POLYURIA AND POLYDIPSIA OF SUDDEN ONSET IN A DOG

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CASE PRESENTATION

Specimen: Giemsa-stained ultrasound-guided fine needle aspiration smears from right and left kidney (Figure 1 and 2).

Signalment: Dog, Doberman pinscher, 7-year-old, intact male, 48.5 kg.

History: The dog was presented with a recent history of polyuria and polydipsia, mild anorexia and right forelimb lameness. The patient had also been diagnosed with leishmaniasis in the past and had been treated accordingly, while two months before the presentation it was surgically treated for intraocular malignant melanoma. The dog was housed indoors and was current on vaccinations and antiparasitic prophylaxis.

Clinical and clinicopathological findings: Physical examination revealed mild peripheral lymph node enlargement and palpable organomegaly of the cranial abdomen. The CBC and blood smear evaluation were unremarkable, except for a moderate increase in total solids (9.2 g/dL, reference interval: 6-8 mg/dL), while moderately elevated cholesterol (390 mg/dL, reference interval: 125-296 mg/dL) and slightly elevated alkaline phosphatase (243 U/L, reference interval: 32-149 U/L) values were reported on serum biochemistry. Urinalysis suggested hyposthenuria (specific gravity: 1.006). *Dirofilaria immitis* and *Ehrlichia canis* serology was negative.

Diagnostic imaging: Thoracic radiographs indicated focal interstitial infiltrates in the caudal lung fields and diffuse interstitial infiltrates in the dorsocaudal lung fields. Abdominal radiographs revealed mild hepatomegaly, while radiographs of the right forelimb were unremarkable. Abdominal ultrasonography indicated multiple hypoechogenic and hyperechogenic foci in the left and right kidney, whereas echocardiography was normal.

Evaluate the following images and provide your diagnostic interpretation (Figure 1 and 2).

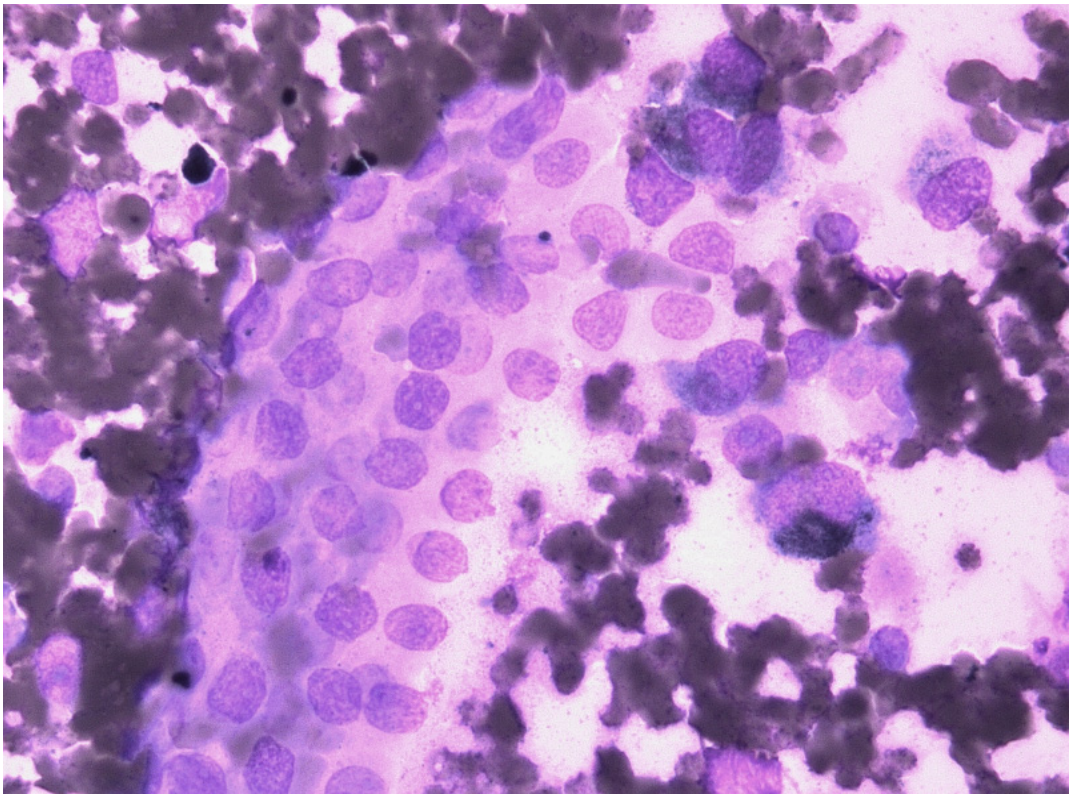

Figure 1 (right kidney, 63x objective)

