the large bowel (**red**) and of the small bowel (**blue**) is shown on the annotated image.

Case courtesy of Dr Jeremy Jones, Radiopaedia.org, rID: 34068

Large Bowel

CHAPTER OUTLINE:

大肠

在普通 X 线平片上，大肠多位于外周，小肠则多居中。大肠管径大于小肠。

章节大纲：

图 9

腹部 X 线平片显示肠道气体正常，气体影多不连续。标注图像中展示了大肠（**红色**）和小肠（**蓝色**）的走行。

病例由 Jeremy Jones 医生提供，Radiopaedia.org，rID：34068

Radiological Investigations

影像学检查

Large Bowel

大肠

CHAPTER OUTLINE:

章节大纲：

/ Imaging Modalities

Plain radiographs are quick and easily **accessible** and they have a modest radiation dose. They have a **limited role** in colonic disease due to their low sensitivity and low specificity. However, plain radiographs may be used as a first-line investigation in the context of volvulus, bowel obstruction and toxic megacolon.

The **standard projection** is the anterior-posterior (AP) supine view. The posterior-anterior (PA) erect view is additionally used to assess free gas in the abdomen, as well as gas-fluid levels in suspected bowel obstruction.

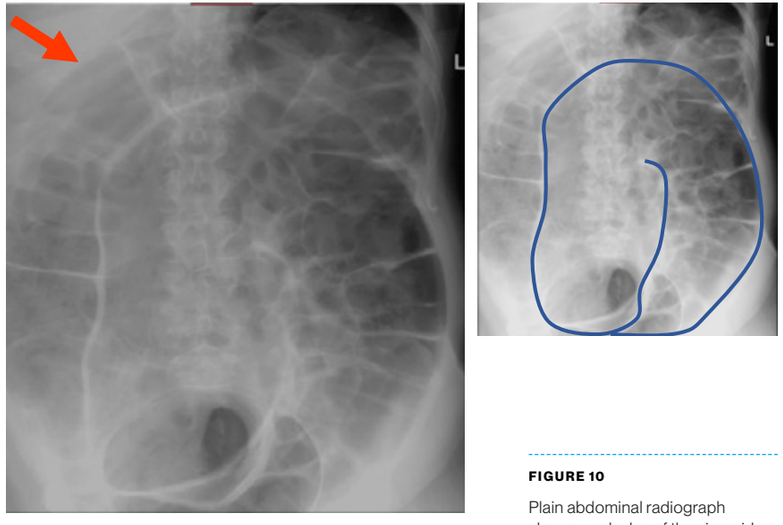


FIGURE 10

Plain abdominal radiograph shows a volvulus of the sigmoid colon with a classic coffee-bean sign (**blue outline**). The apex of the volvulus points to the right upper quadrant and there are loops of dilated large bowel seen proximally (**arrow**). See for comparison Figure 9 (normal abdominal plain radiograph).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 影像学检查方法

X 线平片拍摄速度快、**获取**方便，且辐射剂量适中。但由于其灵敏度和特异度较低，在结肠疾病中的应用**有限**。然而，在肠扭转、肠梗阻和中毒性巨结肠等情况下，X 线平片仍可作为一线检查方法。

标准投照体位为仰卧前后位 (AP) 片。此外，直立后前位 (PA) 片则用于评估腹腔游离气体，以及在怀疑肠梗阻时观察气液平面。

图 10

腹平片可显示乙状结肠扭转，伴有典型的咖啡豆征（**蓝色轮廓**）。肠扭转的顶端指向右上腹，可见近端扩张的大肠袢（箭头）。对比请参照图 9（正常腹部 X 线平片）。

Cross-sectional imaging techniques consist mainly of **computed tomography (CT)**, **magnetic resonance imaging (MRI)** and **ultrasound (US).** These have increasingly become the **mainstay of colonic imaging**.

In the **emergency setting, CT is often the first line imaging test** for assessing acute or life-threatening conditions such as bowel obstruction, bowel ischaemia, volvulus, intussception, the post-operative abdomen and the acute complications of inflammatory bowel disease for example (please see subsequent section on 'Acute Conditions').

A **CT of the abdomen and pelvis with portal venous contrast** (acquired at 60 seconds post-intravenous contrast injection) is the standard imaging acquisition although this will vary according to the clinical question – for example, if bowel ischaemia is suspected, an arterial phase (at 30 seconds) will also be required to assess the arterial vessels for acute thrombus.

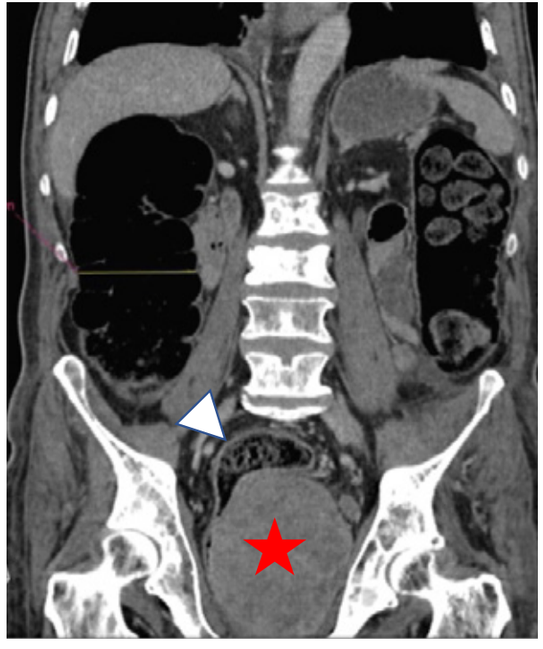


FIGURE 11

Coronal reformat of a portal venous phase CT abdomen/pelvis demonstrates acute large bowel obstruction secondary to a large prostatic mass (**star**) compressing on the distal colon (**arrowhead**). The large bowel should not measure more than 6 cm (9 cm at the caecum). The ascending colon on this image measures up to 7.5 cm.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

横断面成像技术主要包括**计算机断层扫描 (CT)**、**磁共振成像 (MRI)** 和**超声 (US)**。这些方法已逐渐成为**结肠影像检查的主要手段**。

在**急诊情况下，CT 常作为一线影像检查方法**，用于评估急性或危及生命的情况，例如肠梗阻、肠缺血、肠扭转、肠套叠、腹部术后及炎症性肠病的急性并发症（详见后文“急性疾病”章节）。

尽管**腹部及盆腔增强 CT（门静脉期）**（静脉注射对比剂后 60 秒采集）是标准成像方式，但具体扫描方案会根据临床问题调整 - 例如，如果怀疑肠缺血，还需在动脉期（30 秒）采集以评估动脉血管有无急性血栓。

图 11

门静脉期腹部/盆腔CT冠状位重建显示，由于前列腺巨大肿块（星号）压迫远端结肠（箭头），导致急性结肠梗阻。正常情况下，结肠直径不应超过 6 cm（盲肠可达 9 cm）。而本例图像中升结肠的最大直径达 7.5 cm。

Fluoroscopic contrast studies are less commonly performed today but remain useful for problem solving in complex cases, e.g., for assessing post-operative intestinal integrity, diagnosing leaks and delineating colonic fistulae.

A water-soluble contrast enema uses a contrast agent such as diluted Gastrografin, which is instilled into the rectum via a Foley catheter and allows real-time dynamic evaluation of colonic anatomy, using X-rays.

Double-contrast barium enemas are now obsolete tests and have been replaced by cross-sectional imaging. They involved the use of bowel insufflation with either carbon dioxide or air for luminal distension and a smooth-muscle relaxant given intravenously. These were previously commonly used for the diagnosis of tumours and assessment of inflammatory bowel disease.

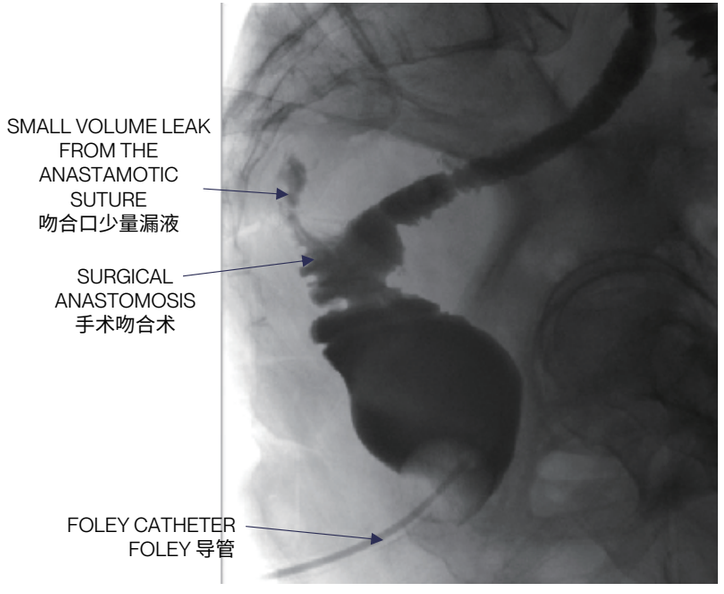


FIGURE 12

Single sagittal image from an iodinated contrast enema in a patient post anterior resection for a rectosigmoid tumour. There is a small volume leak from the posterior aspect of the lower anastomotic suture line.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

荧光透视造影检查如今已较少开展，但仍可用于解决复杂病例中的问题，例如用于评估术后肠道完整性、诊断瘘口及明确结肠瘘的范围。

水溶性对比剂灌肠检查通常使用稀释的泛影葡胺 (Gastrografin) 等对比剂，通过 Foley 导管注入直肠，结合 X 线实时动态评估结肠解剖结构。

双重对比钡剂灌肠已成为过时的检查方法，被横断面影像学取代。该方法原先通过向肠腔充入二氧化碳或空气以扩张肠腔，并静脉注射平滑肌松弛剂，主要用于肿瘤诊断及炎症性肠病的评估。

图 12

图示为一例接受直乙结肠肿瘤前切除术患者的碘造影灌肠矢状位单张影像。可见来自下端吻合口缝线后方的小量渗漏。

Computed tomography colonography (CTC) has replaced barium enema for the **detection of colorectal cancer and polyps** and refers to CT of the gas-filled colon. It is commonly performed in patients who are unsuitable for or have failed colonoscopy.

The patient is given a laxative preparation prior to the study and asked to drink an oral contrast agent to coat (or 'tag') any residual faecal contents remaining. CTC can be performed without laxative (with only a tagging agent) if required. Colonic distension is performed using carbon dioxide, typically via an automated insufflation device and is improved by the additional use of an intravenous anti-spasmodic agent, e.g., hyoscine butylbromide. CT images are acquired in at least two views – prone and supine with additional decubitus images obtained if additional views are needed.

Interpretation is performed using a combination of 2D axial and multiplanar reconstructions and 3D reconstructions.

Intravenous contrast is also administered for evaluation of extra-colonic disease.

FIGURE 13

Prone axial CT reformat of a CTC showing C02 distended loops of bowel (**white arrowhead**) and 'tagged' faecal residue (**white arrow**).

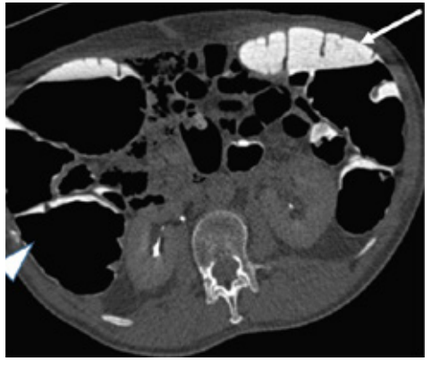
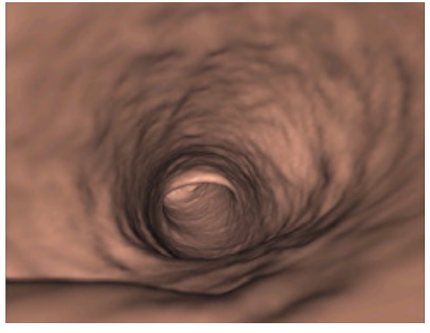


FIGURE 14

3D endoluminal reconstruction of the well-insufflated colon that has been cleansed with a laxative preparation.



Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

计算机断层扫描结肠成像 (CTC) 已取代钡剂灌肠，用于**检测结直肠癌和息肉**，即对充气后的结肠进行 CT 扫描。该检查常用于不适合结肠镜检查或结肠镜检查失败的患者。

在检查前，患者需服用泻药准备肠道，并口服对比剂以覆盖（或“标记”）残留的粪便。如有需要，CTC 也可在不使用泻药的情况下进行，仅使用标记剂即可。使用二氧化碳进行结肠扩张，通常通过自动充气装置注入，若联合静脉注射解痉剂（例如丁溴东莨菪碱），可进一步改善扩张效果。CT 图像至少采集两组体位（俯卧位和仰卧位），如需额外的体位，可加拍侧卧位图像。

图像解读结合 2D 轴位、多平面重建及 3D 重建进行。

如需评估肠外病变，可静脉注射对比剂。

图 13

CTC 的俯卧位横断面 CT 重建图显示二氧化碳扩张的肠袢（**白色箭头**）及被“标记”的粪便残留（**白色箭头**）。

图 14

3D 腔内重建图，可见经泻药清洁、充分充气的结肠。

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

Magnetic Resonance Imaging (MRI) remains the cross-sectional radiological technique of choice for pelvic imaging. It is accurate for local staging of rectal malignancy in addition to assessing benign disease such as anal fistulae and pelvic floor dysfunction.

MR Colonography (MRC) follows similar principles to CTC, requiring bowel cleansing and colonic distension. It can be used to evaluate the colonic lumen, colon wall and extra-luminal tissues. However, endoscopy remains the test of choice for evaluation of the colon in the assessment of inflammatory bowel disease. **MRI with oral contrast**, whilst mainly used to evaluate the small bowel, may have a role to play in evaluating colitis.

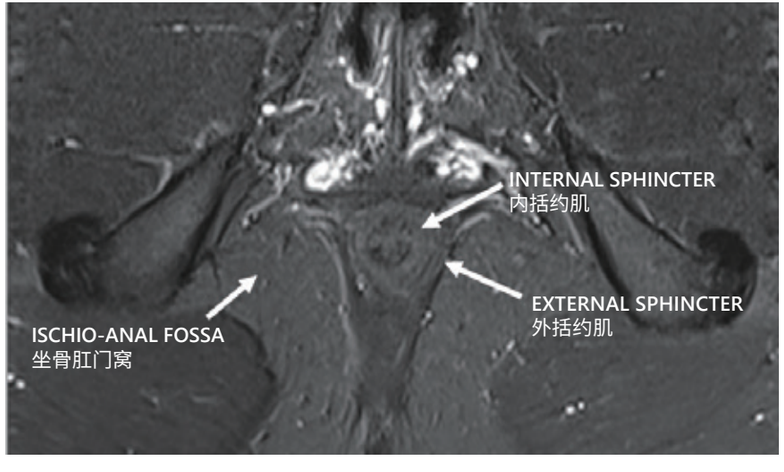


FIGURE 15

Axial STIR (Short T1 Inversion Recovery) sequence from a MR fistula study showing the normal anatomy of the anal sphincters.

磁共振成像 (MRI) 仍然是盆腔影像检查中优选的横断面放射技术。除用于评估肛瘘和盆底功能障碍等良性疾病外，它还能对直肠恶性肿瘤进行准确的局部分期。

MR 结肠成像 (MRC) 遵循与 CTC 相似的原则，需要清洁肠道和结肠扩张。MRC 可用于评估结肠腔、结肠壁和腔外组织。然而，在炎症性肠病的评估中，内镜检查仍是评估结肠的首选检查。**口服对比剂增强 MRI** 虽然主要用于小肠评估，但在评估结肠炎方面也可能发挥一定作用。

图 15

MR 肛瘘检查中的轴位 STIR（短 T1 反转恢复）序列显示了肛门括约肌的正常解剖结构。

Evacuation proctography is a study of the dynamics of rectal evacuation. Conventionally the procedure has been performed using X-ray fluoroscopy, but MRI proctography is now more commonly used.

The rectum is distended using air or ultrasound jelly and evacuation is captured using a rapid dynamic MRI sequence.

Proctography may be viewed in three stages: Rest, evacuation and recovery. At rest, the anorectal junction is normally just above the plane of the ischial tuberosities. Evacuation is initiated by descent of the pelvic floor, widening of the anorectal angle, and relaxation of the anal sphincters.

During MRI proctography, organ prolapse is conventionally measured with respect to the **pubococcygeal line** which provides a convenient, reproducible point of reference.

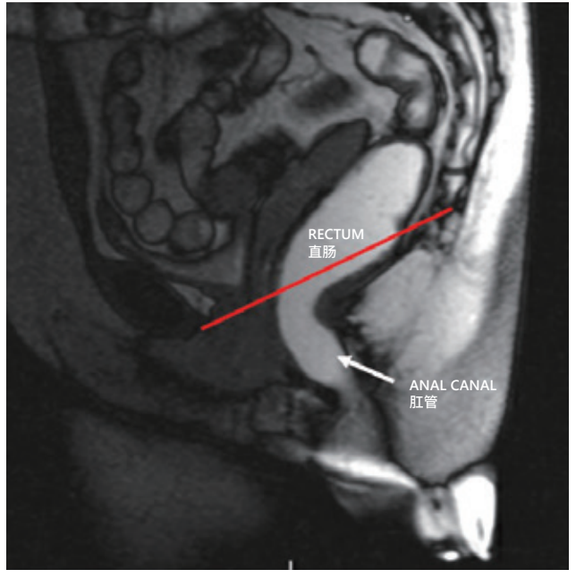


FIGURE 16

Sagittal image from a MR defecating proctogram showing the rectum distended with jelly. The red line is the pubococcygeal line which is defined as the line that joins the inferior border of the pubic symphysis to the last coccygeal joint.

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

直肠排粪造影是一项用于评估直肠排空动力学的检查。传统上，这项检查多采用 X 线荧光透视完成，但现在更常用的是 MRI 排粪造影。

检查时，通常通过注入空气或超声耦合剂扩张直肠，并使用快速动态 MRI 序列记录排便过程。

直肠排粪造影可分为 3 个阶段：静息、排便和恢复。静息时，肛直肠结合部通常位于坐骨结节平面之上。排便启动时，盆腔底下降，肛直肠角变宽，肛门括约肌松弛。

在 MRI 直肠造影过程中，器官脱垂的评估通常以**耻尾线**为参考，可提供方便、可重复的参照标志。

图 16

MR 排粪造影的矢状位图像，显示扩张的直肠充满凝胶。红线即为耻尾线，定义为耻骨联合下缘与尾骨末端关节之间的连线。

High frequency ultrasound provides detailed imaging of the colon wall and has a valuable role for assessing extent and activity of inflammatory bowel disease, the diagnosis of appendicitis and for assessment of the anal sphincters.

