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Diagnosis and Management of Testicular Tumours in Eclectus Parrots using Computer Tomography

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Introduction

Testicular tumours in parrots are often very large by the time clinical signs appear (Bowles 2002). This is because most clinical signs are associated with large testicles and how their size effects the other internal organs. The large size and therefore advanced stage of disease at diagnosis can limit the success of any treatment option. This report looks at two cases of testicular neoplasia, both causing macro-testicular changes, one with invasive spread at diagnosis. Comparable clinical work up was done on both birds using haematology and biochemistry, radiology including a barium study, computer tomography (CT) and endoscopy in one of the cases. These cases give good insight into how each of these different diagnostic tools can be used in the diagnosis and management decisions of testicular neoplasia in Eclectus parrots, especially the use of CT as a tool for confirming tumour growth and metastasis.

Case 1

An 18 year old male Eclectus parrot (Eclectus roratus) was presented to the Greencross Springvale Animal hospital with feather damaging behaviour of the abdominal area. Clinical examination indicated that there was feather chewing of this area, and abdominal palpation indicated that there might be organ enlargement causeing a slight bulge. A modified faecal wet preparation test using a small amount of sodium nitrate solution and faeces on a slide was negative for parasite eggs. A skin tape preparation was negative for dermatitis and skin pathogens. Haematology indicated a high white blood cell count (32×10 /L ref 9-15×10 /L). Biochemistry showed a mild increase in creatine kinase (454 U/L ref 132-410 U/L) and urea (1.4 mmol/L ref <1.1 mol/L), an increase in amylase (1207 U/L ref 562-682U/L) and a high cholesterol (8.5 mmol/L ref 2.6-6.8 mmol/L).

Under general anaesthesia, whole-body radiographs evealed a mass approximately 34mm by 20mm ventral to the cranial kidney in the area of the testicles, displacing the ventriculus ventrally and cranially, and in turn displacing the liver cranially. Testicular disease being the most likely cause, initial treatment included Leuprorelin actate 200 ug (Lucrin® 7.5mg, AbbVie Pty Ltd, Mascot, NSW) given every two weeks for three treatments, and Clamoxyl® Duo 400/57 (Alphapharm Pty Ltd, Millers Point, NSW) given orally at 100mg/kg twice daily for seven days. The bird showed some clinical improvement in feather damaging behaiour; however repeat radiographs a month later revealed no improvement with mass size, approximately 36mm by 20mm.

The bird was re-assessed after one month for a transient episode of paralysis in the right leg. There was improvement in feather covering, and the slight bulge in the abdomen was still present. Radiography was repeated with a barium meal and endoscopy via the thoracic air sacs. The bird was given a barium meal approximately two hours before the procedure and premedicated with Butorphenol (Torbugesic®,Pfizer Australia Pty Ltd, West Ryde, NSW) 1mg/kg IM. It was then masked down using Isoflurane (Isothesia®, Abbott Laboratories, Abbot Park, USA) and then intubated with a 2.5mm non-cuffed endotracheal tube and maintained on a ventilator. The radiographs appeared to show a further increase in mass size. The contrast study demonstrated that the intestines were displaced by the mass. Endoscopy using a 25 degree angle, 1.9mm, 19cm rigid endoscope via the left thoracic air sac was performed. The view was filled with a large white mass of low vascularity and smooth surface; the large size of the mass made it difficult to see the edges, the details of its attachments and the organs immediately underneath it. Endoscopy from the right thoracic air sac revealed a normal appearing right testicle similar in colour to the mass on the left. It was also difficult to assess the area of attachment of the large left testicle from this view, there were no obvious changes or metastasis detected in other organs viewed by endoscopy.

Computed tomography (8 slice, GE medical light speed ultra) was performed to assess the tumour attachments and if the transient paretic episode was caused by local

inflitration of the tumour into the kidney or the area of the sciatic nerve, indicating a poor prognosis. The bird was anaesthetised, a 26g catheter was placed in the right basilic wing vein and Iohexol (Omnipaque™, 300mg, GE Healthcare, Auckland) contrast 0.8ml was injected. The CT was able to identify the full size and shape of the mass, clarifying its attachments, and confirmed no obvious signs of spread (Figs. 1 and 2).

As there was no evidence of spread and a lack of response to leuprorelin actate, with likely continued growth of the tumour, surgical removal was attempted. The bird was pre-warmed, premedicated with Butorphenol and anaesthetised. A 26g catheter was placed in the right basilic vein and fluids delivered using a syringe pump; the bird was taped to a surgery board in dorsal recumbency. A ventral transverse abdominal approach was taken. Once the ventriculus and intestines were gently retracted, the firm and encapsulated mass filled the surgical field. The mass was relatively avascular; it was debulked with sharp dissection and suction within the capsule. It was then possible to ligate the attaching blood vessels using micro-haemiclips and a long-handled right angle haemiclip applicator. Once the mass was removed the right testicle was examined and also removed, the bird went into cardiac arrest and could not be revived. Histologic examination indicated the mass to be a seminoma.

