**Correspondence**

Clear cell adenocarcinoma of the colon arising in endometriosis: a rare variant of primary colonic adenocarcinoma

Colonic adenocarcinomas composed predominantly or exclusively of cells with clear cytoplasm are extremely rare.\(^1\) Considerable diagnostic difficulties can arise in distinguishing primary colonic clear cell adenocarcinoma and metastatic carcinoma from sites such as ovary or kidney. Here, we describe a case of primary colonic clear cell adenocarcinoma that probably arose in endometriosis. The possible presence of endometriosis was only appreciated on review and after the examination of multiple levels and extra histological sections.

A 65 year old woman presented with cramping lower abdominal pain and the passage of blood and mucus from the rectum. Barium enema showed an apparently malignant stricture of the rectosigmoid and she underwent an anterior resection. Preoperative serum CA125 was not measured. At surgery, the clinical impression was of a primary colorectal tumour. Small haemorrhagic nodules were present on the pelvic and abdominal peritoneum, suggestive of endometriosis. There were multiple metastatic lesions within the liver. Both ovaries and kidneys appeared normal.

The surgical specimen consisted of a 30 cm length of colon. A polyoid ulcerated tumour protruded into the mucosa and infiltrated through the full thickness of the colonic wall. Histology of the tumour showed an ulcerated surface. The tumour was composed entirely of cells with abundant clear cytoplasm and prominent cell membranes (fig 1A). Several growth patterns were present. Much of the tumour had a pronounced papillary pattern, with hyalinised cores covered by tumour cells (fig 1A). Tubular and solid areas were also identified. There was moderate nuclear pleomorphism and low mitotic activity, with a formal mitotic count revealing 1–2 mitoses/10 high power fields. Areas of necrosis were present and there was extensive haemorrhagic pelvic and abdominal peritoneal nodules. The strong immunoreactivity for the epithelial lining of the cyst from cells with eosinophilic cytoplasm, suggestive of endometriosis, to cells with abundant clear cytoplasm, similar to those seen within the main tumour. One of us (WGM) has previously observed similar features in ovarian clear cell carcinoma arising in endometriosis. It was thought possible that the cystic structure could have been a mesothelial lined cyst, but this was ruled out by strong positivity of the lining cells for Ber-EP4.

Malignant transformation in endometriosis was first described by Sampson in 1925,\(^3\) who recommended that three criteria be met for a definitive diagnosis, namely: (1) there should be histological evidence of endometriosis in close proximity to the tumour; (2) no other primary site of malignancy should be histologically identified; and (3) the histological appearance of the tumour should be compatible with an origin in endometriosis. In our patient, only the second and third of these criteria were fully satisfied. However, these criteria are restrictive because in many cases the tumour may completely obliterate preexisting endometriosis, making it impossible to confirm its presence unequivocally. Tumours that can arise in endometriosis include endometrioid adenocarcinoma, clear cell carcinoma, squamous carcinoma, endometrioid stromal sarcoma, adenosarcoma, and carcinosarcoma.\(^4\)

Clear cell adenocarcinoma of the ovary is associated with pelvic endometriosis in 50–70% of cases and a quarter of ovarian clear cell carcinomas can be shown to arise in endometriotic cysts. It should therefore be no surprise if occasionally a clear cell carcinoma of ovarian type should arise in extraperitoneal endometriosis, and several such cases have been reported.\(^6\) Endometrioid type adenocarcinoma has occasionally been described arising in colonic endometriosis,\(^5\) and we are aware of a single previous report of clear cell carcinoma arising in endometriosis of the sigmoid colon.\(^9\)

In our patient, the strong positivity of tumour cells with CA125 provides evidence of Mullerian derivation. Although focal immunoreactivity can be present in primary colonic carcinoma, positivity to this extent is unusual. The strong immunoreactivity for CK7, combined with CK20 negativity, is also in keeping with an ovarian type primary, the converse pattern of staining being expected in a primary colonic neoplasm.\(^11\) A further histological pointer to an ovarian type tumour was the presence of calcified psammoma bodies. The ovaries and kidneys appeared grossly normal at laparotomy, helping to exclude the possibility of a colonic metastasis from an ovarian or renal primary.

