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Successful surgical management of multiple foreign bodies in a captive green iguana (*Iguana iguana*)

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Abstract: A 3.5-year-old male green iguana (*Iguana iguana*) presented with a two-week history of anorexia, absence of defecation, and dysecdysis. Physical examination revealed abdominal distension and discomfort. Initial radiographs identified multiple coins and sharp radiopaque objects within the large intestine, along with intestinal gas accumulation. Due to the size, position, and number of the foreign bodies, surgical intervention was deemed necessary. The patient was pre-medicated intramuscularly with a combination of ketamine, midazolam, and dexmedetomidine, and anesthesia was maintained with isoflurane. An exploratory coeliotomy was performed through a paramedian incision. The cecum was isolated, and typhlotomy was performed to remove the foreign bodies, which included six coins and several small stones. Incisions were closed, and the patient recovered uneventfully from the operation. Postoperative care included supportive fluid therapy, analgesia, and assisted feeding until a normal appetite resumed. Follow-up radiographs showed a clear gastrointestinal tract with improved intestinal motility. By postoperative day ten, the patient had shown complete resolution of clinical signs and a return to a normal appetite and defecation. This case report highlights the importance of prompt diagnosis and timely surgical intervention when multiple foreign bodies are present. It also underscores the need for proactive client education to prevent recurrence.

Keywords: Anorexia, Gastrointestinal foreign bodies, Green iguana, Typhlotomy, Reptile surgery

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Summary

A 3.5-year-old male green iguana (*Iguana iguana*) presented with a two-week history of anorexia, absence of defecation, and dysecdysis. Previous medical management had failed to improve the patient's condition. Initial radiographs revealed multiple radiopaque foreign bodies and radiographic signs of gastrointestinal obstruction. Since the foreign materials were localized within the cecum, making endoscopic removal unfeasible, exploratory coeliotomy and typhlotomy were performed. Several coins and stones were then successfully removed. By postoperative day ten, the animal's normal appetite and bowel movement had resumed. Initial radiography is recommended for any reptile presenting with non-specific gastrointestinal signs. This case underscores the importance of timely diagnosis, careful surgical intervention, and proactive client education to prevent recurrence.

Background

Signalment, client complaints, and history taking

A 3.5-year-old male green iguana (*Iguana iguana*), weighing 3.3 kg, was presented to the Exotic Pet Unit of Kasetsart University Veterinary Teaching Hospital, Bangkhen Campus, Thailand, with a two-week history of anorexia, absence of defecation, and dysecdysis. The patient had previously been treated at another veterinary facility with metoclopramide, cisapride, and meloxicam, but showed no clinical improvement. As no referral documentation was provided, the exact dosages of the previously administered medications were unavailable. The iguana's diet consisted primarily of mulberry leaves (*Morus alba*), pumpkin (*Cucurbita* spp.), and various leafy greens. The animal was housed individually and permitted to roam freely within the household, with occasional access to an outdoor enclosure. Routine deworming had not been performed.

Investigations and diagnosis

Physical and clinical examination

The iguana was conscious and responsive with a Body Condition Score (BCS) of 3/5 and an adequate hydration status. No ocular, nasal, or oral discharge was observed, and the oral mucous membranes were pink and moist. Mild abdominal distension and discomfort were detected on palpation. A radiographic evaluation was performed to further investigate the cause of abdominal discomfort. The images revealed multiple radiopaque foreign bodies within the stomach and intestines, including several coin-shaped objects localized in the region of the cecum (Fig. 1). These radiographic findings, combined with the abdominal discomfort noted on palpation, strongly supported a clinical diagnosis of gastrointestinal obstruction and irritation. To assess the patient's overall

systematic health status prior to treatment, and to evaluate for potential metallic toxicosis associated with the ingested foreign bodies, hematological and serum biochemical analyses were performed. Hematological evaluation revealed mild anemia and heterophilia, while serum biochemical parameters remained within reference ranges.

