

Surgical Interventions for Inguvotomy in Avian Patients Suffering from Crop Impaction; a Mini Review

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Abstract

Crop impaction in avian patients is a serious ailment needing quick and efficient treatment. Crop impaction happens when the crop, a unique organ in birds that stores and moistens food, becomes blocked, causing excruciating discomfort and sometimes dangerous complications. This brief study seeks to offer a thorough examination of surgical Inguvotomy treatments, which are frequently used to treat crop impaction in patients with avian disease. This review examines numerous Inguvotomy surgical procedures with an emphasis on their advantages, disadvantages, and postoperative results. Preoperative assessment, anesthetic protocols, and postoperative care are emphasized as important factors for effective surgical management. Additionally, methods for preventing and managing potential problems from Inguvotomy surgeries are looked at. The papers chosen provided useful insights into various methodologies such as traditional Inguvotomy, endoscopic-guided techniques, and laparoscopic Inguvotomy, highlighting their respective benefits and drawbacks.

Keywords: Avian Surgery; Crop Impaction; Inguvotomy; Poultry Surgery

Introduction

When it comes to economic and social growth in the livestock industry, poultry farming is an essential aspect (Ravikumar, 2023). Birds can be classified as carnivores, insectivores, seed-eaters, and similar creatures based on their varied diets, which are just as diverse as those of mammals. Due to this several variations are seen in the digestive anatomy of different birds. The anterior digestive system of birds is composed of the beak, esophagus, crop, proventriculus, and ventriculus (Hussain et al. 2020). The bird's digestive mechanism is characteristic in the way that it consumes its food as a whole, and then temporarily stores it in the crop, later it masticates in a gizzard rather than chewing it in the mouth. The crop has a characteristic micro-flora that consists of lactobacilli,

enterococci, micrococci, and yeast. The age of the bird also impacts the gastrointestinal structure, dynamics, and functions of the body (Dibner and Richards 2004). The crop (ingluvies), which serves as a temporary food storage and fermentation chamber before beginning further digestion in birds, is the distal anatomic out pocketing of the esophagus (Laku et al. 2021). It is common for birds to have gastrointestinal foreign things in their crop, including metals, plastics, feathers, and stones that can cause crop impaction (Baker and Raines, 2000). Birds frequently undergo Inguvotomy, or surgical investigation of the crop, in response to issues such as grain impaction, pierced or broken crop, or crop obstruction (Laku et al. 2021). Young ones, especially those who are malnourished, are more prone to rupture from ingesting foreign things.

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Clinical signs include a prolonged lump in the crop, food retention, delayed crop emptying, and regurgitation. When feeding newborns by hand, crop rupture can happen from inappropriate or careless gavage tube feeding penetrating the skin. Today, feeding tube-related ruptures are a common cause of emergency cases at most veterinary clinics, which should be treated right away because the injury will prevent the bird from being able to eat or drink (Hussain et al. 2020). Acute clinical lead poisoning 0.6 ppm [60 g/dL] in California birds is associated with crop distension and stasis. These birds have a huge appetite yet are unable to absorb enough nutrients to survive without medical intervention. Because medical intervention alone was ineffective in inducing crop emptying, and in response to the necessity for nutritional assistance during chelation treatment, a combination of Inguvotomy and chelation treatment was used (Aguilar et al. 2012). There is a Stepwise illustration of the Inguvotomy surgical process from pre-operative to post-operative in birds.



Anesthesia & Surgical Approach

Sedation in birds has recently been demonstrated for several operations, including physical examination restraint, minor surgical procedures, venipuncture, vascular abscess, and diagnostic imaging (Bickler and Sessler, 1990).

When combined with a local anesthetic, sedation can be used for even relatively painful procedures, Midazolam (midazolam hydrochloride, 5 mg/mL) is an anxiolytic drug used to sedate birds. Midazolam is efficacious when given intramuscularly to birds at a dose of 0.86 to 1.53 mg/kg. The bird was put to sleep with an intramuscular injection of 0.5 milligrams of midazolam and 3.5 milligrams of butorphanol (Hussain et al. 2020). Hispaniola Amazon parrots

(*Amazona ventralis*) have been the subject of several investigations that investigated the effects of intranasal midazolam alone in several avian species. Some people gave their birds and canaries midazolam, while others gave them alternative medications. By blocking sodium channels in the nerve axon, local anesthetics prevent action potentials from being formed and transmitted along a neuron. Anesthetic conserving in birds has been studied, and lignocaine (lignocaine hydrochloride, 20 mg/mL) has been used for cutaneous anesthesia in several animal species (Lee and Lennox 2016).