In summary, we describe an unusual case of primary colonic clear cell adenocarcinoma that has probably arisen in extraperitoneal endometriosis. When confronted with an extraperitoneal tumour with the histological appearances described above, pathologists should consider a primary of ovarian type and an origin in endometriosis. The demonstration of endometriosis might require the examination of multiple levels and extra histological sections. Even then, residual endometriosis might not be definitely dem-
onstrated because it may be completely obliterated by tumour. Confirmation that a tumour is of ovarian type is of clinical importance, because chemotherapeutic regimens will differ from those administered for a typical colonial adenocarcinoma.

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Retroperitoneal extraskeletal osteosarcoma

Extraskeletal osteosarcomas are rare malignant mesenchymal neoplasms characterised by the direct production of osteoid or bone by tumour cells. By definition, they are located in the soft tissues without primary bone or peristematic origin. The most common location of these tumours is the lower extremity, especially the thigh, followed by the upper extremity and the retroperitoneum.1–4

We report the radiological presentation of a retroperitoneal extraskeletal osteosarcoma, which may be helpful in the consideration of its differential diagnosis.

A 68 year old man presented with a painless palpable mass in the right side of the abdomen. A previous trauma was denied. The patient was not on anticoagulant medication. Except for a cholecystectomy in 1986, his medical history was unremarkable. Physiologic examination revealed a firm mass measuring approximately 10 × 10 cm. Laboratory findings were within normal limits, with the exception of a slightly raised alkaline phos- phatase concentration of 140 U/litre (normal range, 40–120).

Plain radiography of the abdomen demonstrated a large ill defined dense lesion projecting over the right side of the pelvis. Contrast enhanced helical computed tomography (CT) of the abdomen identified a large, non-homogeneous soft tissue mass in the right side of the retroperitoneum (fig 1). The tumour measured 9 × 12 × 14 cm. The major part of the mass was predominantly mineralised; the lateral side showed a large soft tissue mass with low density in the centre suggestive of necrosis or haemorrhage. The radiological features suggested an osseous, rather than chondroid, nature because of the poorly defined and homogenous aspect of the mineralisation. The radio- lucency border of the mass was in close anatomical proximity to, but clearly separate from, the adjacent right kidney on three dimensional reformattting. The tumour definitely did not arise from adjacent osseous structures and the psoas muscle was compressed by the tumour.

Magnetic resonance imaging (MRI) demonstrated a mass surrounded by a pseudocapsule near but not originating from the lower pole of the right kidney. In addition to the ossified zone, the mass contained areas of necrosis, old haemorrhage, or secondary lacunae formation filled with protein substance indicated by intermediate signal intensity on T1 weighted sequences and very high signal intensity on T2 weighted images. Based on the clinical history and radiographic findings, the diagnosis of an extraskeletal osteosarcoma was suggested.

Macroscopic examination of the resected specimen revealed a 19 × 12 × 9 cm tumour including the resected margins, partly bony, partly firm, partly weak of consistency, with a white pink colour. There was a large cystic area, measuring 7 × 6 cm filled with serous fluid.

Microscopically the tumour was composed of storiform oriented bundles of spindle shaped tumour cells, admixed with areas of polygonal shaped tumour cells with abundant deposition of primitive osteoid matrix in between (fig 2). The osteoid matrix showed a trabecular arrangement and was focally admixed with chondroid forming areas. In these fields, the tumour cells showed lacunae. In all areas the tumour cells showed moderate pleomorphism and mitotic activity of up to 5 per 10 high power fields. No areas of necrosis were seen. No relation with a pre-existing bone was documented. Immunohistochemically, the tumour showed diffuse reactivity with antibodies against vimentin and focal reactivity with antibodies against the S-100 protein in the chondroid containing fields and the spindle cells. Antibodies directed against neurofilaments and p53 showed no reactivity. The differential diagno- sis included high grade extraskeletal osteogenic sarcoma, malignant peripheral nerve sheath tumour with heterologous elements, and dedifferentiated liposarcoma. A combined liposarcomatous part was not identified. Because of the lack of an identifiable nerve, diagnostic criteria specifically described focal reactivity only with S-100, and neurofilaments being negative, the diagnosis was extraskeletal osteogenic sarcoma.

