Manchester University
NHS Foundation Trust

Beyond the obvious: The Radiologist's Role in Unmasking Non-colorectal mimics in Suspected Primary and Metastatic Colorectal Cancer

Dr Dalia Elbeih ST5 Radiology, Dr Yoke Lim Consultant Radiologist, Dr Kyungmin Kim Consultant Radiologist, Dr Sathi Sukumar Consultant Radiologist

Wythenshawe Hospital, Manchester Foundation trust

Manchester University
NHS Foundation Trust

Introduction:

- Radiologists play a pivotal role in the multidisciplinary management of suspected colorectal cancer, particularly in discerning atypical presentations that may not represent primary colorectal malignancy.

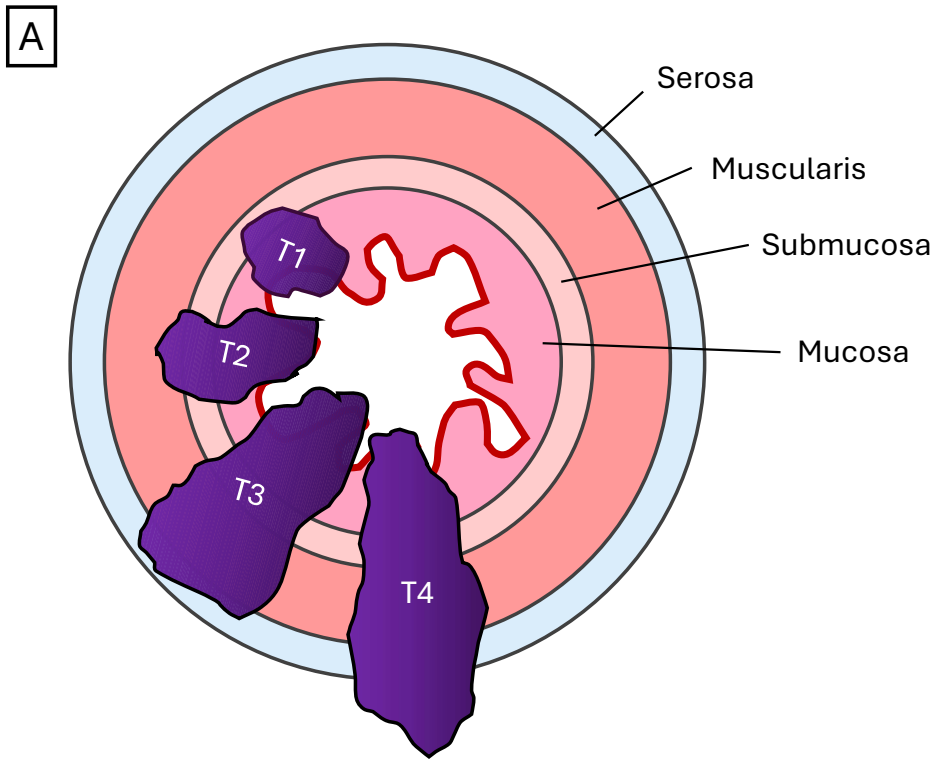
- This presentation highlights the importance of a high index of suspicion and pattern recognition in identifying alternative diagnoses in patients referred to colorectal multi-disciplinary team meetings.

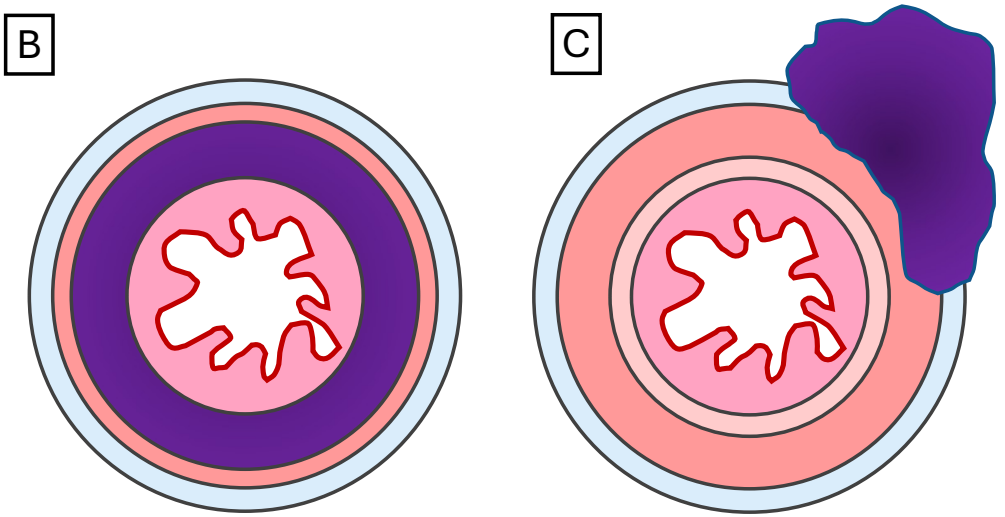
Manchester University
NHS Foundation Trust

- Recognition of these signs allows the radiologist to redirect work-up, avoid unnecessary interventions, and guide appropriate oncological or medical management.

- Key imaging clues include **non-contiguous segmental involvement**, **atypical nodal spread** or location of **metastasis**, **unusual pattern of bowel wall thickening** and **morphology**, and lack of typical features of colorectal primaries.