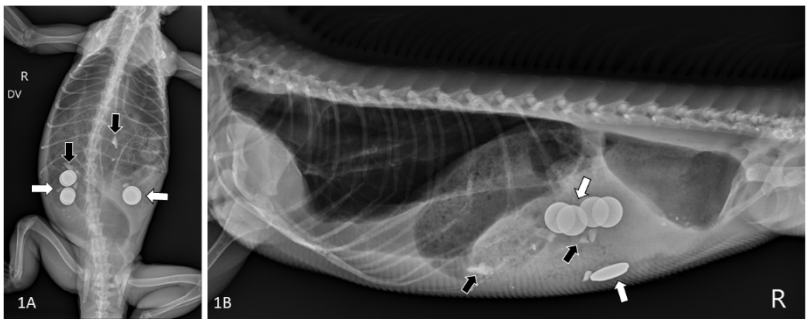

Figure 1. (1A) Abdominal radiograph (dorsoventral) showed several radiopaque foreign bodies within the gastrointestinal tract, including several sharp objects and coin-like materials (white arrow), with excessive gas accumulation. (1B) Lateral abdominal radiograph demonstrated the distribution of these foreign bodies in the anteroposterior plane with foamy gastrointestinal content and excessive gas accumulation. Coin-shaped objects are visualized in the lower quadrant, consistent with progression into the cecum (white arrow). The sharp objects were primarily localized in the regions corresponding to the stomach, proximal small intestine, and cecum (black arrows) (Figures 1A and 1B).

Differential diagnosis

The combination of clinical signs and radiographic evidence of multiple radiopaque foreign bodies, specifically sharp and coin-like objects, strongly indicated either partial gastrointestinal obstruction or hypomotility. Due to the metallic nature of the ingested materials, metallic toxicosis was also considered. Additional differentials included gastrointestinal mucosal irritation, hemorrhage, and secondary inflammation. The definitive diagnosis of gastrointestinal foreign body obstruction was ultimately established through the comprehensive integration of both the clinical presentation and the diagnostic imaging findings.

Treatment, outcome and follow-up

Anesthetic and Surgical Procedures

After discussion of the clinical condition and treatment options, the owner consented to surgical removal of the foreign bodies. Anesthesia was induced intramuscularly (IM) with a combination of midazolam (0.5 mg/kg), dexmedetomidine (0.05 mg/kg), and ketamine (5 mg/kg). After achieving adequate anesthetic depth, the iguana was endotracheally intubated with an uncuffed tube, and anesthesia was maintained with isoflurane under mechanical ventilation. Lactated Ringer's solution was administered intravenously via the ventral tail

vein at a rate of 3 mL/kg/h throughout the procedure. Analgesia was provided with subcutaneous meloxicam (0.2 mg/kg), and marbofloxacin (2 mg/kg, IM) was administered as a prophylactic antibiotic. The patient was positioned in dorsal recumbency on a heating pad. The surgical site was carefully prepared using standard aseptic technique including cleaning the skin with antiseptic agents, draping the patient with sterile surgical drapes to isolate the sterile field. To avoid the large midline abdominal vein, a 5-cm left paramedian skin incision was made to access the coelomic cavity. The foreign bodies were localized within the cecum, and importantly, no evidence of coelomitis was observed. A typhlotomy was performed, facilitating the successful removal of six coins along with several stone-like and sharp foreign bodies. The cecal incision was closed in a two-layer continuous cushing pattern using an absorbable, monofilament suture material (Polydioxanone (PDS®), 4-0, Ethicon, Germany). The muscular and coelomic walls were subsequently closed with the same suture material using a simple continuous pattern. The skin was opposed using an everting horizontal mattress pattern with a non-absorbable monofilament suture (Polyamide (Nylon®), 4-0, Ethicon, Germany). Post-surgery, atipamezole (0.5 mg/kg, IM) was administered to reverse the effects of dexmedetomidine. Active warming, using a Bair Hugger system, was implemented to prevent hypothermia.

Supportive care SC administration of marbofloxacin (2 mg/kg q24h), meloxicam (0.2 mg/kg q24h), and Lactated Ringer's solution (20 mL q48h) for ten days. By the first postoperative week, the surgical incision was healing well with good tissue apposition, and no discharge was observed. Appetite had improved, but defecation had not yet resumed. Cisapride (1.8 mg/kg, orally, SID) was prescribed to stimulate gastrointestinal motility. The iguana was discharged on postoperative day ten, at which time defecation had improved and returned to normal by the third postoperative week. By the sixth postoperative week, the remaining skin sutures were removed, as the patient had begun shedding and naturally sloughed both skin and several sutures.

Figure 2. (2A) Under general anesthesia, the iguana was placed in dorsal recumbency. The surgical site was aseptically prepared following standard sterile technique (2B). Upon entering the coelomic cavity, notable abnormalities were observed, including a dark red cecum with marked vascular congestion (2C). A typhlotomy was performed, facilitating the removal of foreign bodies, including coins and sharp objects (2D–E). The cecal incision was closed in two layers using monofilament absorbable suture material in a continuous cushing suture pattern (2F). The iguana was continuously monitored and ventilated during the postoperative period (2G). The skin was closed using an everting horizontal mattress suture technique (2H).