Inguvotomy (surgical exploration of the crop) is a routine surgery performed on birds due to different anomalies of the crop (Laku et al. 2021). Research suggests that preventing aspiration during Inguvotomy necessitates placing the bird in a dorsal recumbent position with its head up and its esophagus covered with moist cotton or gauze. Blade number 22 will incise the skin across the lateral sac of the crop. The avascular portion of the crop is only incised for roughly half the required length because of how easily it grows. Inguvotomy is a surgical technique that may involve the Closure of a single layer: The skin and Inguvotomy incision were closed using absorbable suture no. 4/0 Vicryl, stitched in a straightforward interrupted pattern. To finish things off, we used the simple interrupted pattern with two layers. After the crop closure with 4/0 Vicryl, the skin is closed independently over the Inguvotomy incision (Hussain et al. 2020).

Avian surgeries, like owner expectations, are continually evolving. Presenting practitioners must have extensive knowledge of the distinctive anatomical and physiologic features between avian & mammalian patients (Ramesh et al, 2020). Before surgery, every patient ought to receive a comprehensive medical evaluation and, if feasible all measures, be maintained. All necessary tools should be on hand and ready to be utilized during surgery. Regardless of the treatment or organ system being surgically performed, one must optimize patient and surgeon positioning, apply precisely suited suture material, and preserve hemostasis, magnification, and lighting to enhance the surgical skill (Miles, 2023).

Endoscopes are magnified fiber optic instruments that enable visual examination of the oral cavity, trachea, gastrointestinal tract, and coelomic cavity. (Miller et al, 2017). For avian endoscopy, a light source, a fiber optic cable, and a small-diameter endoscope are essential instruments. The 2.7-mm rigid scope can be used for tracheal examination in patients larger than the Amazon bird, as

well as coelomic evaluation in the majority of psittacines and passerines (Laku et al, 2021; Angulilar et al, 2012)

Laku et al in 2021 reported a case of Inguviotomy in birds. Upon presentation, it can be seen in Fig.1 as the crop is fully distended with the abnormal material. The material can be irrelevant to the feeding pattern of the pigeon or else it has taken in an extra amount. The main point is to remove the pain of pigeons which can be possible with crop surgery known as Inguviotomy.



Figure 1: The pigeon upon presentation.

Later the same case report by Laku et al presented the point of surgery, which is the selected field of Interest by veterinarians. First, the selected crop region was later incised professionally, by maintaining the above-mentioned dose patterns of anesthesia. Both conditions are elaborated in Figure 2a, b below.

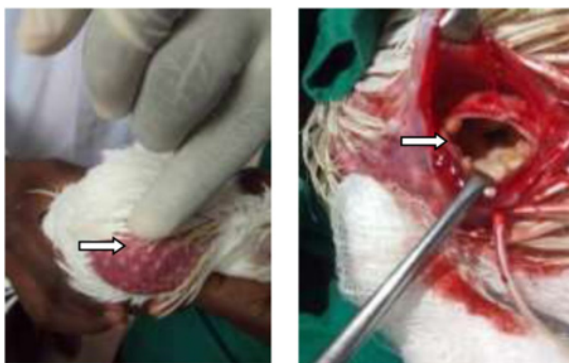


Figure 2a: Surgical field.

Figure 2b: Incised crop.

After the surgical Incision in the right place, Laku and, co-presented the main reason for the crop bulge, that it was bloated with the peanuts. These peanuts were removed clearly and the crop was sutured properly by the use of Vicryl Pattern as shown in Figure 3a & 3b. Finally, the bird was left for proper post-operative care under observation.

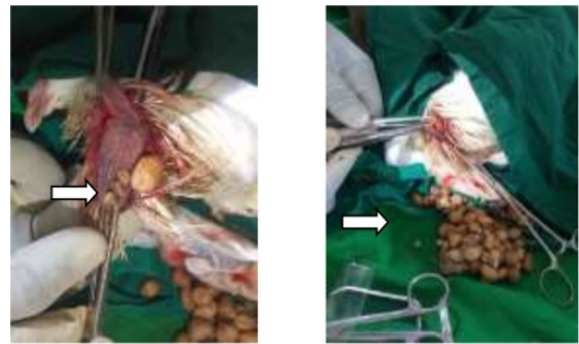


Figure 3a: Evacuation of peanut.

3b: Suturing and mass evacuated.

Recovery by Postoperative Management

Two hours after surgery, the bird was given unrestricted access to water and a liquid diet was recommended for the next three days. The watery discharge has been observed six hours after surgery. After that, normal nutrition was progressively resumed. I/M administration of enrofloxacin at a dose of 7.5 mg/kg is preferred (Hussain et al. 2020). I/M analgesics such as meloxicam at a dose of 0.5 mg/kg should be administered for five days. The exterior sutures were either removed or absorbed by the body after 7 days, at which point the bird could return to usual monitoring (Hussain et al. 2020). During the 8-week follow-up period, no postoperative problems if detected, then this procedure resulted in excellent clinical sign remission, and the prognosis is good.