Key imaging points for colorectal adenocarcinoma





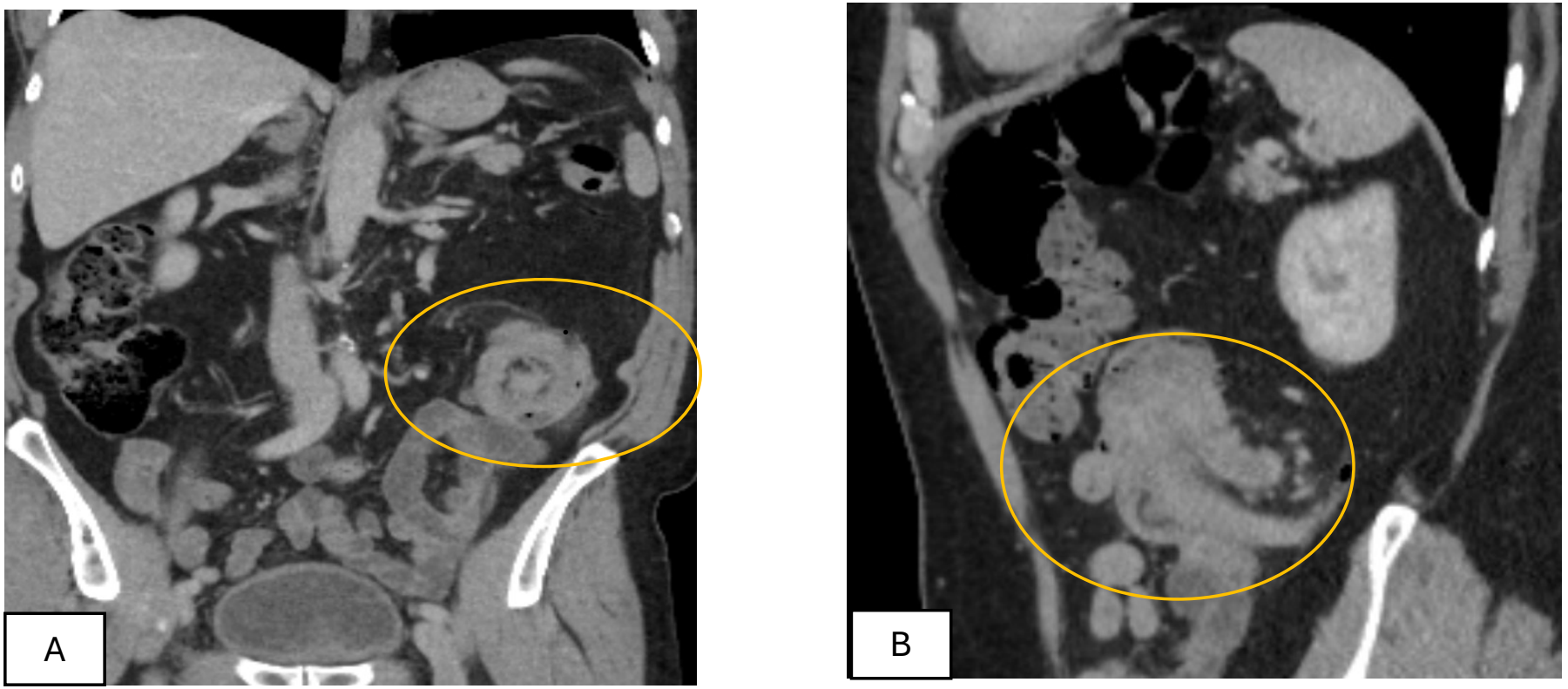
(A): Cross-sectional diagram of bowel wall with different T-stages of classic colorectal adenocarcinomas. T1 tumors do not extend beyond the submucosal layer. T2 tumors do not extend beyond the muscularis layer. T3 tumors do not extend beyond the serosa. T4 tumors extend beyond the serosal layer and invade the peritoneal lining (T4a) or adjacent organs or structures (T4b).
(B, C): Cross-sectional diagram of bowel wall with appearances atypical of primary colorectal adenocarcinoma. It there is diffuse thickening of the submucosal layer (B) or extrinsic growth of tumor into the bowel wall (C), an alternative diagnosis should be considered.

Learning points:

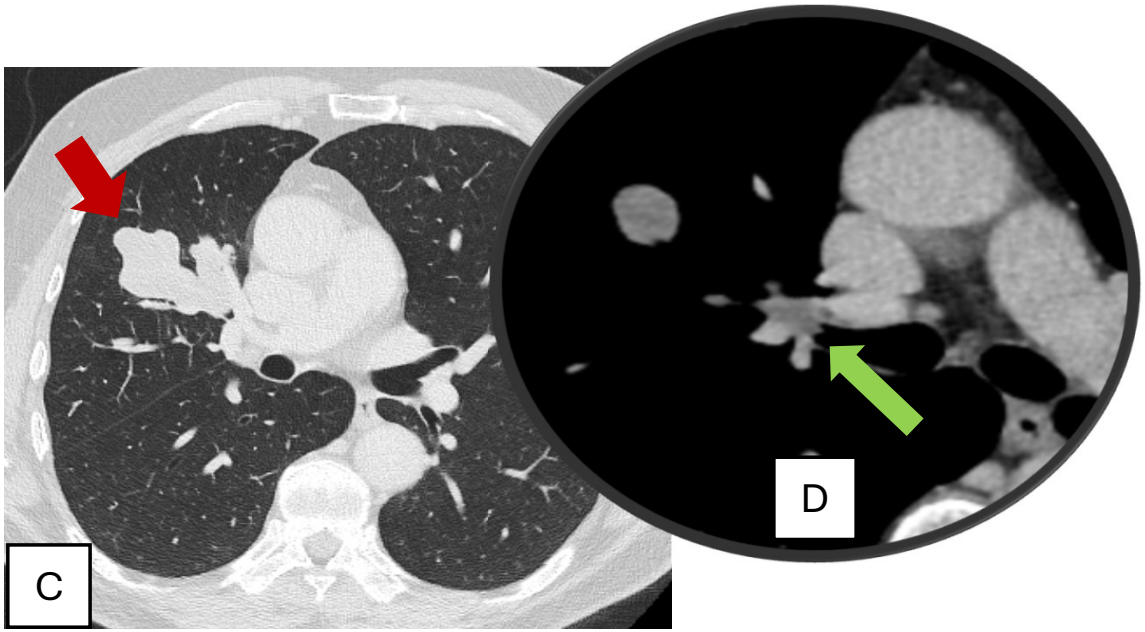
- ✓ Classic colorectal adenocarcinoma originates from the mucosal layer of the bowel wall and grows cross-sectionally outwards beyond the submucosa, muscularis and serosa with progressive disease.
- ✓ If the mucosal layer of the bowel appears normal on imaging, consider an alternative diagnosis.

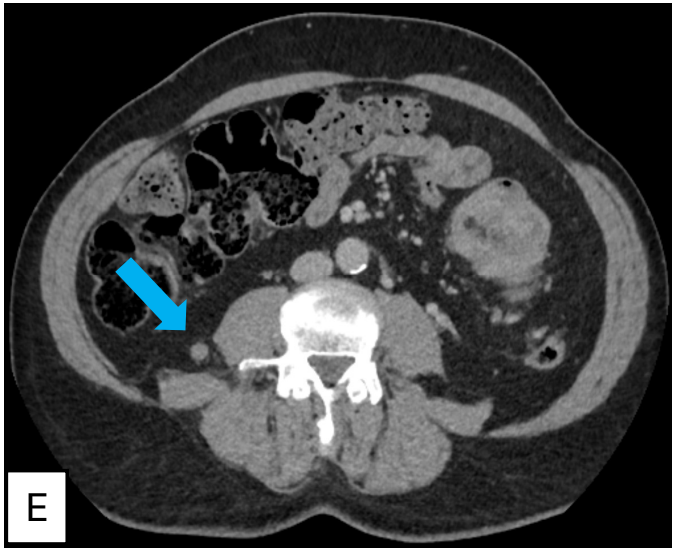
Case 1: Malignant melanoma mimicking colorectal carcinoma

A 67-year-old presented with a large colonic polyp on colonoscopy. Initial biopsies of the polyp was inconclusive. Staging CT was requested to plan resection.



(A, B): Coronal (A) and sagittal (B) slices of a contrast-enhanced CT scan demonstrating **colo-colic intussusception** of the descending colon (**yellow circle**), suggestive of a colonic mass as a lead point. No suspicious pericolic lymphadenopathy.





(C, D): CT demonstrating a **large bronchocele** (red arrow) with **soft tissue** occlusion of the **right upper lobe bronchus** (green arrow).

(E): Small **retroperitoneal nodule** adjacent to the right psoas muscle (blue arrow) was concerning for a metastatic tumour deposit.

Manchester University
NHS Foundation Trust

- The case was discussed in the colorectal multidisciplinary team meeting (MDT).

- On review of the CT, the radiologist suggested metastatic melanoma as a likely differential based on the overall pattern of the disease.

- Subsequent clinical history revealed right upper back malignant melanoma excised 10 years ago, which was not disclosed at time of referral.

- Left hemicolectomy and bronchoscopy were then performed. Final histology proved to be metastatic melanoma.

