Pediatr Blood Cancer 2012;58:481–482

LETTER TO THE EDITOR
Clear Cell Sarcoma of the Gastrointestinal Tract Presenting as a Second Malignant Neoplasm Following Neuroblastoma in Infancy

To the Editor: Clear cell sarcoma of the gastrointestinal tract (GI CSS) in children is extremely rare with only four cases reported in the literature [1–4]. Two of these reports describe CCS presenting as a second malignant neoplasm (SMN) following prior therapy for acute leukemia [1,2]. We are reporting the first published case of GI CCS presenting as an SMN from a survivor of neuroblastoma in infancy.

A 15-year-old Caucasian male presented with fevers, myalgias, night sweats, and weight loss. His past medical history was significant for neuroblastoma diagnosed at 2 months of age with disease localized to the liver. The tumor was hyperdiploid with a non-amplified *MYCN*. He received local radiotherapy (450 cGy) followed by chemotherapy as per Pediatric Oncology Group study 9243: cyclophosphamide (7,350 mg/m^2), doxorubicin (245 mg/m^2), cisplatin (180 mg/m^2), and etoposide (400 mg/m^2). He went into complete remission and was well until his most current presentation. He was thin with pallor. No abdominal masses were palpated. Laboratory studies revealed iron deficiency anemia and an elevated ESR. An initial computed tomography (CT) scan was read as non-diagnostic. However an ^{18}F-fluoro-2-deoxy D-glucose positron emission tomography (FDG-PET) scan revealed an avid area of intensity in the presacral region (Fig. 1A). When the CT scan was retrospectively reviewed, this area of FDG-PET avidity corresponded to a 2.5 cm soft tissue intraluminal mass in the area of the distal ileum that was previously suspected to be an unopacified loop of bowel (Fig. 1B). The mass was completely resected with negative margins (Fig. 1C). Histologically, the soft tissue mass included sheets of round cells having focal clear cell and rhabdoid features (Fig. 1D). FISH was positive for the EWS gene rearrangement confirming the diagnosis of GI CCS.

Rubino et al. [5] analyzed data on 544 childhood survivors of neuroblastoma and found 13 SMNs. The median age of neuroblastoma diagnosis in these patients was 17 months (range, 3–35 months). Further, the median time from diagnosis of neuroblastoma and occurrence of an SMN was 19.5 years (range, 5–37 years) which is consistent with the timing of presentation in our patient (14 years). The most common SMNs included thyroid (n = 5), breast (n = 3), and leukemia (n = 2). All but one patient received radiotherapy while only three received chemotherapy. Moreover, five of those receiving radiotherapy developed an SMN within the radiation field. This would suggest that radiotherapy may be an important risk factor in the development of SMNs in neuroblastoma patients. The proximity of our