Advantages of Inguviotomy

Inguviotomy, often known as crop surgery, is a surgical operation performed on birds to treat certain medical disorders that affect the crop. While surgery is often seen as a last choice and is not without hazards, there may be some possible benefits in certain circumstances (Bennett and Harrison, 1997). Here are a few potential benefits of Inguviotomy in birds:

Removal of foreign objects: Birds, particularly those maintained as pets, may consume foreign objects such as small toys, fabric, or jewelry by accident. If these objects become trapped in the crop, an

Ingluviotomy can be performed to remove them and avoid future difficulties.

Treatment of crop impaction: Crop impaction happens when a crop becomes clogged or packed with food or other material, impeding appropriate digestion and creating discomfort (Bickler and Sessler, 1990). Conservative treatments such as crop lavage or medication may not be enough in some cases, and Inguviotomy may be necessary to clear the obstruction and get normal crop function again.

Diagnosis and Treatment of Crop Infections: The crop may become diseased, resulting in crop impasse or crop burns. If conservative treatment measures fail to clear the infection, an Inguviotomy may be performed to allow direct access to the afflicted area for cleaning, debridement, and drug delivery.

Biopsy & Tissue Sampling: In cases where crop tumors or other abnormalities are detected, an Inguviotomy might allow a veterinarian to obtain tissue samples for further diagnostic testing, such as histology. This can help with precise diagnosis and therapy planning.

Emergency Relief: In rare emergency incidents where the crop becomes distended and threatens to rupture, an Inguviotomy can relieve pressure and prevent potentially deadly complications (Adamcak et al, 2000).

Ingluviotomy is a surgical technique that should only be performed by a certified avian veterinarian. A thorough review of the bird's condition, as well as consideration of potential risks and advantages, should be used to choose to proceed with the procedure.

Disadvantages of Inguviotomy

Along benefits of Inguviotomy (crop surgery) in birds, it is vital to understand the risks and drawbacks of the technique. Here are some of the potential disadvantages.

General Anesthesia Risk: Inguviotomy needs general anesthesia, which always carries risky situations. Birds have a higher metabolic rate than other animals and may be more vulnerable to the effects of anesthesia (Lupu et al, 2009). Complications such as respiratory depression, cardiovascular issues, or severe responses to anesthesia medicines are possible.

Surgical Complications: Complications during or after Inguviotomy are possible, as with any surgical operation. These can include bleeding, infection, poor wound healing, tissue or organ damage, and post-operative pain or discomfort (Ninu et al, 2019).

Stress and Recovery: Surgery can be a difficult procedure for birds, which are already highly sensitive to stress. Isolating or restricting the bird's movement during its recovery from Inguviotomy can add to the bird's already high-stress levels and may have negative effects on its health as a whole.

Limited success in certain cases: Inguviotomy might fix the underlying problem or yield the expected results in some cases. The reasons for particular crop problems or diseases may be too multifaceted to be remedied by surgery alone (Cotton and Stephen, 2017).

Cost Attention: Inguviotomy is a specialized procedure that requires the skills of a veterinary specialist in avian medicine. Due to the apparatus, medications, and expertise required, it can be expensive. In addition, postoperative care, follow-up visits, and any necessary medications or treatments can increase the total cost.

Recurrence or complications: Even after Inguviotomy, certain conditions, such as crop infections or impactions, can recur. In addition, complications may develop at the surgical site or as a result of the bird's response to surgery, necessitating additional interventions or treatment (Guzman, 2016).

Before making a decision, consult with a certified avian veterinarian to properly evaluate the bird's circumstances and weigh the potential benefits and dangers of ingluviotomy. To establish the best course of action, the veterinarian will assess the individual bird's health, the nature of the problem, and alternative treatment alternatives.

Future Perspectives

During the initial treatment of avian patients, the emergency clinician may be required to execute procedures. Bandaging procedures should be used to stabilize fractures, either temporarily or permanently. Endoscopy is finding more and more applications in emergencies, involving tracheal and syringe examination and removal of foreign materials from the gastrointestinal tract. Avian veterinarians routinely perform endoscopic biopsies of coelomic or visceral organs as a less invasive alternative to surgery. The clinician must be ready to perform such processes in emergency conditions.

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Conclusion

Eventually, surgical procedures for Inguviotomy are an important component in the therapy of avian patients with crop impaction. This brief review is a helpful resource for veterinary practitioners, providing an overview of Inguviotomy surgical techniques, concerns, and possible outcomes. By incorporating this knowledge into clinical practice, veterinarians may give effective and customized care, which will improve the overall well-being and prognosis of crop-impaction avian patients. This brief review intends to give veterinary practitioners and surgeons helpful insights for making educated decisions about the management of avian patients with crop impaction by integrating available knowledge on surgical techniques for Inguviotomy. Standardized protocols and standards based on evidence-based practices can make a major difference in patient outcomes and quality of care. However, further research and clinical trials are needed to better understand the long-term effects, comparative efficacy, and future breakthroughs in surgical procedures for Inguviotomy. Continuous efforts should be made to improve surgical techniques, reduce complications, and improve patient care.

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