Case Report of a Pediatric Undifferentiated Pleomorphic Sarcoma of the Cecum

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Abstract

Undifferentiated pleomorphic sarcoma (UPS) is a high grade neoplasm typically diagnosed in older adults and localized to the extremities or retroperitoneum. Poor response to therapy with high rates of recurrence confer this neoplasm a poor prognosis. This report of cecal UPS in a 12-year-old is rare due to the patient's age and tumor location. Only two other cases of pediatric UPS located in the intestinal tract have been reported.

Introduction

UPS, formerly known as malignant fibrous histiocytoma (MFH), is a high grade pleomorphic neoplasm without any definable line of differentiation[1]. UPS usually occurs in the extremities or retroperitoneum, and primary tumors of the gastrointestinal tract are uncommon. Only 14 cases of cecal or ascending colon UPS are reported in the literature. The classification and subdivision of these tumors went through several iterations until the WHO 2002 classification eliminated the term MFH and replaced it with UPS[1].

UPS are most common later in life, usually the 6th and 7th decades[2], and account for roughly 20% of all soft-tissue sarcomas[3, 4, 5]. UPS are more common in men than women with a 2.4:1 ratio[6].

Risk factors for the development of UPS include genetics, radiation or chemotherapy exposure, chemical carcinogens, chronic postoperative repair, trauma, surgical incisions and lymphedema[6, 7].The cellular origins of UPS are unclear, but possibly arise from primitive mesenchymal stem cells that retain both fibroblastic and histiocytic potential and may present with markers and behaviors of both cell lines[8, 9].

UPS typically presents as an enlarging lump that is often excised early when located on an extremity. Unfortunately, intestinal UPS is often discovered late with substantial tumor bulk. Presenting symptoms may include abdominal distention and pain, altered bowel habits, weight loss, anemia, blood in the stool, or palpable abdominal mass. Compared to other types of colon cancer, UPS presents more frequently with a right sided mass, less frequently with constipation, and in up to 25% of cases patients report fevers[9]. Labs at diagnosis may be normal, or may show elevated inflammatory markers, leukocytosis, and anemia.

Diagnosis is based on a combination of microscopic features and immunohistochemical staining techniques used to rule out other cell lines of origin. Lesions are typically characterized by pleomorphic, spindle-shaped cells with bizarre cytology and nuclear atypia[10]. Immunohistochemical staining is sometimes positive for vimentin, actin, CD68, alpha 1-antitrypsin, alpha 1-antichymotrypsin, and laminin mRNA[3, 10]. Importantly, UPS has no reproducible immunophenotype or pattern of protein expression that allows for further classification of the tumor[3] and exclusion of pleomorphic variants of other neoplastic lines is required[5].

CT imaging typically shows a well-circumscribed and homogeneous mass, or a low-density mass secondary to necrosis and hemorrhage[10]. Masses are sometimes large and lobulated, and may also have calcifications, hemorrhage, myxoid degeneration, necrosis, or tissue invasion[3].

Standard treatment for UPS is early complete surgical resection with negative resection margins and en-bloc lymph node dissection. The role of chemotherapy and radiation in the treatment of UPS is debated and without strong evidence. Increasing number of reports suggest that adjuvant chemo or radiation may improve prognosis in certain clinical scenarios[4, 10]. Data from large studies on outcomes with different treatments is limited and most reported cases of intestinal UPS were treated with surgery alone.

Prognosis for UPS is generally poor because of regional invasiveness, distant metastases and frequent recurrence[6]. A review of 200 cases found that the 2 year survival rate was 60%, 5 year survival rate 47%, and overall recurrence rate 44%. Metastasis occurred in 42% of cases, most commonly to the lungs (82%) but also to lymph nodes (32%)[2].

Results

A 12-year-old African American female presented to an urgent care clinic with one week of nausea and vomiting. She reported fatigue and chronic intermittent cramping abdominal pain for four months and unintentional weight loss of 25 pounds over the last three. On exam she had pale conjunctiva, tachycardia and mild abdominal pain.