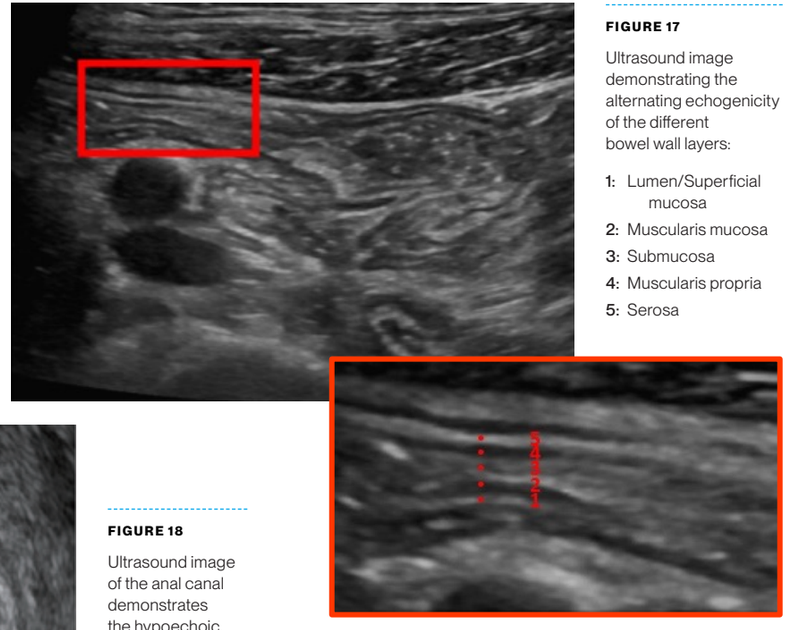


FIGURE 17

Ultrasound image demonstrating the alternating echogenicity of the different bowel wall layers:

1: Lumen/Superficial mucosa
2: Muscularis mucosa
3: Submucosa
4: Muscularis propria
5: Serosa

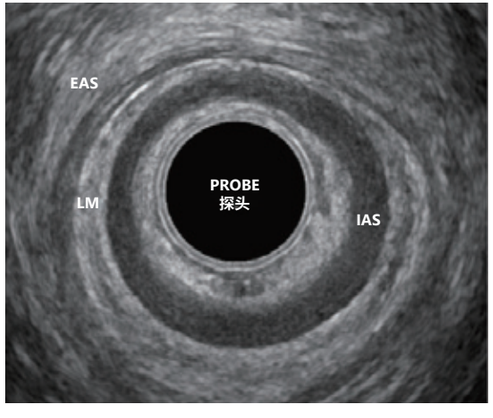


FIGURE 18

Ultrasound image of the anal canal demonstrates the hypoechoic internal anal sphincter (IAS), the longitudinal muscle in the intersphincteric plane (LM) and the echogenic external anal sphincter (EAS).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

高频超声能够清晰显示结肠壁，对于评估炎症性肠病的范围和活动性、阑尾炎的诊断以及肛门括约肌的评估具有重要价值。

章节大纲：

图 17

超声图像显示了不同层次交替出现的回声特征：

1: 管腔/浅表黏膜
2: 黏膜肌层
3: 黏膜下层
4: 固有肌层
5: 浆膜层

图 18

肛管的超声图像可见低回声的肛门内括约肌 (IAS)、括约肌间隙内的纵行肌 (LM) 以及高回声的肛门外括约肌 (EAS)。

PET (Positron emission tomography) is a nuclear medicine scan usually combined with CT (PET-CT) or MRI (PET-MRI) which has a role to play in the staging of metastatic or recurrent colon cancer. It uses an isotope tracer (18-fluoride) combined with a radiopharmaceutical (fluorodeoxyglucose) to highlight sites of metabolically active disease. They are useful for the assessment of extraluminal disease and distant metastases.

Colonic cancer and adenomatous polyps are often 18-FDG avid and may be found incidentally during PET scans performed for other indications.

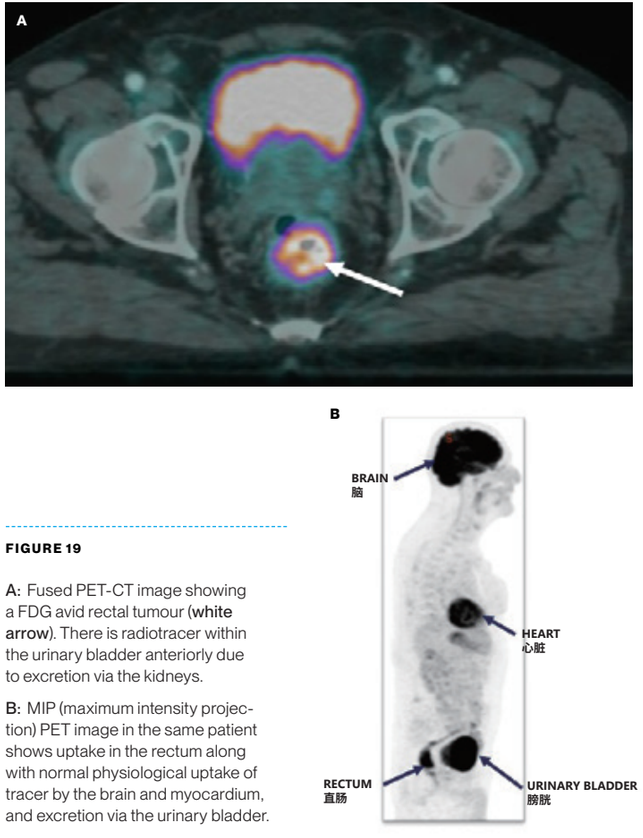


FIGURE 19

A: Fused PET-CT image showing a FDG avid rectal tumour (**white arrow**). There is radiotracer within the urinary bladder anteriorly due to excretion via the kidneys.

B: MIP (maximum intensity projection) PET image in the same patient shows uptake in the rectum along with normal physiological uptake of tracer by the brain and myocardium, and excretion via the urinary bladder.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

PET（正电子发射断层显像）是一种核医学扫描，通常与 CT (PET-CT) 或 MRI (PET-MRI) 联合使用，在转移性或复发性结肠癌的分期中具有重要作用。该检查利用同位素示踪剂（18-氟）结合放射性药物（氟脱氧葡萄糖），能够突出显示代谢活跃的部位，对于评估肠腔外病变及远处转移具有重要价值。

结肠癌和腺瘤性息肉常表现为 FDG 高摄取，可能在因其他指征进行 PET 扫描时偶然发现。

图 19

A: 融合 PET-CT 图像显示 FDG 高摄取的直肠肿瘤（**白色箭头**）。由于经肾脏排泄，放射性示踪剂可见于前方的膀胱内。

B: 同一患者的 MIP（最大密度投影）PET 图像显示，直肠部位有示踪剂摄取，同时可见脑和心肌的正常生理性摄取，并经膀胱排泄。

Acute Conditions

Large Bowel

CHAPTER OUTLINE:

急性疾病

大肠

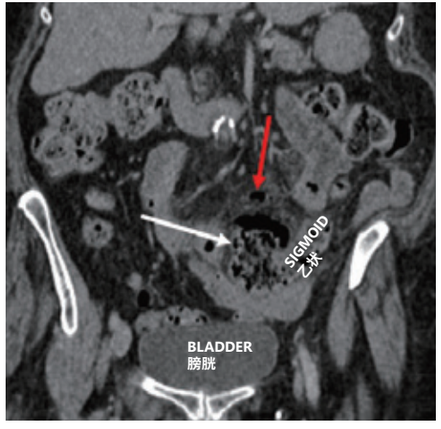
章节大纲：

/ Perforation

Colonic perforation is an acute surgical emergency. It may result from infection and inflammation, trauma including instrumentation, ischaemia, malignancy, and bowel obstruction. Shown on this page are examples of colonic perforation.

FIGURE 20

Coronal CT image demonstrates an example of sigmoid colonic perforation with locules of gas outside the bowel (**red arrows**) secondary to the pressure effect of hard impacted faeces that forms a more solid mass (**white arrow**). This causes ischaemic necrosis of the colonic wall and ultimately perforation, known as stercoral perforation.



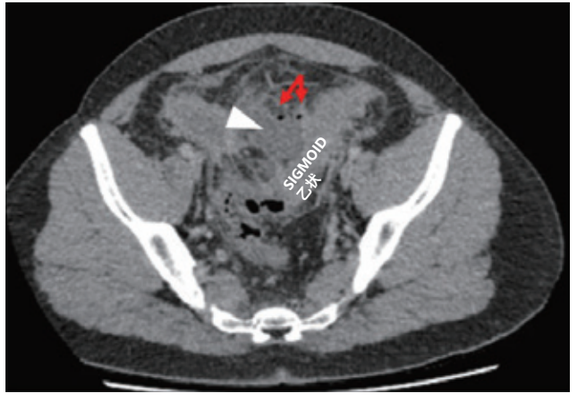


FIGURE 21

Axial CT image, taken in the portal venous phase, demonstrates a small perforation of the sigmoid colon with small locules of gas outside the bowel (**red arrows**) secondary to acute inflammation. There is also a small fluid collection (**arrowhead**) seen adjacent to the sigmoid colon. The patient had evidence of skip lesions (non-contiguous segments of inflamed bowel) and suspected undiagnosed Crohn's disease.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 穿孔

结肠穿孔是一种急性外科急症。它可能由感染和炎症、创伤（包括器械操作）、缺血、恶性肿瘤和肠梗阻引起。本页展示了结肠穿孔的示例。

图 20

冠状位 CT 图像显示一例乙状结肠穿孔，肠道外有气泡影（**红色箭头**），系硬性粪块形成实性团块（**白色箭头**）产生压力所致。这会导致结肠壁缺血性坏死，最终穿孔，称为粪性穿孔。

图 21

门静脉期轴位 CT 图像显示乙状结肠急性炎症继发小穿孔，肠外可见小气泡影（**红色箭头**）。乙状结肠附近还可见少量积液（箭头处）。由于患者还存在跳跃性病变（非连续的肠段炎症）的表现，临床上怀疑患有未确诊的克罗恩病。

/ Diverticulitis

Diverticulae are outpouchings of the muscular colonic wall. Diverticular disease denotes the presence of diverticulae, very commonly seen in elderly patients and most commonly in the sigmoid colon. **Diverticulitis** refers to the presence of inflammation, thought to be secondary to retention of faecal material in the diverticulum which leads to ischaemic necrosis and microperforation.

Differentiation of acute diverticulitis from a tumour can sometimes be difficult with overlapping imaging features. Cancer can present with a short segment of mass-like colonic mural thickening whilst diverticulitis often affects a longer segment of colon and is associated with mesenteric engorgement and fluid.

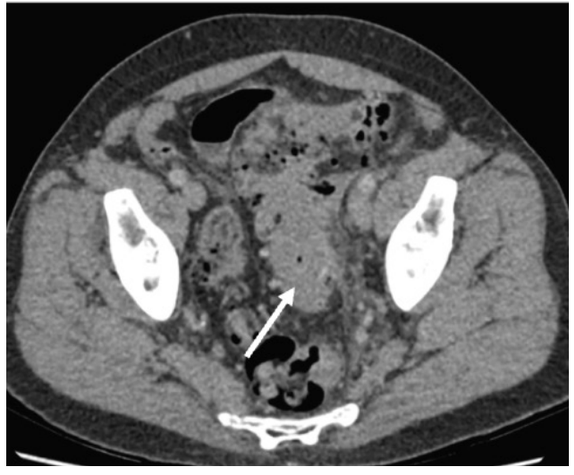


FIGURE 22

CT is the **most accurate imaging modality** for the assessment of acute diverticulitis. Hallmark changes include colonic wall thickening (**white arrow**) and associated inflammatory change and oedema in the pericolic fat.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 憩室炎

憩室是指结肠肌层壁向外形成的膨出。憩室病指存在憩室，这种情况在老年患者中较为常见，最常见于乙状结肠。**憩室炎**是指憩室发生炎症，通常认为继发于憩室内粪便滞留，可导致缺血性坏死和微穿孔。

急性憩室炎与肿瘤在影像学上有时难以区分，两者征象可能重叠。癌症可表现为短节段的结肠壁肿块样增厚，而憩室炎则多累及较长段结肠，并伴有肠系膜充血水肿和积液。

图 22

CT 是评估急性憩室炎**最准确的影像学方法**。标志性改变包括结肠壁增厚（**白色箭头**）及周围脂肪组织的炎性改变和水肿。

Complications of acute diverticulitis include localised perforation, abscess and fistula formation. An abscess may perforate directly into the abdominal cavity causing faecal peritonitis. Rarely pseudocysts can form from expansion of a wall-off subserosal perforation. Abscesses less than 3 cm are usually treated with antibiotics whilst those more than 4 cm often benefit from image-guided drainage.

>=< FURTHER KNOWLEDGE

Fistula formation commonly involves the bladder resulting in a **colovesical fistula**. The fistulous tract may not always be seen but the presence of gas within the bladder (in the absence of catheterisation or recent instrumentation) is highly suggestive.

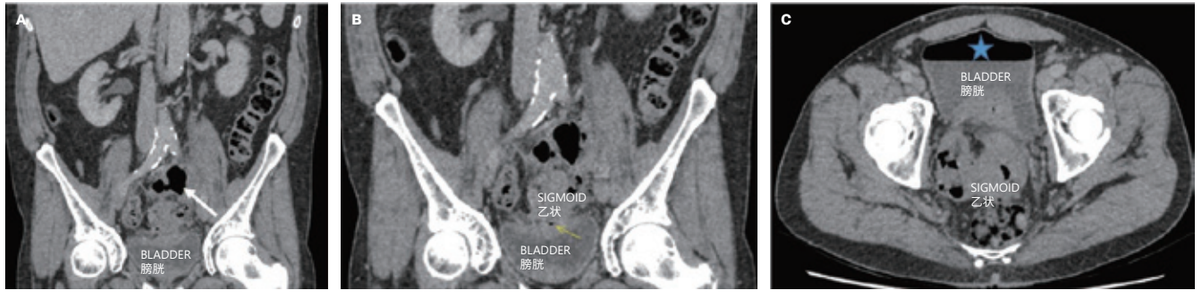


FIGURE 23

Coronal (**A** and **B**) and axial (**C**) CT images showing a thick-walled gas-containing abscess (**white arrow**) in the pelvis as a result of severe acute diverticulitis. There is a direct fistulous tract (**yellow arrow**) between the urinary bladder and adjacent inflamed sigmoid colon with resulting dependent gas within the urinary bladder (**star**).

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

急性憩室炎的并发症包括局部穿孔、脓肿和瘘管形成。脓肿可能直接破溃进入腹腔，引起粪性腹膜炎。少数情况下，被包裹的浆膜下穿孔扩张后可形成假性囊肿。直径小于 3 cm 的脓肿通常采用抗生素治疗，而直径大于 4 cm 的脓肿则常需影像学引导下引流。

>=< 进阶知识

瘘管形成常见于膀胱，形成**结肠膀胱瘘**。瘘道不一定能直接显示，但膀胱内存在气体（无导管插入或近期器械操作）高度提示存在瘘道。

图 23

冠状位（**A** 和 **B**）及轴位 (**C**) CT 图像显示，由于严重急性憩室炎，盆腔内形成了厚壁含气脓肿（**白色箭头**）。可见膀胱和邻近的炎性乙状结肠之间存在一条直接瘘道（**黄色箭头**），导致膀胱内存在坠积性气体（**星号**）。

/ Epiploic Appendagitis

Epiploic appendages are protrusions of subserosal fat, lined by peritoneum, that arise from the surface of the colon. There are around 50-100 of them in the colon, most commonly at the rectosigmoid junction.

Epiploic appendagitis is a self-limiting inflammatory/ischaemic process involving the appendix epiploica. The pathogenesis is thought to be due to torsion of a large pedunculated appendage or thrombosis of the venous outflow. Along with omental infarction, epiploic appendigitis falls under the broader group of intraperitoneal focal fat infarction.

The condition is self-limiting and is managed conservatively.

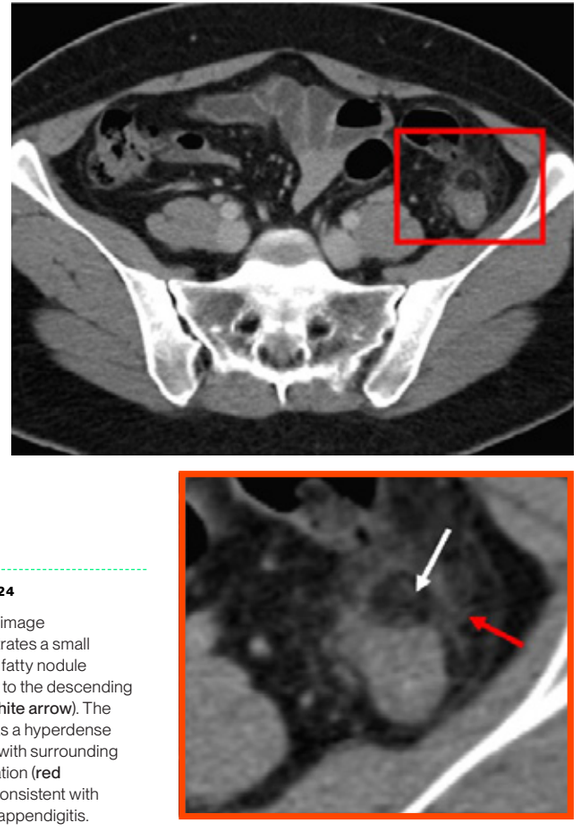


FIGURE 24

Axial CT image demonstrates a small rounded fatty nodule adjacent to the descending colon (**white arrow**). The lesion has a hyperdense capsule with surrounding inflammation (**red arrow**), consistent with epiploic appendigitis.

CHAPTER OUTLINE:

/ 肠脂垂炎

章节大纲：

肠脂垂是结肠表面由腹膜包裹的浆膜下脂肪突起，结肠中约有50~100 个，最常见于直肠乙状结肠交界处。

肠脂垂炎是一种累及肠脂垂的自限性炎症/缺血疾病。其发病机制主要包括较大带蒂脂肪垂的扭转或静脉回流血栓形成。与网膜梗死类似，肠脂垂炎也属于腹膜内局灶性脂肪梗死。

该病具有自限性，通常采用保守治疗。

图 24

轴位 CT 图像显示降结肠附近有圆形小脂肪结节（**白色箭头**）。病灶周围包绕高密度囊壁，并伴有局部炎症反应（**红色箭头**），符合肠脂垂炎的影像学表现。

<!> ATTENTION

/ Appendicitis

This is the one of the most common abdominal pathologies. Imaging is used to support clinical evaluation to make the diagnosis, exclude other pathologies or to look for complications.

CT scans are very sensitive but care must be taken in younger patients given the associated radiation exposure. Ultrasound is a very useful alternative. Although highly specific, its sensitivity is limited. MRIs are also useful in pregnant women and paediatric populations.

