Le patologie dell'apparato urinario, anatomia, esame in bianco e con contrasto

Diagnostic Mindset

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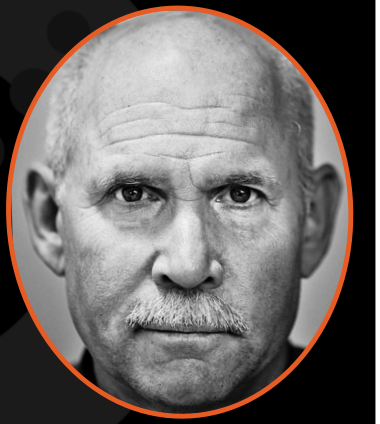
DVM, PhD, DECVDI

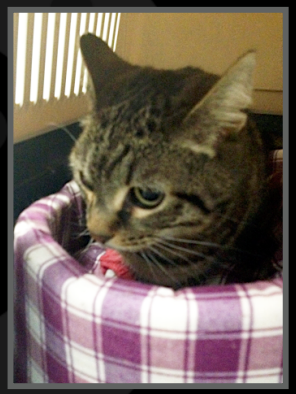
Objectives

- Radiographic contrast studies are the best modalities to assess urinary system rupture and function
- It is an easy and safe procedure



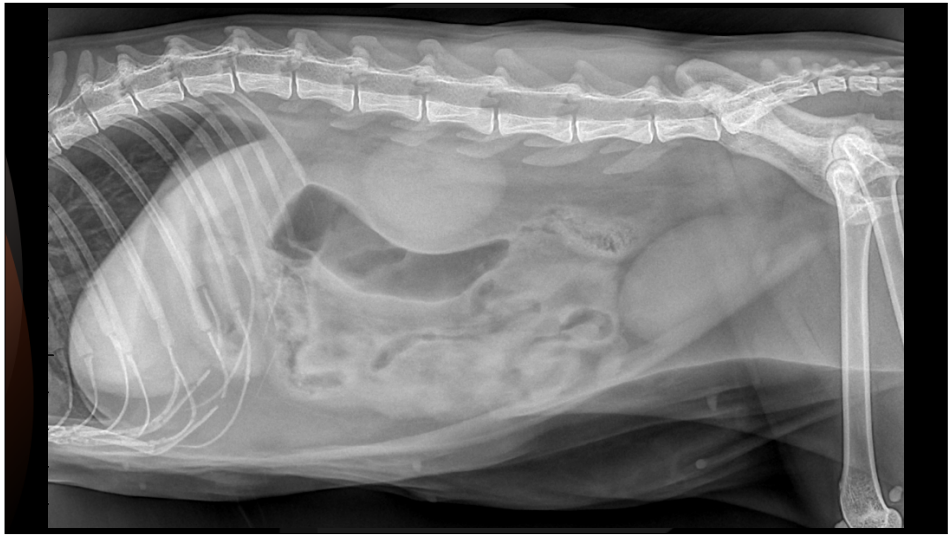
Mimi, DSH, FS, 4 years

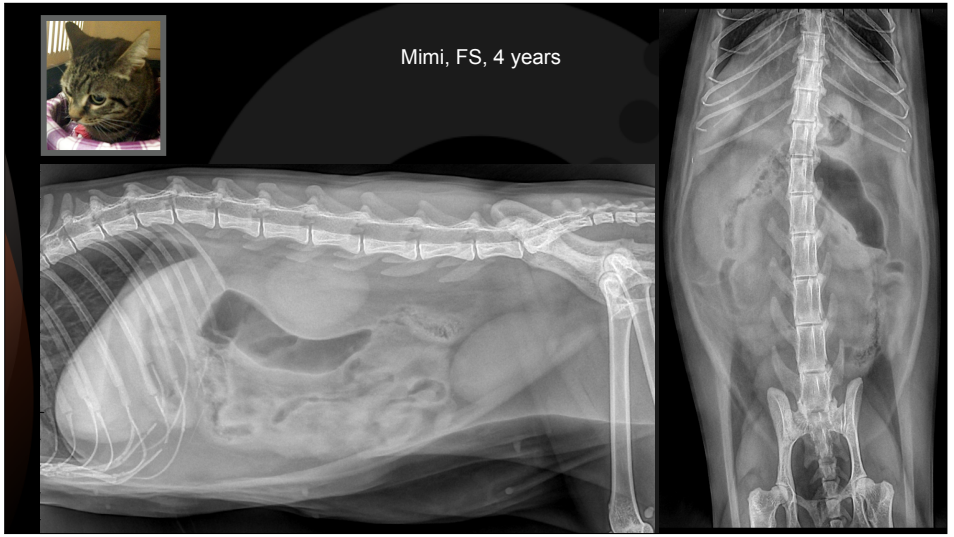
- Stack in the electric gate two days ago
- Now reluctant to move
- Anorexic

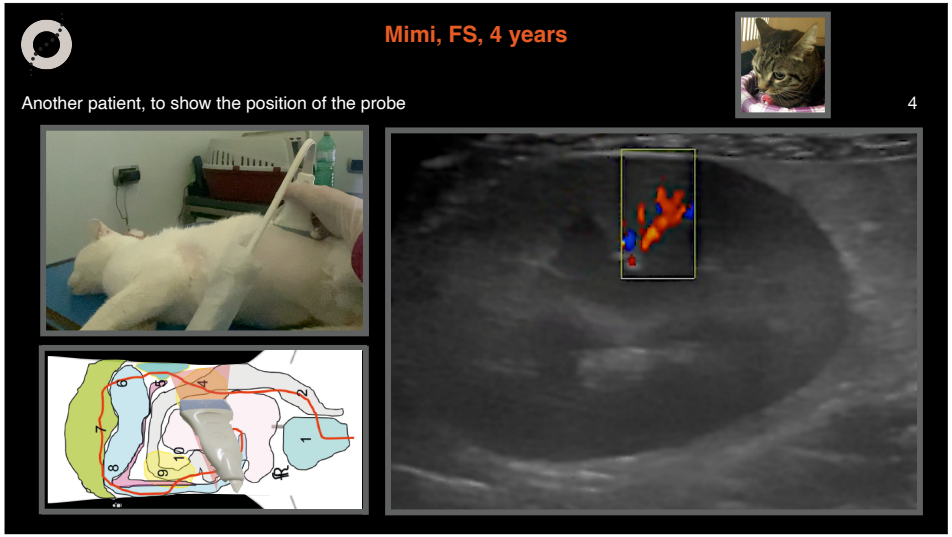


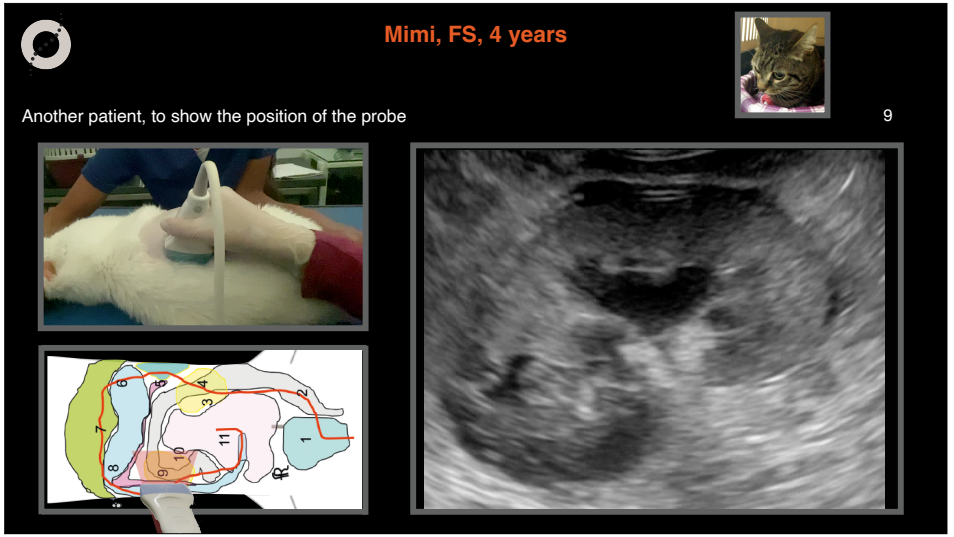
Mimi, DSH, FS, 4 years

- Abdominal pain
- Bun 69 (20-65), Crea 2,0 (0,7-1,6)
- The rest of the blood works unremarkable
- A-Fast not possible due to temper