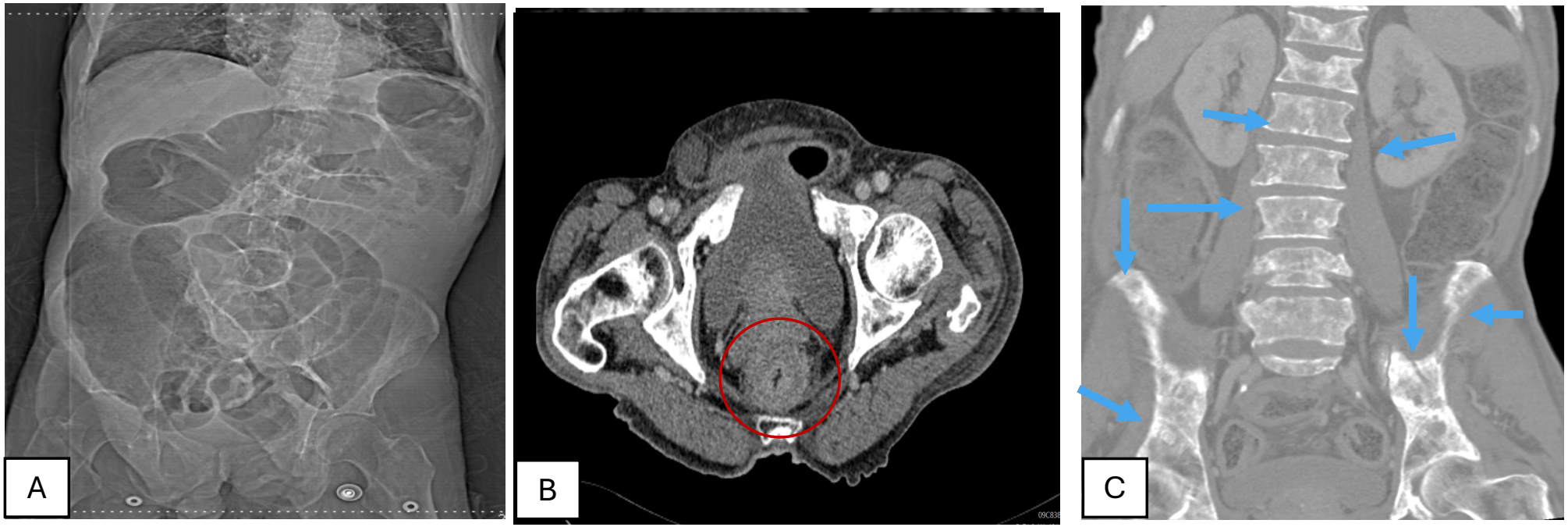
NHS
Manchester University
NHS Foundation Trust

Learning points:

- ✓ In the presence of a colonic mass, atypical sites of presumed metastatic disease should raise the suspicion of an alternative diagnosis.
- ✓ In this case, the presence of an additional retroperitoneal soft tissue nodule and an endobronchial lesion was felt to be atypical for primary colorectal malignancy or colorectal metastases, as colorectal cancer more commonly spreads to the liver, lungs, lymph nodes, and peritoneum, with retroperitoneal involvement usually occurring via direct invasion rather than discrete metastatic deposits.
- ✓ In contrast, melanoma is well recognized for producing unusual metastatic patterns, including subcutaneous/soft tissue metastases and deposits at uncommon sites.
- ✓ Metastatic melanoma is well known for widespread and atypical metastatic spread, including soft tissue/subcutaneous and retroperitoneal deposits.

Case 2: “When the prostate plays tricks: A case of rectal masquerade”

73-year-old man admitted with abdominal distension, vomiting and constipation. CT scan was requested.



(A): Dilated small and large bowel on scout view. (B): Axial CT demonstrating **abnormal circumferential thickening of the rectum** with **exaggerated stratification of the bowel wall** (red circle). There was associated luminal narrowing causing upstream bowel dilatation. Prostate gland was enlarged. (C): Coronal reformat in bone window revealed **multiple sclerotic lesions** (blue arrows).

Manchester University
NHS Foundation Trust

- The case was discussed in colorectal MDT for suspicion of primary rectal malignancy.
- On review, the rectal wall thickening demonstrated a **concentric ring appearance**, which was **atypical for primary rectal adenocarcinoma**.
- **Widespread sclerotic osseous metastases** are **unusual for colorectal cancer**.
- The imaging appearances were more suggestive of **metastatic prostate cancer.**
- As there was **no CT evidence of direct extracapsular prostatic invasion into the rectum**, the rectal thickening was thought to represent **secondary linitis plastica**.
- Rectal biopsy confirmed metastatic prostatic adenocarcinoma.

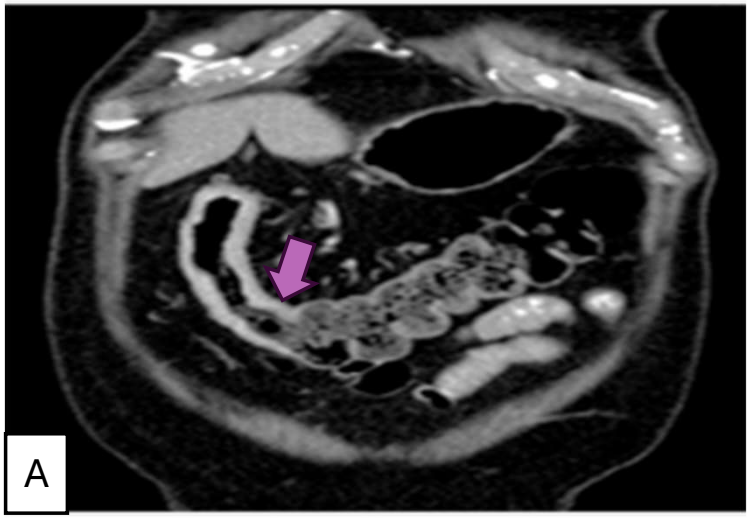
NHS
Manchester University
NHS Foundation Trust