On ultrasound, imaging findings are a **dilated (> 6 mm), fluid-filled, non-compressible** appendix with **increased echogenicity of the surrounding fat** suggesting peri-appendiceal inflammation. On colour Doppler images, there is increased vascularity of the appendix wall.

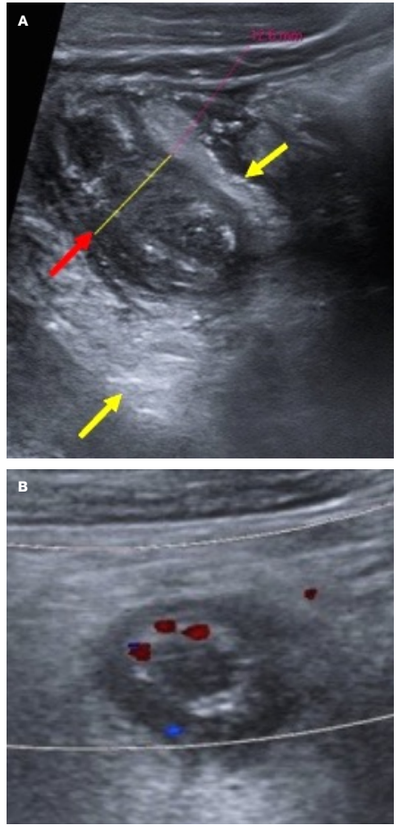


FIGURE 25

A: Ultrasound image (longitudinal plane) of a dilated oedematous appendix (**red arrow**). Note the increased echogenicity of the surrounding fat (**yellow arrows**). The transverse diameter of the appendix measures 12.6 mm.

B: Increased vascularity demonstrated on colour Doppler assessment (transverse imaging plane).

CHAPTER OUTLINE:

章节大纲：

<!> 注意

/ 阑尾炎

阑尾炎是最常见的腹部病变之一。影像学检查用于辅助临床评估，帮助确诊、排除其他疾病或发现并发症。

CT 扫描灵敏度高，但对于年轻患者需注意辐射暴露风险。超声检查是一种非常有用的替代方法，虽然特异性高，但灵敏度有限。MRI 也适用于孕妇和儿童。

超声影像表现为**阑尾扩张 (> 6 mm)、腔内积液、不可压缩，伴周围脂肪回声增强**，提示阑尾周围炎症。彩色多普勒图像显示阑尾壁的血供增多。

图 25

A: 纵切面超声图像显示肿胀扩张的阑尾（**红色箭头**）。可见周围脂肪回声增强（**黄色箭头**）。阑尾横径为 12.6 mm。

B: 彩色多普勒评估（横切面）显示血供增加。

<!> ATTENTION

CT is superior to ultrasound not only for the diagnosis of appendicitis but also for assessing for the presence of complications such as perforation or abscess formation. Low-dose CT has replaced standard CT in many institutions as it offers significant radiation dose reduction while having a similar diagnostic accuracy.

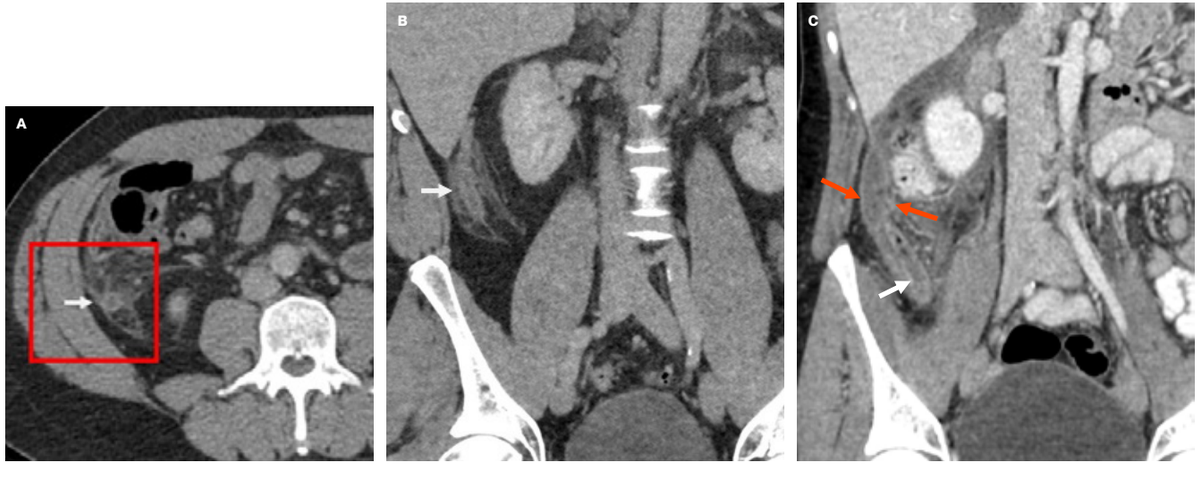


FIGURE 26

A and B: Axial and coronal CT images showing an inflamed appendix (**white arrow**) with inflammation of the surrounding fat (streaky, reticulated aspect).

C: Coronal CT image in a different patient showing the inflamed appendix (**white arrow**), inflammation of the surrounding fat and abscess formation (**red arrows**).

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

<!> 注意

CT 优于超声，不仅在阑尾炎的诊断上更优，还能更好地评估是否存在穿孔或脓肿等并发症。低剂量 CT 可显著降低辐射剂量，同时保持相似的诊断准确度，因此在许多机构已取代标准 CT。

图 26

A 和 B：轴位和冠状位 CT 图像，显示发炎的阑尾（**白色箭头**），周围脂肪组织可见炎症（呈条纹状、网状）。

C：另一例患者的冠状位 CT 图像，显示阑尾发炎（**白色箭头**）、周围脂肪炎症及脓肿形成（**红色箭头**）。

/ Volvulus

Volvulus is an uncommon cause of acute abdominal pain. It occurs when a **segment of bowel twists arounds its own axis or around its mesentery**. The **sigmoid colon is the most common site** of occurrence **followed by the caecum**. Volvulus can also occur (although less commonly) in the transverse colon and splenic flexure.

On an abdominal X-ray, findings are a **bean-shaped** dilated loop of large bowel (see also Figure 10). CT demonstrates a "**whirl sign**" which denotes twisting of the mesenteric vessels. Complications include obstruction and perforation and these can be investigated on CT.

A volvulus is usually caused by a redundant segment of bowel (i.e. a very mobile segment of bowel not firmly attached to the mesentery). **Occasionally, the cause of a volvulus is an obstructing lesion** and as such in patients with intermittent episodes of volvulus, colonoscopy or CT colonography (CTC) should be done afterwards to exclude a tumour.

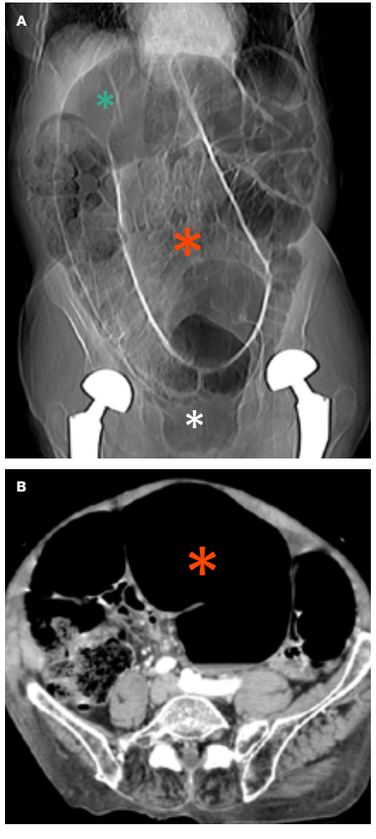


FIGURE 27

CT topogram (**A**) and axial CT image (**B**) showing the characteristic aspect of a sigmoid volvulus. The large dilated loop of the sigmoid colon (**red asterisk**) has a wall without haustra and the lower end points towards the pelvis. There is no rectal gas (**white asterisk**). The liver overlap sign can be seen, i.e. the sigmoid volvulus ascends to the right upper quadrant and projects over the liver (**green asterisk**). There is major large bowel dilatation due to obstruction. Case courtesy: Pierre Alexandre Poletti, MD, Geneva University Hospitals.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 肠扭转

肠扭转是急性腹痛中较为少见的原因。其发生机制为**肠道某一段绕自身轴线或肠系膜旋转。乙状结肠是最常见的发病部位，其次为盲肠。**横结肠和脾曲也可发生肠扭转，但较少见。

腹部 X 线片检查表现为大肠袢**咖啡豆状**扩张（另见图 10）。CT 检查可见**“漩涡征”**，表示肠系膜血管扭转。并发症包括梗阻和穿孔，可通过 CT 评估。

肠扭转通常是由冗长（即活动度大、未牢固附着于肠系膜）的肠段引起。**偶尔，肠扭转的病因是梗阻性病变**，因此，对于肠扭转间歇性发作的患者，建议后续行结肠镜检查或 CT 结肠成像 (CTC) 以排除肿瘤。

图 27

CT 定位图 (**A**) 和轴位 CT 图像 (**B**) 显示乙状结肠扭转的特征性表现。极度扩张的大乙状结肠袢（**红色星号**）肠壁无结肠袋形态，下端指向骨盆。直肠内无气体（**白色星号**）。可见肝重叠征，即乙状结肠扭转上升至右上腹并与肝影重叠（**绿色星号**）。可见因梗阻导致的结肠明显扩张。病例提供：Pierre Alexandre Poletti 医学博士，日内瓦大学医院。

/ Intussusception

This is when **one segment of bowel telescopes into another segment of bowel**. The segment of bowel on the outside is called the *intussusceptum* and the bowel that telescopes into it is called the *intussuscipiens*.

Intususscception is more common in children and often occurs and resolves intermittently. It can sometimes get stuck, leading to oedema and subsequently obstruction of the intussusceptum. Timely reduction to avoid bowel necrosis is essential.

In adults, **colonic intussusception is almost always due to a tumour**, which serves a lead point.

Ultrasound is very useful for diagnosis in children however in adults, CT is preferable. Imaging shows a typical "**target**" appearance.

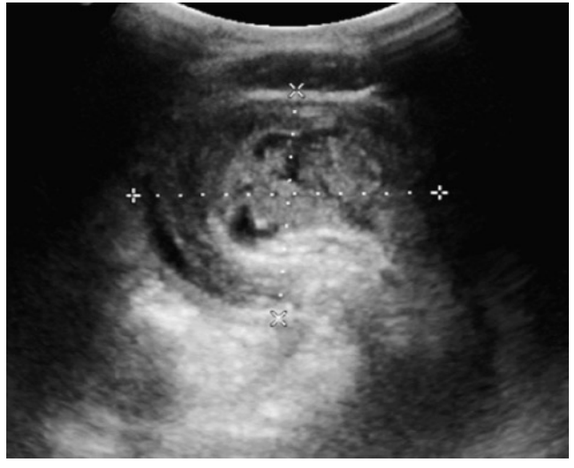


FIGURE 28

Ultrasound scan in a case of ileo-colic intussusception showing a target appearance of bowel within bowel. This appearance is caused by alternating concentric hypoechoic and hyperechoic bands. The hyperechoic bands correspond to the mucosa and muscularis, whereas the hypoechoic bands correspond to the submucosa.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 肠套叠

肠套叠是指**一段肠管套入另一段肠管内**。外层的肠段称为*鞘部*，而套入其中的肠段称为*套入部*。

肠套叠多见于儿童，常呈间歇性发作和自行缓解。有时肠套叠可能无法自行复位，导致水肿，进而引发套入部梗阻。必须及时复位以避免肠坏死。

在成人中，**结肠肠套叠几乎总是由肿瘤**作为套叠的"引导点"引起。

超声对于儿童肠套叠的诊断非常有价值，但在成人中则更偏向于选择CT。影像学上，肠套叠的典型表现为"**靶征**"。

图 28

例如，回肠结肠型肠套叠的超声图像可见"肠中有肠"的靶环结构。这种表现是由同心性低回声带与高回声带交替所致。高回声带对应于黏膜层和肌层，而低回声带则对应于黏膜下层。

Tumours

Large Bowel

大肠

CHAPTER OUTLINE:

章节大纲：

肿瘤

/ Tumours – **Polyps**

Polyps are elevated mucosal lesions which can be classified according to their morphology (Paris classification) or histological types.

The most clinically significant polyps are **adenomas** which have the potential to become dysplastic and develop into a cancer. Adenomas can be histologically classified as tubular, villous or tubulovillous. **Villous adenomas** are more likely to become malignant. Other risk factors are adenomas > 1 cm in size or those containing high grade dysplasia.

Benign histological subtypes include hamartomatous and inflammatory polyps.

The detection of polyps is therefore important to remove or reduce the risk of developing colorectal cancer. Endoscopy and CT colonography form the mainstay of polyp detection.

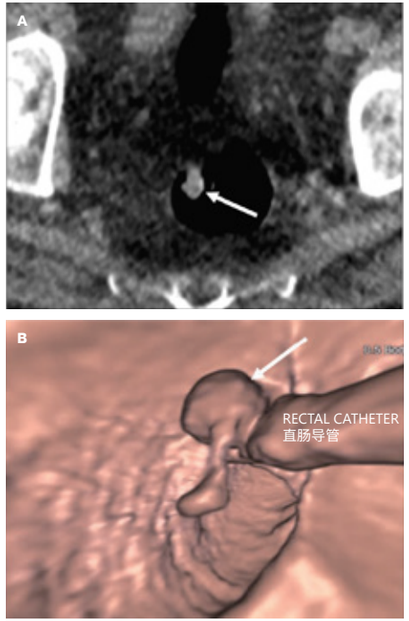


FIGURE 29

2D image from a CTC (**A**) and 3D reconstruction (**B**) of a rectal polyp (**white arrows**). Note the rectal catheter used for CO_2 insufflation seen directly adjacent to the polyp.

/ Large **Bowel**

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 肿瘤 - **息肉**

息肉是黏膜表面隆起的病变，可根据其形态（巴黎分类）或组织学类型进行分类。

最具临床意义的息肉是**腺瘤**，因其有发生异型增生并发展为癌症的潜力。腺瘤在组织学上可分为管状腺瘤、绒毛状腺瘤或管形绒毛状腺瘤。其中，**绒毛状腺瘤**更容易发生恶变。其他危险因素包括腺瘤 > 1 cm 或存在高级别异型增生的腺瘤。

良性组织学亚型包括错构瘤性息肉和炎性息肉。

因此，息肉检测对于消除或降低结直肠癌的发生风险至关重要。内镜检查和 CT 结肠成像是息肉检测的主要手段。

图 29

CTC 图像 (**A**) 的 2D 图像和 3D 重建图像 (**B**)，显示直肠息肉（**白色箭头**）。可见用于注入 CO_2 的直肠导管，紧邻息肉。

The morphology of polyps can be described according to the **Paris classification**.

Pedunculated polyps (Paris Ip) have a stalk and are more likely to contain high-grade dysplasia. However, because the stalk provides distance between the polyp and bowel wall, they are often considered cured once resected.

Sessile polyps (Paris Is) have a broad base and a higher risk of invasive malignancy.

Subpedunculated polyps (Paris Isp) are intermediate in risk and appearance between pedunculated and sessile polyps.

Flat lesions (Paris 0-II group) is defined as being less than 3 mm in height above the mucosal surface.

Paris 0-IIa are slightly elevated, Paris 0-IIb are completely flat and Paris 0-IIc are depressed rather relative to the mucosal surface. The latter have a higher risk of invasive cancer.

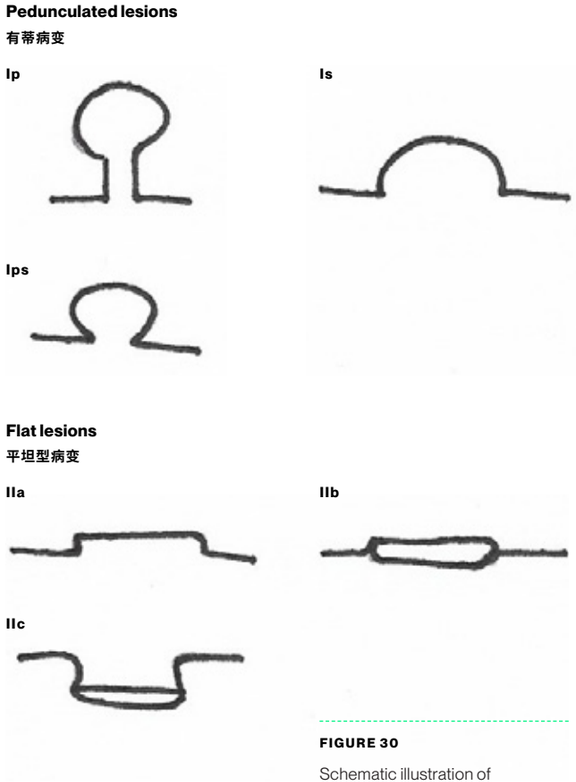


FIGURE 30

Schematic illustration of the Paris classification.

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

息肉形态可参照**巴黎分型**进行描述。

有蒂息肉 (Paris Ip) 具有蒂部，更易出现高级别异型增生。但由于蒂部为息肉与肠壁之间提供了一定距离，切除后通常可视为治愈。

无蒂息肉 (Paris Is) 基底较宽，侵袭性恶性肿瘤的风险更高。

亚蒂息肉 (Paris Isp) 的风险和外观介于有蒂和无蒂息肉之间。

平坦型病变（Paris 0-II 组）定义为高出黏膜表面不足 3 mm。

Paris 0-IIa 较黏膜表面轻微隆起，Paris 0-IIb 完全与黏膜表面齐平，Paris 0-IIc 则相对于黏膜表面凹陷。后者发生浸润性癌症的风险更高。

图 30

巴黎分类的示意图。

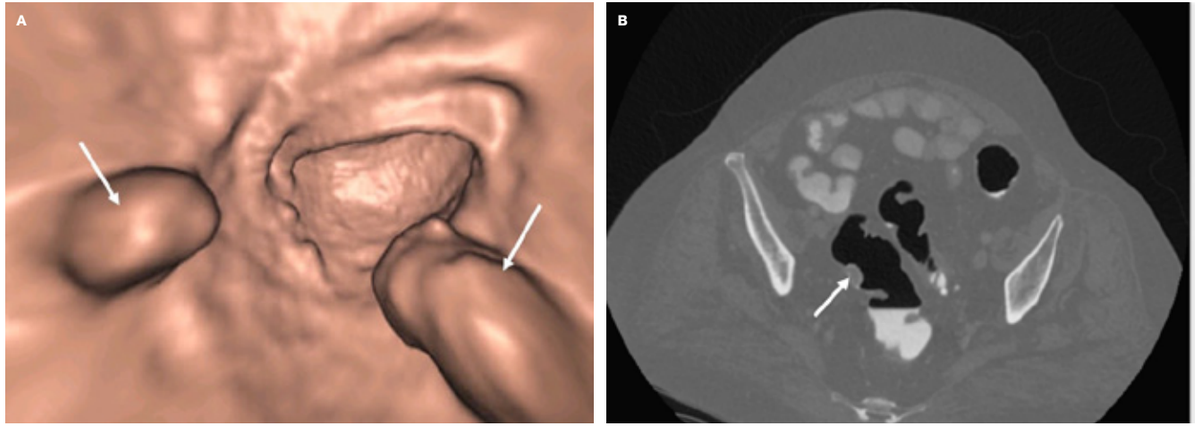


FIGURE 31

Case example of a 3D endoluminal reconstruction (**A**) which demonstrates two polyps in the sigmoid colon (**white arrows**). The larger polyp of the two is also demonstrated on the 2D axial CTC image (**B**) which shows a predominantly raised flat polyp (Paris IIa).