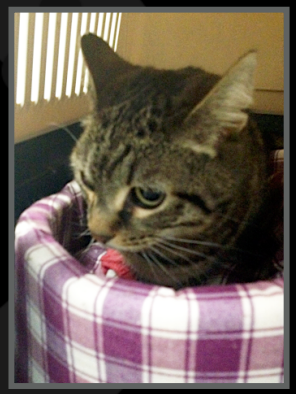

Mimi, FS, 4 years


Mimi, FS, 4 years
Another patient, to show the position of the probe
4


Mimi, FS, 4 years
Another patient, to show the position of the probe
9

Mimi, DSH, FS, 4 years

Two days later

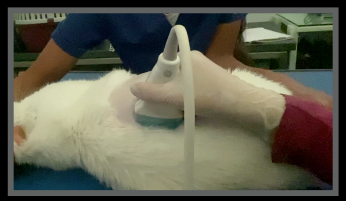


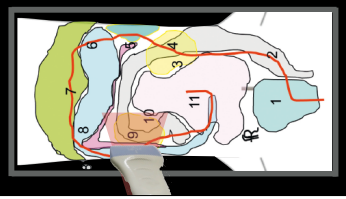
- Bun 25 (20-65), Crea 1,0 (0,7-1,6)
- Reduced abdominal pain (under treatment)
- Persistent anorexia

Mimi, FS, 4 years

Two days later

Another patient, to show the position of the probe



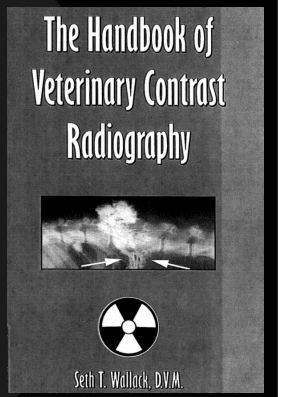


Intra-venous pyelography

Iohexolo 200 / 300 / 370 mgI/ml

Iopamiro 200 / 300 / 370 mgI/ml

- 880 mgI/kg given as a rapid bolus
- Put one or two large IV catheters
- Warm the contrast medium



Intra-venous pyelography

- Fasten the patient for 24 hours
- Consider enema if colon is full
- Native, at least two projections

Intra-venous pyelography

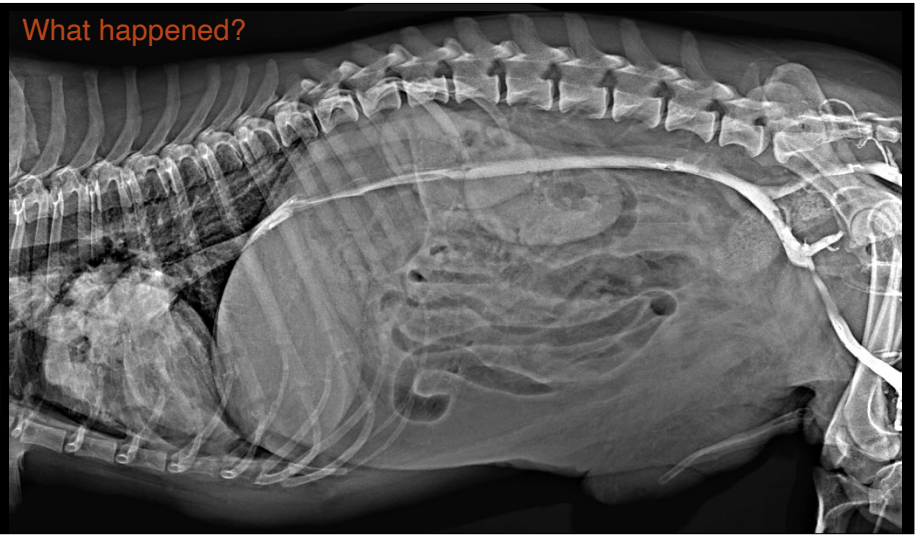
- Anesthesia - Analgesia
- Collect sterile urine before contrast
- Catheterise the UB and inject negative contrast for ectopic ureters

Intra-venous pyelography 1

- VD 5” after injection to check renal arteries
- RLR 5” to check the aorta

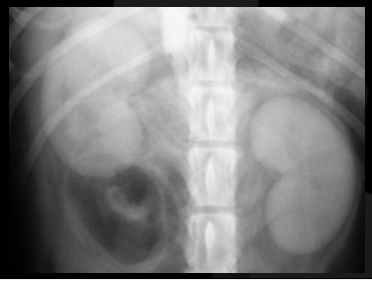
Intra-venous pyelography 1

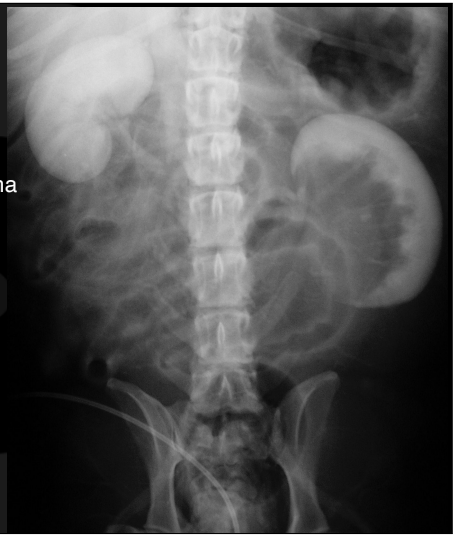
What happened?



Intra-venous pyelography 2

- VD 20” after injection to check renal parenchyma





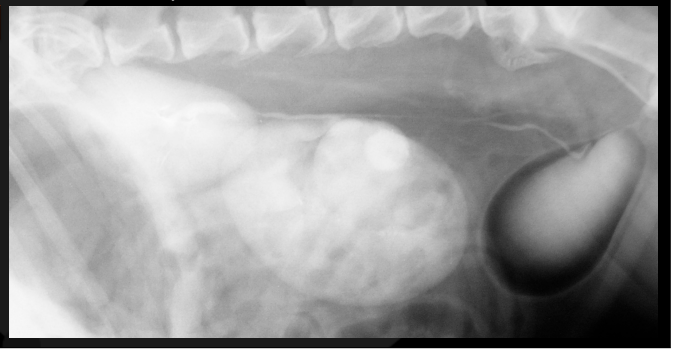
Intra-venous pyelography 3

- VD 1,5-3’ after injection to check renal pelvis and ureters
- RLR 1,5-3’ after injection to check renal pelvis and ureters

Intra-venous pyelography

- RLR 1,5-3’ after injection to check renal pelvis and ureters

4



Intra-venous pyelography

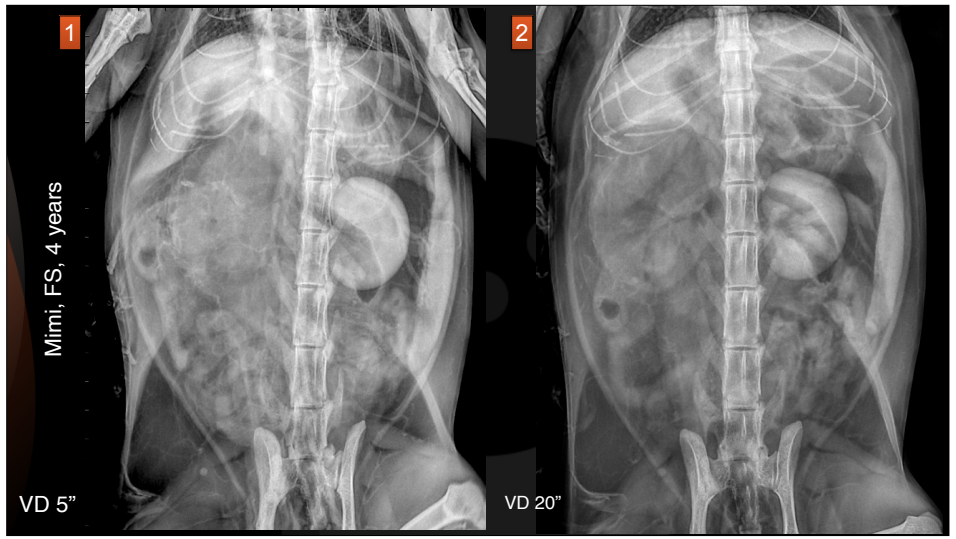
- VD, obliques, and RLR 10 minutes after contrast to check ureters and UB

