Atypical metastasis of the colorectal cancer: the rarity in the frequent

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Learning objectives

To review the common and uncommon locations of metastasis in colorectal cancer. To get used to the possible ways of unusual presentation of these metastases from the radiologic point of view in CT.

Background

Colorectal carcinoma is one of the most common neoplastic diseases (15% of diagnosed tumours) and the second leading cause of cancer mortality, only surpassed in men by lung cancer and women with breast cancer. It is estimated that approximately 156,000 new cases are diagnosed each year in the U.S. and about 11,000 in Spain. Most have an origin in the ascending and transverse colon (39%), followed by descending-sigmoid colon (30%) and less frequently rectum (29%). Histologically, the usual type is adenocarcinoma (up to 98% of cases) being rare lymphoma, carcinoid and gastrointestinal stromal tumour.

The routes of spread of colorectal cancer may be haematogenous, lymphatic or contiguity, varying in frequency according to the segment affected by the primary tumour. The most frequent location of metastasis are liver (75%) Fig. 1 on page 4 Fig. 2 on page 5 the lung (5-50%) Fig. 3 on page 6 and adrenal glands (14%) Fig. 4 on page 7 Fig. 5 on page 8. Hypovascular behaviour is often observed, especially in the liver, with relatively well-defined edges and uniform density although sometimes central hypodensity related to necrosis can be observed.

All we ever heard the famous axiom "is more common the uncommon presentation of a common disease rather than the common presentation of a rare disease". This is perfectly applicable to the present case: given the high frequency of cases of colorectal carcinoma is essential to be used to the uncommon forms of presentation of this pathology, especially in the case of metastases which presents considerable variability.

Lung (5-50%)

It is one of the most common sites of metastases. It is important to note that haematogenous metastases of rectal cancer may appear isolated in the lung due to its drainage through the inferior vena cava, but colon cancer liver metastases previously usually has to submit a drainage through portal vein. Metastasis usually appear as multiple solid nodule with well-defined borders and variable size ("balloon release" look) Fig. 3 on page 6. Other styles are:

Cavitary nodules
Are mainly seen in adenocarcinoma (approximately 9.5% of cases). Typically seen as central cavitation and thick wall nodules with irregular inner borders; sometimes thin wall nodules with poorly defined edges and a ground glass halo produced by peritumoural haemorrhage (CT halo sign). Differential diagnosis with infectious causes, breast cancer and sarcoma.

Peripheral halo
Solid nodules with poorly defined edges and a ground glass halo produced by peritumoural haemorrhage (CT halo sign). Differential diagnosis with aspergillosis, candidiasis, Wegener granulomatosis, lymphoma and bronchioloalveolar carcinoma.

Consolidation areas
By extending through the alveolar walls similarly to bronchioloalveolar carcinoma. Occupation of airspace occurs and may show with solid appearance with inside air bronchograms or ground glass areas of ill-defined edges. Differential diagnosis with pneumonias and bronchioloalveolar carcinoma.

Semisolid nodules
Ground glass nodules with partially well-defined edges, sometimes with bronchovascular structures within. May appear associated with adenocarcinomas of gastrointestinal origin.

Mucoid masses with calcification
They appear in mucinous adenocarcinomas, a subtype (10%) more common in males. Looks similar to the hamartoma as a hypodense mass with multiple nodular calcifications within.

Metastasis endobronchial
Intrabronchial lesions by haematogenous or lymphatic spread or by direct invasion of the bronchial tree by adjacent lesion. Often presented as corresponding lobe atelectasis.

Carcinomatous lymphangitis
By lymphatic spread, commonly associated with pre-existing metastatic foci, showing thickening and nodularity of interlobular septa and fissures.

Mesentery and retroperitoneum (5-10%)

Mesenteric metastases may occur via the lymphatic or haematogenous way, being less frequent a direct spread. Mesenteric implants can occur isolated by peritoneal dissemination, although this is rare, as nodules with well-defined irregular edges and hypovascular character. Peritoneal carcinomatosis can also be observed with omental fat infiltration (also called "omental cake"), manifest as thickening of omental fat with trabeculation and hyperdensity thereof. Exceptionally the appearance of pseudomyxoma peritoneal can be observed associated with mucinous adenocarcinomas, with peritoneal space occupation by a mucoid material.
looking like ascites but with slightly higher attenuation values, sometimes with septa or calcifications Fig. 17 on page 20 Fig. 18 on page 21.
Also exceptionally rectal cancer can result in retroperitoneal metastatic implants Fig. 19 on page 22.

**Bone (5-10%)**

Metastases usually present as foci of hyperdensity, sometimes confluent, without associated lytic lesions Fig. 20 on page 23 Fig. 21 on page 24. Sometimes it can be difficult to assess, especially in early stages with little or questionable lesions; in these cases it is recommended scintigraphy or PET due to its high sensitivity for detection.

**Ovary (3-8%)**

In this organ metastases may present a mixed solid-cystic appearance, similar to that of cystadenocarcinoma, so they should be considered as a possibility in new-onset cystic lesions in patients with a previous history of colorectal carcinoma Fig. 22 on page 25 Fig. 23 on page 26.

**Brain (3-5%)**

They appear as masses of unspecific character with peripheral enhancement, usually with central necrosis and surrounding oedema Fig. 24 on page 27. Often lie in supratentorial location. It is rare to find them in isolation because they are generally a result of spread from lung micrometastases undiscovered and asymptomatic. The presence of a single metastatic brain lesion is uncommon and is described in less than 1% of patients in some series.