/ Large **Bowel**

CHAPTER OUTLINE:

/ 大肠

章节大纲：

图 31

3D 腔内重建病例 (**A**)，显示乙状结肠内的两个息肉（**白色箭头**）。其中较大的息肉在 2D 轴位 CTC 图像 (**B**) 中也有显示，为以隆起为主的平坦型息肉（Paris IIa 型）。

/ Tumours – **Inherited Polyposis Syndromes**

There are a number of **inherited polyposis syndromes** which carry an increased risk of developing colorectal cancer (CRC).

FAMILIAL ADENOMATOUS POLYPOSIS (FAP)

- Autosomal dominant inheritance
- Typically, have > 100 adenomatous polyps
- All patients eventually develop CRC
- Preventative proctocolectomy is therefore recommended
- Extra-intestinal manifestations include skull osteomas, abnormal dentition and desmoid tumours
- Gardner syndrome is a variant of FAP with prominent skeletal and skin manifestations

HEREDITARY NON-POLYPOSIS COLORECTAL CANCER (HNPCC)

- Autosomal dominant inheritance
- Increased risk of endometrial, small bowel and transitional cell carcinoma
- 70% of colorectal cancers occur in the proximal colon

PEUTZ-JEGHERS SYNDROME

- Autosomal dominant inheritance
- Small bowel hamartomas. Large bowel polyps are less common
- Mucocutaneous pigmentation

TURCOT SYNDROME

- Rare polyposis syndrome
- Colonic adenomatous polyps and CNS tumours, e.g., medulloblastomas

COWDEN SYNDROME

- Hamartomatous polyps
- Mucocutaneous lesions, thyroid abnormalities, fibrocystic disease of the breast

CRONKHITE-CANADA SYNDROME

- Multiple or large serrated colonic polyps
- Alopecia, nail atrophy and skin hyperpigmentation

/ Large **Bowel**

CHAPTER OUTLINE:

/ 肿瘤 - **遗传性息肉病综合征**

多种遗传性息肉病综合征会增加罹患结直肠癌 (CRC) 的风险。

/ 大**肠**

章节大纲：

家族性腺瘤性息肉病 (FAP)

- 常染色体显性遗传
- 通常出现 > 100 个腺瘤性息肉
- 所有患者最终都会发展为 CRC
- 因此，建议进行预防性直肠结肠切除术
- 肠外表现包括颅骨骨瘤、牙列异常和硬纤维瘤
- 加德纳综合征 (Gardner syndrome) 是 FAP 的一个变异型，骨骼和皮肤表现更为突出

遗传性非息肉病性结直肠癌 (HNPCC)

- 常染色体显性遗传
- 子宫内膜癌、小肠癌和移行细胞癌的风险增加
- 70% 的结直肠癌发生在近端结肠

黑斑息肉综合征

- 常染色体显性遗传
- 小肠错构瘤。大肠息肉较少见
- 黏膜和皮肤色素沉着

特科特综合征

- 罕见息肉病综合征
- 结肠腺瘤性息肉伴 CNS 肿瘤，例如髓母细胞瘤

COWDEN 综合征

- 错构瘤性息肉
- 黏膜和皮肤病变、甲状腺异常、乳腺纤维囊性病

CRONKHITE-CANADA 综合征

- 多发性或大型锯齿状结肠息肉
- 脱发、指甲萎缩、皮肤色素过度沉着

Patients with Familial Adenomatous Polyposis (FAP) are at risk of developing extra-colonic adenomas, particularly in the stomach and duodenum. In addition, desmoid tumours (benign locally infiltrative fibroblastic tumours) have a known association with FAP. The development of desmoid tumors is often precipitated by trauma or surgery.

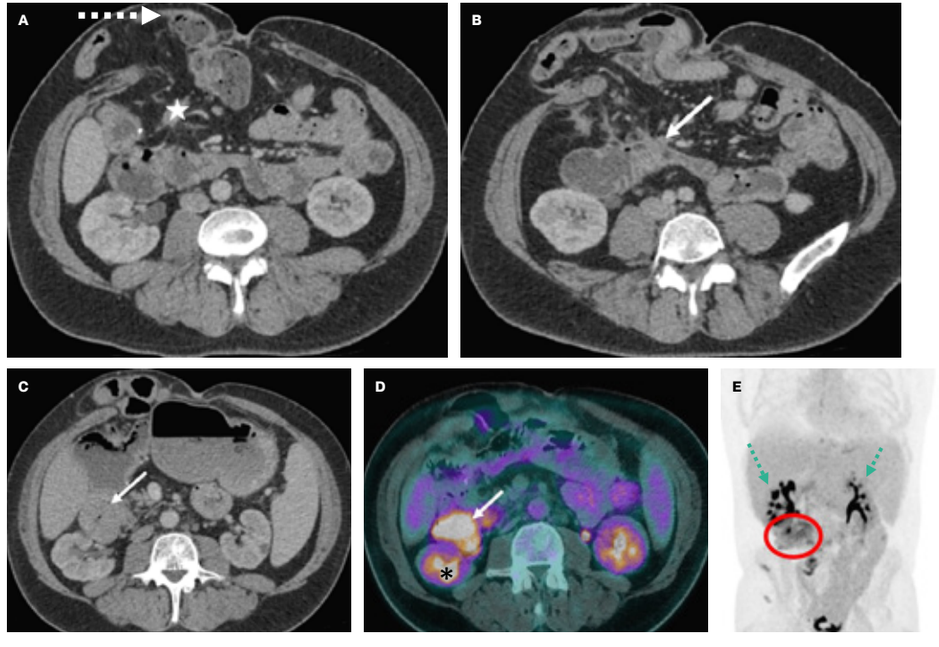


FIGURE 32

Case example of a patient with known FAP and previous colectomy. There is an end-ileostomy with an incidental para-stomal hernia (**dashed arrow in A**). The patient developed a desmoid tumour in the small bowel mesentery (**star**) with associated retraction and nodularity of the mesentery (**arrow in B**) and tethering of the small bowel. A number of years later, the same patient went on to develop a mass at the junction of the second and third parts of the duodenum (**arrows in C and D**) which was confirmed to be avid on FDG-PET CT (**D** and **E**), highly suspicious for the development of an adenocarcinoma. Normal FDG uptake is also demonstrated in the kidneys (**asterisks in D, dashed arrows in E**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

家族性腺瘤性息肉病 (FAP) 患者有发生结肠外腺瘤的风险，尤其好发于胃和十二指肠。此外，FAP 与硬纤维瘤（良性局部浸润性成纤维细胞瘤）也有明确相关性。硬纤维瘤常由创伤或手术诱发。

图 32

已确诊患有 FAP 且既往接受过结肠切除术的患者病例示例。影像显示末端回肠造口，并伴有偶然发现的造口旁疝（**A** 图虚线箭头）。患者的小肠系膜内出现硬纤维瘤（星号），伴有肠系膜回缩和结节（**B** 图的箭头）以及小肠牵拉。数年后，该患者在十二指肠第二、三段交界处出现肿块（**C**、**D** 图箭头），FDG-PET CT（**D**、**E** 图）显示该病灶代谢活跃，高度怀疑为腺癌。同时，肾脏可见正常的 FDG 摄取（**D** 图星号，**E** 图虚线箭头）。

<!> ATTENTION

/ Tumours – **Colorectal Cancer (CRC)**

- Primary colorectal cancer is the second most common cause of cancer mortality in both men and women in Europe. 5-year survival is around 50%.
- Over **half of cases** occur in the **sigmoid** and **rectum**, with one third alone occurring in the rectum.
- Prognostic factors include local tumour invasion, vascular or lymphatic involvement, preoperative elevation of carcinoembryonic antigen (CEA) and tumour differentiation.
- The traditional **Duke's staging system** has been largely **replaced by the TNM** (tumour, nodes, metastases) system.
- CT estimates the T stage but is less able to distinguish between early T stages (T1 and T2). Ultrasound is better than CT at differentiating between T1 and T2 tumours. **MRI** is used to locally **stage rectal cancers**.
- Adverse prognostic factors are T3 or T4 tumours, and tumours with extra-mural venous invasion which is suspected by the expansion of diagnosing veins.
- Poor-prognostic rectal tumours are likely to receive neoadjuvant chemotherapy prior to surgical resection.

CHAPTER OUTLINE:

章节大纲：

<!> 注意

/ 肿瘤 - **结直肠癌 (CRC)**

- 原发性结肠直肠癌是欧洲男性和女性癌症死亡的第二大原因。其 5 年生存率约为 50%。
- 超过**一半**的病例发生在**乙状结肠**和**直肠**，其中仅直肠病例就占三分之一。
- 预后因素包括肿瘤局部浸润、血管或淋巴系统受累、术前癌胚抗原 (CEA) 升高以及肿瘤分化程度。
- 传统的 **Duke 分期系统**已基本被 **TNM**（肿瘤、淋巴结、转移）系统所取代。
- CT 可用于评估 T 分期，但对早期 T 分期（T1 和 T2）的区分能力有限。超声在区分 T1 和 T2 期肿瘤方面优于 CT。**MRI** 主要用于**直肠癌的局部分期**。
- 不良预后因素包括 T3 或 T4 肿瘤，以及存在壁外静脉浸润的肿瘤，后者可通过引流静脉扩张推测。
- 预后不良的直肠肿瘤通常会在手术切除前接受新辅助化疗。

TNM	TUMOUR EXTENT	DUKES
Stage I	Invasion into submucosa T1	A
	Invasion into muscularis propria T2	
Stage II	Invasion outside muscularis propria T3	B
	Invasion of visceral peritoneum T4a	
	Invasion of other organs T4b	
Stage III	1-3 lymph nodes involved N1	C
	⩾ 4 lymph nodes N2	
Stage IV	Distant metastasis in one organ M1a	D
	Distant metastasis in > 1 organ or to the peritoneum M1b	
	Peritoneal metastases M1c	

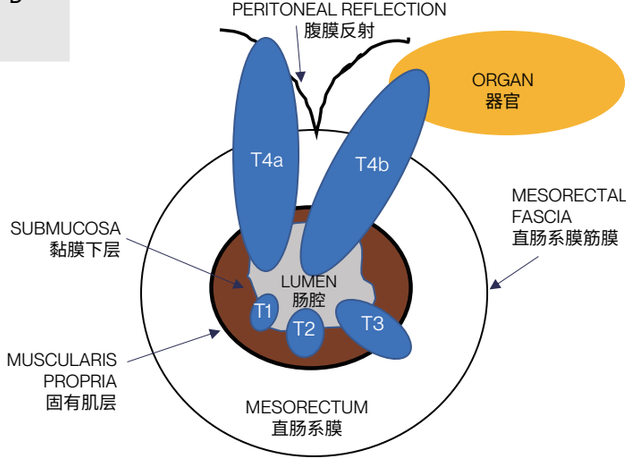


FIGURE 33

8th Edition TNM staging of colorectal cancer (CRC).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

TNM 分期	肿瘤范围	DUKES 分期
I 期	浸润至黏膜下层，T1	A
	浸润至固有肌层，T2	
II 期	浸润至固有肌层外，T3	B
	浸润至脏层腹膜，T4a	
	浸润至其他器官，T4b	
III 期	1-3 个淋巴结受累，N1	C
	⩾ 4 个淋巴结受累，N2	
IV 期	单一器官远处转移，M1a	D
	> 1 个器官远处转移，而无腹膜转移，M1b	
	腹膜转移，M1c	

图 33

第 8 版结直肠癌 TNM 分期。

Large Bowel

CHAPTER OUTLINE:

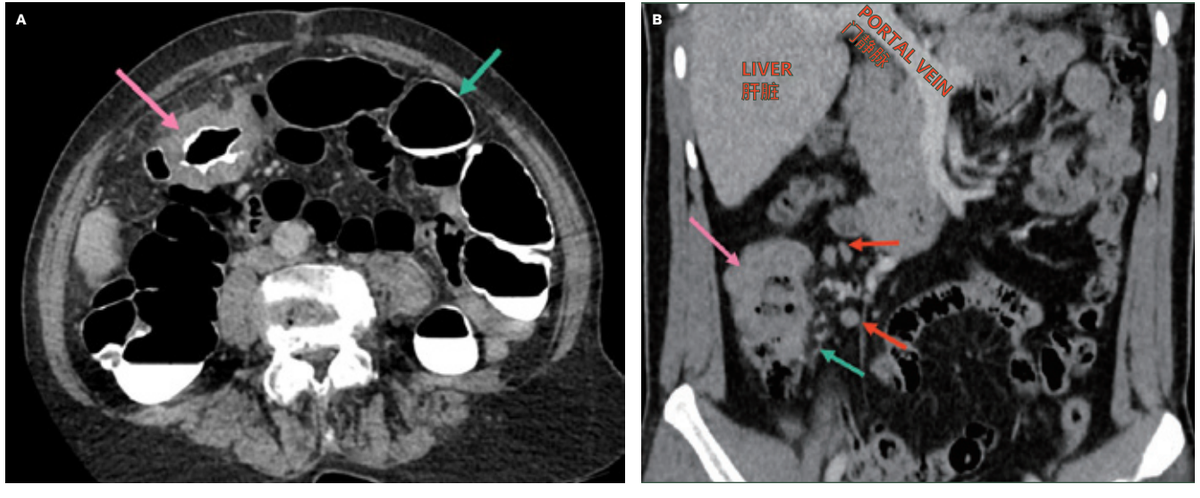
CORE KNOWLEDGE

CTC has an equivalent sensitivity to colonoscopy for detecting CRC and readily depicts colonic masses. On conventional CT, tumours are seen as **a focal area of wall thickening**. Conventional CT has a modest sensitivity for colon cancer compared to CTC with bowel cleansing and colonic distension. Nodal staging accuracy is also modest on cross-sectional imaging.

FURTHER KNOWLEDGE

FIGURE 34

The axial CTC image (**A**) demonstrates a circumferential mass at the hepatic flexure (**pink arrow**) which is causing luminal narrowing. Compare this with the remainder of the colon which has a paper-thin wall (**turquoise arrow**). The coronal CT image (**B**) demonstrates thickening of the caecum (**pink arrow**), which proved to be an adenocarcinoma on biopsy taken at the time of colonoscopy. There is also evidence of tumour extension into the pericolic fat (**turquoise arrow**) and multiple adjacent regional lymph nodes (**red arrows**). The T and N staging is therefore T4a N2.



大肠

章节大纲：

核心知识

CTC 检测 CRC 的灵敏度与结肠镜相当，并且能够清晰显示结肠肿块。在常规 CT 上，肿瘤表现为**局灶性肠壁增厚**。与经过肠道清洁和扩张的 CTC 相比，常规 CT 对结肠癌的灵敏度一般。横断面成像对淋巴结分期的准确性也较为有限。

进阶知识

图 34

轴位 CTC 图像 (**A**) 显示结肠肝曲有一环形肿块（**粉色箭头**），并导致肠腔狭窄。与此对比，其余结肠壁极薄（**蓝绿色箭头**）。冠状位 CT 图像 (**B**) 显示盲肠增厚（**粉色箭头**），结肠镜活检证实为腺癌。同时可见肿瘤侵犯结肠周围脂肪组织（**蓝绿色箭头**）及多个邻近区域淋巴结（**红色箭头**）。因此，T 和 N 分期为 T4a N2。

MRI is imaging investigation of choice for the local staging of **rectal cancer**.

The surgical treatment of rectal cancer involves a **total mesorectal excision** (TME) which is a total resection of the tumour, rectum and mesorectum. The dissection plane along the mesorectal fascia is known as the **circumferential resection margin** (CRM).

The mesorectal fascia (MRF) is considered involved if there is direct invasion of the MRF by the primary tumor or a margin of ≤ 1 mm between the primary tumor and MRF. These tumours will require down-staging with neoadjuvant chemoradiotherapy prior to surgery to increase the likelihood of curative surgery.

Local nodes and extra-mural vascular invasion can also be assessed on MRI. Morphological features such as an irregular contour and heterogeneous signal intensity of lymph nodes confer a high likelihood of disease involvement.

>▪< FURTHER KNOWLEDGE

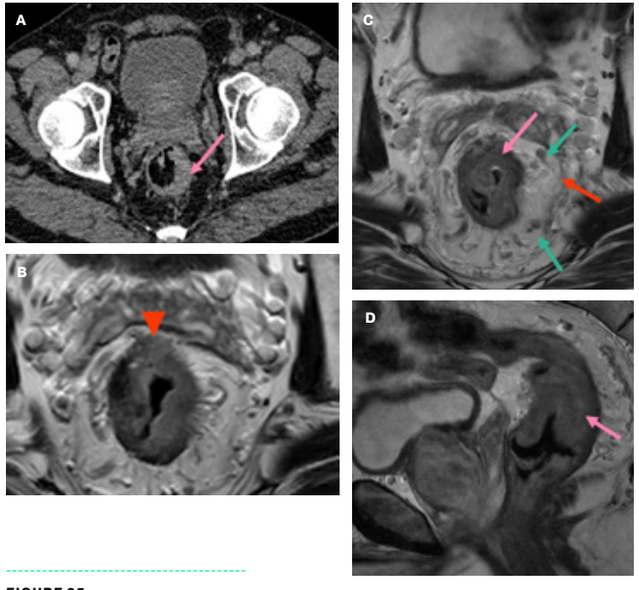


FIGURE 35

Pelvic CT (**A**) shows a semi-annular tumour within the mid-rectum which has rolled edges (**pink arrow**). The same lesion is shown on a small-field of view axial MRI sequence (**B**). There is clear evidence of tumour extension beyond the muscularis propria (**dark black outline**) and into the perirectal fat (**arrowhead**). On **C**, the tumour extends from the 10 – 6 o'clock position. There are small lymph nodes (**turquoise arrows**). The more anterior of these lie approximately 1 mm from the circumferential resection margin (**orange arrow**). The mid-rectal tumour as seen on the sagittal MRI sequence (**D**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

MRI 是**直肠癌**局部分期的首选影像学检查方法。

直肠癌的手术治疗涉及**全直肠系膜切除术** (TME)，即完全切除肿瘤、直肠和直肠系膜。沿直肠系膜筋膜的剥离平面称为**环周切缘** (CRM)。

如果原发肿瘤直接侵犯直肠系膜筋膜 (MRF)，或 MRF 与原发肿瘤距离 ≤ 1 mm，则认为 MRF 受累。这类肿瘤需要在手术前通过新辅助放化疗降期，以提高根治性手术的可能性。

MRI 还可以评估局部淋巴结及壁外血管侵犯情况。淋巴结形态特征（如，轮廓不规则和信号强度不均匀）提示病变累及的可能性高。

>▪< 进阶知识

图 35

盆腔 CT (**A**) 显示直肠中段内有边缘隆起的半环形肿瘤（**粉色箭头**）。在小视野轴位 MRI 序列上显示相同的病变 (**B**)。明确可见肿瘤已突破固有肌层（**深黑色轮廓**）并侵及直肠周围脂肪（**箭头**）。在 **C** 图上，肿瘤自 10 点向 6 点方向扩展。可见小淋巴结（**蓝绿色箭头**）。其中较前方的淋巴结距离环周切缘约 1 mm（**橙色箭头**）。在矢状位 MRI 序列上可见直肠中段肿瘤 (**D**)。

MRI also has an important role to play in the evaluation of tumour response after chemoradiotherapy. **Diffusion-weighted sequences may be** helpful for assessing if there is any residual tumour present.