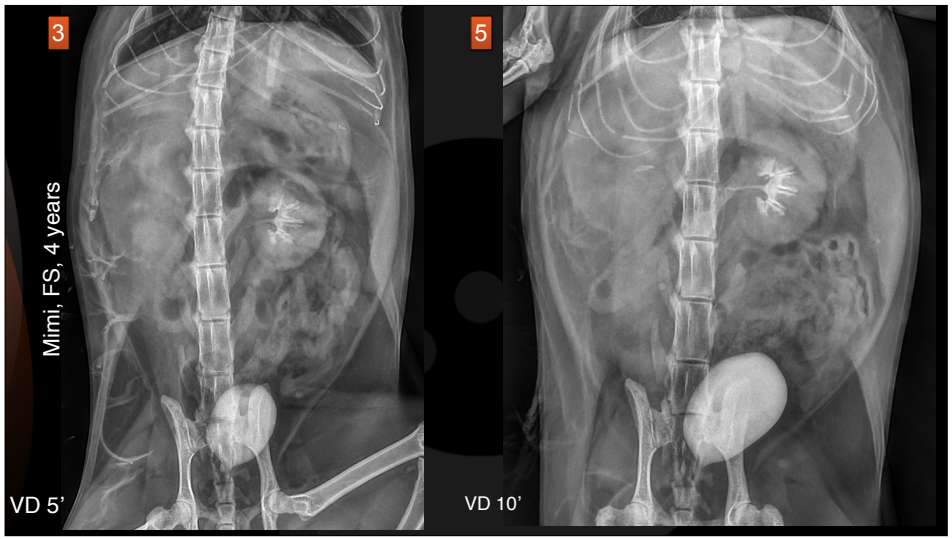
5

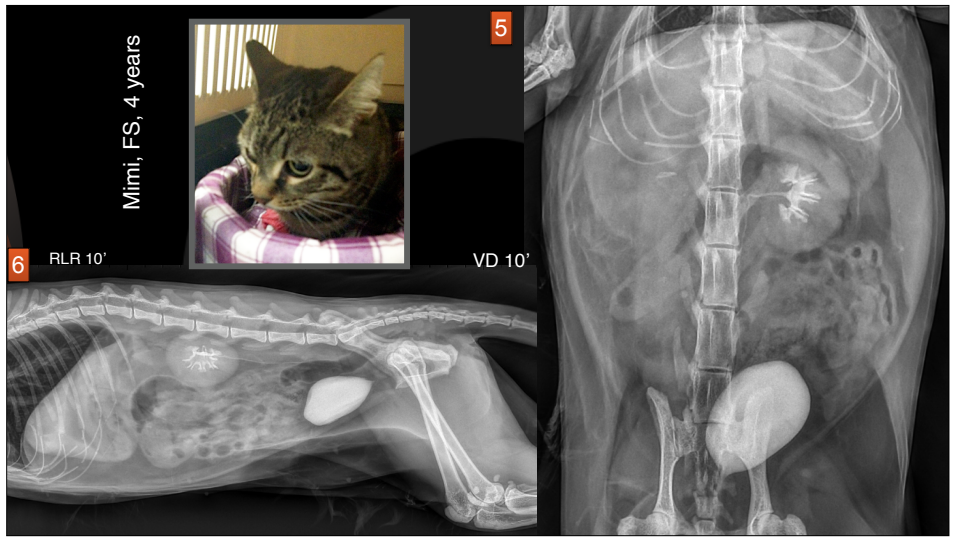
6

Intra-venous pyelography

- VD, obliques, and RLR 10 minutes after contrast to check ureters and UB





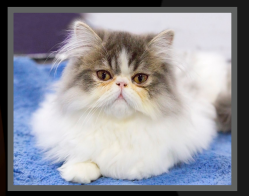


Olivia, Persian, FS, 8 years

- Brough to vaccination: “Because she is not eating well lately”
- A large abdominal mass palpated
- Agreed to lab works ad abdominal US

Olivia, FS, 8 year

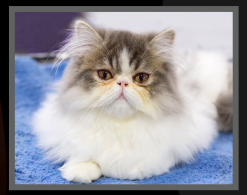
Blood works



RBC (milioni /µL) :	4.59	6.35	9.50	Acantociti:	+	Eliptociti:	
HGB (g/dL) :	8.50	9.6	14.3	Anisocitosi:	+	Ipocromia:	
HCT (%) :	21	28.0	42.5	Agglutinazione:		Macrociti:	
MCV (fL) :	43.4	38.0	49.5	Codociti:		Microciti:	
MCH (pg) :	15.2	12.6	16.0	Cheratociti:		Parassiti eritrocitari:	
MCHC (g/dL) :	35.1	31.0	35.0	Cnizociti:		Policromasia:	
CHCM (g/dL) :		30.0	33.5	Corpi di Heinz:		Punteggiature basofile:	
CH (pg) :		12.0	15.5	Corpi di Howell-Jolly:		Rouleaux:	
CHDW (pg) :		1.70	2.70	Cristalli di Hb:		Schistociti:	
RDW (%) :	16.6	14.2	17.4	Dacriociti:		Selenociti:	
HDW (g/dL) :		1.60	2.50	Drepanociti:		Sferociti:	
NRBC/100 WBC:	0	0	0	Eccentrociti:		Stomatociti:	
				Echinociti:		Torociti:	
Varie RBC:							
WBC (x 1000 /µL) :	15.2	5.0	11.0	Linfociti attivati:			
Conta corr. WBC (x 1000 /µL) :		5.0	11.0	Linfociti atipici:			
Mielociti (/µL) :	0	0	0	Neutrofili tossici:			
Metamielociti (/µL) :	0	0	0	Corpi di Doehle:			
Neutrofili banda (/µL) :	152	0	300	Schiumosità citopl.:			
Neutrofili segmentati (/µL) :	9120	2500	7000	Vacuolizzazione citopl.:			
Linfociti (/µL) :	4104	1300	5500	Basofilia citopl.:			
Monociti (/µL) :	1216	65	250	Granuli tossici:			
Eosinofili (/µL) :	152	70	800	Neutrofili giganti:			
Basofili (/µL) :	0	0	110	Macropoliciti:			
Danneggiate (/µL) :	0	0	0				
Indifferenziate (/µL) :	608	0	0				
Altre (/µL) :	0	0	0				
Varie WBC:							
PLT (1000 /µL) :	176	130	430	Stima PLT:	ADEG.: ☐	INADEG.: ☐	AUMENT.: ☑
MPV (fL) :	11.7	7.9	17.5	Varie:	Piastrine attivate: ☐		Macropiastrine: ☐
PCT (%) :	0.206	0.20	0.50		Piastrine allungate: ☐		Inclusi piastrinici: ☐
PDW (%) :	15.3	55.0	70.0	Note:			
MPC (g/dL) :		17.0	28.0				