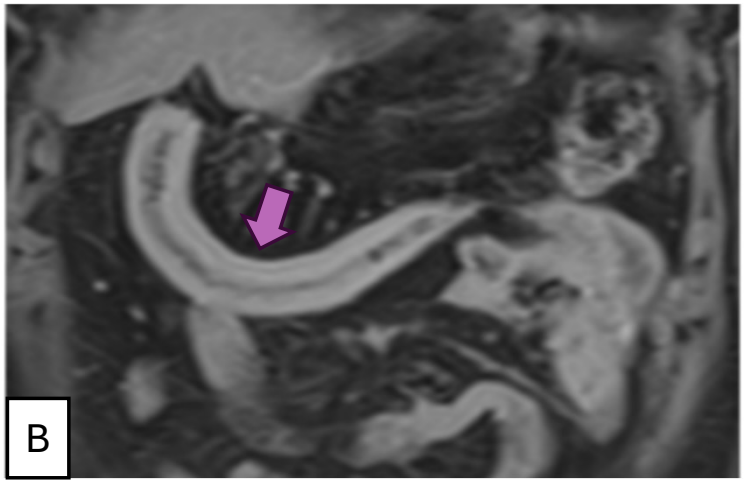
Learning points:

- ✓ Long segment, smooth thickening of the bowel with lack of adjacent inflammation and desmoplastic reaction, suggest an infiltrative process, which is more commonly metastatic.
- ✓ Most common primary cancer to cause colonic linitis plastica would be lobular breast cancer. Other primary sites include prostate, ovarian and GI tract.
- ✓ Radiological suspicion is essential, as often the mucosa is preserved on endoscopy, and superficial biopsy may miss deep infiltrative lesions.
- ✓ Widespread sclerotic osseous metastases are unusual for colorectal cancer, as only 1-2.7% cases metastasize to the bone.
- ✓ If bone metastases from colorectal primaries are present, they are often lytic or mixed lytic/sclerotic.

Companion case!

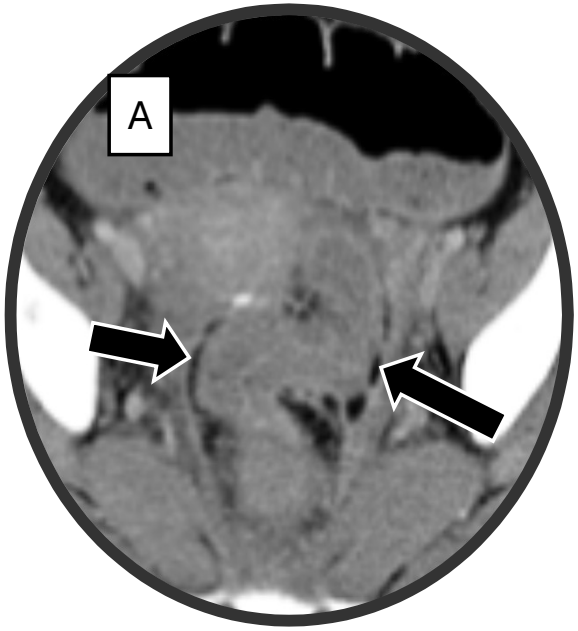
- 70-year-old woman with altered bowel habit referred to the colorectal MDT.
- (A&B) **Uniform, concentric thickening and enhancement of a long segment of transverse colon** seen on CT and MR (lilac arrows).
- **No extramural extension or mesenteric inflammation.**
- **No regional lymphadenopathy**. The appearance was suspicious for an infiltrative process.
- Imaging morphology and features **not typical for a primary colonic malignancy.** Patient's scan also demonstrated previous mastectomy.
- **Metastatic lobular breast carcinoma** was suspected and later confirmed on deep colonic biopsy.

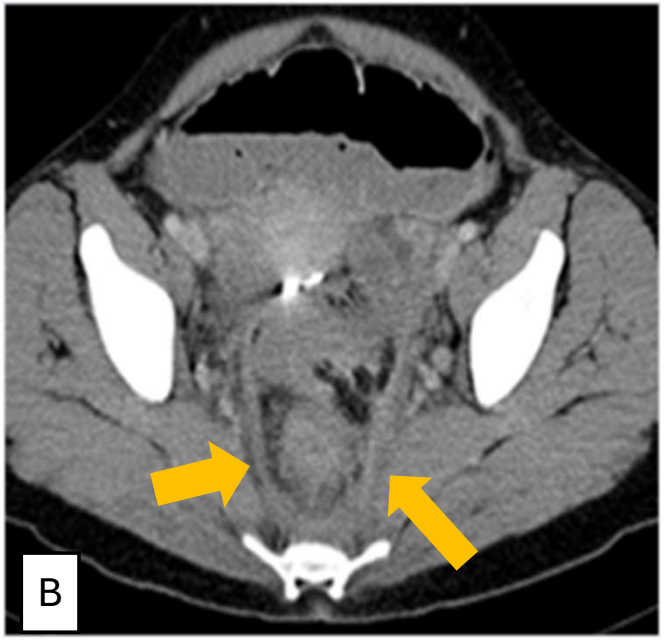




Case 3: “When infection imitates cancer: A rare case of pelvic actinomycosis”

A 36-year-old woman presented with vomiting, abdominal pain and raised inflammatory markers.