The presence of a **dense fibrotic scar** with no evidence of tumour signal denotes a complete radiological response. In some centers, such patients may undergo close 'watch and wait' surveillance rather than straight to surgery.

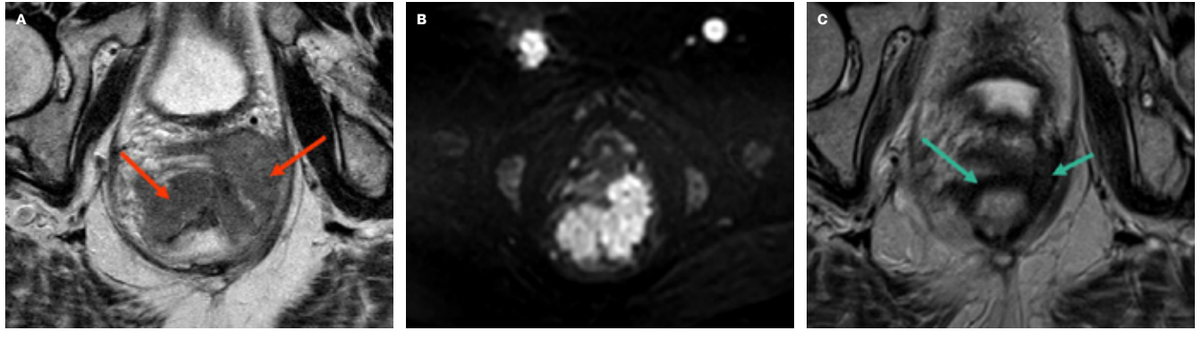


FIGURE 36

Axial MRI shows a bulky tumour in the anterior lower rectum (**A**, **orange arrows**) infiltrating into the vagina on the left. The corresponding DWI sequence (**B**) shows high signal consistent with the presence of restricted diffusion. MRI following chemoradiotherapy (**C**) shows a very good response to treatment. The bulky mass has been replaced with low signal fibrosis (**turquoise arrows**). On the corresponding DWI images, there was no associated residual high signal (not shown).

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

MRI 在放化疗后的肿瘤反应评估中也发挥着重要作用。**弥散加权序列**可能有助于评估是否存在任何残余肿瘤。

若存在**致密纤维化瘢痕**且无肿瘤信号，则提示放射学完全缓解。在部分中心，这类患者可能会接受密切的“观察和等待”随访，而非直接进行手术。

图 36

轴位 MRI 显示直肠下段前壁的巨块肿瘤（**A**，**橙色箭头**），浸润左侧阴道。相应的 DWI 序列 (**B**) 显示高信号，符合弥散受限表现。放化疗后的 MRI (**C**) 显示对治疗的反应良好。巨大肿块已被低信号的纤维化组织取代（**蓝绿色箭头**）。在相应的 DWI 图像上，未见相关残余高信号（未显示）。

/ Tumours – **Anal Cancer**

Anal cancers are relatively uncommon and account for less than 2% of large bowel malignancies. They are defined as originating between the anorectal junction above and the anal verge below. **MRI** is the modality of choice for staging anal cancers.

The majority are squamous cell cancers and have a high association with HPV (human papilloma virus).

>▪< FURTHER KNOWLEDGE

They are staged differently to rectal tumours as follows:

TNM	TUMOUR EXTENT
Stage I	Tumour 2 cm or less in greatest dimension T1
Stage IIa	Tumour > 2 cm but < 5 cm in greatest dimension T2
Stage IIb	Tumour > 5 cm in greatest dimension T3
Stage IIIa	T1 or T2
	Metastases in inguinal, mesorectal and/or internal iliac lymph nodes N1a
	Metastases in external iliac lymph nodes N1b
	Metastases in external iliac and N1a nodes N1c
Stage IIIb	Tumour of any size that invades adjacent organs T4
Stage IIIc	T3 + N1 + M0 (no distant metastases)
Stage IV	Any T stage + Any N stage + M1 (distant metastases)

/ Large **Bowel**

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 肿瘤 - **肛门癌**

肛门癌相对少见，在大肠恶性肿瘤中占比不足 2%。其定义为起源于上方肛门直肠交界处和下方肛缘之间的肿瘤。**MRI** 是肛门癌分期的首选方法。

大多数肛门癌为鳞状细胞癌，且与 HPV（人乳头瘤病毒）高度相关。

>▪< 进阶知识

肛门癌的分期与直肠肿瘤不同，具体如下：

TNM 分期	肿瘤范围
I 期	肿瘤最大直径 ≤ 2 cm，T1
IIa 期	肿瘤最大直径 > 2cm 但 < 5 cm，T2
IIb 期	肿瘤最大直径 > 5 cm，T3
IIIa 期	T1 或 T2
	腹股沟、直肠系膜和/或髂内淋巴结转移，N1a
	髂外淋巴结转移，N1b
	髂外及 N1a 淋巴结转移，N1c
IIIb 期	任何大小肿瘤侵犯邻近器官，T4
IIIc 期	T3 + N1 + M0（无远处转移）
IV 期	任何 T 分期 + 任何 N 分期 + M1（有远处转移）

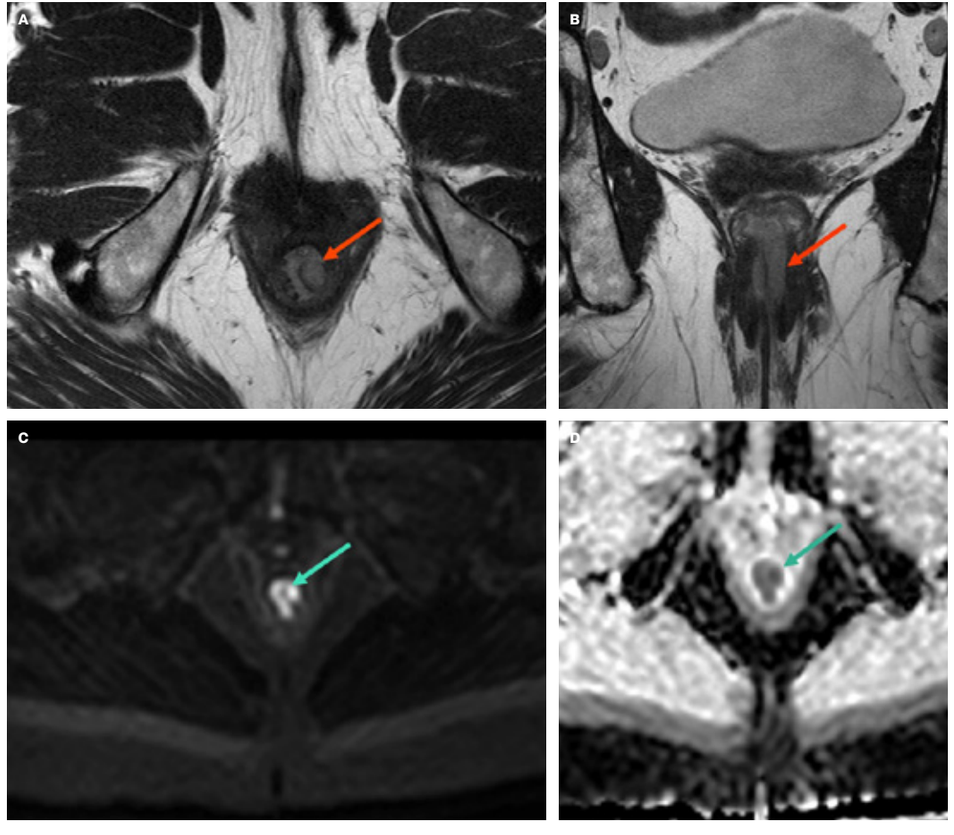


FIGURE 37

Axial (**A**) and coronal (**B**) T2-weighted MRI images show an intraluminal mass in the rectum (**orange arrows**) consistent with an anal tumour. The tumour measured 2.7 cm and is therefore staged as T2. DWI image (**C**) shows corresponding high signal and ADC (apparent diffusion coefficient) map (**D**) shows corresponding low signal (**turquoise arrows**) consistent with the presence of diffusion restriction. Diffusion restriction in this case indicates a tumour with increased cellularity.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

图 37

轴位 (**A**) 和冠状位 (**B**) T2 加权 MRI 图像显示直肠腔内肿块（**橙色箭头**），符合肛门肿瘤表现。肿瘤大小为 2.7 cm，因此分期为 T2。DWI 图像 (**C**) 显示相应高信号，ADC（表观扩散系数）图 (**D**) 显示相应低信号（**蓝绿色箭头**），符合弥散受限表现。本例弥散受限提示肿瘤细胞密度增高。

/ Tumours – **Appendix**

There are a number of neoplasms which can involve the appendix, most commonly **neuroendocrine tumours or mucinous neoplasms**. Mucinous neoplasms of the appendix range from more benign mucoceles to more malignant cystadenocarcinomas. They are the most common cause of pseudomyxoma peritonei which is the intraperitoneal accumulation of mucinous ascites related to a mucin-producing neoplasm.

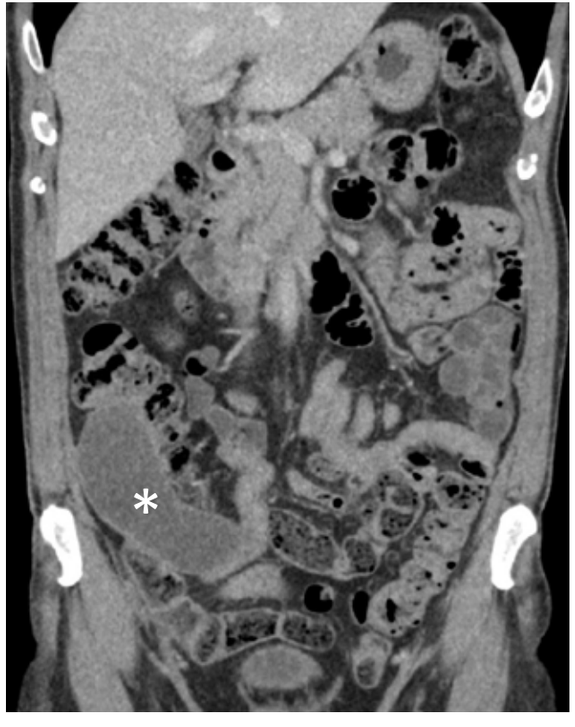


FIGURE 38

Coronal CT reformat demonstrates a cystic tubular mass arising from the caecum (**asterisk**). No soft tissue component to the mass. Histology post surgical resection confirmed a low grade appendiceal mucinous neoplasm.

/ Large **Bowel**

CHAPTER OUTLINE:

/ 大**肠**

章节大纲：

/ 肿瘤 - **阑尾**

有多种肿瘤可累及阑尾，最常见为**神经内分泌肿瘤或黏液性肿瘤**。阑尾黏液性肿瘤从较良性的黏液囊肿到较恶性的囊腺癌均有涉及。这类肿瘤是腹膜假黏液瘤的最常见病因，而腹膜假黏液瘤是指与产生黏液的肿瘤相关的黏液性腹水在腹腔内积聚的一种病变。

图 38

冠状位 CT 重建图像显示源自盲肠的囊性管状肿块（星号）。肿块内未见软组织成分。手术切除后组织学检查证实为低级别阑尾黏液性肿瘤。

/ Tumours – **Lymphoma**

Lymphoma of the large bowel is uncommon. There will often be marked bowel wall thickening or aneurysmal dilatation without obstruction.

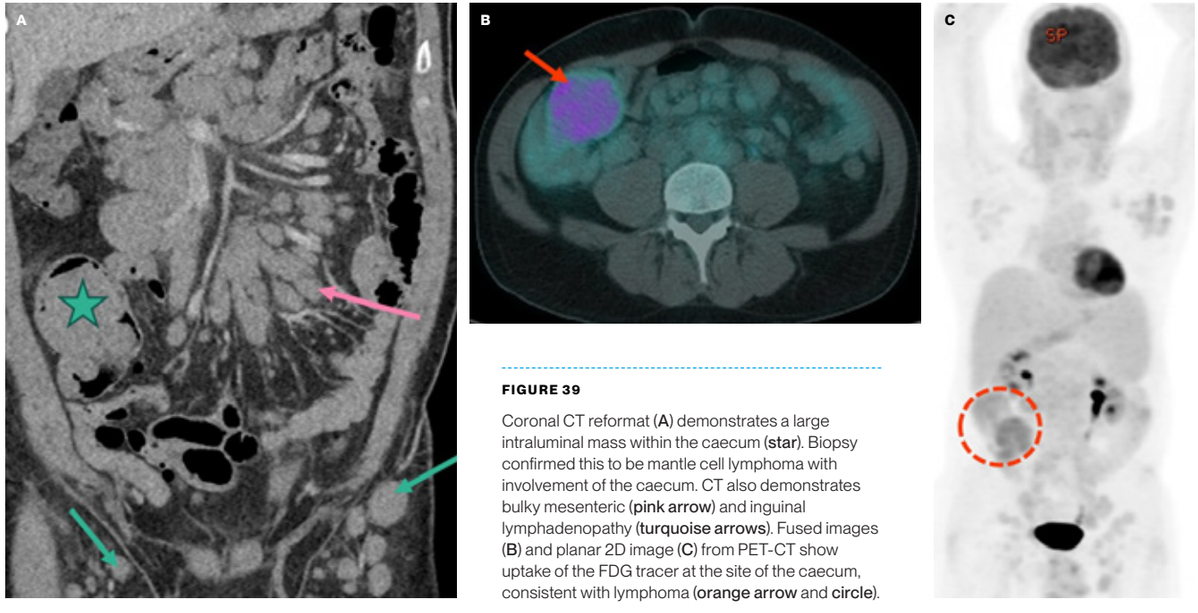


FIGURE 39

Coronal CT reformat (**A**) demonstrates a large intraluminal mass within the caecum (**star**). Biopsy confirmed this to be mantle cell lymphoma with involvement of the caecum. CT also demonstrates bulky mesenteric (**pink arrow**) and inguinal lymphadenopathy (**turquoise arrows**). Fused images (**B**) and planar 2D image (**C**) from PET-CT show uptake of the FDG tracer at the site of the caecum, consistent with lymphoma (**orange arrow** and **circle**).

/ Large **Bowel**

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 肿瘤 - **淋巴瘤**

大肠淋巴瘤较为少见。常见表现为肠壁明显增厚或动脉瘤样扩张而无梗阻。

图 39

冠状位 CT 重建图 (**A**) 显示盲肠腔内有一个较大的肿块（**星号**）。活检证实为套细胞淋巴瘤，累及盲肠。CT 还显示出肠系膜区（**粉色箭头**）和腹股沟（**蓝绿色箭头**）均有明显淋巴结肿大。PET-CT 融合图像 (**B**) 和平面 2D 图像 (**C**) 显示盲肠部位有 FDG 示踪剂摄取（**橙色箭头和圆圈**），符合淋巴瘤表现。

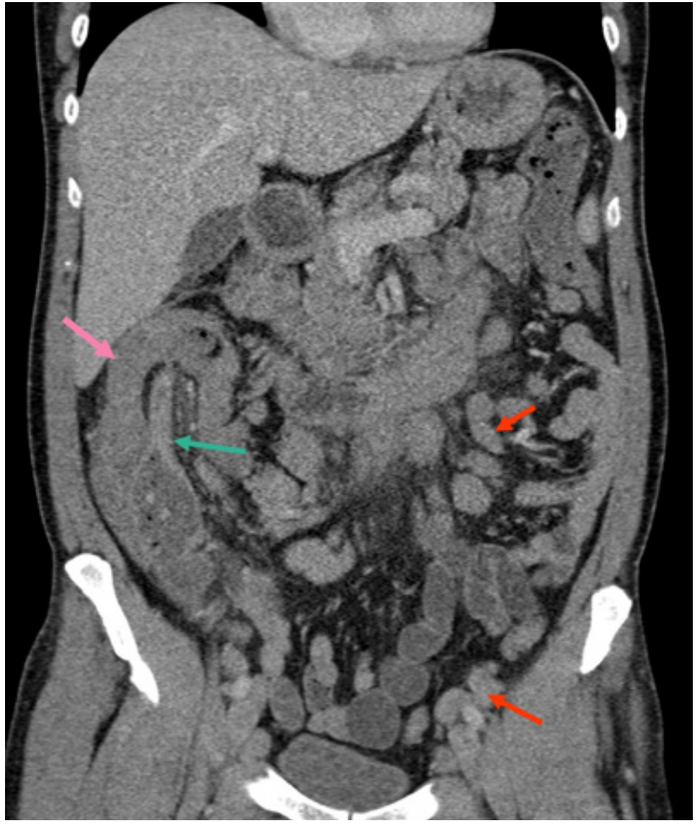


FIGURE 40

The same patient as in Figure 38 went on to develop ileo-colic intussusception **secondary to the lymphoma mass acting as a lead point**. Intussusception is where the bowel invaginates on itself and is pulled into a neighbouring loop of bowel (see Acute conditions). The intussusceptum is in this case the terminal ileum (**turquoise arrow**) and the intussuscipiens is in this case the caecum, (**pink arrow**). As on the previous CT (Figure 39), there is evidence of widespread bulky lymphadenopathy (**orange arrows**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

图 40

图 38 中的同一患者**继发以淋巴瘤肿块为引导点的**回结肠肠套叠。肠套叠是指肠道自身内陷并套入邻近肠袢（详见“急性疾病”）。在本例中，套入部为末端回肠（**蓝绿色箭头**），鞘部为盲肠（**粉色箭头**）。与先前的 CT 结果（图 39）相同，可见多处体积较大淋巴结肿大（**橙色箭头**）。

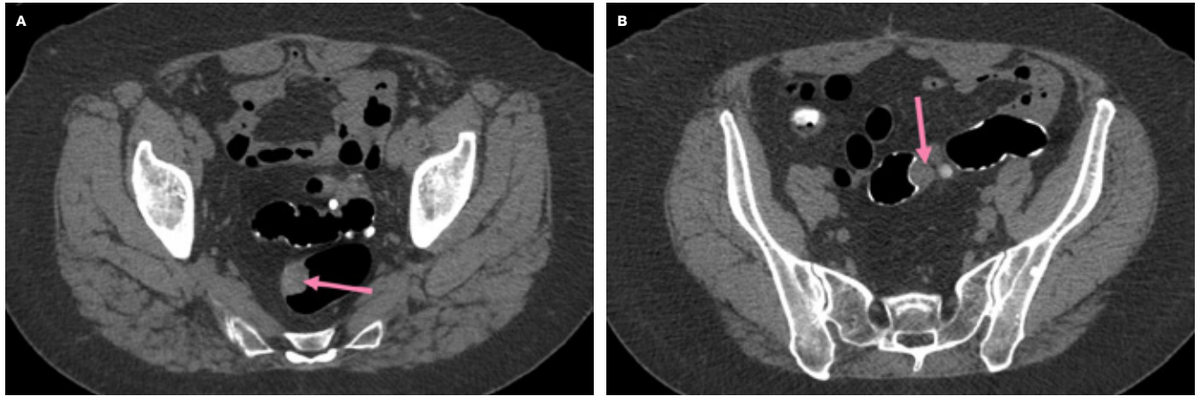
/ Tumours – **Secondary Cancers**

The colon may be secondarily involved by direct invasion, lymphatic permeation, intraperitoneal seeding or haematogenous spread. Gastric cancer spreading via the gastrocolic ligament or pancreatic cancer spreading via the transverse mesocolon are typical.