Olivia, FS, 8 year

Blood works



CPK (IU/L):	327	40-150
AST (IU/L):	55	20-60
ALT (IU/L):	302	15-50
ALP (IU/L):	2632	10-70
GGT (IU/L):	6.9	1.5-12
Colinesterasi (IU/L):		1955-3950
Bilirubina Totale (mg/dL):	1.52	0.1-0.5
Proteine Totali (g/dL):	8.1	5.8-8
Albumine (g/dL):	3.7	2.5-4.0
Globuline (g/dL):	4.4	2.8-5.5
Rapporto A/G:	0.84	0.4-1.3
Colesterolo (mg/dL):	277	70-200
Trigliceridi (mg/dL):	80	30-100
AMILASI (IU/L):	1105	350-1800
Urea (mg/dL):	425	20-65
Creatinina (mg/dL):	8.23	0.7-1.6
Glucosio (mg/dL):	98	80-145
Calcio (mg/dL):	9.9	8.0-11.2
Fosforo (mg/dL):	9.5	2.6-5.0
Magnesio (mg/dL):		0.81-1.05
Sodio (mEq/L):	150	141-155
Potassio (mEq/L):	4.5	3.0-5.5
Rapporto Na/K:	33.3	31-43
Cloro (mEq/L):	114	110-130
Cloro corretto (mEq/L):	118.6	112-119
HCO-3 (mmol/L):		12.0-22.5
Divario Anionico:		-
Osmol. sier. calc. (mOsm):	308	285-296
Ferro totale (µg/dL):	96	110-170

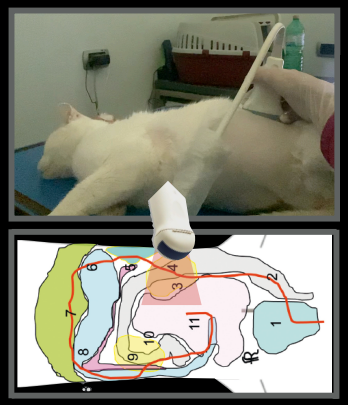
Haemolysis (?)

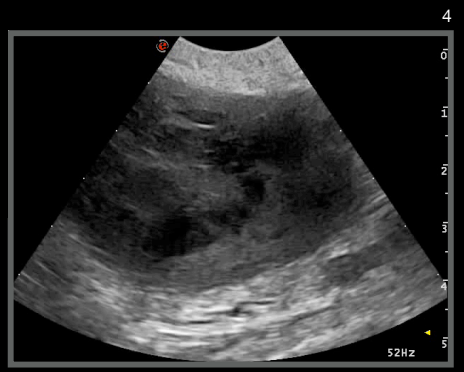
Hepatopathy (?)

Nephropathy

Olivia, FS, 8 years

Another patient, to show the position of the probe





Olivia, FS, 8 years

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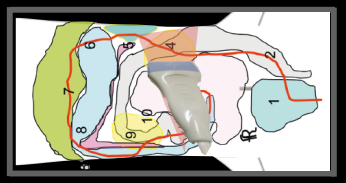
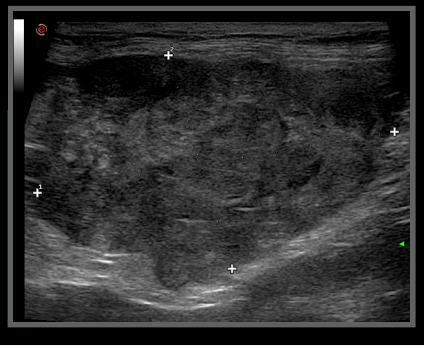
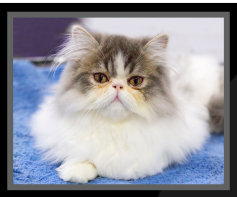


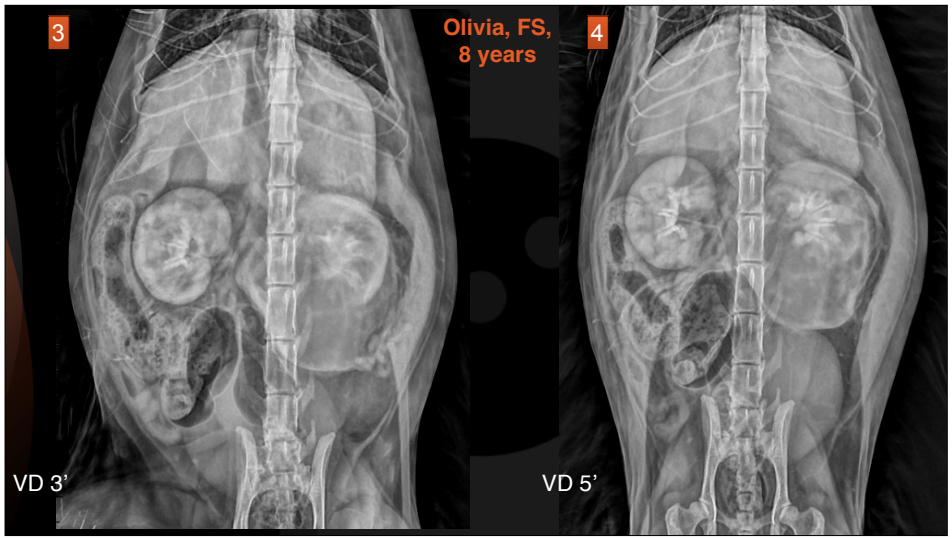


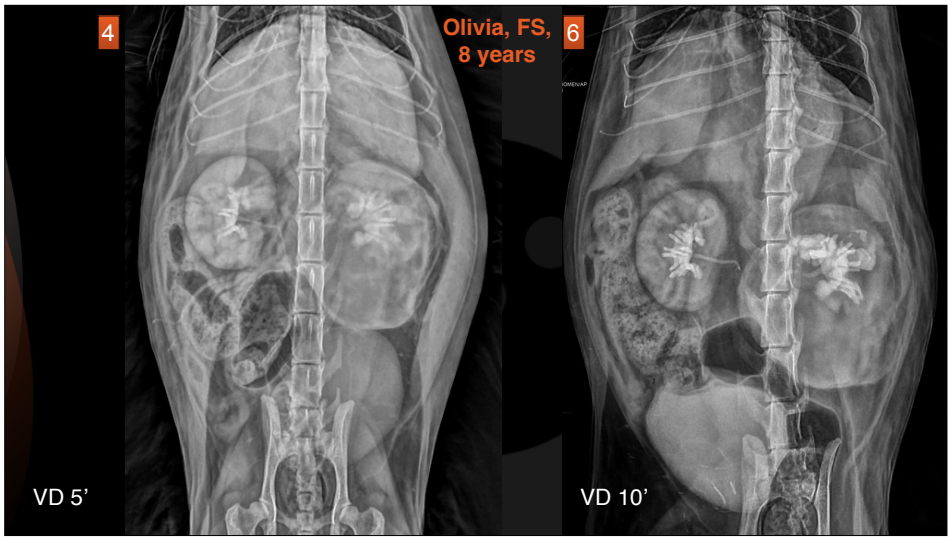


Olivia, FS, 8 years

Would you perform an IVP in a hyper-azotemic patient?