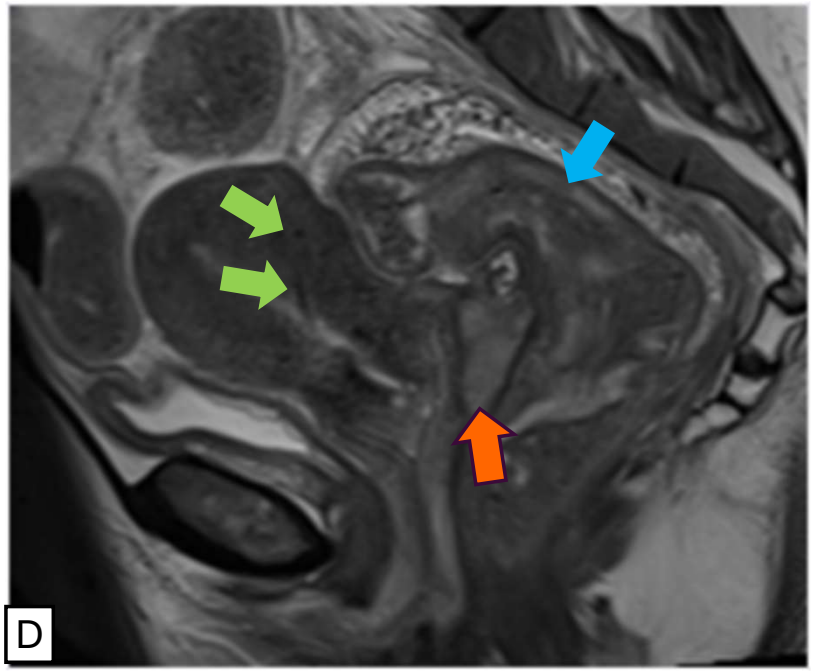


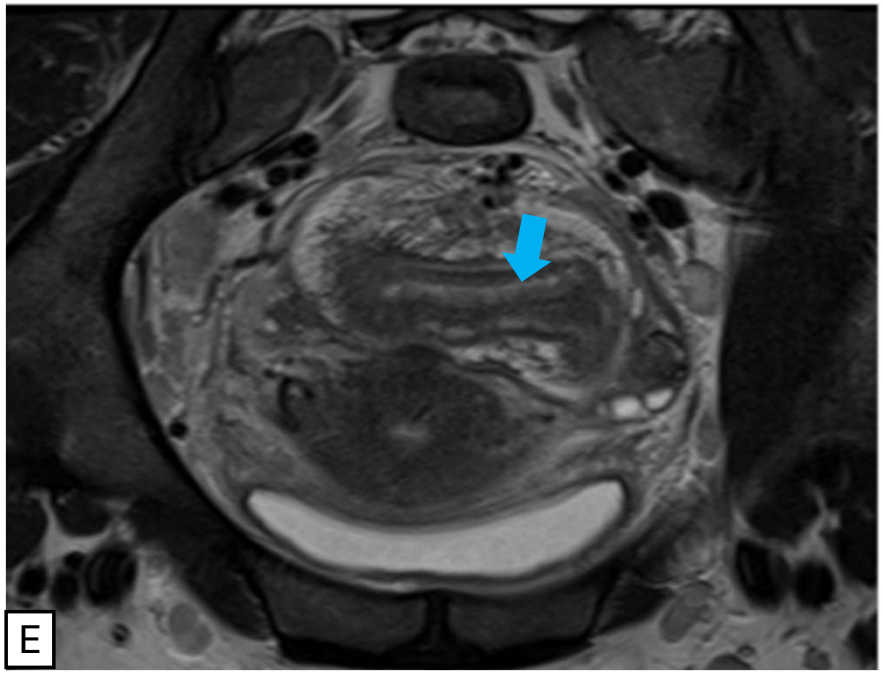
(A) : Axial CT **demonstrating circumferential thickening of the rectosigmoid** (**black arrows**) causing upstream bowel dilatation.

(B) : There was also **thickening of the mesorectal fascia and pelvic side walls** (yellow arrows).

(C) : Note **intrauterine contraceptive device (IUCD)** in situ (red circle). **Upstream bowel dilatation** (blue arrows).

➢ MRI was performed for suspected colorectal tumour staging.

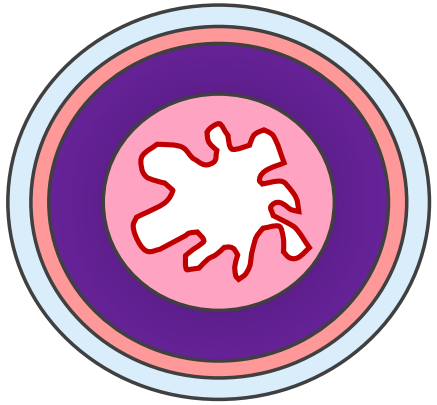




(D,E): Subsequent MRI confirming the **thickened large bowel with exaggerated mural stratification and submucosal oedema** (blue arrow) and **abnormal intermediate T2 signal material in the pouch of Douglas** (Orange arrow). Note **malpositioned IUCD embedded in the myometrium** (green arrows).

Manchester University
NHS Foundation Trust

- On Discussion in the colorectal MDT, given **presence of an IUCD**, **increased inflammatory markers and atypical imaging features**, this was felt to be more in keeping with **inflammatory/ infective process**, and **actinomycosis** was raised as a diagnosis.
- This was confirmed in microbiology.