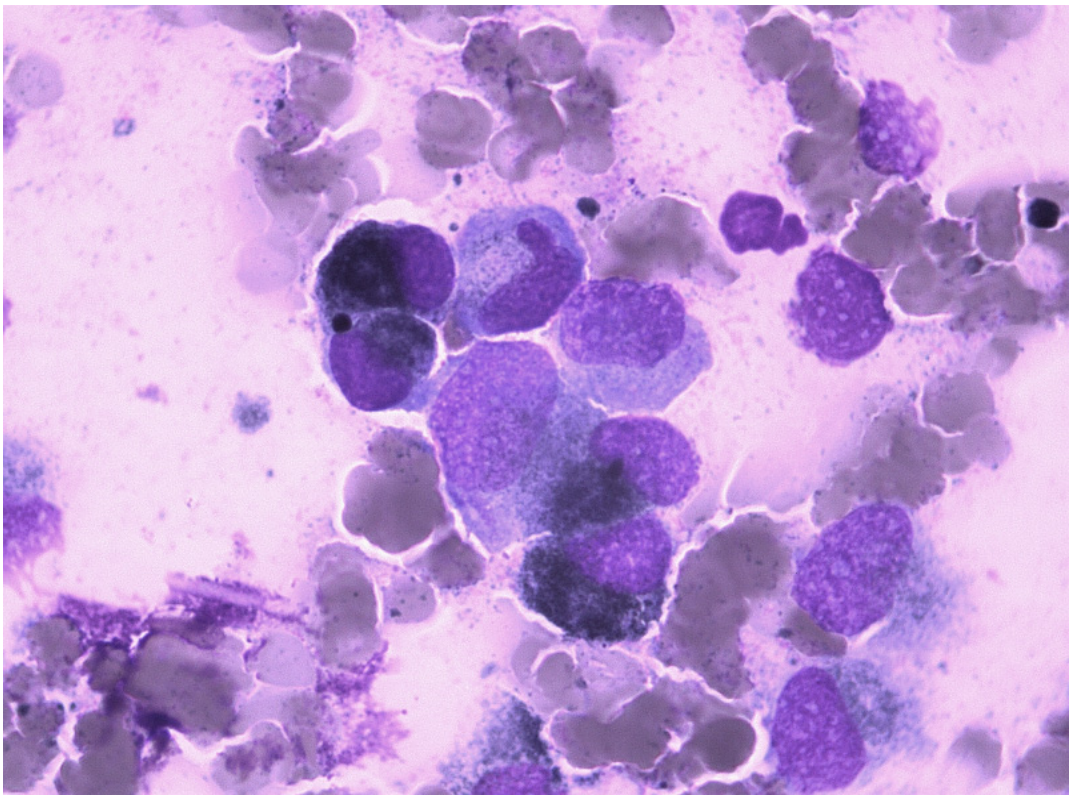

Figure 2 (left kidney, 100x objective)

Cytological description of the left and right kidney cytology smears: FNA yielded specimens of moderate cellularity. On a markedly hemorrhagic background, round-to-ovoid and occasionally epithelioid melanocytes were distributed mainly as single cells or as small aggregates. The aforementioned cells were characterized by moderate pleomorphism, anisocytosis and anisokaryosis, high nuclear-cytoplasmic ratio, coarse chromatin pattern and sporadic multiple prominent nucleoli. Their scant-to-moderate cytoplasm was slightly to moderately basophilic and exhibited variable pigmentation with melanin granules. No mitotic figures were observed. A small number of melanophages was also present, while renal tubules were rarely seen.

Cytological diagnosis: Renal malignant melanoma.

Short-term clinical and laboratory follow-up: The patient was referred to the intensive care unit with marked depression and oliguria. After a 4-day hospitalization with crystalloids, tramadol (3 mg/kg BW IV QID) and cefazoline (20 mg/kg BW IV BID), no clinical improvement was noticed. Serum biochemistry analysis revealed a mild elevation of creatinine phosphokinase activity (513 U/L, reference interval: 58-314 U/L). Urine was collected by catheterization. Dipstick and urine sediment microscopy (blood +4 and >5 RBC/HPF in sediment, respectively) confirmed a significant hematuria.

Outcome: Due to the poor long-term prognosis the dog was euthanized four days post diagnosis.

