Summary of histopathological findings

- Lymph nodes (subcutaneous, mesenteric, splenic, hilar), kidneys, urinary bladder, lung, cerebrum, cerebellum
- Kidneys and ureters: hydropnephrosis and hydroureter
- Lung: diffuse alveolar damage and intra-acinar hemorrhage
- Heart: multifocal hemorrhage and necrosis
- Liver: centrolobular necrosis, multifocal hemorrhage, hepatic alveolar damage
- Spleen: microhemorrhage
- Diaphragm: focal hemorrhage

Results of immunohistochemistry

See Table 1 for detailed results.

Histologic features of the tumor cell

- Atypical polyhedral (epithelioid) or round cells proliferate in sheets and nests with delicate to small amount of stroma.
- Distinct cell boundaries, moderate amount of weakly basophilic fine granular cytoplasm, round to oval single vascular nuclei with slight anisokaryosis (3 to 5 red blood cells nuclear diameter), prominent single nucleoli.
- Mitotic figures 40/10 H.P.F.
- Frequent lymphatic/vascular invasion and geographic necrosis.

Conclusions

- A cell of origin of this dog’s tumor could not be determined, and there was no distinct correlation with known human round cell neoplasms.
- This case represents a rare event and supports the implementation of wider immunohistochemical screening and molecular diagnostic methods, though methods used for human cases may have a lower efficacy rate or different outcomes.

Summary of immunohistochemistry and histochemistry results

- **Antibody/stain**
  - Desmin
  - HHF35
  - Chromogranin A
  - Synaptophysin
  - CD99
  - CAM5.2
  - vimentin
  - CK-AE1/AE3
  - EMA
  - Melan-A
  - Leu-M1
  - CD1a
  - CD34
  - TDF
  - FLI-1

- **Target**
  - Subcutaneous tissues
  - Round cell tumor

- **Results**
  - Desmin: negative
  - HHF35: negative
  - Chromogranin A: negative
  - Synaptophysin: negative
  - CD99: negative
  - CAM5.2: negative
  - vimentin: negative
  - CK-AE1/AE3: negative
  - EMA: negative
  - Melan-A: negative
  - Leu-M1: negative
  - CD1a: negative
  - CD34: negative
  - TDF: negative
  - FLI-1: negative

Discussion

- Apparent atypical characteristics and disseminated proliferation of the tumor cells precluded the possibility of benign neuroendocrine tumors and the need for an immunohistochemical, morphologic, or proliferative assessment. Features of some small round cell tumors are shown as the following:
  - Lymph node round cell tumors: Lymphoma/leukemia, plasmacytoma, histiocytic sarcoma, mast cell tumor
  - Soft tissue round cell tumors: Neuroblastoma, Ewing’s sarcoma, small round cell tumor, rhabdoid tumor
  - Mesothelial round cell tumors: Mesothelioma, small round cell tumor, malignant melanoma (MRT), and osteosarcoma
  - Cytomorphological similarities among these human tumors necessitate the use of IHC and histochemical results as follows: Lymph node round cell tumors: Lymphoma/leukemia, plasmacytoma, histiocytic sarcoma, mast cell tumor
- The clinicalopathological features of the patient’s tumor suggest malignant round cell tumor (MRT) of childhood. MRT typically includes: Neuroblastoma, Ewing’s sarcoma, small round cell tumor, rhabdoid tumor, malignant melanoma (MRT), and osteosarcoma. Cytomorphological similarities among these human tumors necessitate IHC by a panel of antibodies and genetic analysis on top of routine histopathology for a diagnostic definition. The table below denotes main criteria for diagnosing human MRTs and discriminates partially the tumor’s lineage to those criteria.

References