Surgery of the Avian Gastrointestinal Tract

R. Avery Bennett, DVM, MS, Diplomate ACVS

CELIOTOMY

A simple ventral midline celiotomy provides limited exposure to most abdominal organs in birds. It may be used for a liver biopsy or for surgery on the small intestine. A left lateral approach provides exposure to most organs. The bird is positioned in right lateral recumbency with the left leg retracted caudally. The skin incision is made from the proximal end of the pubis to the sixth rib dorsal to the uncinate process. After the skin is incised, the left leg can be retracted farther caudally to provide improved exposure. A branch of the femoral artery is located within the body wall coursing toward midline from the area of the coxofemoral joint. This vessel must be coagulated or ligated before the abdominal musculature can be incised. An incision is made through the mid-lateral body wall from the level of the pubic bone to the last rib (8th in most psittacine birds). Care must be taken to protect the underlying structures from accidental incision. In order to gain exposure to the gonad and proventriculus, the last two ribs often must be transected. The intercostal vessels are located just cranial to each rib in the intercostal space. They are coagulated with bipolar forceps or hemostatic clips. The ribs are then transected just dorsal to the junction between the sternal and the vertebral ribs. Care must be taken to preserve the lung which may extend as far caudal as the 7th rib. A retractor, such as a Heiss retractor, is placed between the cut ends of the ribs and used to spread the ribs providing exposure to the more cranial abdominal organs. Following completion of the procedure, closure involves apposition of the abdominal and intercostal muscles. No effort is made to unite the cut ends of the ribs. Skin is closed in a Ford interlocking pattern. This approach offers exposure to the male or female reproductive tract, the ventriculus, the proventriculus, the spleen, the left lung, the left kidney and some of the intestines.

A transverse abdominal approach offers good exposure to a large portion of the abdomen. With the bird in dorsal recumbency a transverse incision is made midway between the vent and the caudal extent of the sternum. The body wall is lifted and incised being careful to protect underlying structures. The duodenal loop and pancreas lie immediately under the body wall in this location. Using this approach, the ventriculus and small intestine are most accessible. If there is hepatomegaly, the caudal extent of the liver may also be accessible. The viscera may be reflected to expose the middle and caudal lobes of the kidneys, the cranial cloaca, and the lower reproductive tract (shell gland of females and vasa defentia of males). The body wall incision is closed in a simple continuous pattern and the skin in a Ford interlocking pattern.

A flap approach is also made with the bird in dorsal recumbency. A ventral midline celiotomy incision is made and extended along one side of the caudal border of the sternum leaving 2-3 mm of muscle into which sutures may be placed. A Y shaped incision may be created by performing bilateral flaps. This approach often provides the best exposure to mid-abdominal masses, uterine masses, and generalized abdominal disease such as yolk peritonitis. The approach should be limited to the minimum needed to accomplish the task in order to minimize tissue exposure, compromise to the blood supply, and disruption of air sacs. It may be difficult to maintain anesthesia with large abdominal approaches which disrupt multiple air sacs. Closing the incision or covering it with

saline moistened sponges for several breaths along with increasing the level of anesthesia will often help with maintenance of anesthesia.

INGLUVIOTOMY AND CROP SURGERY

The ingluvies (crop) is a storage organ of the avian digestive tract. Because it is often full and protruding, it is susceptible to trauma. It may also be the site where a foreign body has lodged. Hand fed baby birds may suffer from crop burns from overheated food. Fortunately, the crop has a good blood supply and heals well.

The patient should be anesthetized and intubated to prevent aspiration of crop contents. If possible, the head should be maintained slightly elevated to prevent liquid from being aspirated. Foreign bodies can often be retrieved using blunt, atraumatic forceps or by massaging the object, gently, from the crop. When ingluviotomy is necessary, the skin incision is made in the left lateral cervical region over the crop to minimize disruption of the vasculature and complications associated with tube feeding in the recovery period. Stay sutures are placed and the incision in the crop is made to a length approximately 1/2 the length of the skin incision. Closure is accomplished using a continuous appositional or inverting pattern. The skin is closed separately over the ingluviotomy incision. This approach is used for retrieval of a foreign body or for passing a rigid endoscope into the proventriculus in larger birds where the scope may not be long enough to reach the proventriculus using an oral approach.