Extraskeletal osteosarcoma is a rare tumour, constituting approximately 1% of all soft tissue sarcomas and approximately 4% of all osteosarcomas.5–9 Although primary osteosarcomas of bone occur predominantly in the first decades of life, extraskeletal osteosarco- mas are rarely encountered under 40 years of age.1

The pathogenesis of the tumour is unclear; the tumour may occur and be induced at sites that have received previous radiotherapy. In addition, a history of trauma has been reported in 12–30% of patients. There are cases described in which extraskeletal osteosarcoma is presumed to be preceded by myositis ossificans lesions.1–3

Few reports of extraskeletal osteosarcoma have detailed the radiological findings of this rare neoplasm.1–3 The imaging techniques showed a large soft tissue tumour, for a large part demonstrating ossification, located in the retroperitoneum. Another primary osteosarcoma of bone was not found elsewhere in the body. On T1 weighted sequences the tumour was hypointense and isointense compared with muscle, and exhibited high signal intensity on T2 weighted imaging in the lateral part of the tumour, suggesting necrosis, haemorrhage, or secondary lacunae formation filled with protein substance. This latter correlated with the histological findings. Compression but no involvement of the psoas muscle, as visualised by CT, was confirmed.

The radiological differential diagnosis of extraskeletal osteosarcoma includes benign and malignant lesions that show mineralisation. The most important benign lesions are calcified haematomas and myositis ossificans. Several mesenchymal tumours can show reactive or metaplastic bone formation—for example, synovial sarcoma, epithelioid sarcoma, liposarcoma, and malignant peripheral nerve sheath tumour.1 Both possible benign lesions could be ruled out. The first because the patient definitely denied previous trauma. Furthermore, the patient did not use anticoagulant medication and the aorta was normal on all studies. Myositis ossificans was unlikely because there was no previous trauma and because of the large size of the lesion. Most myositis ossificans lesions measure 3–6 cm in

Figure 1 Axial contrast enhanced helical computed tomography (CT) scan showing a large soft tissue mass with extensive mineralisation in the medial part of the tumour, as well as an area of decreased attenuation laterally compatible with necrosis. The psoas muscle is compressed. However, the tumour does not seem to arise from this structure.

Figure 2 Photomicrograph of the tumour mass demonstrates the spindle shaped tumour cells with abundant deposition of osteoid matrix (haematoxylin and eosin stained; magnification, ×200).
The excellent paper by Rhodes and colleagues 
provides a valuable insight into the factors that might cause interlaboratory variability in the immunohistochemical demonstration of oestrogen receptor expression, which is probably the most frequent histopathology result that determines specific patient treatment. There is, however, one section of the paper where the statistical analysis may be causing confusion, rather than clarity.

In table 6, the degrees of agreement between the participants and organising laboratory's assay on the same in house tumours, are 0.70 and 0.74, respectively, indicating good agreement by the same assessor when evaluating the same slides on two different occasions. The weighted k statistics for inter-observer agreement when assessing the participants' and organising laboratories' IHC results by Quick score evaluation in this study were 0.79 and 0.75, respectively, indicating excellent agreement. These findings support those of previous studies that have used the Quick score method of evaluation. In summary, we conclude that the results of these additional tests suggested by Dr Cross support and clarify those published in our original study. They emphasise that the significant differences observed in the Quick score evaluations of the IHC assay results for ER on in house tumours are caused by differences in the sensitivities of the IHC assay.

1 Chung EB, Enzinger FM. Extraskeletal osteosarcoma. Cancer 1987;60:1132–42.

The authors' reply

We would like to thank Dr Cross for his interest shown in our article and for his kind and constructive comments.

Cohen's k statistic has been used in our study to compare the degree of agreement between the immunohistochemical (IHC) sensitivity for oestrogen receptors (ER) achieved by 152 laboratories on in house breast tumours, to that achieved by the UK National External Quality Assessment Scheme for Immunocytochemistry (NEQAS-ICC) organising laboratories' IHC assay on spare sections from the same cases, as evaluated by the “Quick score” method. As quite rightly deduced by Dr Cross, the rationale behind using k statistics for this part of the study, in addition to the Wilcoxon's matched pairs signed rank test and the y2 goodness of fit test, was to emphasise the lack of agreement between the pairs of matching slides. This was reflected in the negative k scores, and the significant differences shown in the results of the other statistical tests, indicating a degree of agreement that was worse than would have occurred by chance alone.

In retrospect, we agree that the way the k statistics were calculated and the way the results were expressed may have been confusing, and we welcome this opportunity to clarify the results by repeating the calculations using a 4 × 4 contingency table and by calculating a single k statistic as suggested by Dr Cross, using the formula detailed by Robertson et al in 1981. Table 1 gives the results of this analysis.