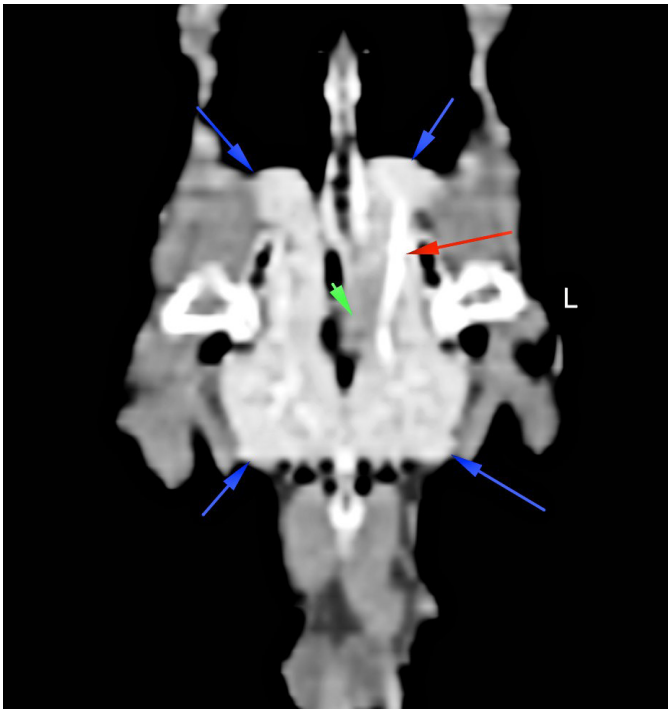

Figure 1. CT Coronal plane Case 1. Blue arrows - right and left kidneys. Red arrow - left ureter. Green arrow - the tumour shadow, creating a slight impression on the left kidney.
Compare to Figure 3.

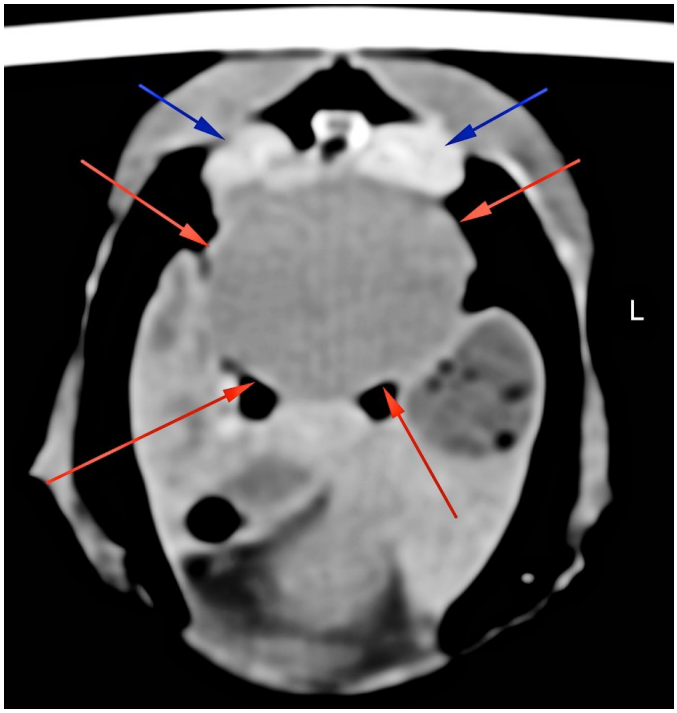

Figure 2. CT Transverse plane through the tumour, Case 1. Red arrows - encapsulated tumour. Blue arrows - left and right kidneys. A normal right testicle can be seen between the kidney and tumour on the right side. Compare to Figure 4.

Case 2

A 14 year old male Eclectus was originally seen six weeks previously by two colleagues. It had presented with general signs of depression and closing of the right eye and poor feather condition. Haematology, biochemistry and radiology were performed. There was an initial mild regenerative anaemia and hypoproteinaemia and radiographs showed a large mass in the area of the testicle displacing the ventriculus cranioventrally. Follow-up radiographs with barium contrast more clearly defined testicular enlargement, indicating left-craniventral displacement of the proventriculus and the ventriculus and right caudoventral displacement of the intestines. Further haematology indicated a degenerative anaemia (PCV 0.24 L/L ref 0.42-0.55L/L) and hypoproteinaemia (TP 16g/L ref 32-43 g/L). The bird was given a course of Leuprorelin acetate and a deslorelin acetate (Suprelorin® 4.7mg, Virbac, Milperra, NSW) implant, resulting in a slight improvement in clinical presentation; however the bird started to have episodes of weakness and falling over.