Serosal tumour spread can cause tethering and contraction of the bowel wall secondary to a desmoplastic response. Occasionally, haematological spread may produce a more diffuse 'linitis plastica' appearance.

FIGURE 41

Axial CT slices from the same patient show serosally-based nodules (**arrows**) in the rectosigmoid colon (**A**) and mid-proximal sigmoid colon (**B**) in a patient with a history of previously treated ovarian cancer. The metastatic lesions are consistent with recurrence of the patient's cancer.



/ Large **Bowel**

CHAPTER OUTLINE:

/ 大肠

/ 肿瘤 - **继发性癌症**

章节大纲：

结肠可能因直接侵袭、淋巴道浸润、腹腔种植或血行转移而发生继发性受累。典型表现包括胃癌经胃结肠韧带扩散，或胰腺癌经横结肠系膜扩散。

浆膜肿瘤扩散可引起肠壁牵拉和收缩，这是由于促结缔组织增生反应所致。有时，血行转移可导致肠壁呈现弥漫性更强的“皮革胃”外观。

图 41

同一患者的轴位 CT 图像显示，直肠乙状结肠 (**A**) 和中近端乙状结肠浆膜面 (**B**) 可见多发结节（**箭头**），该患者有卵巢癌既往病史。这些转移病灶符合患者癌症复发的表现。

Colitis

Large Bowel

大肠

CHAPTER OUTLINE:

章节大纲：

结肠炎

/ Colitis

Colitis refers to inflammation of the large bowel. It can occur as a result of **infection**, **inflammation** and sometimes, **ischaemia**. Colitis is often evaluated using cross sectional imaging, primarily CT and MRI. Ultrasound can be used particularly in patients with inflammatory bowel disease who require regular imaging. Given the multiple potential causes, imaging features can be non-specific.

The main diagnostic criteria for colitis is **a wall thickness of > 4 mm**. Depending on the cause, other signs may be present such as:

/ Distension

/ Increased or decreased enhancement

/ Changes in the surrounding fat – "fat stranding"

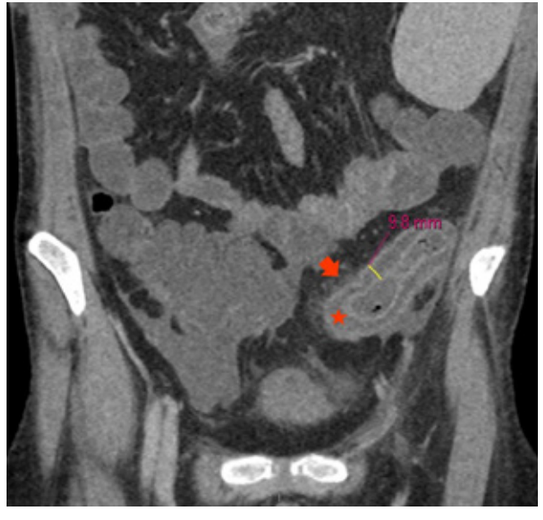


FIGURE 42

Coronal CT showing in a patient with colitis showing gross oedema and thickening of the bowel wall measuring approximately 10 mm (**orange star**), increased mucosal and serosal enhancement and mild surrounding fat stranding (**orange arrow**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 结肠炎

结肠炎是指发生在大肠的炎症。它可以是**感染**、**炎症**的结果，有时也可由**缺血**引起。结肠炎的评估通常采用横断面成像检查，主要包括 CT 和 MRI。超声检查特别适用于需要定期影像学检查的炎症性肠病患者。由于结肠炎的潜在病因很多，影像学表现往往缺乏特异性。

结肠炎的主要诊断标准是**肠壁厚度 > 4 mm**，根据不同病因，还可能出现其他表现，如：

/ 肠腔扩张

/ 强化程度升高或降低

/ 周围脂肪组织改变 - "脂肪条索征"

图 42

冠状位 CT 图像显示一例结肠炎患者出现明显的肠壁水肿和肠壁增厚，肠壁厚度约为 10 mm（**橙色星号**），黏膜及浆膜层强化明显，周围脂肪可见轻度条索征（**橙色箭头**）。

/ Cause of Colitis and Common Sites of Involvement

DIFFUSE

- / Cytomeglovirus
- / Pseudomembranous colitis
- / Ulcerative colitis

RIGHT-SIDED

- / Tuberculosis
- / Crohn's
- / Salmonella
- / Neutropenic colitis
- / Ischaemic colitis (hypo-perfusional)

LEFT-SIDED

- / Ischaemic (watershed)
- / Shigella
- / Gonorrhoea
- / Ulcerative colitis
- / Radiation colitis

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 结肠炎的病因和常见受累部位

弥漫型

- / 巨细胞病毒感染
- / 假膜性结肠炎
- / 溃疡性结肠炎

右半结肠

- / 结核
- / 克罗恩病
- / 沙门氏菌感染
- / 中性粒细胞减少性结肠炎
- / 缺血性结肠炎（低灌注型）

左半结肠

- / 缺血性（分水岭区）
- / 志贺氏菌感染
- / 淋病
- / 溃疡性结肠炎
- / 放射性结肠炎

/ Inflammatory Bowel Disease

This is a term used to denote two main conditions – **Ulcerative Colitis** and **Crohn's Disease**.

/ Ulcerative Colitis

Ulcerative disease affects **only** the **colon** and **rectum** (the small bowel is not involved). Inflammation is **confined to the mucosa** and usually starts at the rectum and progresses proximally to include the rest of the colon in a continuous manner.

>▪< FURTHER KNOWLEDGE

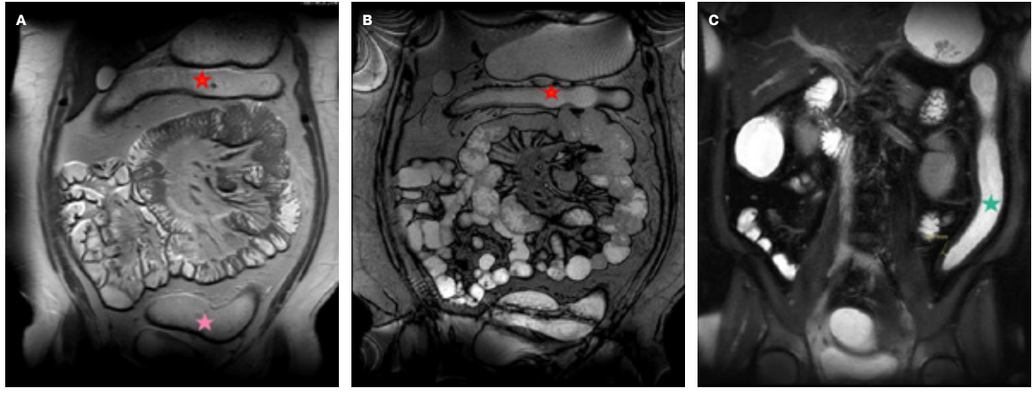


FIGURE 43

Coronal heavily T2 –weighted sequences (**A**, **B**, **C**) in a patient with long standing colonic inflammatory bowel disease. Notice the lack of normal colonic haustra (lead-pipe appearance) in the transverse (**red star**), descending (**turquoise star**) and sigmoid colon (**pink star**) and thickening of the descending colon.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 炎症性肠病

这是一个总称，主要包括两种疾病 - **溃疡性结肠炎和克罗恩病**。

/ 溃疡性结肠炎

溃疡性病变，**仅累及结肠和直肠**（小肠不受累及）。炎症**局限于黏膜层**，通常自直肠起始，连续向近端进展累及结肠的其余部分。

>▪< 进阶知识

图 43

一例长期结肠炎症性肠病患者的冠状位重 T2 加权序列（A、B、C）。可见横结肠（**红星号**）、降结肠（**蓝绿色星号**）和乙状结肠（**粉色星号**）缺乏正常的结肠袋结构（铅管样外观），同时降结肠壁增厚。

/ Crohn's Disease

Crohn's disease on the other hand can affect **both small** and **large bowel**, rectum and **anus**. **The most common site of disease is the terminal ileum**. The inflammation in Crohn's is not continuous, and there can be segments of normal bowel interspersed between areas of inflammation. In addition, unlike ulcerative colitis, Crohn's disease **affects all the bowel layers** (i.e., it is transmural) and can therefore, lead to perforation, fistulation and abscess formation.

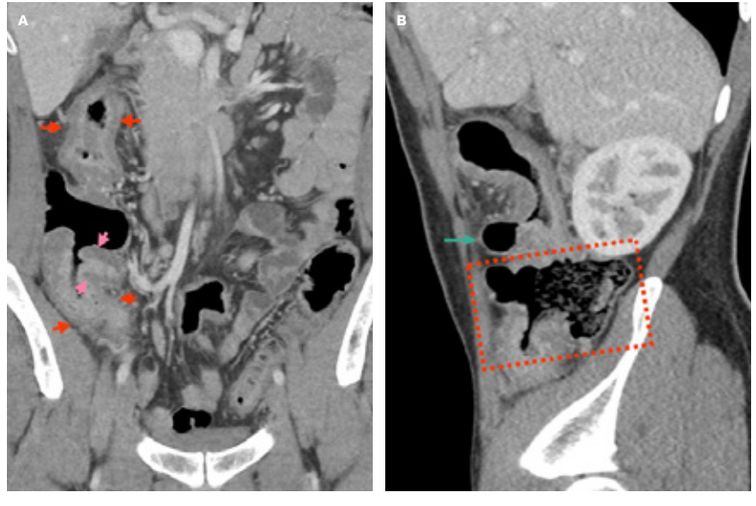


FIGURE 44

Coronal CT scan (**A**) showing right sided colitis (**orange arrows**) in a patient with Crohn's disease with involvement of the ileo-caecal junction (**pink arrows**). Sagittal CT scan (**B**) of the same case demonstrating normal bowel (**orange square**) between affected segments and pseudo-sacculation (**turquoise arrow**) due to stricturing.

<!> ATTENTION

Both diseases have overlapping presentations with **abdominal pain**, **weight loss** and **diarrhoea** (bloody diarrhoea in ulcerative colitis).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 克罗恩病

相比之下，克罗恩病可累及小肠、大肠、直肠和肛门。**最常见的发病部位是末端回肠**。克罗恩病的炎症表现为非连续分布，炎症区域之间可散布着正常肠段。此外，与溃疡性结肠炎不同，克罗恩病**累及肠壁全层**（即具有透壁性），因此可导致肠穿孔、瘘管及脓肿形成。

图 44

冠状位 CT 扫描图像 (**A**) 显示克罗恩病患者右半结肠炎症（**橙色箭头**），累及回盲部（**粉色箭头**）。同一病例的矢状位 CT 扫描图像 (**B**) 显示受累肠段之间存在正常肠段（**橙色方框**），以及因狭窄形成的假性憩室（**蓝绿色箭头**）。

<!> 注意

两种疾病的临床表现有重叠，均可出现腹痛、体重减轻和腹泻（溃疡性结肠炎多为血性腹泻）。

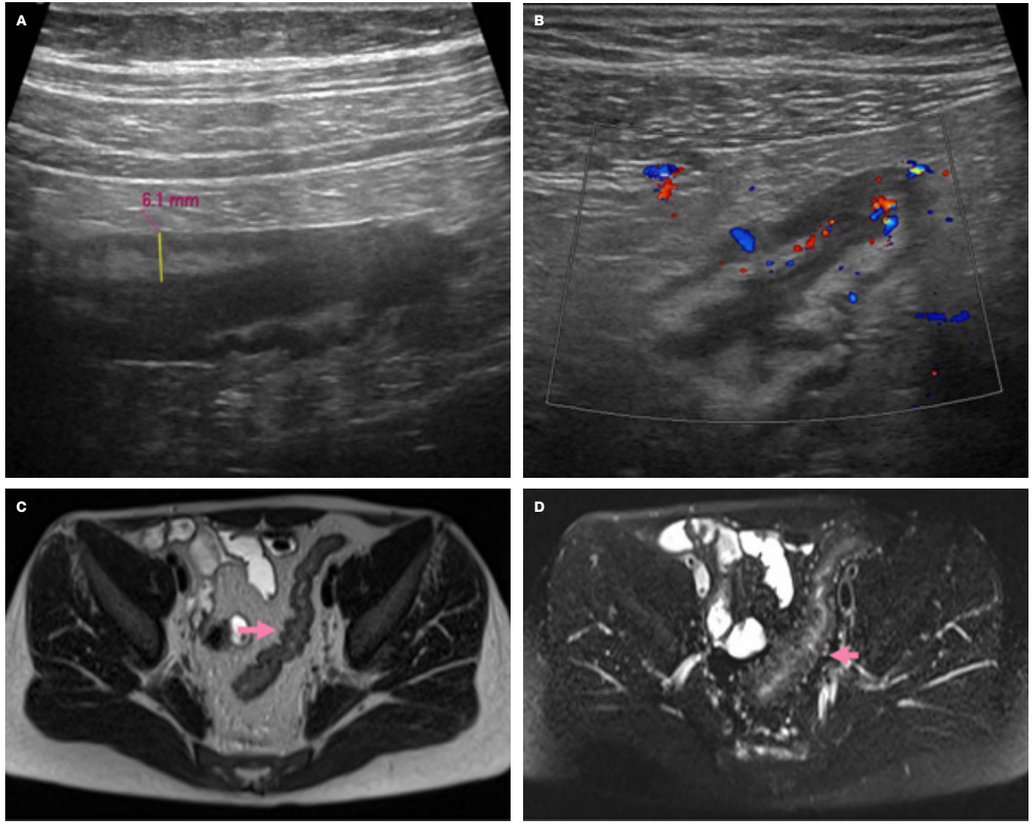


FIGURE 45

Ultrasound showing a thickened sigmoid colon (6.1 mm in **A**) with increased vascularity on colour Doppler assessment (**B**) in a case with left-sided colonic Crohn's disease. MRI scan of the same patient with axial T2 TRUFI (True Fast Imaging with Steady State Free Precession) and HASTE (Half fourier Single-shot Turbospin-Echo) fat saturated sequences (**C** and **D**) showing an inflamed thickened sigmoid colon with a narrowed lumen (**pink arrows**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

图 45

超声显示一例左半结肠克罗恩病的患者乙状结肠增厚（**A** 图，6.1 mm），彩色多普勒 (**B**) 可见血管增多。同一患者的 MRI 检查，轴位 T2 TRUFI（真稳态自由进动快速梯度回波序列）和 HASTE（半傅里叶采集单次激发快速自旋回波序列）脂肪饱和序列（**C** 和 **D**），显示炎症性的乙状结肠增厚伴肠腔狭窄（**粉色箭头**）。

/ Ischaemic Colitis

This occurs when there is an **absence** or **reduction in blood flow** to the colon. It is mainly seen in people > 60 years but is sometimes present in younger patients with **hypercoagulable states, vasculitis, long distance athletes** and in cases of **drug use**. It is a **life-threatening condition** and may require urgent surgical intervention, although many cases resolve spontaneously.

The causes include

- / Arterial or venous occlusion
- / Low flow states/hypoperfusion
- / Increased intracolonic pressure proximal to an area of obstruction

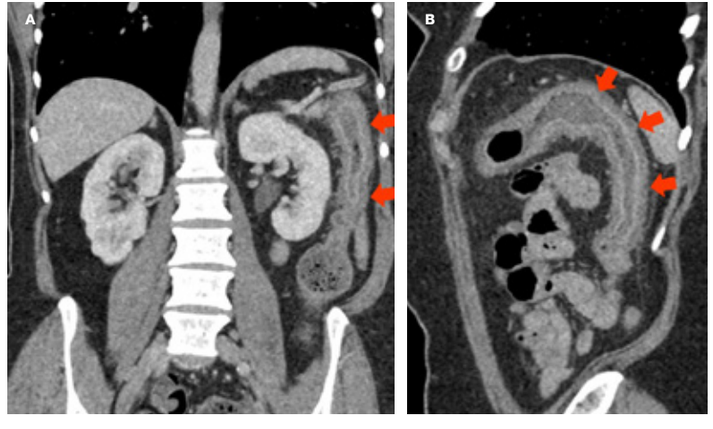


FIGURE 46

Coronal (**A**) and sagittal (**B**) slices of a patient with suspected ischaemic colitis affecting the splenic flexure and proximal descending colon. Note uniform and segmental bowel wall thickening with a low density linear band (submucosal oedema) between enhancing mucosa and serosa.

<!> ATTENTION

The splenic flexure is mostly affected (Figure 45) as it is a watershed area, i.e., lies between the superior mesenteric artery (SMA) and inferior mesenteric artery (IMA) vascular territories).