- 1) Yes
- 2) No
- 3) Yes, after hydration and check of the systemic pressure
- 4) Yes but I will inform the owner that the patient will die

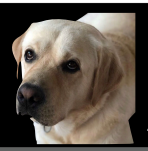




Pepper, Labrador, FI, 1 year

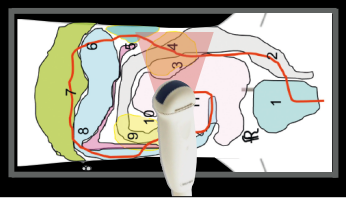
- Smell of urine
- When on the back drop urine from the vagina
- Requested abdominal US, lab works pending

Pepper, FI, 1 year



Another patient, to show the position of the probe

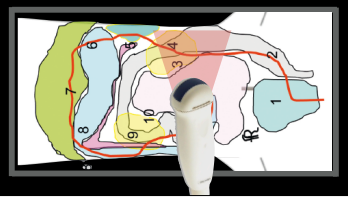
4

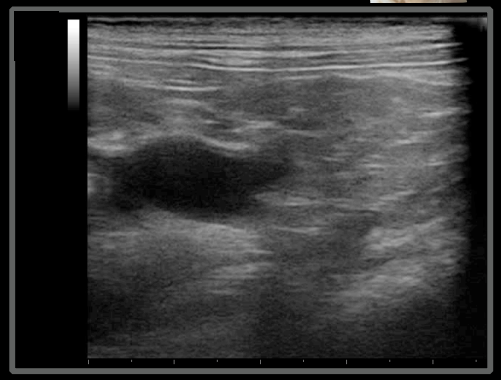


Pepper, FI, 1 year

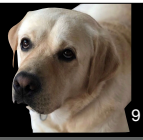
4

Another patient, to show the position of the probe





Pepper, FI, 1 year



9

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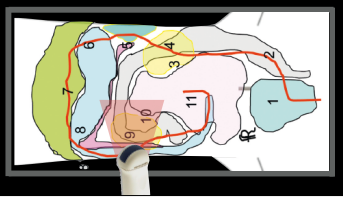
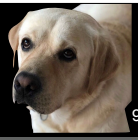
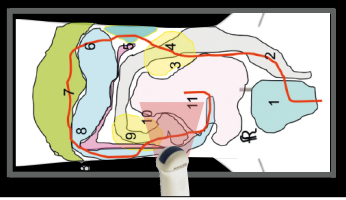


Pepper, FI, 1 year



9

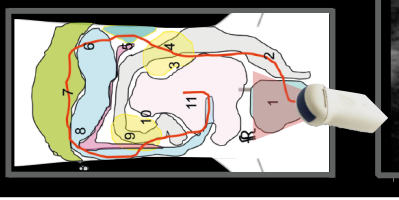
Another patient, to show the position of the probe

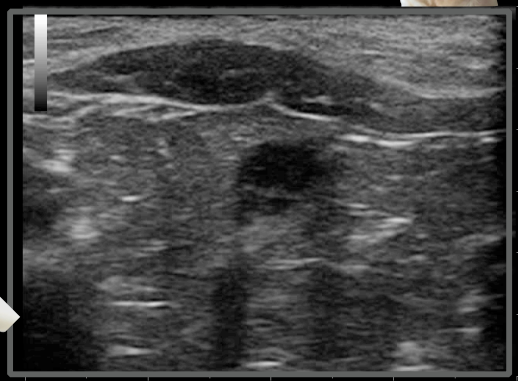


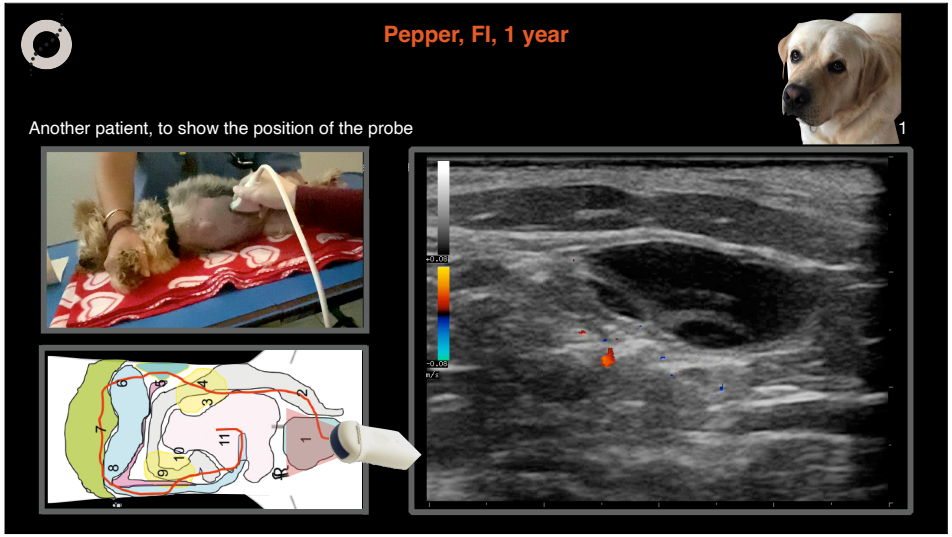
Pepper, FI, 1 year

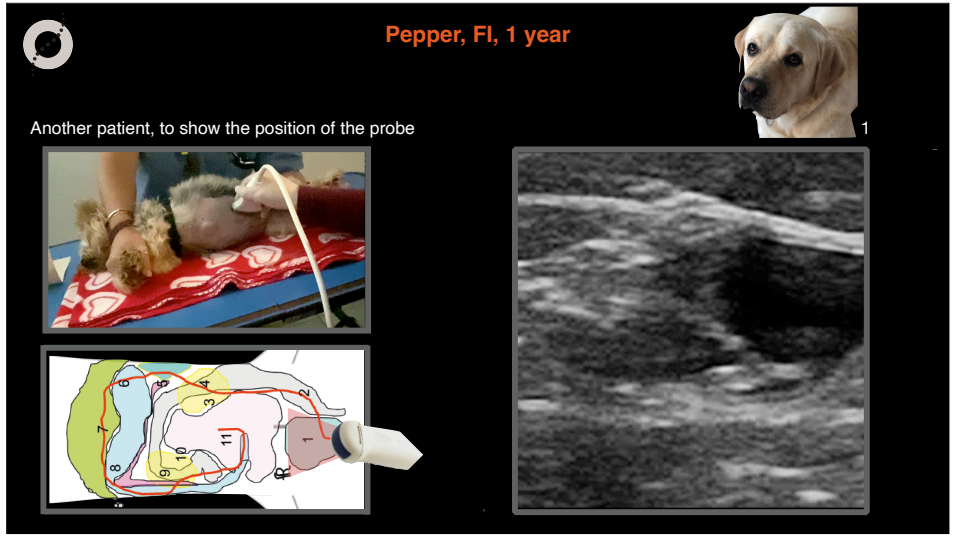
1

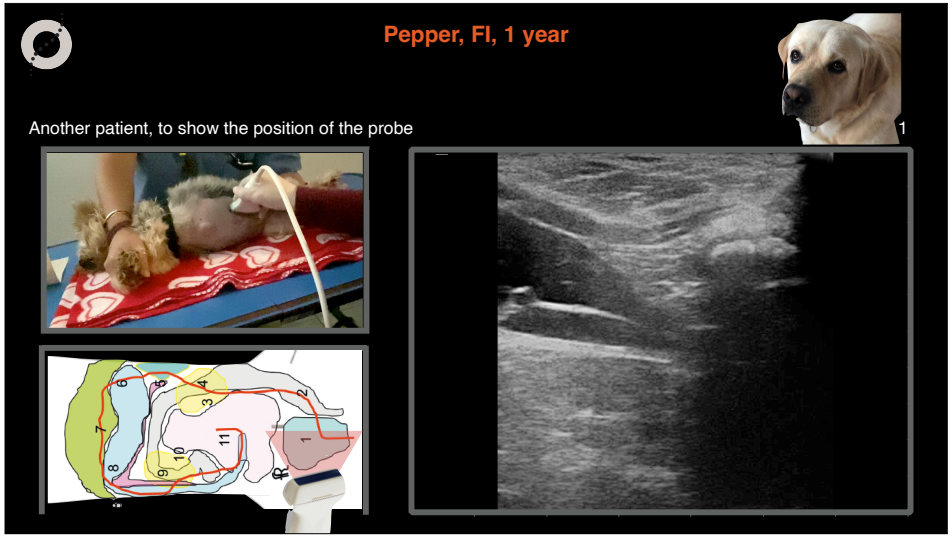
Another patient, to show the position of the probe











Ultrasonography as a sensitive and specific diagnostic modality for the detection of ectopic ureters in urinary incontinent dogs

Vet Radiol Ultrasound. 2022;63:328–336.

