Appendicitis masquerading as malignancy

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CASE 1
A post-menarchal 13 year old female presented with weight loss, a two week history of diarrhoea, and a one week history of dysuria. Her brother had been treated for a testicular teratoma. Ultrasound scan had shown a 14 cm pelvic mass and left hydronephrosis.

On assessment by paediatric oncologists, she was afebrile, wasted, and had a pelvic mass. Provisional diagnosis of an ovarian tumour was made.

Investigations showed leucocytosis (13\(\times\)10\(^9\)) with neutrophilia, normal serum \(\alpha\)-fetoprotein (AFP) and \(\beta\)-HCG, and sterile pyuria. MRI showed a complex pelvic mass, suggestive of a left ovarian teratoma. Chest CT and abdominal ultrasound revealed no metastases.

She was referred to paediatric surgery for biopsy and possible resection. At laparotomy a large collection, suggestive of appendix abscess, was drained. The appendix was not identified.

Peritoneal fluid grew \textit{Escherichia coli}. No malignancy was found on histological examination of the omentum.

The patient was discharged after a week of cefotaxime and metronidazole and remained well at 4 month review.

CASE 2
A 10 year old, prepubertal girl was referred by adult gynaecologists with a six month history of cyclical abdominal pain and diarrhoea. Ultrasound had suggested an ovarian tumour.

On arrival she was unwell but afebrile with a lower abdominal mass. Investigations revealed a leucocytosis (WCC 14.5\(\times\)10\(^9\)) and normal AFP and \(\beta\)-HCG levels.

MRI showed a complex pelvic mass, suggestive of a left ovarian teratoma. Chest CT and abdominal ultrasound revealed no metastases.

She was referred to paediatric surgery for biopsy and possible resection. At laparotomy a large collection, suggestive of appendix abscess, was drained. The appendix was not identified.

Peritoneal fluid grew \textit{Escherichia coli}. No malignancy was found on histological examination of the omentum.

The patient was discharged after a week of cefotaxime and metronidazole and remained well at 4 month review.

CASE 3
A prepubertal 12 year old female presented to casualty with an eight day history of abdominal pain, diarrhoea, and anorexia. She looked unwell, was pyrexial, and had a tender pelvic mass. Investigations revealed leucocytosis (19.6\(\times\)10\(^9\)) and sterile pyuria.

Ultrasound showed a 10 cm mass with dense calcification and cystic elements arising from the right iliac fossa; ovarian teratoma or torsion were suspected.

At laparotomy a large pelvic abscess was drained. The appendix could not be identified. Peritoneal cultures grew \textit{Streptococcus constellatus}. Cefotaxime and metronidazole were continued for five days and the patient discharged on day 7.

DISCUSSION
Pelvic malignancy clearly must be considered in children presenting with chronic malaise and a lower abdominal mass. Two of the patients described had been symptomatic for several weeks with associated weight loss, and findings of large complex pelvic masses on imaging prompted the diagnosis of ovarian tumour. Calcification, seen in one case, is also suggestive of malignancy in this context.\(^1\) However, germ cell tumours are uncommon, with an incidence of 4 per million,\(^2\) and ovarian tumours account for only 30% of these.\(^3\)

In contrast, appendicitis is the most common surgical emergency in childhood and it is estimated that an appendix mass is discovered in 10% of children at presentation.\(^4\) Recognised presenting features include abdominal pain, fever, bowel disturbance, and urinary symptoms, which were present in our cases to varying degrees. However, these symptoms can be minimal, such that they are overlooked, or absent completely.

Appropriate management of these two conditions is markedly different. Complex inflammatory appendix masses may reasonably be treated in the first instance with broad
spectrum antibiotics. In cases of malignancy the onus is on tissue diagnosis followed by apposite oncological treatment. There are few reported cases of inflammatory appendix masses masquerading as pelvic tumours in children. Conversely pelvic tumour has been reported to mimic complex appendicitis in adults.

This series indicates that pelvic tumours cannot be reliably distinguished from inflammatory appendix masses despite expert ultrasonography. Furthermore our experience has shown that CT and MRI may similarly be unable to make this distinction.

Childhood appendicitis may mimic pelvic malignancy clinically and radiologically. Paediatricians, surgeons, and oncologists should be alert to the possibility of appendicitis when counselling patients and parents.

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