Discussion and Learning points

Foreign body ingestion is a relatively common clinical issue in captive green iguanas, especially those housed in non-naturalistic environments where small, ingestible objects are accessible (Büker *et al*., 2010). Clinical signs of reptilian gastrointestinal (GI) diseases include anorexia, polyphagia, pica, cloacal prolapse, vomiting, diarrhea, constipation, lethargy, and weight loss (Benson, 1999). In this case, the iguana exhibited anorexia and mild abdominal discomfort. Radiographic and clinical evaluation was instrumental, confirming the ingestion of coins and sharp, stone-like foreign bodies, resulting in gastrointestinal obstruction and hypomotility. Previous medical management with prokinetic agents and non-steroidal anti-inflammatory drugs (NSAIDs) failed to yield clinical improvement. This therapeutic failure underscores the critical importance of a prompt and accurate diagnosis, as well as the necessity of timely surgical intervention. Based on these findings, surgical removal of the foreign bodies is strongly recommended in similar cases to resolve the obstruction and prevent further morbidity (Mader, 1996).

Typhlotomy is rarely reported in reptiles due to the anatomical and physiological challenges associated with the procedure. In this case, surgical intervention was deemed

necessary because endoscopic retrieval of the foreign bodies was not feasible due to their size, shape, and location within the gastrointestinal tract. The cecum of iguanas is a thin-walled, gas-filled structure that is highly vascularized and contaminated with microbes. Thus, the cecum needs to be carefully handled in order to limit contamination and coelomitis (Holland *et al*., 2008). As reptiles possess a coelomic cavity rather than a true peritoneal cavity (Holland *et al.*, 2008), infection or inflammation in this space (coelomitis) can rapidly become systemic. Therefore, surgeons must take particular care to isolate the cecal contents during foreign body removal, and thorough lavage of the coelomic cavity should be performed if any spillage is suspected. Postoperative monitoring for signs of coelomitis, such as depression, abdominal distension, and abdominal discomfort, is critical, particularly within the first week, as these complications can be life-threatening in reptiles (Mader, 1996). The importance of minimizing intraoperative contamination is not overstated.

The ingestion of coins presents both mechanical and toxicological hazards (Bennett *et al*., 1997). Coins commonly contain heavy metals such as zinc, copper, and nickel, which may leach into the gastrointestinal tract and be systemically absorbed, particularly if the foreign body remains in situ for an extended period (Bennett *et al*., 1997; Dhawan *et al*., 2008). Zinc toxicosis is especially concerning in reptiles and has been associated with hemolytic anemia, hepatic dysfunction, and renal compromise (Fitzgerald & Newquist, 2008). Despite the presence of multiple coins within the cecum, the initial hematological and biochemical parameters did not indicate overt metal toxicity. Nonetheless, the observation of mild anemia and heterophilia suggested a potential chronic inflammatory response or possibly the onset of early systemic effects. The ingestion of coins should always necessitate the consideration of toxic effects, particularly if clinical manifestations include signs such as anemia, hematuria, or hepatic dysfunction (Bennett *et al*., 1997; Pawa *et al*., 2008). Regular monitoring of serum parameters, particularly uric acid, liver enzymes, and hematologic indices, is recommended in any case involving suspected septicemia or confirmed metal ingestion. The decision for early surgical intervention in this patient was critical, as it likely prevented the progression to both coelomitis and significant systemic toxicosis.

This case highlights several critical clinical points. First, non-specific gastrointestinal signs in reptiles, such as anorexia, absence of defecation, and dysecdysis, warrant a thorough diagnostic evaluation, encompassing radiography and hematological testing. Second, while medical management may be attempted in mild cases, surgical intervention is indicated when mechanical obstruction or ingestion of sharp or metallic foreign bodies is identified. Lastly, when performing coelomic surgery involving highly contaminated and fragile structures, such as the cecum, strict adherence to appropriate surgical

planning and aseptic technique is paramount to minimize complications like coelomitis and septicemia.

From a preventive perspective, client education regarding environmental enrichment, supervised roaming, and proper dietary management is vital to reduce the risk of foreign body ingestion. Furthermore, routine deworming and regular veterinary visits should be emphasized to ensure the long-term health and welfare of captive reptiles.

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