Oliver Taylor[1] | Rebekah Knight[2] | Marie-Aude Genain[2] | Laura Owen[2]

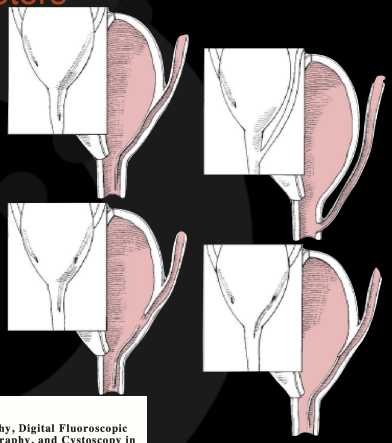
ities. Ultrasonographic findings were compared with those from cystoscopic examination to determine diagnostic accuracy. The relationship between the presence of at $P \leq 0.05$. Ultrasonography had a sensitivity of 93.5%, specificity of 100%, and diagnostic accuracy of 95% when identifying dogs with ureteral ectopia. When classifying individual ureters as ectopic or non-ectopic, sensitivity was 87.8% and specificity was 86.7%. Dogs with ureteral ectopia had significantly more concurrent urinary tract abnormalities on ultrasound than unaffected dogs ($P = 0.004$). Ectopic ureters were associated with significantly more concurrent ipsilateral upper urinary tract ultrasonographic abnormalities than unaffected ureters ($P < 0.001$). Ultrasonography performed by an experienced ultrasonographer is a sensitive and specific screening tool for canine ureteral ectopia, which eliminates the need for heavy sedation, general anesthesia, and advanced imaging, although it should not be relied upon as the sole diagnostic modality for the assessment of individual ureters.

Ectopic ureters

CT

Endoscopy

Rad + contr



J Vet Intern Med 2004;18:271–281

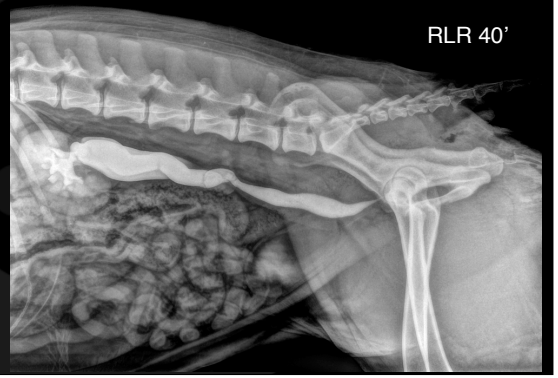
Digital Fluoroscopic Excretory Urography, Digital Fluoroscopic Urethrography, Helical Computed Tomography, and Cystoscopy in 24 Dogs with Suspected Ureteral Ectopia

Valerie F. Samii, Mary A. McLoughlin, John S. Mattoon, Wm. Tod Drost, Dennis J. Chew, Stephen P. DiBartola, and Stacy Hoshaw-Woodard

VD 40’

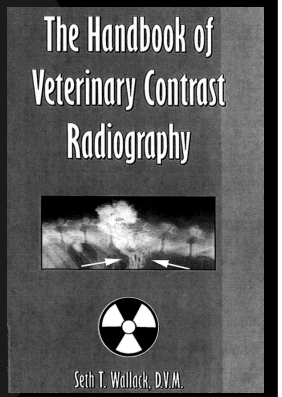
Pepper, FI, 1 year

RLR 40’



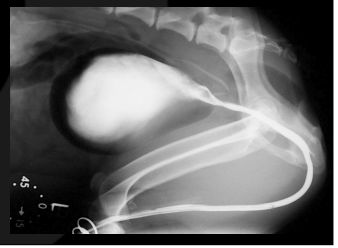
Ascending urethrography

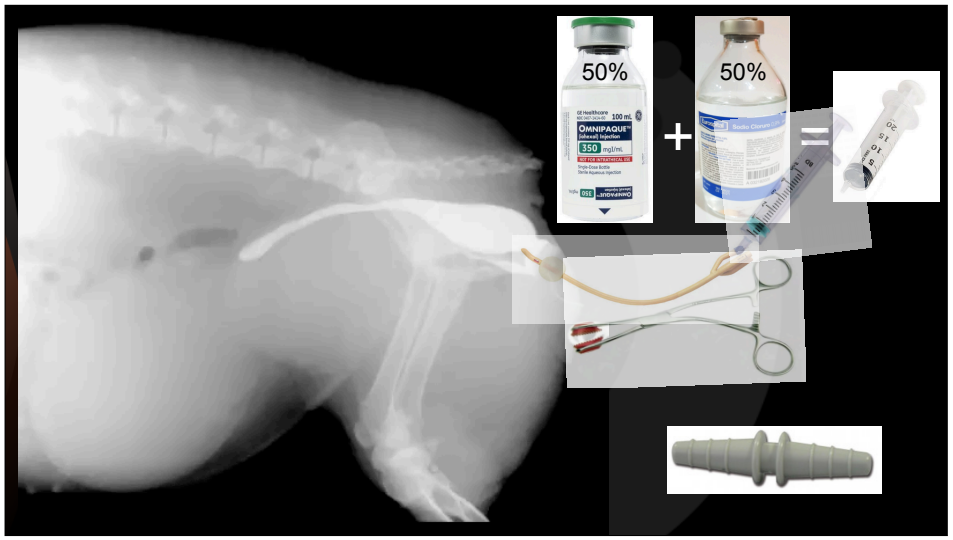
- Heavy sedation or anesthesia
- Obtain survey radiographs, two or more
- Dilute the contrast 30-50% with saline



Ascending urethrography

- Put a foley on the vaginal vestibule or distal urethra
- Close the vaginal labias / penis to avoid contrast leakage





Ascending urethrography

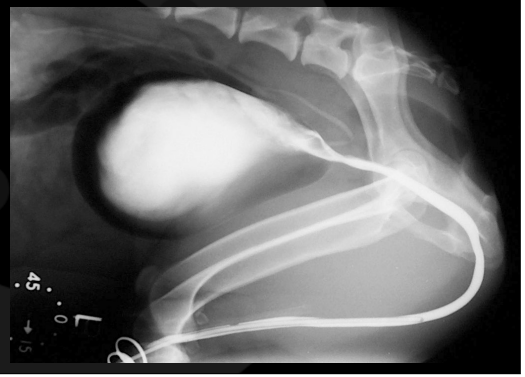
- Cats 15 ml
- Small dog 30 ml
- Middle dog 45 ml
- Large dog 90 ml

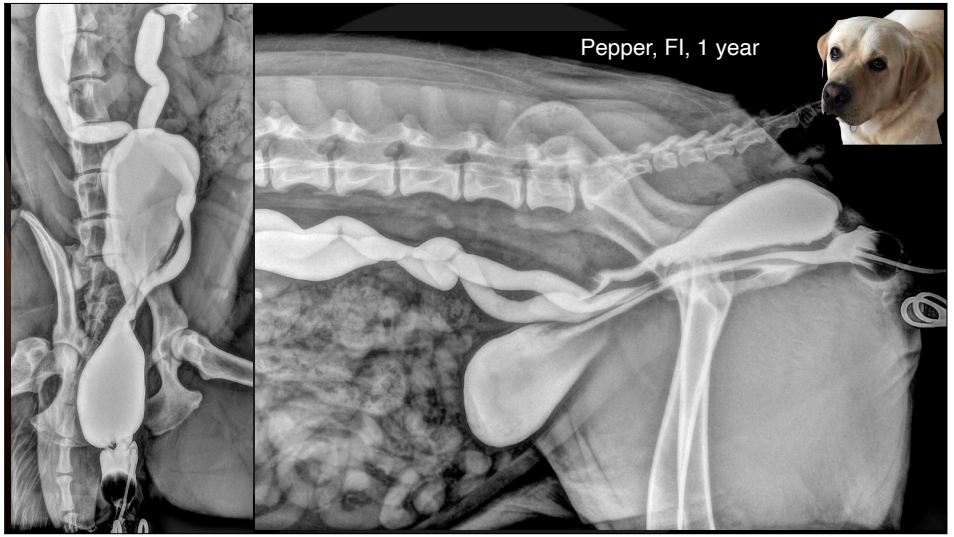
Take images during last third portion of the injection