Necropsy/Gross pathology (Figure 4): At necropsy, the kidneys, lungs, adrenal glands, liver, pancreas, heart, mesenterium, pleura and pituitary gland had a variable number of gray or black, raised nodular discrete to coalescing masses ranging from 0.1 to 5 cm in diameter. A great number of lymph nodes throughout the body were enlarged and diffusely black on cut surface. The bone marrow in several different sites examined showed a black discoloration.

Cytological examination of lung, kidney, pancreas, mesenteric lymph nodes and adrenals (Figure 3) imprints/core biopsy bone marrow imprints: The examination revealed a moderate-to-high number of malignant melanocytes, morphologically similar to those observed in the renal FNA smears, intermingled with or effacing the indigenous cellular components of the various tissues suggesting the presence of a diffuse malignant melanoma.

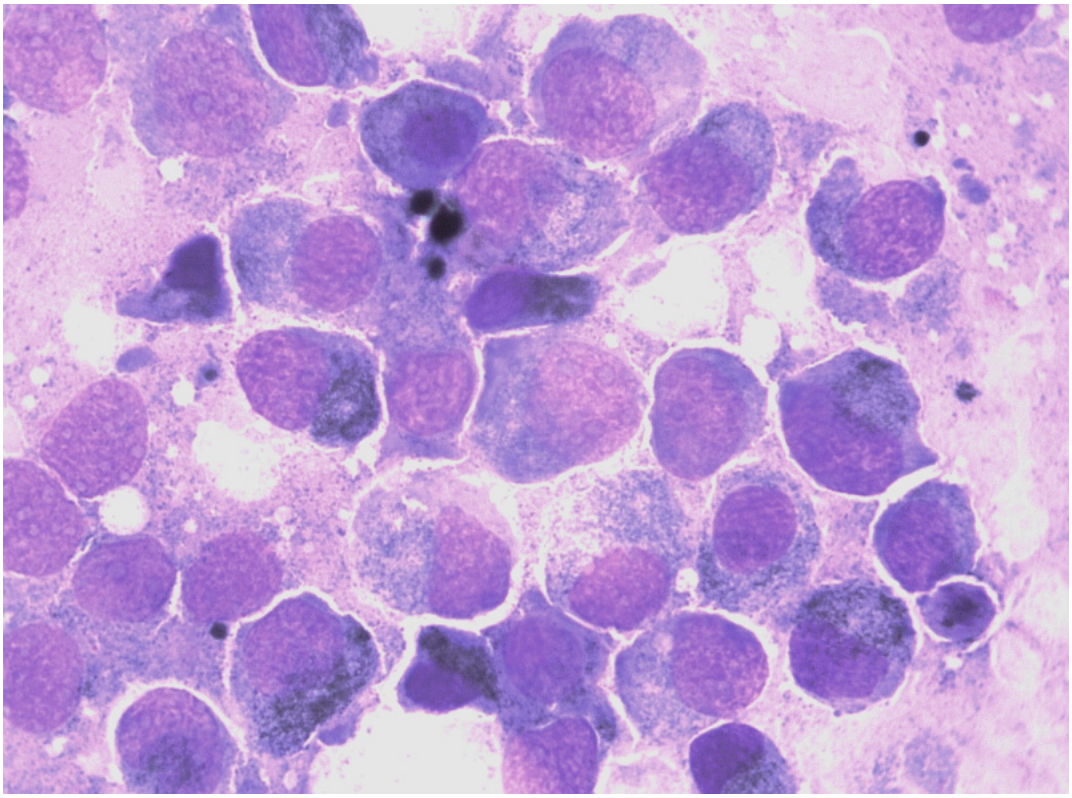

Figure 3 (adrenal, 100x objective)

Histopathological description (Figure 4): Microscopically, all of the masses had a similar histomorpholgy. They were unencapsulated and composed of large solid sheets or variably-sized nests of round to polygonal cells. To a lesser extent, there were also spindle cells, which were arranged in loosely interweaving bundles. The tumor cells were supported by thin strands of collagenous stroma. Large numbers of neoplastic cells were heavily pigmented. The degree of neoplastic cell pigmentation, however, was highly variable. There was a moderate degree of cellular pleomorphism and rare mitotic figures (0-2/HPF).

