

Ventriculotomy for the removal of a foreign body in a common myna (*Acridotheres tristis*): a case report

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ABSTRACT: A seven-month old common myna with a history of ingesting a wire was transferred to the Iranmeher companion animal clinic in Mashhad, Iran. The bird's symptoms included anorexia, retching, intermittent vomiting, a lack of vocalisation, fluffing, and nervousness lasting for two days. X-rays confirmed a radiopaque foreign body in the proventriculus. Initial attempts to remove the wire thorough the oral route were futile; however, surgical removal using ventriculotomy (ventral midline celiotomy) under general anaesthesia proved successful. Slight haemorrhaging occurred when the incision was made in the caudal aspect of the ventriculus, but overall, the procedure was performed with no serious complications. A follow-up after three month revealed no complications. Despite the negative views associated with this technique, our study shows that ventriculotomy can be recommended for the removal of ventricular and proventricular foreign bodies, at least in this species.

Keywords: avian surgery; myna; foreign body; celiotomy; ventriculotomy

Ingesting metallic foreign bodies is not uncommon in avian species, particularly Galliformes, Anseriformes, Columbiformes, Gruiformes, Pelecaniformes, Psittaciformes, and Ratites (Lumeij 1994; Christine et al. 2009). Nestling and juvenile birds, particularly hand-raised chicks, are naturally curious, and frequently ingest foreign objects such as toys, bedding, and seeds (Adamcak et al. 2000). Gastrointestinal foreign bodies can be metallic and non-metallic, with the latter further divided into gastric and intestinal foreign bodies. Metallic foreign bodies are by far the most common. They can lodge anywhere in the gastrointestinal tract, but are most commonly found in the proventriculus and ventriculus (Dumoncaux et al. 1994; Wagner 2005). The ingestion of ferrous metal objects, such as nails, wire, hairpins, and needles, accounts for the majority of cases (Peckham 1978). Foreign body ingestion may be diagnosed using plain and contrast radiography as well as gastric endoscopy.

To our knowledge, there is only one report of successful foreign body (needle) removal using ventriculotomy in the myna (Hayati et al. 2011). The following is a description of a successful surgical

removal of a tangle of wire from the proventriculus using ventriculotomy in a common myna.

Case description

The common myna (*Acridotheres tristis*) is a member of the Starling family. It is a species of bird native to Asia with populations extending from Iran, Pakistan, India, and Kazakhstan to Malaysia and China (Hayati et al. 2011). The common myna has become established in many parts of the world outside its native range because of accidental or deliberate introduction by humans (Peacock et al. 2007). In this case, a seven-month old common myna was referred to our clinic with a history of ingesting a piece of wire (Figure 1).

The bird was caged alone and was fed fruits, seeds, and a special commercial myna feed compounded with insects and low levels of iron. The owner indicated that it swallowed a tangle of wire two days previously. During the subsequent 48 h, signs included intermittent vomiting, anorexia, lack of vocalisation, restlessness, open mouth,



Figure 1. The piece of wire that was swallowed (5 mm × 29 mm)

and lethargy. Radiographic examination was performed. Lateral and ventrodorsal X-rays showed a radiopaque foreign body in the abdominal cavity (Figures 2, 3). Its anatomical location suggested the proventriculus. First, we decided to remove the wire by mouth, but these attempts were not successful. We therefore decided to remove it using a ventral midline celiotomy.

Surgical procedure

The bird was anaesthetised with xylazine-ketamine and placed in dorsal recumbency with the head raised about 30–40 degrees on a heating pad. Feathers on the incision site were plucked, and the skin was prepared for aseptic operation using an iodine-based alcoholic

tincture (povidone-iodine solution and alcohol). The operative field was draped, and an incision was made along the ventral midline from the tip of the xyphoid and extended caudally. The abdominal musculature was “tented” with forceps, and a stab incision was made with a scalpel in the midportion of the ventral midline. A forceps was inserted and used as a groove director to extend the incision cranially and caudally. Care was taken to ensure the abdominal air sac remained intact and would appear as a clear, membranous structure that billowed gently inward and outward as the patient breathed. An incision was made in the left abdominal air sac and was extended cranially and slightly caudally. The ventriculus was observed and packed with povidone solution-moistened sterile gauze to minimise the effect of leakage (Harrison and Harrison 1986; Forbes 2002). An initial stab incision was made and extended with scissors. The proventriculus cavity was then explored with a small mosquito haemostat, and the tangled wire was carefully removed (Figure 4).

A three-layer closure of the ventriculus was made, using 4-0 Vicryl sutures for each layer. The linea alba and skin were then closed separately using a simple, continuous suture pattern. The bird recovered uneventfully; post-surgical radiographs were normal, and no further signs of a gastrointestinal (GI) foreign body were observed.