Crop biopsy is also indicated as a tool for diagnosing proventricular dilation syndrome. The skin over the crop is incised and dissected off the surface of the crop. The biopsy must be taken in a location where there are blood vessels in order to obtain nerves which might demonstrate the typical histologic changes. Once the biopsy is obtained, haemostasis is achieved and closure is routine.

When the crop is burned or traumatized, there may be loss of significant portions of tissue. In some birds the will be a true fistula with food material dropping out the hole. In more acute burns, it may be difficult to distinguish viable from devitalized tissues. In these cases it is best to wait 3-5 days for a line of demarcation between necrotic and viable tissue to develop. The wound edges should be debrided until the skin can be separated from the crop wall. The skin and crop are sutured separately. Placing a rubber feeding tube into the crop will help identify the lumen especially where there is major tissue loss. In cases where there is significant loss of crop tissue it is best to maintain the longitudinal integrity of the esophagus (crop) as there is a much higher likelihood of stricture formation with resection and anastomosis.

PROVENTRICULOTOMY AND VENTRICULOTOMY

Proventriculotomy or ventriculotomy is most commonly indicated for removal of foreign objects (such as lead) from the proventriculus or ventriculus not retrievable with an endoscope. Ventriculotomy is considered more likely to leak postoperatively as it is difficult to seal the incision with sutures and birds do not have an omentum to help seal enterotomy incisions. Very fine monofilament material must be used and accurately placed. Sealing the incision with a product like Surgicel or BioSIS may help provide a seal. A left lateral approach is used. The suspensory tissues surrounding the ventriculus are bluntly dissected and stay sutures placed into the white tendinous portion of the ventriculus to elevate the isthmus into the field. Stay sutures should not be placed into the proventriculus or in the pink muscular component of the ventriculus as these tissues are weak

and the sutures will tear through them. Moistened sponges should be used to isolate the proventriculus and contain any gastric contents that may spill. A stab incision is made in an avascular area of the isthmus using a scalpel or scissors (electrosurgery is not used as this causes lateral heat damage which might predispose to incisonal leakage). The incsions is then extended orad using scissors for a proventriculotomy or aborad for a ventriculotomy. Leakage is controlled with suction. Careful irrigation and suction are used to evacuate the contents. The air sac will be open and irrigation fluids can enter the lung through the ostium. The proventriculotomy incision is closed with a fine monofilament absorbable material on a small atraumatic needle using a simple continuous oversewn with a Cushing pattern. For a ventriculotomy, the incision is closed in a simple interrupted pattern with fine monofilament material on a small atraumatic needle. No attempt is made to repair the suspensory tissues. The abdominal viscera are gently cleaned prior to abdominal closure.

ENTEROTOMY

Enterotomy is NOT frequently indicated in avian patients. It is usually indicated as the result of trauma or accidental incision during celiotomy. Historically enterotomy has carried a guarded to poor prognosis. With the use of magnification and fine monofilament absorbable material on a small atraumatic needle, accurate closure is more easily accomplished with a much better prognosis. Midline, flap, or transverse approaches may be used depending on the location of the lesion. Magnification and microsurgical techniques are generally required. The intestines receive their blood supply from the celiac (duodenum) and cranial mesenteric (jejunum and ileum) arteries. 6-0 to 10-0 suture in a simple appositional pattern is used. As with microvascular anastomoses, avian intestinal anastomosis usually requires 6-8 sutures.

CLOACOTOMY

This procedure is indicated for a thorough evaluation of the internal structures of the cloaca as would be necessary in treating cloacal papillomatosis or other masses within the cloaca. Through this approach you will be able to visualize the coprourodeal fold and the uroproctodeal fold as well as the ureteral and oviductal openings.

Insert a moistened cotton tipped applicator stick into the cloaca. Using the monopolar electrosurgical tip, incise through the skin, the muscle of the cloacal sphincter, and the mucosa of the cloaca from the vent to the cranial extent of the cotton tipped applicator. Alternatively, small scissors may be inserted into the cloaca and the ventral wall including skin, body wall, and cloaca cut all at once. Using this technique you should not enter the coelomic cavity. Inspect the cloacal and on the dorsal surface you should be able to visualize the ureteral openings and urine/urates flowing into the cloaca. Closure is accomplished using 6-0 monofilament absorbable material in a simple continuous pattern beginning at the cranial extent of the incision. The vent sphincter muscle is closed with a single mattress suture of 4-0 absorbable material. Skin closure is routine.