Venous ischaemia tends to present with more wall thickening than is seen in arterial ischaemia.

The degree of wall thickening does not correspond to the degree of transmural necrosis.

/ Large Bowel

CHAPTER OUTLINE:

/ 缺血性结肠炎

缺血性结肠炎是由于结肠血流减少或中断所致。多见于 60 岁以上人群，但有时也见于存在高凝状态、血管炎、长跑运动员和使用药物的年轻患者。该疾病危及生命，可能需要紧急手术干预，尽管多数可自行缓解。

病因包括

- / 动脉或静脉闭塞
- / 低血流状态/灌注不足
- / 梗阻部位近端结肠内压力升高

图 46

疑似缺血性结肠炎患者的冠状位 (A) 和矢状位 (B) 图像，病变累及脾曲和降结肠近端。可见肠壁均匀、节段性增厚，在强化的黏膜与浆膜之间有低密度线状带（黏膜下水肿）。

<!> 注意

脾曲最常受累（图 45），因其为分水岭区，即位于肠系膜上动脉 (SMA) 和肠系膜下动脉 (IMA) 血管分布区之间。

与动脉性缺血相比，静脉性缺血往往表现出更明显的肠壁增厚。

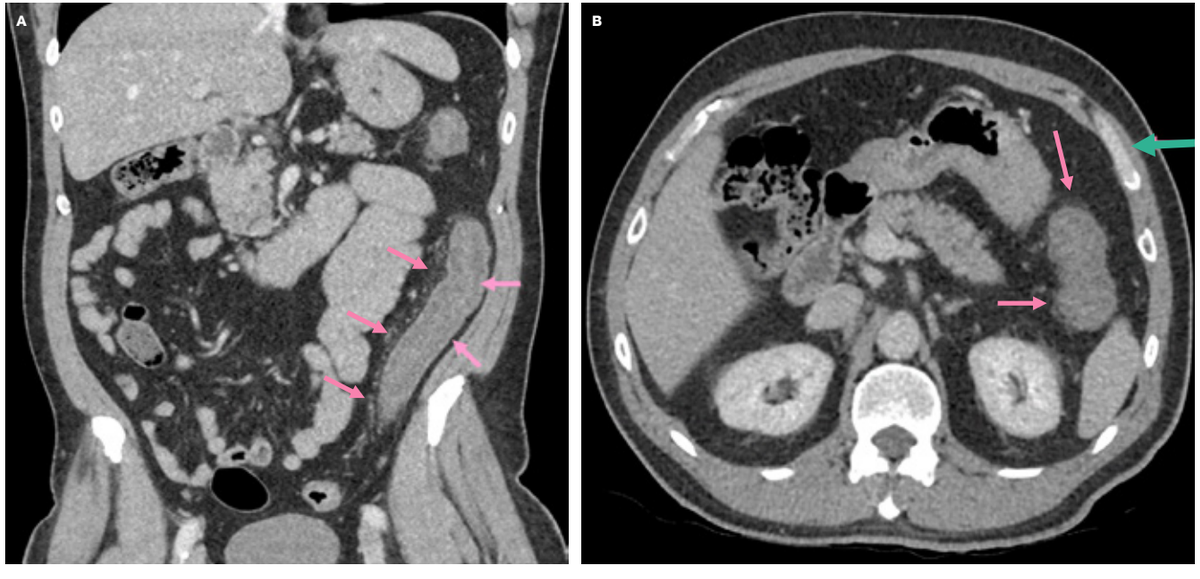
肠壁增厚的程度与透壁性坏死的程度不对应。

章节大纲：

On plain radiographs, signs include **thumbprinting** (which indicates mural oedema), **pneumoperitoneum** (indicating perforation) and **gas in the portal venous system** (indicating transmural necrosis). These are also seen on CT and effort should be made to look for would be sites arterial or venous occlusion.

FIGURE 47

Coronal (**A**) and axial CT images (**B**) of a patient with ischaemic colitis affecting the descending colon and sigmoid (IMA territory). Signs are bowel wall thickening and surrounding fat stranding (**pink arrows**). Note for comparison normal fat aspect without stranding (**green arrow**).



Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

普通 X 线平片上的表现包括**拇指纹征**（提示肠壁水肿）、**气腹**（提示穿孔）和**门静脉系统积气**（提示透壁性坏死）。这些征象在 CT 上也可见，应特别注意寻找动脉或静脉闭塞的部位。

图 47

一例患者的冠状位 (**A**) 和轴位 CT 图像 (**B**) 显示缺血性结肠炎累及降结肠和乙状结肠（IMA 区域）。影像表现为肠壁增厚和周围脂肪条索征（**粉色箭头**）。对比可见，正常脂肪无条索征（**绿色箭头**）。

/ Infectious Colitis

/ Pseudomembranous Colitis

This is a form of infectious colitis caused by an **overgrowth of Clostridium difficile** bacteria, often as a result of broad spectrum antibiotic use. It usually presents with **fever, diarrhoea** and **a raised white cell count**. It can progress to a fulminant colitis which is characterised by **necrosis** and **perforation** and as such, can be a surgical emergency.

On CT MRI and US, there is marked bowel wall thickening, with submucosal hyperenhancement and submucosal oedema.

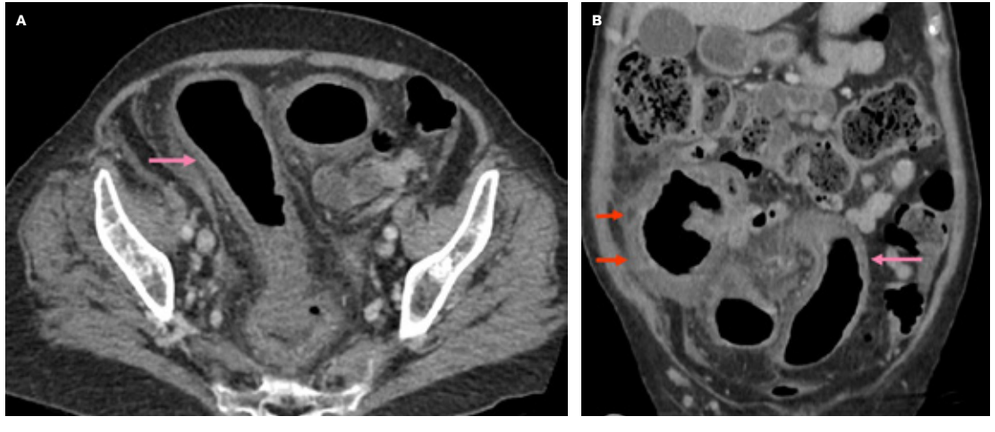


FIGURE 48

Axial (**A**) and coronal CT (**B**) images showing inflammation of the sigmoid colon (**pink arrow**) and the a caecum (**red arrow**) in a case of confirmed C-difficile infection.

/ Large Bowel

CHAPTER OUTLINE:

/ 感染性结肠炎

/ 大肠

章节大纲：

/ 假膜性结肠炎

这是一种由**艰难梭菌**过度生长（通常为广谱抗生素使用后的结果）引起的感染性结肠炎。通常表现为**发热**、**腹泻**和**白细胞计数升高**。该病可进展为暴发性结肠炎，出现肠**坏死**和**穿孔**，属于外科急症。

CT、MRI 和超声检查可见肠壁明显增厚，伴黏膜下层高强化和黏膜下水肿。

图 48

轴位 (**A**) 和冠状位 (**B**) CT 图像显示一例确诊艰难梭菌感染患者的乙状结肠（**粉色箭头**）和盲肠（**红色箭头**）炎症。

/ Tuberculosis

This is another common infectious cause of colitis and should be considered in patients from areas where tuberculosis (TB) is endemic.

<!> ATTENTION

It can affect any part of the bowel but is mostly seen in the terminal ileum and ileo-caecal region. When it affects the ileo-caecal region, it may be difficult to differentiate it from Crohn's disease.

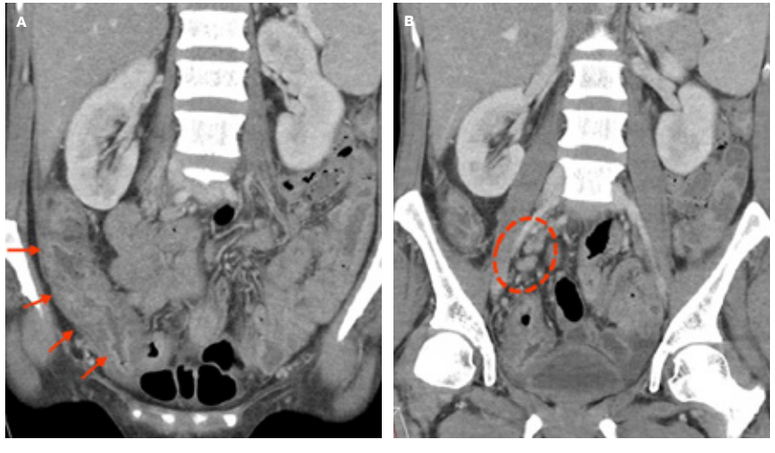


FIGURE 49

Coronal CT images of TB colitis affecting the right colon (**red arrows**). Note the presence of associated enlarged mesenteric nodes (**dotted circle**).

>=< FURTHER KNOWLEDGE

Differentiating features include:

- Ascites
- Gross lymphadenopathy (particularly lymphadenopathy with caseous necrosis)
- Peritoneal involvement
- Conical contracted appearance of the caecum with a dilated terminal ileum.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 结核

结核 (TB) 是另一种常见的感染性结肠炎病因，在来自结核流行地区的患者中应考虑该因素。

<!> 注意

结核可累及肠道任何部位，但最常见于回肠末端和回盲部。当累及回盲部时，影像学上可能难以与克罗恩病区分。

>=< 进阶知识

鉴别要点包括：

- 腹水
- 明显淋巴结肿大（尤其是干酪样坏死的淋巴结）
- 腹膜受累
- 盲肠呈锥形收缩，末端回肠扩张。

图 49

冠状位 CT 图像显示结核性结肠炎累及右半结肠（**红色箭头**）。可见肠系膜淋巴结肿大（**虚线圈**）。

/ Other organisms

Other organisms are also known to cause colonic inflammation including **Salmonella**, **shigella**, and **cytomegalovirus** (CMV).

>▪< FURTHER KNOWLEDGE

Shigella causes mainly **left-sided colitis** and Salmonella mainly **right-sided colitis**. Left-sided colitis is also seen in patients with gonorrhoea. CMV causes a vasculitis leading to **diffuse colonic inflammation** with associated **mesenteric lymphadenopathy** and sometimes, **ascites**.

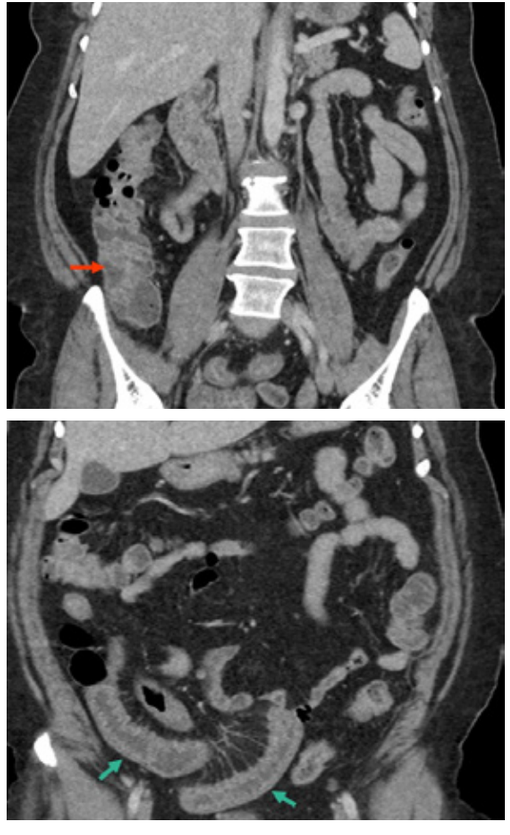


FIGURE 50

Coronal CT showing right-sided colitis (**orange arrow**) and enteritis affecting the distal and terminal ileum (**turquoise arrows**) in a case of confirmed shigella infection.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 其他微生物

其他微生物也可导致结肠炎症，包括沙门氏菌、志贺氏菌和巨细胞病毒 (CMV)。

>▪< 进阶知识

志贺氏菌感染主要引起**左半结肠炎**，沙门氏菌感染主要引起**右半结肠炎**。淋病患者也可出现左半结肠炎。CMV 可引起血管炎，导致**弥漫性结肠炎**，常伴有**肠系膜淋巴结肿大**，有时还可见**腹水**。

图 50

冠状位 CT 图像，显示一例确诊志贺氏菌感染患者的右半结肠炎（**橙色箭头**）和累及远端及末端回肠的小肠炎（**蓝绿色箭头**）。

/ Radiation Colitis

This refers to inflammation as a **result of previous radiation therapy**. It is a **late complication** (often years after treatment) that can occur due to either **direct radiation treatment** (for example in patients with rectal cancer), or from radiation therapy to adjacent organs (such as the prostate and gynaecological organs).

Exposure to radiation **above 45 Gy** leads to **inflammation of the end arteries** resulting in **ischaemia**, **inflammation** and subsequently **fibrosis** and **stricture formation**. In some cases, there may be fistulation with adjacent structures such as the bladder or the vagina. The rectum is most commonly involved.

>=< FURTHER KNOWLEDGE

On imaging, findings are **bowel wall thickening**, **mesenteric fat stranding** and **widening of the pre-sacral space** and **thickening of the mesorectal fascia**.

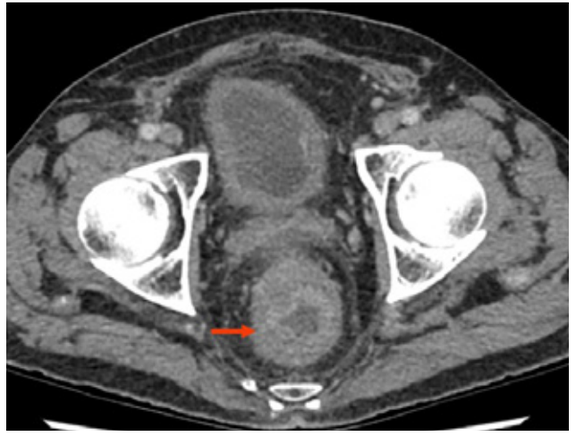


FIGURE 51

Axial CT showing a thickened inflamed rectum (proctitis) post radiotherapy treatment for prostate cancer (**red arrow**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 放射性结肠炎

放射性结肠炎是指因**既往放疗**引起的炎症。这是一种**晚期并发症**（常在治疗多年后出现），可由**直接放射治疗**（例如直肠癌患者）或对邻近器官（如前列腺和妇科器官）的放射治疗导致。

45 Gy 以上的辐射暴露可导致**末梢动脉炎症**，造成**缺血**、**炎症**，最终形成**纤维化**和**肠腔狭窄**。部分病例还可能存在与邻近结构（如膀胱或阴道）之间的瘘管形成。直肠是最常受累的部位。

>=< 进阶知识

影像学表现包括**肠壁增厚**、**肠系膜脂肪条索征**、**骶前间隙增宽**以及**直肠系膜筋膜增厚**。

图 51

轴位 CT 显示前列腺癌放疗后直肠增厚炎症（直肠炎，红色箭头）。

>▪< FURTHER KNOWLEDGE

/ Neutropenic Colitis

This is a specific form of colonic inflammation seen in **immunosuppressed** individuals with **neutropenia**.

As with other causes of colitis, imaging findings are **wall thickening** and **oedema** (although less than seen in other infectious colitis) and signs of adjacent mesenteric inflammation (stranding).

The inflammation **usually affects the right colon** but can be confined to the caecum – a condition known as **typhlitis**.

/ Acute Fulminant Colitis

This is a late complication of colitis characterised by **transmural inflammation** and **neuromuscular degeneration** leading to gross colonic dilatation- **toxic megacolon**- and potentially, perforation.

The hallmark of fulminant colitis is a **dilated colon (> 5 cm)** with **absence of normal colonic haustra**. Fulminant colitis can be with all causes of colonic inflammation but is most commonly seen in cases of ulcerative colitis.

Abdominal X-rays are useful in assessing for colonic dilatation and particularly for monitoring. In the supine position, the transverse colon is the easiest site to observe findings as it is the least dependent part of the colon.

/ Large Bowel

CHAPTER OUTLINE:

>▪< 进阶知识

/ 大肠

章节大纲：

/ 中性粒细胞减少性结肠炎

这是一种特异性结肠炎症，发生于患有**中性粒细胞减少症**的**免疫抑制**患者中。

与其他原因引起的结肠炎类似，该病的影像学表现为**肠壁增厚**和**水肿**（但通常较其他感染性结肠炎轻），以及邻近肠系膜炎症征象（条索征）。

炎症**多累及右半结肠**，也可局限于盲肠 - 后者称为**盲肠炎**。

/ 急性暴发性结肠炎

这是结肠炎的晚期并发症，表现为**透壁性炎症**和**神经肌肉变性**，导致结肠显著扩张（**中毒性巨结肠**），并可能导致穿孔。

暴发性结肠炎的标志影像特征为**结肠扩张 (> 5 cm)**，伴有**正常结肠袋消失**。暴发性结肠炎可由多种结肠炎引起，其中以溃疡性结肠炎最为常见。

腹部 X 线检查有助于评估结肠扩张，尤其适用于监测。仰卧位时，横结肠最易观察到扩张表现，因为其位置最不受重力影响。

Functional Disorders of the Anorectum

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

肛门直肠功能性疾病

/ Functional Disorders of the Anorectum

These include **constipation**, **difficulty initiating defaecation**, to the **feeling of incomplete emptying** and needing rectal digitation to facilitate evacuation.

/ Constipation

This is a common presenting complaint and is usually as a result of slow transit of food. To assess colonic transit, several radiopaque markers with different shapes are ingested; 20 markers on day 1, 20 on day 2 and 20 on day 3. An abdominal radiograph is then obtained on Day 5 to evaluate the position of the markers. The presence of > 4 of day 1 markers, > 5 of day 2 markers and > 12 of day 3 markers is considered abnormal.

/ Dyssynergia (Anismus)

A functional inability to empty the rectum. Diagnosis can be made radiologically by **fluoroscopic** or **MR defaecating proctograms**.