Ascending urethrography

- Cats 5 ml
- Small dog 10 ml
- Middle dog 20 ml
- Large dog 30 ml

Take images during last third portion of the injection



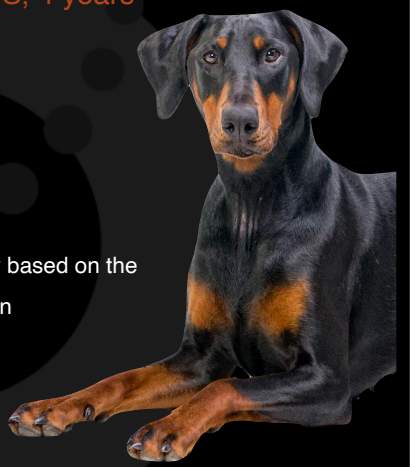


Pepper, Labrador, FI, 1 year

- Bilateral octopic ureters diagnosed
- Surgical intervention with ureters repositioned
- Continent patient
- Came back three years later for acute abdomen - gossypiboma
- Recovered well from FB removal

Lady, Doberman, FS, 4 years

- HBC
- Send to Utrecht university for pelvic fracture
- Surgeon on duty decides for immediate surgery based on the single view provided by the referring veterinarian

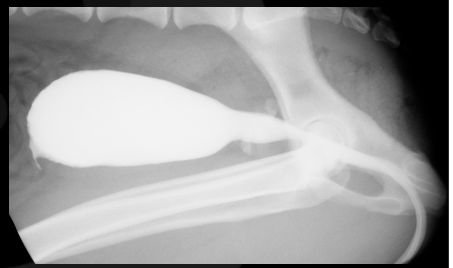


Lady, Doberman, FS, 4 years

- The day after called in for an urgent positive cystography
- Suspected urine leakage from left thigh

Positive cystography

- Heavy sedation or anesthesia
- Obtain survey radiographs, two or more
- Dilute the contrast 30-50% with saline
- Insert a sterile catheter in the UB



Positive cystrography

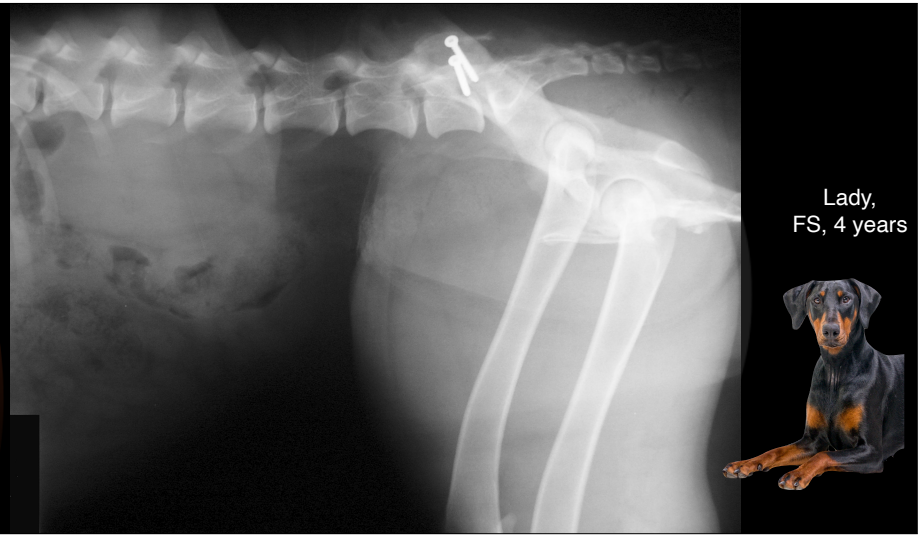
- Empty the UB
- Lydocaine 2% 3-5 ml to reduced discomfort
- 5 ml/kg of contrast (hold the UB to avoid overdistension)
- Cats 25 ml
- Take images during injection

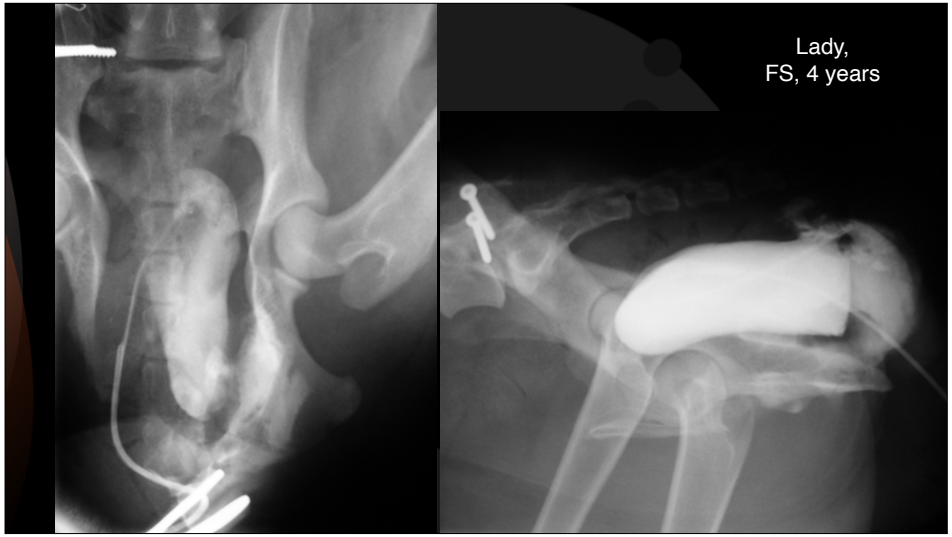
Negative

- 5 ml/kg of room air (hold the UB to avoid overdistension)

Double cystography

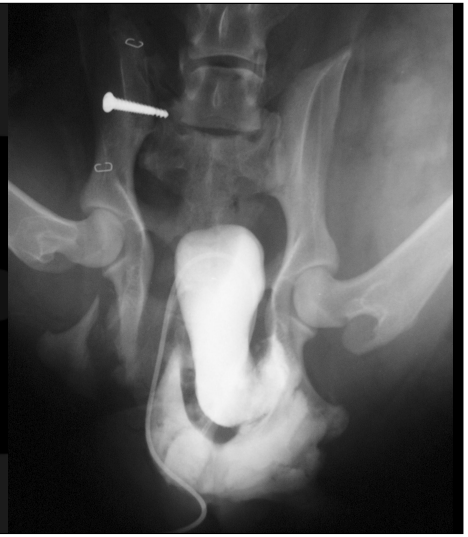
- 5-10 ml of positive contrast and room air (hold the UB to avoid overdistension)





Lady, Doberman, FS, 4 years

- Herniated and ruptured UB in the pelvic canal
- At surgery, severe necrosis find
- Euthanised on the table



Romeo, DSH, MN, 9 years

- Difficult in urinating, severe swelling right hind limb
- Hematuria
- Lethargic and anorexic

Romeo, DSH, MN, 9 years

- Two years ago Hit By Car
- Pelvic fracture + ruptured urethra
- Urethrostomy performed at the time

Romeo, DSH, MN, 9 years

- Three months later caudal abdominal hernia with UB displacement - repaired
- Today, 18 months later, swelling of the right hind limb with suspicion of urine leakage

Stato del Sensorio:	☑ normale	☐ depresso	☐ stuporoso	☐ comatoso	☐ delirium

Peso (Kg):	5.65	B.C.S.:	NORMOPESO	TRC (sec):	2
Temp. (°C):	36.8	Polso (bpm):	132	Respiro (rpm):	28
Press. max.(mmHg):	160	Press. min.(mmHg):	90	Press. media (mmHg):	120

Romeo, DSH, MN, 9 years

RBC (milioni /µL) :	6.00	6.35	9.50
HGB (g/dL) :	8.5	9.6	14.3
HCT (%) :	24.4	28.0	42.5
MCV (fL) :	40.7	38.0	49.5
MCH (pg) :	14.1	12.6	16.0
MCHC (g/dL) :	34.6	31.0	35.0
CHCM (g/dL) :		30.0	33.5
CH (pg) :		12.0	15.5
CHDW (pg) :		1.70	2.70
RDW (%) :	14.9	14.2	17.4
HDW (g/dL) :		1.60	2.50
NRBC/100 WBC:	0	0	0