CLOACOPEXY

Cloacopexy is indicated for treatment of chronic cloacal prolapse. This appears to occur most commonly in Old World species of psittacines (primarily cockatoos) and is associated with reduced or lost tone of the cloacal sphincter. The cloaca should be cultured and the bird placed on

appropriate antibiotic therapy prior to surgery. Several procedures have been recommended for the treatment of chronic cloacal prolapse. Recurrence is observed with most techniques. It is likely that permanent adhesions between the cloaca and the body wall are difficult to establish. With all techniques, it is important to excise the fat on the ventral surface of the cloaca which can act as a physical barrier to the formation of adhesions.

In one technique, a ventral midline incision is made in the caudal abdomen. The serosal surface of the cloaca is isolated. An appropriate structure (gloved finger for large birds) is inserted into the cloaca to distend the structure and define its limits.

The circumcostal cloacopexy uses the last rib to which the cloaca is sutured to maintain reduction. In order for the cloaca to reach the last rib, it must be stretched out beyond what would be considered normal. Alternatively, the organ may be sutured to the caudal border of the sternum. The sutures are passed around the rib or through the cartilaginous border of the sternum and full thickness through the cloaca. For the rib cloacopexy, two sutures are passed around each rib at the junction of the sternal and vertebral portions. These are preplaced and tied once all are in position. This will anchor the organ in a reduced position; however, it is unlikely that permanent adhesions will form at these locations. Therefore, following the placement of these sutures, the ventral midline is closed to incorporate the cloaca. The incisional cloacopexy involves incorporating the cloacal wall in the closure of the ventral midline celiotomy. The suture passes through one side of the body wall incision, full thickness through the cloaca, and through the other side of the body wall. This encourages the cloaca to heal within the body wall forming permanent adhesions between these structures.

VENTPLASTY

Ventplasty is indicated in birds with chronic cloacal prolapse where the vent sphincter has become atonic. This may be the result of chronic straining or primary neuropathy. The result is that the sphincter is incompetent and is no longer able to prevent the cloacal tissues from prolapsing. Ventplasty (analogous to canthoplasty of the eyelids) is used to decrease the size of the vent opening.

The skin over the vent sphincter at the lateral commissures of the vent lips is excised exposing the underlying muscle. Fine monofilament absorbable suture (such as 5-0 or 6-0 Maxon or PDS) is placed transversely in the mucosa of the cloaca. Next, the vent sphincter muscle is apposed with a synthetic absorbable in a mattress pattern between the cranial aspect of the sphincter and the caudal aspect of the sphincter. Finally, the skin edges are apposed cranial to caudal using a synthetic absorbable material. Postoperatively, the patient is monitored to assure that it can still void urine, urates, and fecal material.

DUODENOSTOMY FEEDING TUBE

A duodenostomy tube is place to bypass the upper gastrointestinal tract including the proventriculus and ventriculus. The duodenum is approached through a ventral midline incision. The duodenal loop are immediately inside the body wall. The duodenum is exteriorized and a through-the-needle catheter is used. The catheter should be less than 1/3 the diameter of the intestine. The needle is first passed through the left body wall. With the needle still through the body wall, it is inserted into the descending loop of the duodenum (the left limb of the loop). The catheter is advanced through the

needle and into the ascending loop (4-6 cm) and the needle withdrawn from the intestine and body wall. Two sutures are placed between the peritoneal surface of the body wall and the intestine to maintain them in apposition while a seal forms preventing leakage. The catheter is secured to the outside skin using a finger trap technique. The wire stylet is then removed and the catheter is capped. The needle is protected in the "snap guard" which may be bent to conform to the body. The catheter is directed caudal to the leg, then under the wing and may be bandaged or sutured in place. The tube should not be used for 24 hr. It must be maintain at least 10 days to allow a seal to form. When no longer needed, the catheter is pulled and the wound allowed to heal by second intention.