The bird was then presented to Greencross Springvale Animal Hospital. During the six weeks since being seen by other veterinarians the bird

had lost 30g weight. Endoscopy was contra-indicated due to the compression of the airsac space. A CT scan was performed to look for local invasion and metastasis to assess the mass for surgery. The bird was anaesthetised as per Case 1; a 26g catheter was placed in the right basilica vein and 0.8ml of Iohexol contrast was injected as with case one. The CT revealed a very large left testicle and there was solidification and density changes of the left caudal lung and left cranial kidney indicating local invasion of the mass (Fig. 3). There was also enlargement of the right testicle (Fig. 4). Based on this information the bird was deemed a poor prognosis and inoperable, it was then maintained on palliative treatments including anti-inflammatories and pain relief and was euthanased approximately 20 days later.

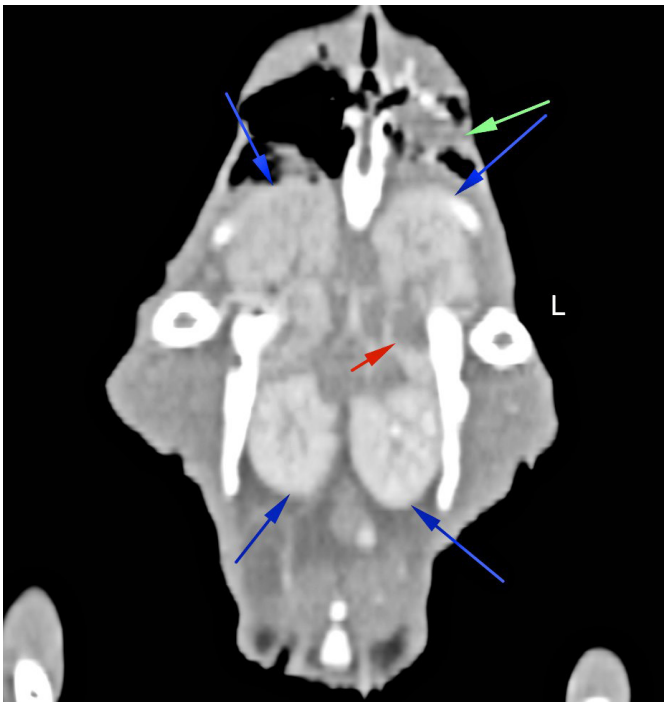

Figure 3. CT Coronal Plane Case 2. Blue arrows - left and right kidneys. Red arrow - tumour infiltration of the left kidney (adjacent to the ureter filled with contrast). Green arrow -metastasis/tumour infiltration in the left lung. Compare to Figure 1.

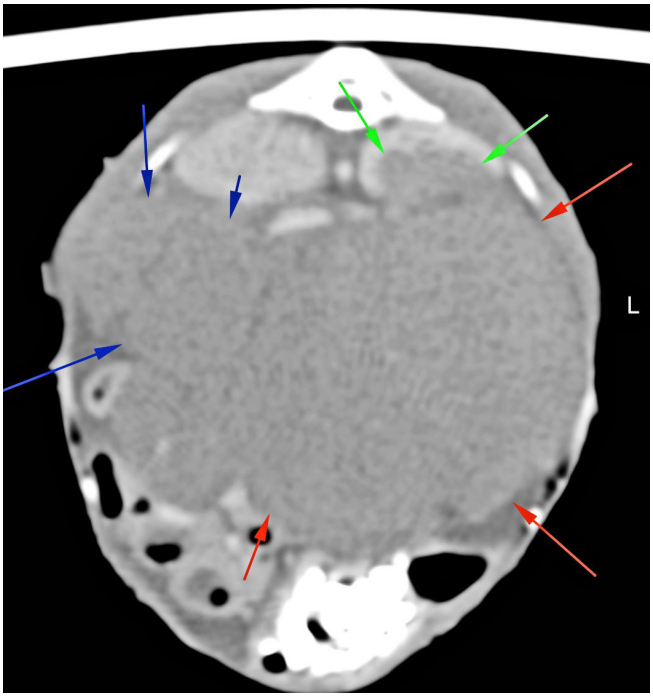

Figure 4. CT transverse plane through Case 2. Red arrows - large testicular tumour. Green arrows - infiltration of the tumour into the kidney. Blue arrows - tumour also in the right testicle. Compare to Figure 2.