>▪< FURTHER KNOWLEDGE

Findings include:

- Delayed or incomplete evacuation (< 66% of the instilled rectal contents in 30 seconds)
- Failure of the pelvic floor and anal sphincter to relax on straining
- Co-existing anatomical findings are not infrequent
  - Anterior bulging of the rectal wall with retention within the rectocoele
  - Ancillary findings such as sigmoidocoeles/peritoneocoeles

/ Large Bowel

CHAPTER OUTLINE:

/ 肛门直肠功能性疾病

此类疾病包括**便秘**、**排便困难**、**排便不尽感**，以及需要用手辅助直肠排便等症状。

/ 便秘

便秘是常见的主诉，通常由肠道食物通过缓慢所致。为评估结肠传输，患者需口服不同形状、不透射线的标记物；第 1 天服用 20 个，第 2 天服用 20 个，第 3 天服用 20 个。第 5 天进行腹部 X 线检查，观察标记物的位置。第 1 天标记物 > 4 个、第 2 天标记物 > 5 个，第 3 天标记物 > 12 个，则提示异常。

/ 协同失调

（盆底失弛缓综合征）

指功能性直肠排空障碍。影像学上可通过 **X 线透视**或 **MR 排粪造影**进行诊断。

>▪< 进阶知识

影像学表现包括：

- 排便延迟或不完全（30 秒内排出灌注物不足 66%）
- 用力排便时，盆底和肛门括约肌未能松弛
- 常伴有解剖异常
  - 直肠前壁膨出，内容物滞留于直肠膨出囊袋内
  - 其他辅助表现如乙状结肠疝/腹膜疝

/ 大肠

章节大纲：

/ Difficulty Initiating Evacuation

This is due to dyssynergia between straining and relaxation of the of the anorectal junction and is termed **anismus**.

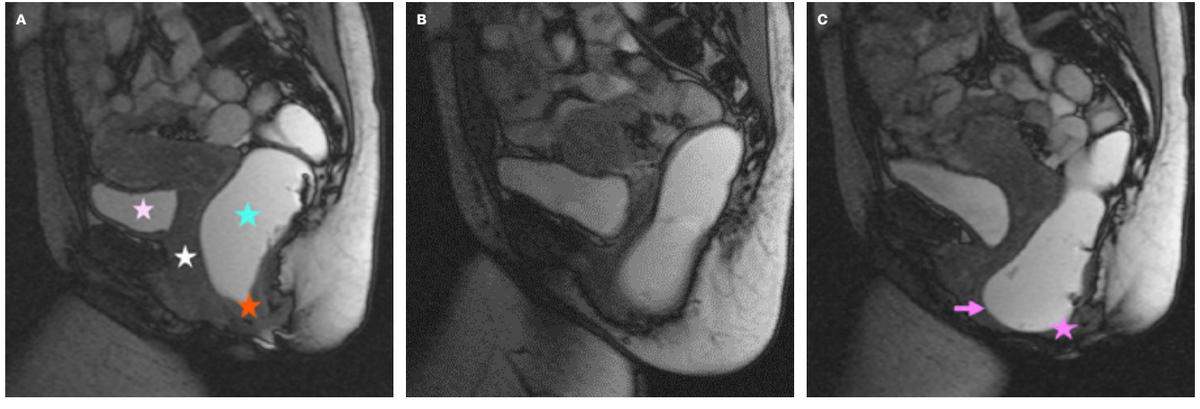


FIGURE 52

MR defaecating proctogram (A-C)

A: **Turquoise star** = rectum with instilled gel | **Pink star** = Bladder | **White star** = Vagina | **Orange star** = Anorectal junction

B: On straining, there is no evacuation despite relaxation of the pelvic floor evidenced by the descent of the bladder and anorectal junction

C: On maximum straining, there is still no evacuation of the rectal contents. This is a case of anismus. Note the anterior bulging of the rectal wall indicating a rectocoele (**purple arrow**). The **purple star** denotes the anorectal junction.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 排便启动困难

这是由于肛门直肠交界处在用力和松弛之间的协同失调所致，称为**盆底失弛缓综合征**。

图 52

MR 排粪造影 (A-C)

A: **蓝绿色星号** = 直肠（灌注凝胶）| **粉色星号** = 膀胱 | **白色星号** = 阴道 | **橙色星号** = 肛门直肠交界处

B: 用力排便时，尽管膀胱和肛门直肠交界处下降，提示盆底放松，但并未排便

C: 最大用力时，直肠内容物仍未排出。这是一个盆底失弛缓综合征的病例。可见直肠壁向前膨出，提示存在直肠膨出（**紫色箭头**）。**紫色星号**标示肛门直肠交界处。

/ Incomplete Emptying

The feeling of incomplete emptying can be due to **rectocoeles** (bulging of the anterior wall of the rectum leading to pressure sensation and sometimes, faecal trapping) and **rectal intussusception**. Rectocoeles are often seen in multiparous women but are not always symptomatic.

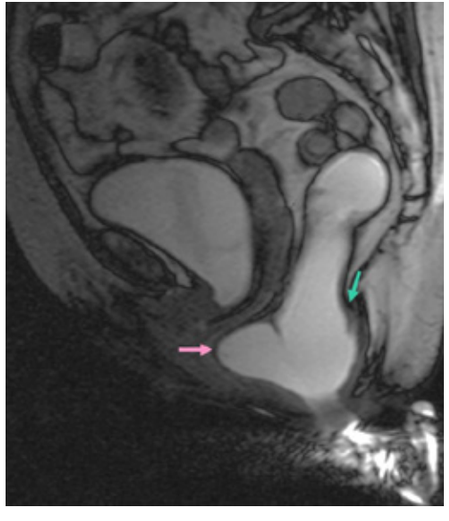


FIGURE 53

MR proctogram showing a rectocoele (**pink arrow**) and early rectal intussusception (**turquoise arrow**).

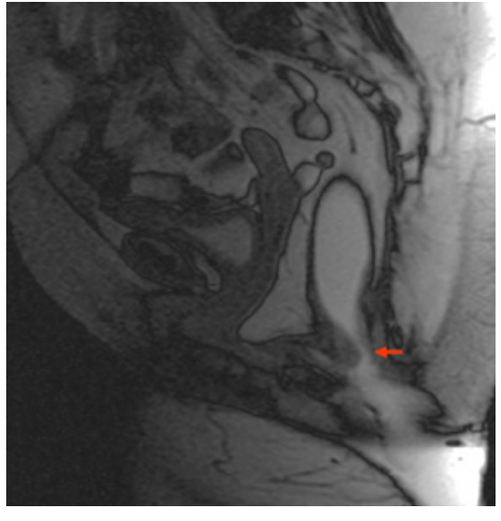


FIGURE 54

MR proctogram showing an obstructive rectal intussusception preventing complete evacuation. Note the narrowing of the rectum due to intussusception (**red arrow**).

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 排便不尽感

排便不尽感可能由**直肠膨出**（直肠前壁膨出导致压迫感，有时会导致粪便滞留）和**直肠套叠**引起。直肠膨出多见于经产女性，但不一定出现症状。

图 53

MR 排粪造影显示直肠膨出（粉色箭头）和早期直肠套叠（蓝绿色箭头）。

图 54

MR 排粪造影显示阻塞性直肠套叠，无法完全排空。可见肠套叠引起的直肠狭窄（**红色箭头**）。

/ Anal Fistula

This is an **abnormal connection between the anal canal** and the perineal skin surface via a tract. These commonly occur as a result of **cryptoglandular inflammation, or Crohn's disease**. They are often is divided into 4 types according to the Parks classification; intersphincteric, transphincteric, suprasphincteric and extrasphincteric.

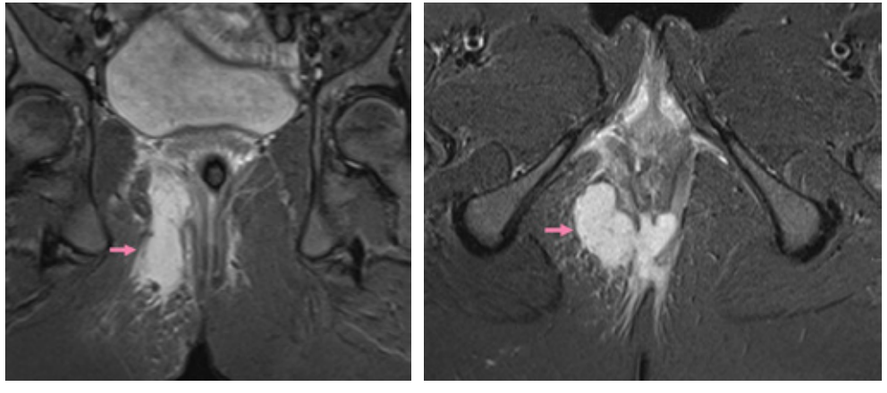


FIGURE 55

Coronal (**A**) and axial (**B**) MRI slices showing a perianal abscess (**pink arrows**) as a result of an anal fistula in Crohn's disease involving the puborectalis muscle.

<!> ATTENTION

MRI is the modality of choice for investigating anal fistulae. T2 and STIR sequences show as high signal against the low signal of the sphincter complex and adjacent fat (on the fat supressed sequences).

/ Large Bowel

CHAPTER OUTLINE:

/ 肛瘘

肛瘘是指肛管与会阴皮肤表面之间形成的异常连接通道。多因隐窝腺炎或克罗恩病引起。根据 Parks 分型，肛瘘通常分为 4 型；括约肌间型、经括约肌型、括约肌上型和括约肌外型。

<!> 注意

MRI 是评估肛瘘的首选检查方法。T2 和 STIR 序列可显示肛瘘为高信号，而括约肌复合体及周围脂肪组织（在脂肪抑制序列下）为低信号。

/ 大肠

章节大纲：

图 55

冠状位 (**A**) 和轴位 (**B**) MRI 图像显示，克罗恩病患者因肛瘘导致的肛周脓肿（**粉色箭头**），累及耻骨直肠肌。

/ Take-Home Messages

- Cross-sectional imaging forms the mainstay for the imaging of colonic pathologies.
- Abdominal radiographs have a role to play in specific situations, namely in suspected volvulus, bowel obstruction or toxic megacolon.
- CT is the first-line imaging modality in acute or life-threatening conditions.
- Ultrasound has a role to play in the assessment of acute appendicitis and inflammatory bowel disease.
- MRI is mainly used for assessment of pelvic disease, namely primary staging of rectal and anal cancers, functional disorders of the anorectum and the imaging of perianal fistulas.

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 核心要点

- 结肠疾病的影像检查主要依赖横断面成像。
- 腹部 X 线检查在某些特定情况下有其作用，即疑似肠扭转、肠梗阻或中毒性巨结肠。
- CT 是急性或危及生命状况下的一线影像学方法。
- 超声可用于急性阑尾炎和炎症性肠病的评估。
- MRI 主要用于盆腔疾病的评估，包括直肠癌和肛门癌的初步分期、肛门直肠功能性疾病和肛周瘘管的影像检查。

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/ Large Bowel

CHAPTER OUTLINE:

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/ Frickenstein AN, Jones MA, Behkam B, McNally LR. Imaging Inflammation and Infection of the Gastrointestinal Tract. Int. J. Mol. Sci. 2020; 21, 243

Test Your Knowledge

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

知识测试

Test Your Knowledge

<?> QUESTION

1 What is the upper limit for the diameter of a normal appendix?

- ☐ 3 mm
- ☐ 4 mm
- ☐ 5 mm
- ☐ 6 mm
- ☐ 7 mm

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

知识测试

<?> 问题

1 正常阑尾直径的上限是多少?

- ☐ 3 mm
- ☐ 4 mm
- ☐ 5 mm
- ☐ 6 mm
- ☐ 7 mm

Test Your Knowledge

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1 What is the upper limit for the diameter of a normal appendix?

- ☐ 3 mm
- ☐ 4 mm
- ☐ 5 mm
- ■ 6 mm
- ☐ 7 mm

Large Bowel

CHAPTER OUTLINE:

知识测试

大肠

章节大纲：

<?> 回答

1 正常阑尾直径的上限是多少?

- ☐ 3 mm
- ☐ 4 mm
- ☐ 5 mm
- ■ 6 mm
- ☐ 7 mm

Test Your Knowledge

<?> QUESTION

2 How many layers does the bowel wall have on high resolution ultrasound?

- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

知识测试

<?> 问题

2 在高分辨率超声下，肠壁有多少层？

- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7

Test Your Knowledge

<?> ANSWER

2 How many layers does the bowel wall have on high resolution ultrasound?

- ☐ 3
- ☐ 4
- ■ 5
- ☐ 6
- ☐ 7

Large Bowel

CHAPTER OUTLINE:

知识测试

<?> 回答

2 在高分辨率超声下，肠壁有多少层？

- ☐ 3
- ☐ 4
- ■ 5
- ☐ 6
- ☐ 7

大肠

章节大纲：

Test Your Knowledge

<?> QUESTION

3 Which sign is used to describe the appearance of sigmoid volvulus on an abdominal radiograph?

- ☐ Lead-pipe sign
- ☐ Comb's sign
- ☐ Target sign
- ☐ Coffee-bean sign
- ☐ Accordion sign

Large Bowel

CHAPTER OUTLINE:

知识测试

大肠

章节大纲：

<?> 问题

3 乙状结肠扭转在腹部 X 线片上表现为什么征象？

- ☐ 铅管征
- ☐ 梳状征
- ☐ 靶征
- ☐ 咖啡豆征
- ☐ 手风琴征

Test Your Knowledge

<?> ANSWER

3 Which sign is used to describe the appearance of sigmoid volvulus on an abdominal radiograph?

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- ☐ Comb's sign
- ☐ Target sign
- ■ Coffee-bean sign
- ☐ Accordion sign

Large Bowel

CHAPTER OUTLINE:

知识测试

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- ☐ 梳状征
- ☐ 靶征
- ■ 咖啡豆征
- ☐ 手风琴征

大肠

章节大纲：

Test Your Knowledge

<?> QUESTION

4 Which is the optimal imaging modality for the detection of colonic tumours and polyps?

- ☐ Abdominal radiograph
- ☐ CT colonography
- ☐ Portal-venous phase CT
- ☐ MR abdomen and pelvis
- ☐ PET-CT

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

知识测试

<?> 问题

4 检测结肠肿瘤和息肉的最佳影像学方法是什么？

- ☐ 腹部 X 线摄影
- ☐ CT 结肠成像
- ☐ 门静脉期 CT
- ☐ 腹部和盆腔 MR
- ☐ PET-CT

Test Your Knowledge

<?> ANSWER

4 Which is the optimal imaging modality for the detection of colonic tumours and polyps?

- ☐ Abdominal radiograph
- ■ CT colonography
- ☐ Portal-venous phase CT
- ☐ MR abdomen and pelvis
- ☐ PET-CT

Large Bowel

CHAPTER OUTLINE:

大肠

章节大纲：

知识测试

<?> 回答

4 检测结肠肿瘤和息肉的最佳影像学方法是什么？

- ☐ 腹部 X 线摄影
- ■ CT 结肠成像
- ☐ 门静脉期 CT
- ☐ 腹部和盆腔 MR
- ☐ PET-CT

/ Test Your Knowledge

<?> QUESTION

5 Which of the following are included in the imaging protocol for CT colonography?

- ☐ Intravenous contrast
- ☐ Faecal tagging
- ☐ Laxative preparation
- ☐ Anti-spasmolytic
- ☐ Two or more patient positions

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 知识测试

<?> 问题

5 CT 结肠成像检查方案包括以下哪些项？

- ☐ 静脉对比剂
- ☐ 粪便标记
- ☐ 通便剂
- ☐ 解痉剂
- ☐ 两种或以上患者体位

/ Test Your Knowledge

<?> ANSWER

5 Which of the following are included in the imaging protocol for CT colonography?

- Intravenous contrast
- Faecal tagging
- Laxative preparation
- Anti-spasmolytic
- Two or more patient positions

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 知识测试

<?> 回答

5 CT 结肠成像检查方案包括以下哪些项？

- 静脉对比剂
- 粪便标记
- 通便剂
- 解痉剂
- 两种或以上患者体位

/ Test Your Knowledge

<?> QUESTION

6 What is the gold-standard test for the local staging of rectal cancer?

- ☐ Colonoscopy
- ☐ Portal-venous phase CT
- ☐ Endoanal ultrasound
- ☐ PET-CT
- ☐ Rectal MRI

/ Large Bowel

CHAPTER OUTLINE:

/ 大肠

章节大纲：

/ 知识测试

<?> 问题

6 直肠癌局部分期的金标准检查是什么？

- ☐ 结肠镜
- ☐ 门静脉期 CT
- ☐ 经肛管超声
- ☐ PET-CT
- ☐ 直肠 MRI

/ Test Your Knowledge

<?> ANSWER

6 What is the gold-standard test for the local staging of rectal cancer?

- ☐ Colonoscopy
- ☐ Portal-venous phase CT
- ☐ Endoanal ultrasound
- ☐ PET-CT
- ■ Rectal MRI

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/ 知识测试

/ 大肠

章节大纲：

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<?> QUESTION

7 In the context of rectal cancer, the circumferential resection margin (CRM) is considered involved on MRI if there is disease within what distance?

- ☐ 1 mm
- ☐ 2 mm
- ☐ 3 mm
- ☐ 4 mm
- ☐ 5 mm

/ Large Bowel

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/ 大肠

章节大纲：

/ 知识测试

<?> 问题

7 对于直肠癌，MRI 检查发现病变距离环周切缘 (CRM) 小于多少，即认为 CRM 受累？

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<?> ANSWER

8 Familial adenomatous polyposis is one of the most common inherited polyposis syndromes. What is its inheritance pattern?

- ☐ Autosomal dominant
- ☐ Autosomal recessive
- ☐ X-lined dominant
- ☐ X-lined recessive
- ☐ Mitochondrial

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<?> 回答

8 家族性腺瘤性息肉病是最常见的遗传性息肉病综合征之一。它的遗传模式是什么？

- ☐ 常染色体显性遗传
- ☐ 常染色体隐性遗传
- ☐ X 连锁显性遗传
- ☐ X 连锁隐性遗传
- ☐ 线粒体遗传

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Test Your Knowledge

<?> QUESTION

9 Which of the following statements is INCORRECT?

- ☐ Ischaemic colitis most commonly involves the watershed territories.
- ☐ CT is the first-line imaging modality for the assessment of ischaemic bowel.
- ☐ Venous ischaemia tends to present with more bowel wall thickening than arterial ischaemia.
- ☐ The hepatic flexure is the most commonly affected segment in ischaemic colitis.

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章节大纲：

<?> 问题

9 下列哪项说法是错误的？

- ☐ 缺血性结肠炎最常累及分水岭区域。
- ☐ CT 是评估缺血性肠病的一线影像学方法。
- ☐ 静脉性缺血比动脉性缺血更易出现肠壁增厚。
- ☐ 缺血性结肠炎最常累及肝曲。

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Test Your Knowledge

<?> QUESTION

10 What is the first line investigation for the assessment of ulcerative colitis?

- ☐ CT
- ☐ MRI
- ☐ Ultrasound
- ☐ Colonoscopy

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<?> 问题

10 溃疡性结肠炎评估的一线检查是什么？

- ☐ CT
- ☐ MRI
- ☐ 超声
- ☐ 结肠镜

Test Your Knowledge

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