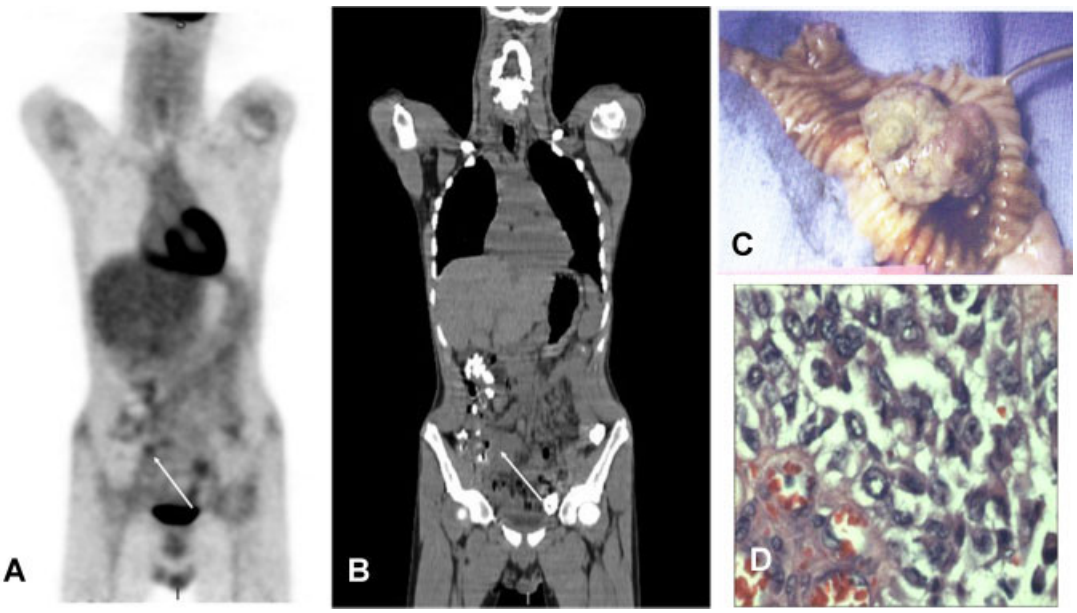

Fig. 1. Initial FDG-PET image (**A**) demonstrates hypermetabolism within the right lower quadrant that corresponds to the distal ileum on the CT scan (**B**). The resected ileum mass (**C**) demonstrates clear cells on histopathology examination (**D**). [Color figure can be seen in the online version of this article, available at http://wileyonlinelibrary.com/journal/pbc]

Conflict of interest: Nothing to declare.

*Correspondence to: Aaron R. Weiss, DO, The Cancer Institute of New Jersey, 195 Little Albany Street, Room 3507, New Brunswick, NJ 08903. E-mail: weissar@umdnj.edu

Received 25 July 2011; Accepted 5 August 2011

DOI 10.1002/pbc.23330
Published online 11 October 2011 in Wiley Online Library (wileyonlinelibrary.com).

patient's GI CCS primary to his previous site of radiation further supports this assumption. Although the significance of chemotherapy, particularly etoposide and cyclophosphamide, combined with radiotherapy in our patient and its influence on the development of his SMN is difficult to determine, all three patients that experienced an SMN in the Rubino et al. study received DNA topoisomerase II inhibitors.

The development of a SMN many years after neuroblastoma stresses the importance of long-term surveillance in childhood cancer survivors and highlights the potential impact therapeutic decisions have on our youngest and most vulnerable patients.

Pauline Balkaransingh, MD
Department of Pediatrics
Jersey Shore University Medical Center
Neptune, New Jersey

Saad A. Saad, MD
Department of Surgery
Jersey Shore University Medical Center
Neptune, New Jersey

Sushama C. Govil, MD
Department of Pathology
Jersey Shore University Medical Center
Neptune, New Jersey

Pritinder K. Thind, MD
Department of Radiology
Jersey Shore University Medical Center
Neptune, New Jersey

Cathleen M. Ballance, MD
Department of Pediatrics
Jersey Shore University Medical Center
Neptune, New Jersey

Aaron R. Weiss, DO*
Department of Pediatrics and
Division of Pediatric Hematology-Oncology
University of Medicine and
Dentistry of New Jersey-Robert Wood Johnson Medical School
New Brunswick, New Jersey

REFERENCES

1. Zambrano E, Reyes-Mugica M, Franchi A, et al. An osteoclast-rich tumor of the gastrointestinal tract with features resembling clear cell sarcoma of soft parts: Reports of 6 cases of a GIST simulator. Int J Surg Pathol 2003;11:75–81.
2. Venkataraman G, Quinn AM, Williams J, et al. Clear cell sarcoma of the small bowel: A potential pitfall. Case report. APMIS 2005;113:716–719.
3. Granville L, Hicks J, Popek E, et al. Visceral clear cell sarcoma of soft tissue with confirmation by EWS-ATF1 fusion detection. Ultrastruct Pathol 2006;30:111–118.
4. Lagmay JP, Ranalli M, Arcila M, et al. Clear cell sarcoma of the stomach. Pediatr Blood Cancer 2009;53:214–216.
5. Rubino C, Adjadj E, Guerin S, et al. Long-term risk of second malignant neoplasms after neuroblastoma in childhood: Role of treatment. Int J Cancer 2003;107:791–796.