CBC revealed hemoglobin 7.3 g/dL (nL: 12.0–16.0), hematocrit 29.7% (nL: 36.0–46.0), MCV 62 fL (nL: 78.0–98.0), RDW 18.9% (nL: 11.5–14.5) and platelets 708 K/uL (nL: 150-450). Serum iron was 10 ug/dL (nL: 30-160), TIBC 304 ug/dL (nL: 265–497), iron saturation 3% (nL: 20–50) and ferritin 5 ng/mL (nL: 16.0–300.0)

The patient had a positive fecal occult blood test (FOBT), suggesting iron-deficiency anemia due to chronic intestinal blood loss. C-reactive protein (CRP) was 3.01 mg/dL (nL: 0.0–0.9). There was initially concern that the patient may have inflammatory bowel disease (IBD) given her iron-deficiency anemia, elevated CRP and positive FOBT with the weight loss and diarrhea. NSAID-induced gastritis was also considered given daily NSAID use for abdominal pain.

Upper gastrointestinal endoscopy was performed which showed no abnormalities. Colonoscopy showed a large, fungating, non-obstructing ˜7 cm cecal mass (Figure 1). The remainder of the colon was normal. Biopsy of the mass was consistent with UPS. Tumor cells were weakly positive for SATB2, negative for Keratin OSCAR, Keratin AE1/AE3, desmin, myogenin, SMA, SOX10, S-100, CD34, WT-1, SALL4 and EMA. Computed Tomography (CT) of the abdomen and pelvis noted a cecal mass and multiple enlarged pericolonic and mesenteric lymph nodes. CT chest with contrast revealed a solid noncalcified subpleural nodule (1.1cm) in the posterior inferior left lower lobe (LLL). Positron Emission Tomography (PET) scan showed positive uptake in the right colon mass and possible uptake in the mediastinum and LLL.

A formal right hemicolectomy was performed without complication. At the time of surgery, an intraluminal cecal mass was noted to be causing colo-colonic intussusception. The ileal and colon margins were negative for malignancy. Thirty-nine regional lymph nodes were sampled and returned negative.

After recovery from the colectomy and pathology review, the patient underwent a video-assisted thoracoscopic surgery and wedge resection of the pulmonary nodule. Pathology on the nodule identified a 1.1 cm necrotizing granuloma. Small yeast with narrow-based budding without a mucicarmine-positive capsule were confirmed with GMS and PAS-F cytochemical stains. The pathological findings of the nodule were consistent with *Histoplasma capsulatum* and the patient completed a six month course of itraconazole.

On a follow-up MRI of the abdomen 2 months post-operatively, there was no evidence of disease and anemia had resolved.

Discussion

UPS is a diagnosis of exclusion reserved for sarcomas with a distinct combination of immunohistochemical and microscopic features, made only after careful consideration of other differential diagnoses. This case is unique both for being localized to the gastrointestinal tract, with only 14 cases reported of cecal or ascending colon UPS, as well as the young age of the patient. Only 2 other cases of gastrointestinal UPS have been reported in the pediatric population[12, 13].

This patient developed a non-obstructing right sided colonic mass, with systemic features of disease including elevated inflammatory markers, anemia, and weight loss, which are consistent with the presentation of UPS. In spite of the tumor's large size at diagnosis (7cm), the tumor was excised with clear margins, no positive lymph nodes, and no signs of metastasis. A lung lesion that was initially suspicious was resected and found to be *Histoplasmosis.*

Chemotherapy was not given in this case as the tumor was resected with clear margins and there was no lymph node involvement or metastatic disease. She will be followed by oncology to monitor for recurrence through periodic imaging and labs. Additional research into the role of radiation and chemotherapy for abdominal UPS is needed, especially for cases where surgical resection is not possible. Continued monitoring and close follow-up are essential to a good long term outcome due to a relatively high recurrence rate.

Conflict of Interest statement: no conflicts of interest reported.

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Figure Legends

Figure 1: Cecal mass on colonoscopy of 12 year old female revealed a fungating, non-obstructing, 7 cm cecal mass.

Figure 2: PET scan demonstrating notable increased uptake to the cecal mass in the right upper abdominal region.