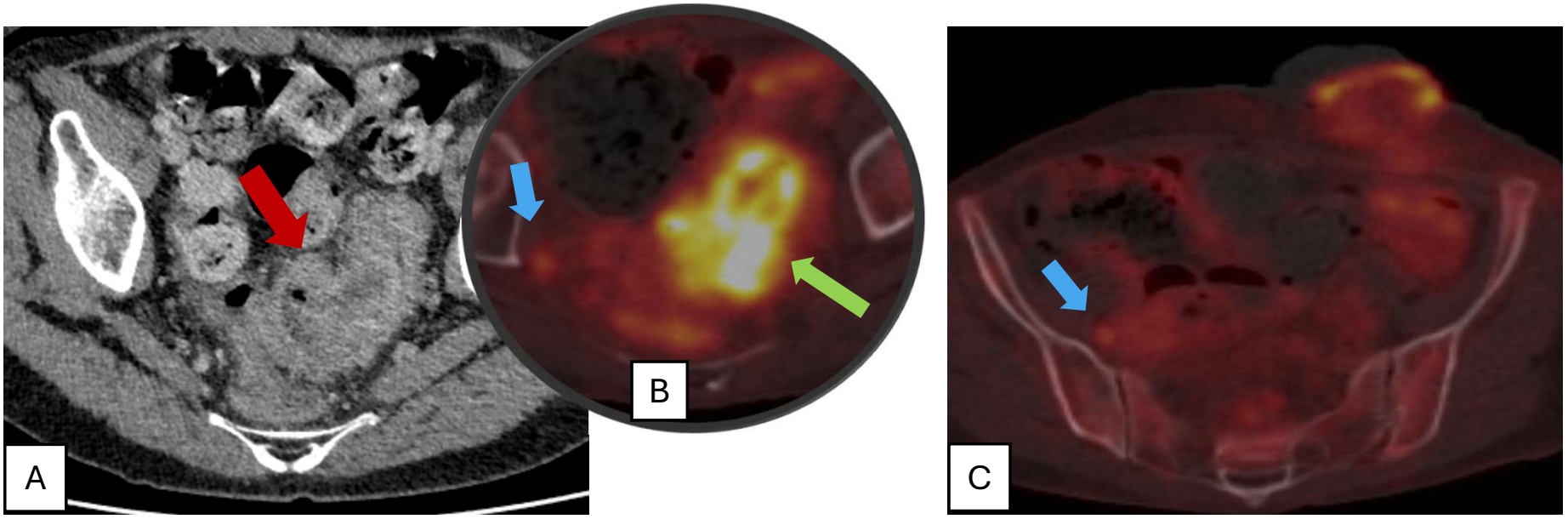
Cross-sectional diagram of the bowel wall with appearances atypical of primary colorectal adenocarcinoma

Learning points:

- ✓ Differentiating malignant *vs* inflammatory cause of circumferential large bowel thickening may be challenging. Lack of raised rolled edges, exaggerated mural stratification, submucosal oedema and features of pericolic inflammation makes inflammation / infection more likely.
- ✓ When there is pelvic inflammatory disease with an IUCD, think actinomycosis!

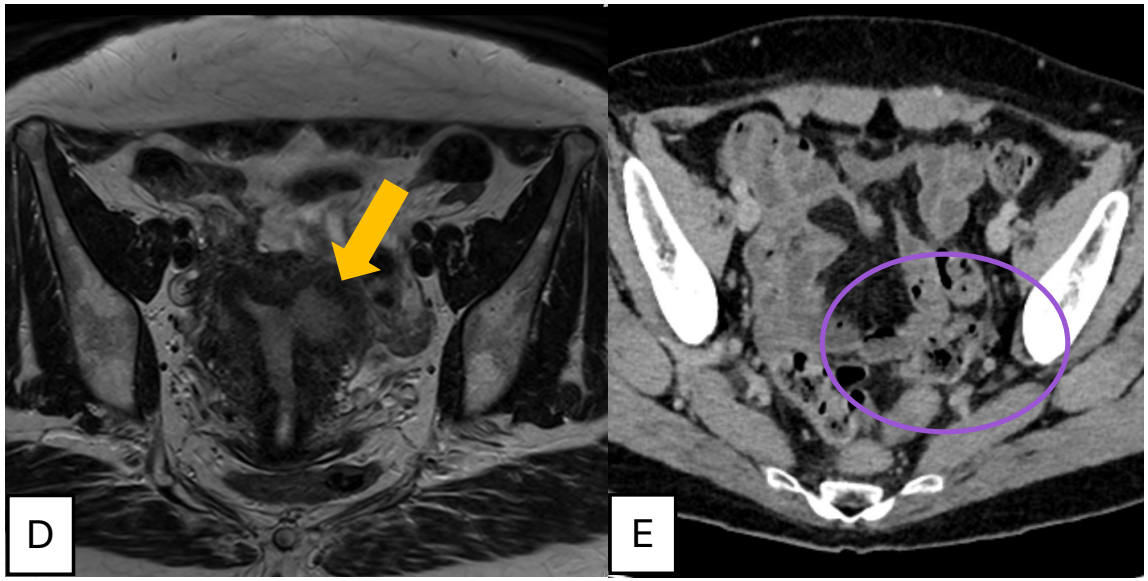
Case 4: “A tumour in disguise: Recurrent endometrial cancer mimicking colorectal cancer”

51-year-old woman with previous hysterectomy for endometrial malignancy, presented with loose stools and haematochezia.