Figure 2. Ventrodorsal X-rays showing a radiopaque foreign body in the abdominal cavity



Figure 3. Lateral X-rays showing a radiopaque foreign body in the abdominal cavity



Figure 4. Removal of the intraluminal foreign body by ventriculotomy, intra-operative picture

Follow-up

The myna was re-evaluated during the following months and follow-up information was obtained through a telephone conversation: the owner reported the bird to be in good condition with no postoperative complications noted.

DISCUSSION AND CONCLUSION

Major abdominal surgery of birds is seldom performed. Indeed, an accurate pre-surgical diagnosis, safe general anaesthesia, adequate surgical exposure, and postoperative care all represent daunting problems. However, when the decision to perform surgery has been made, the size of the avian patient and its anatomy often make surgery extremely difficult (Bush and Kennedy 1978).

In this clinical case report, laboratory tests were not performed because of the clear history and radiographs which confirmed the presence of wire. According to the owner's account, his myna was playing with a tangle of wire for some minutes, but when he attempted to remove the wire the bird escaped and rapidly swallowed the foreign object. This finding is compatible with those of Morishita et al. (1999), who described stressors that seem to induce foreign body ingestion.

Because the caudal thoracic and abdominal air sacs receive fresh air from the trachea, it is important to consider that celiotomy is impossible without opening the air sacs. This profoundly reduces the effectiveness of inhalant anaesthesia while fostering intraoperative heat loss; under these conditions parenteral anaesthesia is indicated (Forbes 2002). When administered parenterally, the combination of ketamine (100 mg/ml) and xylazine

(20 mg/ml) enhances muscle relaxation and analgesia and reduces the incidence of stormy recoveries observed in some avian species compared to cases in which ketamine is administered alone. The dose and route of administration of these agents depend upon the degree of immobilisation and speed of recovery desired. Combining 10–30 mg/kg of ketamine with a half volume of xylazine (1–3 mg/kg) administered intramuscularly induces an anaesthetic level adequate for surgical procedures. However, Hayati et al. (2012) opted for inhalation anaesthesia with isoflurane (1%–3%) and oxygen by face mask, whereas Bush and Kennedy (1978) chose ketamine HCl (15 mg) for sedation, followed by 1.5% halothane and a nitrous oxide/oxygen mixture at a ratio of 3 : 2 administered via a face mask. As previously mentioned, a celiotomy is impossible without opening the caudal thoracic and abdominal air sacs, rendering this procedure (inhalation anaesthesia) both questionable and controversial.

The approach to proventricular foreign bodies in birds is affected by the nature of the foreign body, the clinical signs, available tools, and the surgeon's preference (Lloyd and Med 2009). Ventriculotomy is generally avoided, due to highly muscular walls (the physiological muscular activity can pull the sutures out of the tissue), the inability to form an inversion closure, and the increased vascularity compared with the proventriculus (Bush and Kennedy 1978; Forbes 2002). However, in our experience these factors are not as important in the myna as is likely to be the case in the pigeon, as our report shows that ventriculotomy is useful for the removal of foreign bodies from this species. This finding is in agreement with Hayati et al. (2011, 2012) who performed similar surgery using a ventricular approach in the myna and Alexandrine parakeet. For a proventriculotomy approach it is essential to transect the last two ribs to access the proventriculus, which is likely to increase the postoperative requirement for analgesic agents (non-steroidal anti-inflammatory agents, NSAIDs). Most of these agents increase healing time and cause gastric ulceration and sluggish ulcer healing especially in the acid-secreting portion of the gastrointestinal tract (proventriculus). Further common complications include local or diffuse peritonitis and/or local abscess formation in the area of the incision. Owing to these considerations, we preferred ventriculotomy over proventriculotomy for the removal of the foreign body from the proventriculus. As a muscular organ, the ventriculus poses certain surgical chal-

lenges. Dehiscence of the incision was considered probable because of the poor holding strength of sutured muscle combined with the rhythmic contraction of the ventriculus, each of which adds extra strain to the suture line. The first phase of the contraction cycle is the asymmetric contraction of the muscoli laterales, causing narrowing of the lumen and producing a grinding action. The muscoli laterales insert at the aponeurosis, which is devoid of any muscle tissue itself. The contraction of the muscoli intermedii is the second phase of the contraction cycle (Calhoun 1954; Ziswiler and Farner 1972). Grinding of food does not depend on this phase, so less stress is probably placed on the suture line. For these reasons, a three-layer closure of the ventriculus was carried out, using 4-0 Vicryl sutures for each layer. The first layer was closed with simple interrupted sutures; part of the muscle wall was incorporated into this layer because the mucosal layer was so thin. The muscle wall was closed with a combination of horizontal and vertical mattress sutures. Finally, a continuous pattern of sutures was placed in the adventitia, which can easily tear (Bush and Kennedy 1978).