This approach yields a k coefficient of 0.19 when the Quick scores are evaluated by one of the authors (AR) and 0.20 when evaluated by a second (BJ). Although “yardsticks” are arbitrary and should not be slavishly adhered to, k values less than 0.4 are generally considered to show poor agreement. As suggested by Dr Cross, a weighted k statistic might be more appropriate, because a misclassification between distant categories is of greater importance than a misclassification between adjacent ones, and we have therefore also performed these calculations. Although the weighted k statistics of 0.30 (AR) and 0.34 (BJ) are slightly higher than the unweighted k values they are still less than 0.4, confirming that agreement between the two assays is poor.

Lastly, to emphasise that the differences observed resulted predominantly from differences in the sensitivities of the IHC assays and the organising laboratories' assay on the same in house tumours, are 0.70 and 0.74, respectively, indicating good agreement by the same assessor when evaluating the same slides on two different occasions. The weighted k statistics for in-house observer agreement in our study for the evaluation of the Quick scores of the particular assays and the organising laboratories' assay on the same in house tumours, are 0.70 and 0.74, respectively, indicating good agreement by the same assessor when evaluating the same slides on two different occasions. The weighted k statistics for inter-observer agreement when assessing the participants' and organising laboratories' IHC results by Quick score evaluation in this study were 0.79 and 0.75, respectively, indicating excellent agreement. These findings support those of previous studies that have used the Quick score method of evaluation. In summary, we conclude that the results of these additional tests suggested by Dr Cross support and clarify those published in our original study. They emphasise that the significant differences observed in the Quick score evaluations of the IHC assay results for ER on in house tumours are caused by differences in the sensitivities of the IHC assay.

Table 1 Contingency table showing the overall degree of agreement between the participants' assays and the organising laboratory's assay, on 152 breast carcinomas

<table>
<thead>
<tr>
<th>Organising laboratory's IHC assay</th>
<th>Negative (0)</th>
<th>Low (2, 3)</th>
<th>Medium (4, 5)</th>
<th>High (6, 7)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants' IHC assays</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative (0)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Low (2, 3)</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Medium (4, 5)</td>
<td>1</td>
<td>7</td>
<td>34</td>
<td>42</td>
<td>81</td>
</tr>
<tr>
<td>High (6, 7)</td>
<td>6</td>
<td>6</td>
<td>72</td>
<td>78</td>
<td>128</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>7</td>
<td>19</td>
<td>123</td>
<td>152</td>
</tr>
</tbody>
</table>

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Dietary dangers: ingestion of a bread bag clip

During a routine postmortem examination, a segment of jejunum of approximately 20 cm was noted to be doubled back upon itself, with fibrous adhesions joining the two halves of the loop creating a “U” shape. The segment of jejunum was opened along the antimesenteric border, and a bile encrusted foreign body was seen to be attached by a free bridge of mucosa where the bowel doubled back upon itself. The object was removed without damaging the mucosal bridge; removal of the encrusted bile showed the foreign object to be a plastic bread bag clip. There was no date on the clip. The bridge of free mucosa passed through the space behind the tooth-like pinners (fig 1). The amount of bile encrustation and the remarkable growth of a mucosal bridge through the clip suggest that it had been present in this particular segment of jejunum for a considerable time. Its presence was unrelated to the cause of death, which was given as coronary artery atherosclerosis, and there was no evidence to suggest that the presence of the bread bag clip had caused problems during life.

The segment of jejunum removed was sliced across, the cut running parallel to the plane of circularities, to cut the mucosal bridge longitudinally. Sections were submitted for histopathological examination. A haematoxylin and eosin stain and an actin immunocytochemistry stain, to highlight muscle, were applied. By actin immunocytochemistry we suggest that the clip has “caught up” the small bowel wall in two places, bringing the “mucosal crest” of each into apposition with apparent mucosal fusion to form a bridge.

Review of the literature has identified six previous reports of medical problems arising from the accidental ingestion of bread bag clips.8,9 Problems arising included gastrointestinal bleeding, small bowel obstruction, and intestinal perforation. Complications may arise long after ingestion,4,9 and there may be no recall of the ingestion.8 Although bread bags are now secured with plastic sticky tape, bread bag clips may still be encountered and the potential for late symptomatic presentation in relation to a retained bread bag clip remains.

References
Retroperitoneal extraskeletal osteosarcoma

C S P Van Rijswijk, J G S T A Lieng, H M Kroon and P C W Hogendoorn

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