**Other solid organs**

Exceptionally metastases may occur in other organs such as pancreas or spleen, usually by contiguity spread Fig. 25 on page 28. The location of the tumour and lymph / vascular drainage can influence it: e.g. pancreatic distant metastases are more frequent in the transverse colon carcinoma.

**Images for this section:**
Fig. 1: Axial MDCT. Multiple nodular liver metastases in a patient with sigmoid carcinoma. It can be seen their hypovascular character with well delimited borders.
Fig. 2: Axial MDCT. Similar to the previous case, presents a more hypodense center in some metastatic foci suggestive of necrosis and areas of confluence of the right hepatic lobe lesions.
**Fig. 3:** Axial MDCT. Multiple homogeneous hyperdense nodules (arrows) of different sizes distributed diffusely through the lung parenchyma in a patient with rectal adenocarcinoma.
Fig. 4: Heterogeneous lesion with well defined borders in right adrenal gland with central hypodensity and peripheral hyperdensity corresponding to metastasis from colon carcinoma. The differential diagnosis is often made with nonfunctioning adenoma.
Fig. 5: Right adrenal gland metastasis (arrow), this time homogeneous density, associated with large hepatic metastases (star) in a colon carcinoma.
Fig. 6: Axial MDCT. Nodules with central cavitation (arrows) in lung parenchyma.
Fig. 7: Detail from case shown in Fig. 6
Fig. 8: Axial MDCT, mediastinum window. There is a right parahilar consolidation zone in a patient with a history of rectal carcinoma with previous surgery. The biopsy showed a metastatic origin.
**Fig. 9:** Same case as in Fig. 8, lung window. It can be seen a discrete air bronchogram in some areas of consolidation and adjacent ground glass pattern.
**Fig. 10:** Axial MDCT of chest, lung window. Patient with history of rectal carcinoma. There is a ill-defined area of ground glass that affects diffusely the parahiliar right area (star) with a better delimited focus in the left upper lobe (arrow) near the hilus, which was confirmed as metastatic origin.
**Fig. 11:** Detail of an axial MDCT section from chest, lung window. Semisolid well defined nodule (arrow) in a patient with rectal adenocarcinoma, metastatic origin.
Fig. 12: Detail axial MDCT section from chest, lung window. Semisolid nodule with partially defined borders (arrow) in a patient with a history of colon carcinoma, liver and bone metastases.
Fig. 13: Axial MDCT section, lung window. Medial segment of the right lower lobe shows interlobular septal thickening associated with discrete nodularity in a patient with a history of rectal carcinoma that suggests carcinomatous lymphangitis, subsequently histologically confirmed.
**Fig. 14:** Coronal reconstruction of the case of Fig. 13.
Fig. 15: Axial abdominal MDCT section. Multiple metastatic implants of colon carcinoma at mesentery (arrows).
**Fig. 16:** Axial abdominal MDCT section. Trabeculation, thickening and blurring of omental fat (arrows) in a patient with colon carcinoma, related to mesenteric carcinomatosis ("omental cake").
**Fig. 17:** Axial abdominal MDCT section. Patient with a history of intervened colon carcinoma. TC shows the appearance of a material with Hansfield units values next to the dense fluid, spread by the peritoneal cavity with associated increased density and thickening of mesenteric fat. Subsequently the diagnosis of peritoneal pseudomyxoma was confirmed.
Fig. 18: Same case as in Fig. 17, caudal to the previous cut. Signs of omental fat infiltration (arrows) can be observed.
Fig. 19: Reconstruction of coronal abdominal MDCT section. Patient with history of rectal carcinoma. There were several metastatic implants with well-defined borders and soft tissue density in the retroperitoneal space; the larger one (arrow), adjacent to the left psoas muscle, caught the middle third of the ipsilateral ureter causing retrograde hydronephrosis (star).
**Fig. 20:** Axial MDCT chest section, bone window. Patient with a history of colon carcinoma and liver metastases. Hyperdense nodular lesions in sternum, vertebrae and costal arches are seen, related to bone metastases.
**Fig. 21:** Coronal abdominal reconstruction of the case of fig. 20, bone window. Similar implants can be observed in different vertebral bodies, pelvis and both femurs.
Fig. 22: Axial pelvic MDCT section. Patient with a history of intervened colon carcinoma. In a subsequent control it was observed the appearance of a solid-cystic right adnexal lesion (arrows) of large size, well-defined borders and foci of enhancement after intravenous contrast. Subsequently it was confirmed a metastatic origin.
Fig. 23: Coronal reconstruction of the case of Fig. 22.
Fig. 24: Cerebral metastases from colon carcinoma. It can be seen a mass with hypodense center and peripheral enhancement (arrow) with significant perilesional vasogenic edema.
**Fig. 25:** Axial abdominal MDCT section. Patient with a history of colon carcinoma, surgery years before. In a control study, a nodular lesion hypovascular behavior in pancreatic body was observed, with suspicion of pancreatic carcinoma. However, the histological analysis of the sample resulted in colon carcinoma metastases.
Conclusion

Atypical metastases of colorectal cancer are uncommon, but only in a relative way: although less frequent, given the large number of cases they can be a more common finding than might be expected. It is important to become familiar with their different forms of presentation, on the one hand to avoid possible errors in diagnosis, staging and posterior control, and on the other (not least) to reduce headaches when facing the inevitable question of “What about this, what could it be?” after discovering them.

References


Personal Information