Blue Stuff in a Tiger

Linden Craig, DVM, PhD, DACVP
University of Tennessee
16 year old spayed female tiger (Suka)
16 year old spayed female tiger (Suka)
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Renal Lesions of Nondomestic Felids

K. M. Newkirk¹, S. J. Newman¹, L. A. White¹, B. W. Rohrbach², and E. C. Ramsay³

Abstract
To comprehensively evaluate the occurrence of renal lesions in a variety of nondomestic felids, necropsy cases from 1978 to 2008 were reviewed from a municipal zoo and a large cat sanctuary for those in which the kidneys were examined histologically. Seventy exotic felids were identified (25 tigers, 18 lions, 6 cougars, 5 leopards, 3 snow leopards, 3 clouded leopards, 3 Canadian lynx, 2 ocelots, 2 bobcats, 2 cheetahs, 1 jaguar), and their histologic renal lesions were evaluated and compared. The most common lesion was tubulointerstitial nephritis (TIN); 36 of 70 (51%) cats were affected to some degree. Lymphocytic interstitial nephritis was the most common lesion in the tigers (9 of 25, 36%) and was rarely seen in other species. Although the renal pelvis was not available for all cats, 28 of 47 (60%) had some degree of lymphocytic pyelitis. There was no significant association between the presence of pyelitis and that of TIN. Only 1 cat had pyelonephritis. Renal papillary necrosis was present in 13 of 70 (19%) cats and was significantly associated with historical nonsteroidal anti-inflammatory drug treatment (odds ratio, 7.1; 95% confidence interval, 1.9 to 26.8). Only 1 cat (lion) had amyloid accumulation, and it was restricted to the corticomedullary junction. Primary glomerular lesions were absent in all cats. Intraepithelial pigment was identified in many of the cats but was not correlated with severity of TIN. Despite several previous reports describing primary glomerular disease or renal amyloidosis in exotic felids, these lesions were rare to absent in this population.
Humeral head from a different tiger
Periarticular (shoulder) multiloculated cyst
Periarticular (shoulder) multiloculated cyst

Stifle synovium
Periarticular (shoulder) multiloculated cyst

Stifle synovium
Periarticular (shoulder) multiloculated cyst

Stifle synovium
H&E

Congo red

Congo red + polarized light
Immunohistochemistry for transthyretin
Synovial deposition of wild-type transthyretin-derived amyloid in knee joint osteoarthritis patients

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8% of patients had synovial amyloid
No clinical significance
8% of patients had synovial amyloid

No clinical significance
Transthyretin

- Transport protein in serum and cerebrospinal fluid
Transthyretin

- Transport protein in serum and cerebrospinal fluid
- Transports:
  - Thyroxine
  - Retinol
Transthyretin

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- Transports:
  - Thyroxine
  - Retinol
Transthyretin (TTR) amyloidosis in humans

If mutated:

- Familial Amyloidosis
- Median age 30 years
Transthyretin (TTR) amyloidosis in humans

If mutated:
• Familial Amyloidosis
• Median age 30 years

If wild type:
• Senile Amyloidosis
• Median age 73.8 years
Transthyretin (TTR) amyloidosis in humans

If mutated:
- Familial Amyloidosis
- Median age 30 years
- Mostly men (69%)

If wild type:
- Senile Amyloidosis
- Median age 73.8 years
- Mostly men (96%)

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Transthyretin (TTR) amyloidosis in humans

If mutated:
- Familial Amyloidosis
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- Senile Amyloidosis
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- 25% of humans >80
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- Usually asymptomatic
Transthyretin (TTR) amyloidosis in humans

If mutated:
- Familial Amyloidosis
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- Mostly men (69%)
- Rare
- Myocardial deposition

If wild type:
- Senile Amyloidosis
- Median age 73.8 years
- Mostly men (96%)
- 25% of humans >80
- Usually asymptomatic
Myocardium (Suka tiger)
Other tissues examined (no amyloid)

- Kidney
- Liver
- Lung
- Spleen
- Brain
- Eye
- Skeletal muscle
- Adrenal gland
- Thyroid gland
- Sciatic nerve
- Spinal cord
- Lacrimal gland
What condition has been linked to \textbf{myocardial} amyloidosis in humans?

A. Plantar fasciitis
B. Rotator cuff injury
C. Carpal tunnel syndrome
D. Anterior cruciate rupture
What condition has been linked to myocardial amyloidosis in humans?

A. Plantar fasciitis
B. Rotator cuff injury
C. Carpal tunnel syndrome
D. Anterior cruciate rupture
Original contribution

High prevalence of wild-type transthyretin deposition in patients with idiopathic carpal tunnel syndrome: a common cause of carpal tunnel syndrome in the elderly

Yoshiki Sekijima MD, PhD, Shigeharu Uchiyama MD, PhD, Kana Tojo MD, PhD, Kenji Sano MD, PhD, Yusaku Shimizu MD, PhD, Toshihiko Imaeda MD, PhD, Yoshibonu Hoshii MD, PhD, Hiroyuki Kato MD, PhD, Shu-ichi Ikeda MD, PhD
Transthyretin amyloidosis and carpal tunnel syndrome

• 100 people having carpal tunnel release surgery
Transthyretin amyloidosis and carpal tunnel syndrome

• 100 people having carpal tunnel release surgery
• 34 had amyloid in tenosynovium
Transthyretin amyloidosis and carpal tunnel syndrome

- 100 people having carpal tunnel release surgery
- 34 had amyloid in tenosynovium
- All were wild type transthyretin amyloid
100 people having carpal tunnel release surgery
34 had amyloid in tenosynovium
All were wild type transthyretin amyloid
2 developed myocardial amyloidosis 9-10 years later
Original contribution

Wild-type transthyretin-derived amyloidosis in various ligaments and tendons

Takanao Sueyoshi MD, Mitsuharu Ueda MD, PhD, Hiroyumi Jono PhD, Hiroki Irie MD, PhD, Akira Sei MD, PhD, Junji Ide MD, PhD, Yukio Ando MD, PhD, Hiroshi Mizuta MD, PhD
Transthyretin
Synovial Amyloid
Transthyretin
Synovial
Amyloid
Take Home Points
Take Home Points

1. Amyloid can be blue
Take Home Points

1. Amyloid can be blue
2. Amyloid can occur in joints
Take Home Points

1. Amyloid can be blue
2. Amyloid can occur in joints
3. Can be AA or transthyretin (TTR)
1. Amyloid can be blue
2. Amyloid can occur in joints
3. Can be AA or transthyretin (TTR)
4. Not indicative of systemic amyloidosis
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Please support the UT Pathology Club!
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