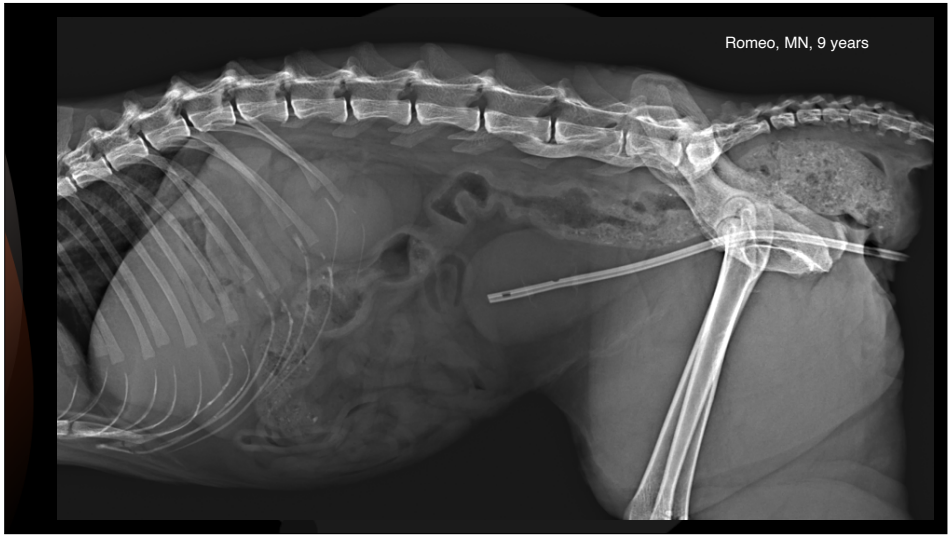
WBC (x 1000 /µL) :	15.1	5.0	11.0
Conta corr. WBC (x 1000 /µL) :		5.0	11.0
Mielociti (/µL) :	0	0	0
Metamielociti (/µL) :	0	0	0
Neutrofili banda (/µL) :	453	0	300
Neutrofili segmentati (/µL) :	12986	2500	7000
Linfociti (/µL) :	1057	1300	5500
Monociti (/µL) :	453	65	250
Eosinofili (/µL) :	151	70	800
Basofili (/µL) :	10	0	110
Danneggiate (/µL) :	0	0	0
Indifferenziate (/µL) :	0	0	0
Altre (/µL) :	0	0	0

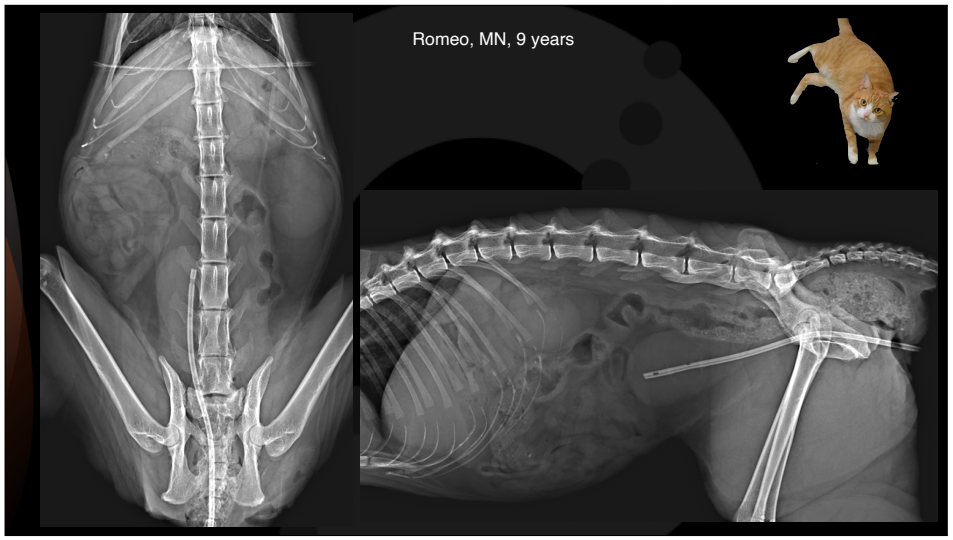
PLT (1000 /µL) :	747	130	430
MPV (fL) :	9.8	7.9	17.5
PCT (%) :	0.735	0.20	0.50
PDW (%) :	14.6	55.0	70.0

Romeo, DSH, MN, 9 years

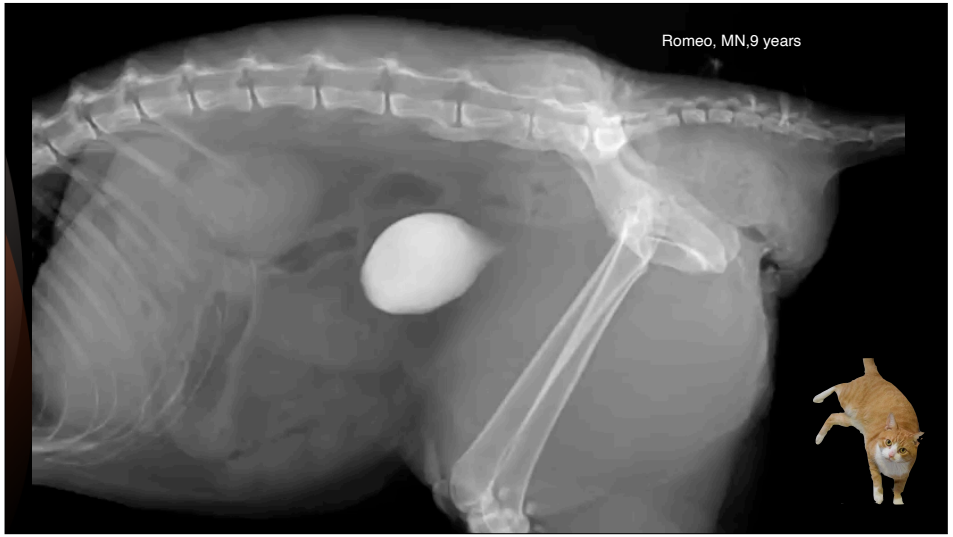
CPK (IU/L):	979	40-150
AST (IU/L):	27	20-60
ALT (IU/L):	29	15-50
ALP (IU/L):	11	10-70
GGT (IU/L):	2.7	1.5-12
Colinesterasi (IU/L):		1955-3950
Bilirubina Totale (mg/dL):	0.16	0.1-0.5
Proteine Totali (g/dL):	8.0	5.8-8
Albumine (g/dL):	3.7	2.5-4.0
Globuline (g/dL):	4.3	2.8-5.5
Rapporto A/G:	0.86	0.4-1.3
Colesterolo (mg/dL):	163	70-200
Trigliceridi (mg/dL):	121	30-100
AMILASI (IU/L):	612	350-1800
Urea (mg/dL):	322	20-65
Creatinina (mg/dL):	7.9	0.7-1.6
Glucosio (mg/dL):	148	80-145

Calcio (mg/dL):	8.5	8.0-11.2
Fosforo (mg/dL):	9.4	2.6-5.0
Magnesio (mg/dL):		0.81-1.05
Sodio (mEq/L):	144	141-155
Potassio (mEq/L):	5.4	3.0-5.5
Rapporto Na/K:	27	31-43
Cloro (mEq/L):	113	110-130
Cloro corretto (mEq/L):	122	112-119
HCO-3 (mmol/L):		12.0-22.5
Divario Anionico:		-
Osmol. sier. calc. (mOsm):	330	285-296
Ferro totale (µg/dL):	15	110-170




Romeo, MN, 9 years


Romeo, MN, 9 years


Romeo, MN,9 years


Romeo, MN,9 years

Conclusions

Contrast medium hold a very important role in the urinary system of small animals

Thank you

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