Discussion

Testicular neoplasia in parrots include seminoma, Sertoli cell tumour, lymphosarcoma, undifferentiated sarcoma and teratoma (Leach 1992). Seminomas are neoplasia of the germ cells of the testicle and are considered benign, however there have been reports of metastatic spread (Saied et al., 2011). Testicular neoplasia in birds frequently grow large and by their size start to interfere with organ function (Reavill et al., 2004). The large size of avian testicular neoplasia reduces air sac size, affecting breathing, placing pressure on the kidneys and sciatic nerves, causing renal problems and paralysis of the legs . Tumour size may also impinge on the gastrointestinal tract, interfering with faecal passage.

The treatment of choice of non-metastatic testicular disease is surgical removal (Rosen, 2012). Castration in parrots is intricate surgery, significantly more difficult with testicular disease and neoplasia as in the two cases in this report. Other therapies have been described including the use of Leuprorelin acetate, a GnRH agonist (Nemetz, 2009). This therapy has been successful in reducing the size of non-metastatic testicular neoplasia. Nemetz (2009) used doses of Leuprorelin acetate much higher (2300µg/kg for psittacine birds <50gm body weight and 1500µg/kg for species >50gm, at three weekly intervals for three injections) than previously described for ovarian disease (750-800µg/kg, at three weekly intervals for three injections). Not all tumours of the testicle will respond to Leuprorelin acetate. In the described cases leuprolide acetate was used in an attempt to reduce the size of the testicle, therefore reducing the complications of surgery or giving an option for ongoing medical management. In both cases the tumour continued to grow with treatment despite

an improvement in clinical signs. However neither of these cases used the high dose rates recommended by Nemetz (2009). Carboplatin and radio therapy have also been described for the treatment of avian testicular tumours (Childs-Sanford et al., 2006; Reavill et al., 2004). More work needs to be done with these treatment options to understand appropriate dosing and expected treatment outcomes.

Early diagnosis through endoscopic or surgical biopsy may lead to an appropriate and rapid treatment of testicular tumours. Nemetz points out a number of possible complications of testicular endoscopic biopsy, including fluid leaking into airsacs if the mass is cystic or bleeding, and excessive bleeding can occur if the mass is vascular. Where tumours are large, the lack of airsac space contra-indicates the use of this technique. Gartrell did a study on fine needle aspirate cytology to assess stages of testicular maturity in swift parrots, this showed good correlation between the cytology results compared to histology, he then suggested this technique could be useful in the diagnosis and assessment of testicular disease (Gartrell 2002). However Nemetz suggests a misdiagnosis can occur with small endoscopic biopsies if multiple diseases are involved, thus highlighting the limitations of small biospies and therefore also fine needle aspirates. Nevertheless fine needle biopsies as decribed by Gartrell may be useful in situations where there is a question of normal seasonal hyperplasia or testicular disease, it may have been useful to attempt this technique in case one when endoscopy was performed. It could also be useful in cases where surgical biopsy may be a higher risk if the bird is medically unstable. If a tumour is the suspected cause, excisional biopsy may be the best option to avoid the need for a follow up surgery to treat the problem.

In case one, a transverse coelomic surgical approach was decided. Due to the tumour's size it was easily accessed, contrast radiology and the CT showed how the tumour could be accessed from this direction. This approach meant airsacs could be preserved and ribs left intact for access. Ligation of vasculature was achievable despite this approach giving poor exposure. Once the tumour was removed the bird appeared to be stable, the contralateral testicle was removed as per personal communications with Nemetz (2015). Bilateral testicular neoplasia has been described (Saied et al., 2011). The CT in case two suggested both testicles were enlarged, confirming Nemetz experience. Unfortunately the bird went into cardiac arrest during the removal of the second testicle.

In these cases a number of different diagnostic tools were used to give valuable information that assisted in the management of the disease. In case one, the tumour was well understood through a radiographic series over a period of time. This showed a small increase in the size of the tumour over this time despite medical treatments. A barium study indicated how the gastrointestinal tract was displaced by the tumour; this was helpful in deciding on the surgical approach to the tumour as well as differentiating the internal organ shadows. Endoscopic assessment was helpful in confirming the mass was testicular; adrenal tumours have been described as similar in size and position (Cornelissen and Verhofstad, 1999). Endoscopy was useful in visualising the organs for any signs of distant metastasis, but the tumour was too large to assess the attachments and rule out local invasion in this area. The use of CT in this case gave the information required to be confident that surgery was a viable treatment option for attempted cure of the disease.

In case two the radiographs indicated the tumour was larger than the tumour in case one. A Barium study helped to define the size of the tumour and helped to differentiate organ shadows showing no other obvious organ enlargements. Haematology indicated a poorer prognosis in this case due to a chronic anaemia and hypoproteinaemia. CT was able to confirm local invasion of the tumour, this information suggested inoperable disease and a grave prognosis.

CT is now common place in veterinary medicine. In both cases, CT gave valuable information showing how it can be useful in making decisions on diagnosis, prognosis and treatment in cases of avian testicular tumours.

Acknowledgements

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