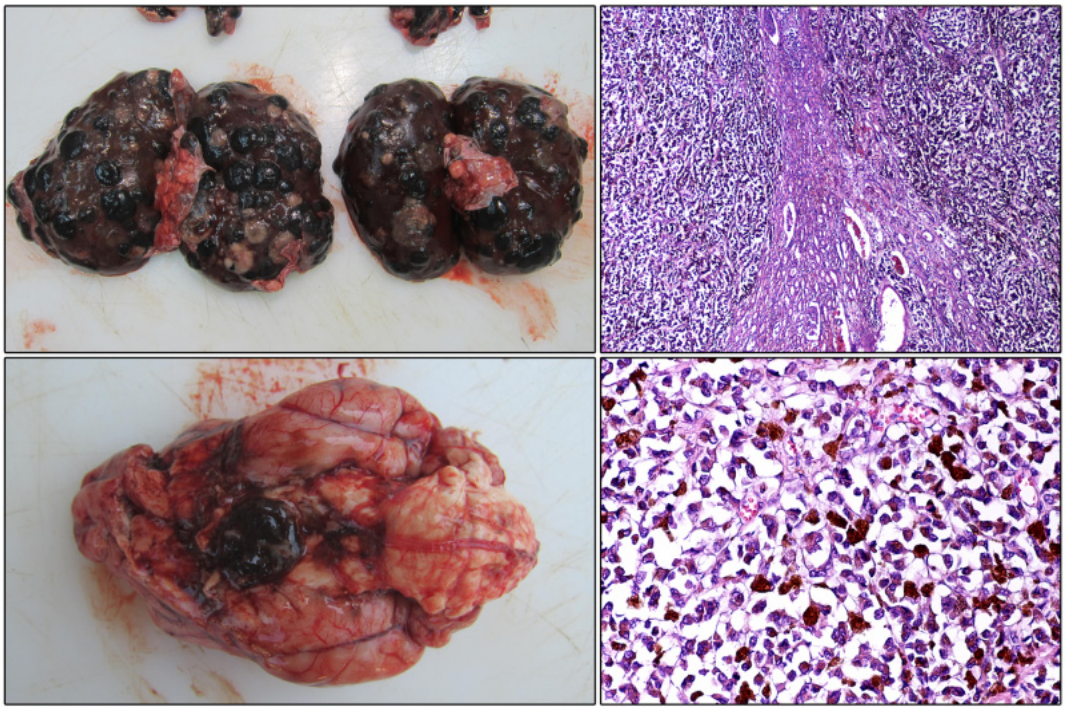

Figure 4 (upper row: kidney, bottom row: hypophysis, left column: original magnification, right column: 4x and 20x objective, respectively)

Definitive diagnosis: Disseminated malignant melanoma.

Discussion:

In the present case, the diagnosis of renal malignant melanoma was established on the basis of the cytological interpretation, as cytology is considered a sensitive method for the diagnosis of melanocytic tumors[1]. The diagnosis was further verified by the histopathological examination of tissue biopsies obtained post mortem. Histopathology also disclosed the diffuse metastatic pattern of the disease, as neoplastic infiltrates were detected in a wide range of organs and tissues including lungs, myocardium, pancreas, liver, kidneys, mesentery, adrenal glands, pituitary gland, bone marrow and several lymph nodes.

Interestingly, the patient was initially presented with a sudden onset of polyuria and polydipsia. The latter could be attributed to chronic renal insufficiency due to the metastatic renal disease; however, the possibility of central diabetes insipidus due to the pituitary metastases is a reasonable alternative, as dogs with mild-to-moderate chronic kidney disease (absence of azothemia), isosthenuric or minimally concentrated urine would be expected rather than markedly hyposthenuric as appeared in the present case[2].

Malignant melanomas affect mainly older dogs, while a breed predilection has been reported for Scottish terriers, Schnauzers, Irish setters, Golden retrievers and Doberman pinschers[3]. Aggressive metastatic behavior is not uncommon in malignant melanomas and is basically lymphogenous[3]. Common sites of metastases are the regional lymph nodes and the lungs, but organs such as the spleen, heart, liver and brain may also be involved[3]. Melanoma cases with such multi-organ metastatic pattern, including the pituitary gland have been rarely reported.

Most of the described cases of disseminated malignant melanomas in dogs involve a primary oral, ocular or cutaneous melanoma, but cases in which the primary site was elusive have uncommonly been reported[4]. In the present case, the possibility that the diffuse metastatic disease might have emerged from the intraocular malignant melanoma cannot be excluded. However, the fact that the metastatic potential of the ocular melanoma in the dog may be as low as 4%[5] and that this dog was surgically treated a few months ago for ocular melanoma, lend support to the possibility of a "melanoma of unknown primary origin"[6].

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