Concurrent heavy metal toxicosis (zinc and lead), characterised by vomiting was excluded as we observed excellent outcome on the first day after surgery.

We were surprised regarding the nature of the foreign body. Our radiographic findings revealed only a central core of radiopaque parts, whereas the foreign body was found to consist of a thick metal wire wrapped by a network of finer wires.

Postoperative management consisted of diet modification (allowing only a small amount of soft chick food) and decreased activity for at least one week. Amoxicillin/clavulanate (125 mg/kg *p.o.* each 8 h for seven days), ceftriaxone (50 mg/kg *i.m.* each 12 h for three days), and cimetidine (5 mg/kg *p.o.* each 12 h for seven days) were administered. We have found that the use of cimetidine and other antacids is essential because they inhibit digestion of suture material, particularly when absorbable sutures are used in the internal layer. Parenteral and oral antibiotic therapies as well as semifluid feeding, which prevent strong contraction of the ventriculus and GI hypomotility, are essential for a good outcome. Towards that end, prokinetic agents such as metoclopramide have been suggested.

In contrast to previous studies that have been critical of ventriculotomy for the removal of foreign bodies, our study and a previous report by

Hayati et al. (2011) show that this approach can be recommended for the removal of ventricular and proventricular foreign bodies, at least in the myna.

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REFERENCES

- Adamcak A, Hess LR, Quesenberry KE (2000): Intestinal string foreign body in an adult umbrella cockatoo (*Catua alba*). *Journal Avian Medicine Surgery* 14, 257–263.
- Bush M, Kennedy S (1978): Ventriculostomy for removal of foreign bodies from Sarus cranes. *Journal of the American Veterinary Medical Association* 9, 1107–1110.
- Calhoun ML (1954): *Microscopic anatomy of the digestive system*. Iowa State College Press, Ames.
- Christine LM, Karyn LB, Brent H (2009): Polyacrylamide gel ingestion leading to fatal intestinal obstruction in two birds in a zoological collection. *Journal of Avian Medicine Surgery* 23, 286–289.
- Dumonceaux G, Harrison GJ (1994): Toxins. In Ritchie BW, Harrison GJ, Harrison LR (eds.): *Avian Medicine: Principles and Applications*. Wingers Publishing, Lake Worth, Florida. 1030–1052.
- Forbes NA (2002): Avian gastrointestinal surgery. *Journal of Exotic Pet Medicine* 11, 196–207.
- Harrison GJ, Harrison LR (1986): *Clinical Avian Medicine and Surgery*. W.B. Saunders Company, Philadelphia. 588–589.
- Hayati F, Lakzian A, Shariati E, Bakhtiari J, Sayyah N, Masoudifard M, Vakili T (2011): Surgical removal of a ventricular foreign body from a common myna (*Acridotheres tristis*): a case report. *Veterinarni Medicina* 56, 97–100.
- Hayati F, Ahrari Khafi MS, Salmanzadeh N, Lakzian A, Seyyedean Moghaddam A, Esmaeli J (2012): Surgical removal of a tube-like foreign body from an Alexandrin parakeet (*Psittaculaeupatria*) using a ventricular approach: a case report. *Global Veterinaria*, 9, 696–699.
- Lloyd C, Med CZ (2009): Staged endoscopic ventricular foreign body removal in a gyr falcon (*Falco rusticolus*). *Journal Avian Medicine Surgery* 23, 314–319.
- Lumeij JT (1994): Gastroenterology. In: Ritchie, BW, Harrison GJ, Harrison LR (eds.): *Avian Medicine: Prin-*

- ciples and Application. Wingers Publishing, Lake Worth, Florida. 482–521.
- Morishita TY, Aye PP, Harr BS (1999): Crop impaction resulting from feather ball formation in caged layers. *Avian Diseases* 43, 160–163.
- Peacock DS, Van Renburg BJV, Robertson MP (2007): The distribution and spread of the invasive alien common myna, *Acridotheres tristis* L. (Aves: Sturnidae), in southern Africa. *South African Journal of Science* 103, 465–473.
- Peckham MC (1978): *Diseases of Poultry*. 7th ed. Iowa State University Press, Ames. 847–893.
- Ziswiler V, Farner DS (1972): *Digestion and the Digestive System Avian Biology*. Vol II. Academic Press, New York. 343–430.
- Wagner WM (2005): Small intestinal foreign body in an adult *Eclectus* parrot (*Eclectus roratus*). *Journal of South African Veterinary Association* 76, 46–48.

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