Subcapsular Hematomas Associated with Renal Lymphoma in a Cat: A Radiographic Study

MITCHELL BUSH, RICHARD J. MONTALI, and A. EVERETTE JAMES, Jr.

INTRODUCTION

Radiographic technics including intravenous urograms and angiography have been used successfully in assessing renal enlargement in man (1, 3, 4). Infiltration of renal parenchyma by tumor cells will increase the susceptibility to hematoma formation as a result of even mild trauma (2). A diagnosis of renal masses with superimposed hematomas may be correctly made by comparing the apparent renal size in the survey radiographs with the nephrogram and with the delayed images from the abdominal angiogram (2, 4). This report describes the use of these technics in a cat with subcapsular hematomas associated with renal lymphoma.

CASE HISTORY

A 15-month-old castrated male domestic short-haired cat was referred to The Johns Hopkins Division of Animal Medicine with palpable bilateral renal enlargement. The owner had observed weight loss and progressive abdominal enlargement in the cat for several months prior to its admission. The animal had been immunized with panleukopenia and pneumonitis vaccines while a kitten.

The cat was alert and moderately active. The abdomen was markedly distended. On palpation both kidneys were greatly enlarged. They were asymmetrical, had relatively smooth surfaces and were firm in texture. The peripheral lymph nodes were not enlarged. The remainder of the physical examination was negative. A tentative diagnosis of renal lymphoma was made, and the animal was hospitalized for further diagnostic procedures.

The white blood cell count was 14,500 mm$^3$ (77 mature neutrophils, 1 band neutrophil, 20 lymphocytes, 1 monocyte, 1 eosinophil). There were no atypical cells present. The PCV was 28%, and the total protein was 9.2 gm%. A SUN of greater than 75 mg% and a creatinine of 4.8 mg% indicated severe renal failure. Serum amylase was 800 Somogyi units and transaminase levels were normal. Urinalysis revealed a specific gravity of 1.022. The sediment contained many WBC's, RBC's, epithelial cells and waxy casts.

Survey radiographs of the abdomen revealed bilateral renal enlargement (Fig. 1). The outline of the left kidney was much larger than the right. An intravenous urogram using 12 ml of sodium diatrizoate$^2$ intravenously allowed visualization of the collecting structures (Fig. 2). The resulting nephrogram was very faint and irregular in the lower poles of the

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2 Assistant Professor, Laboratory Animal Medicine, and Assistant Professor, Radiology. (Present address: Division of Animal Health, National Zoological Park, Smithsonian Institution, Washington, D.C.)
3 Assistant Professor, Pathology, and Assistant Professor, Laboratory Animal Medicine.
4 Associate Professor, Radiology, and Director, Radiological Research.
5 Hypaque, Winthrop, Winthrop Laboratories, New York, N. Y.
kidneys, especially on the left side (Fig. 2). In addition an arteriogram of the renal arteries was performed by surgically exposing the left femoral artery following sedation with 75 mg ketamine$^6$ and 15 mg promazine$^7$ administered intramuscularly. Visualization of the catheter placement was accomplished by fluoroscopy. Radiographs were obtained at two per second for 3 seconds, one per second for 2 seconds, and one every 2 seconds for 6 seconds following injection of 10 ml of radiopaque dye$^8$ into the femoral catheter with a mechanical injector at 180 psi. Exposure factors were 80 kV at 60 mA at $1/30$ second. In the “early” or arterial phase of the angiographic study the intrarenal arteries appeared to be straightened and somewhat stretched (Fig. 3). Both special radiographic technics also demonstrated compressed parenchyma in the caudal pole of the left kidney. This area was surrounded by a soft tissue density that appeared to conform to the general renal outline. A great disparity in size was observed when the nephrogram in Figure 4 was compared with the apparent renal size suggested by the left renal outline in Figure 1. This observation suggested

$^6$ Vetalar, Parke, Davis & Company, Detroit, Mich.
$^8$ Renografin 76, Squibb, New York, N. Y.
the presence of an area at the caudal pole of the left kidney which might represent inflammation, hematoma or nonfunctioning renal tissue.

The cat died following an open renal biopsy. A necropsy was performed immediately.

At necropsy both kidneys were enlarged (left 9x7x8 cm, right 7.5x7x5 cm), pale, and had slightly irregular cortical contours (Fig. 5). The majority of parenchymal structures were replaced by whitish-tan homogeneous tissue which bulged slightly from the cut surfaces. A large mass of clotted blood (approximately 20 ml) distended the capsule over the ventral caudal pole of the left kidney; a smaller hematoma (approximately 5 ml) capped the caudal pole of the right kidney.

The kidneys had very cellular neoplastic infiltrates that either separated tubules and glomeruli or replaced them entirely. The tumor cells had cytologic features of malignant histiocytes and occurred either in monotonous sheets (Fig. 6A) or were intermixed with eosinophils, lymphocytes and multinucleated giant cells (Fig. 6B). The mixed areas morphologically resembled Hodgkin’s disease of man. In some respects the overall pattern of the tumor was more consistent with a pleomorphic histiocytic lymphoma.

Tumor was also present in the right atrium, adrenal glands, skeletal muscle, liver and spleen. The subcapsular hematomas noted grossly were confirmed histologically.

**DISCUSSION**

Utilizing survey radiographs and renal arteriograms for renal size comparison, diagnosis of tumor masses with hematomas surrounding the caudal poles of the kidneys was made successfully in a cat. The possibility that these nonuniform areas which did not show opacification by collection of the angiographic contrast media were inflammatory sites was eliminated on the basis of negative clinical pathologic findings. The presence of normal renal vasculature decreased the possibility that these areas were nonfunctioning renal tissue or necrotic tumor. The angio-
graphic changes in neoplastic renal infiltration in humans characteristically show stretching of the vessels without neovascularity or tumor “stain” (persistence of contrast) (4). These studies tend to support the view that similar manifestations would be present in the cat. By this method most primary renal neoplasms can be excluded. Avascular areas surrounding a pole of the kidney which do not contain contrast on the nephrogram phase of the study are most likely subcapsular hematomas.

SUMMARY

The antemortem diagnosis of renal enlargement with associated subcapsular hematomas was made in the cat with the use of survey radiographs, intravenous urograms and angiography. By comparing the apparent size of the kidneys as seen in survey radiographs with their actual parenchymal size as demonstrated by renal arteriography, a diagnosis of nonfunctional bilateral caudal pole renal masses was made. Pathologic examination confirmed renal lymphoma and caudal pole hematomas.

The Johns Hopkins University
School of Medicine
Baltimore, Md. 21205

REFERENCES

ZUSAMMENFASSUNG


RÉSUMÉ

Un diagnostic ante-mortem de gros reins avec des hématomes sous-capsulaires associés a été porté chez le chat à l’aide de radiographies de contrôle, urographies intre-veineuses et angiographies. Le diagnostic de masses rénales du pôle caudal des deux côtés et non-fonctionnelles a pu être fait en comparant la grosseur apparente des reins comme on peut la voir sur les radiographies de contrôle par rapport à la taille réelle du parenchyme rénal comme elle est mise en évidence par l’artéographie rénale. L’examen pathologique a confirmé le lymphome rénal et les hématomes du pôle caudal.