(A) Presentation CT demonstrated **thickening in the sigmoid colon** (red arrow), reported as primary colonic malignancy. There were also several pathological para-aortic lymph nodes.

(B, C) FDG-PET/CT was performed. In addition to the **high uptake** by the **sigmoid mass** (green arrow), there were also **avidities in the right obturator**, **common iliac** (blue arrows), as well as the para-aortic nodes (not shown), indicating nodal metastases.



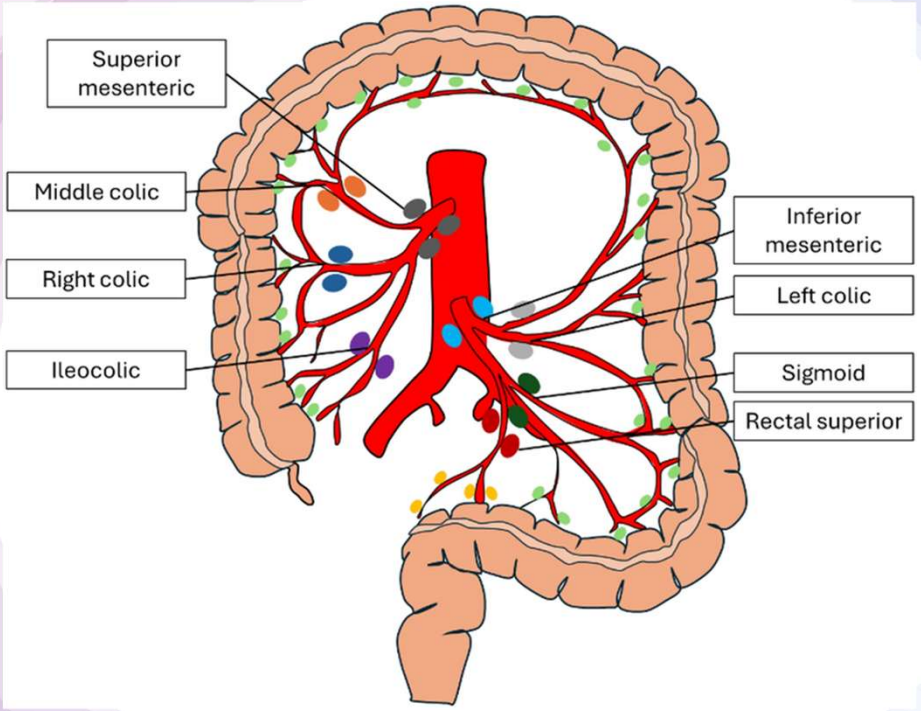
(D,E) MR and CT performed during initial diagnosis of endometrial cancer 2 years ago, showed locally **aggressive endometrial tumor with deep myometrial invasion** (yellow arrow). **Sigmoid colon** was normal at that time (liliac circle) and was in close proximity to the uterus.

- The case was discussed in the colorectal MDT.
- On review, the pattern of nodal spread was thought to be atypical for a sigmoid malignancy; and the sigmoid colon was normal 2 years prior.
- The radiologist raised the possibility of recurrent endometrial cancer, rather than primary colonic malignancy.
- This was subsequently histologically confirmed from further biopsy taken from the sigmoid mass.

Manchester University
NHS Foundation Trust

Learning points:

- ✓ The nodal spread of a colorectal tumor is typically along its lymphatic drainage pathway (in this case, the right obturator and right common iliac being atypical sites).
- ✓ Atypical location of lymphadenopathy should alert the radiologist to an alternative cause or diagnosis, guiding further investigation and management plan.



Lymphatic drainage of the colon and rectum. Colorectal cancer spreads in a stepwise manner from **epicolic and pericolic nodes** to **intermediate nodes along the named colic vessels**, and finally to **central nodes at the superior and inferior mesenteric vessels**. Rectal tumours may also drain to **pelvic lymph nodes**.

Manchester University
NHS Foundation Trust

Conclusion:

- Radiologists add value beyond staging by **recognizing atypical patterns of disease** and refining the differential diagnosis.
- Early diagnostic refinement can **prevent unnecessary surgical intervention** and **support timely management decisions**.
- Close multidisciplinary collaboration remains essential in complex or atypical presentations.

Manchester University
NHS Foundation Trust

References:

- Pickhardt PJ, Taylor AJ. Primary colorectal cancer: CT staging and pitfalls. Radiol Clin North Am. 2002;40(6):1251–1274.
- Horton KM, Fishman EK. The current status of multidetector row CT and three-dimensional imaging of the small bowel and colon. Radiol Clin North Am. 2003;41(2):199–212.
- Gollub MJ, Pickhardt PJ, Goodman KA, et al. Secondary involvement of the colon and rectum: CT findings. Radiographics. 2014;34(4):1018–1035.
- Borley NR, Mortensen NJ. Colorectal cancer masqueraders. Br J Surg. 2004;91(9):1124–1132.
- Ha HK, Lee HJ, Kim H, et al. Intestinal tuberculosis and other infectious diseases mimicking colon cancer. Radiographics. 1999;19(6):1381–1398.
- Hernandez RK, Wade SW, Reich A, Pirolli M, Liede A, Lyman GH. Incidence of bone metastases in patients with solid tumors: analysis of oncology electronic medical records in the United States. BMC Cancer. 2018;18:44. doi:10.1186/s12885-017-3922-0.