



Intestinal Resection and Anastomosis Following Vehicular Trauma in a Juvenile African Helmeted Chelonian (*Pelomedusa subrufa*): A Case Report

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Abstract

This case report describes the successful surgical management of a six-month-old male African Helmeted Turtle (*Pelomedusa* spp.) that sustained a shell fracture with intestinal herniation following a hit-by-car incident. Clinical examination revealed bilateral shell fractures with protrusion of the intestinal tract through the right sided defect, multiple miliary intestinal perforations, moderate to severe dehydration, and absence of faecal output. The patient was stabilized with fluid therapy, analgesia, and wound protection prior to surgery. Based on clinical assessment, a diagnosis of partial intestinal rupture associated with shell fracture was made, and the turtle was classified as American Society of Anaesthesiologists (ASA) physical status III. Surgical management involved intestinal resection of the devitalized segment followed by end-to-end anastomosis using absorbable suture material in a simple interrupted pattern. The herniated intestine was thoroughly irrigated and reduced into the coelomic cavity. Postoperative management included antimicrobial therapy, analgesia, fluid support, assisted feeding, and strict confinement. Recovery was uneventful, with gradual improvement in responsiveness, return of voluntary water intake by day 10, and faecal output by the third postoperative week. At 30 days post-surgery, the turtle demonstrated near-normal activity and complete gastrointestinal functional recovery without complications.

Keywords: African helmeted turtle; Chelonian trauma; End-to-end anastomosis; Intestinal resection; *Pelomedusa subrufa*; Shell fracture

1.0 Introduction

In captive and free-range chelonians, traumatic injury is a major contributor to morbidity and death. Vehicle accident is one of the most frequent causes of trauma, especially in terrestrial tortoises that moves slowly, even cross major roads [1]. Shell fractures (Breakage), soft tissue injury, and internal organ injuries are some of the just a few of the many medical problems caused by a car hit. Although shell fractures are frequently the most injuries in chelonians, serious internal damages occur even in the absence of obvious shell damage [2].

Severe injuries in chelonians are difficult to diagnose due to the complexity of their anatomical and physiological characteristics. They often delay diagnosis until clinical deterioration occurs because their rigid shell limits clinical probing and hides underlying damages or organ rupture [3]. Additionally, the risks of anaesthesia and surgery are increased in juvenile chelonian due to their ectothermic physiology, poor tissue regeneration, and low metabolic rate [1].

Compared to shell fractures, intestinal damage in tortoises is less prevalent, but when it occurs, the prognosis is cautious. Intestinal rupture or

devitalization may result from direct compression forces, sudden increases in coelomic pressure, or displacement of the viscera against the shell [2]. Clinical signs, such as ileus, lethargy, anorexia, or absence of fecal output, might be confusing, making an early diagnosis challenging [4].

For chelonians, coeliotomy and intestinal resection are two surgical procedures that remain technically challenging. Intestinal resection and anastomosis in reptiles are infrequently reported in the literature because teenage tortoises have small bodies, friable tissues, and are more susceptible to hypothermia and postoperative difficulties [2].

Anastomosis and intestinal excision are essential surgical techniques used to treat intestinal injuries caused by trauma, its application to chelonians, such as tortoises, is less documented, but it is still important to investigate because traumatic events, like car accidents, can cause potentially fatal intestinal damage [5,6]. Although the anatomy and physiology of tortoises present special medical challenges, successful surgical management after severe trauma can be guided by concepts from other species addressing careful removal of diseased portions and thorough anastomosis. However, Juvenile chelonians are a particularly vulnerable category following trauma. Their low physiologic reserves, rapid dehydration progression, and increased susceptibility to anesthetic medications further complicate clinical management [7].

This case study provides evidence on how intestinal resection and end-to-end anastomosis were used for successfully treatment of a juvenile chelonian with severe intestine rupture after a car accident.

1.1 Case History

On the 9th of October 2025, a client presented one of his pet turtles from a group of twelve housed to the Large Animal Unit of the Veterinary Teaching Hospital, University of Maiduguri (LAUVTH-UNIMAID) Figures 1 and 2. The case was referred to the Surgery Unit of the Veterinary Teaching Hospital, University of Maiduguri (SUVTH-UNIMAID). The chief complaint was a fractured shell with herniation of intestinal tract; further client clerking revealed that the injury was resulted from a hit by car (HBC) incident involving the owner, which occurred approximately 24 hours before presentation

Signalment

Species: *Pelomedusa*

Sex: Male

Age: 6-month (Estimated)

Breed: African Helmeted Turtle



Figure 1: Patient on Presentation



Figure 2: Dorsal view of patient on presentation

1.2 Clinical Examination and Findings

The injured chelonian's body temperature was recorded at 37.8 °C and appeared weak with minimally responsive. A bilateral shell fracture was noted, with protrusion of the gastrointestinal tract through the rightsided fracture. Examination of the exposed gastrointestinal tissue revealed

evidence of tissue damage, including multiple pinpoint (miliary) perforations on the surface, with traces of blood present on the shell. Palpation of the coelomic cavity elicited signs of discomfort. The turtle demonstrated reduced limb retraction and absence of fecal output around the cloacal region. Cloacal examination revealed no abnormalities. Dehydration test using Skin Turgor Method (STM) was carried out by lifting the skin at the neck region, and observing its return to normal position[8]. Application of this test on the neck, point of shoulder or eyelid has been used for the clinical assessment of dehydration in sick animals [9,10,11]. The test shows a poor turgor as the skin has a sluggish return which is an evident of moderate to severe dehydration [12].

1.3 Differential Diagnosis

- Partial Intestinal rupture or perforation
- Gastrointestinal obstruction
- Internal haemorrhage
- Coelomic organ contusion

1.4 Diagnosis and Patient Stabilization

Based on the patient's history and clinical examination findings, a diagnosis of partial intestinal rupture associated with shell fracture was established. Following diagnosis, immediate stabilization was initiated. Meloxicam (5 mg/ml) was administered for analgesia, and 5 ml of normal saline was given subcutaneously for fluid support. Additionally, 10 ml of warmed clean fresh water was administered orally to assist with hydration. The exposed gastrointestinal tract (GIT) was carefully irrigated with sterile normal saline to remove sand and gross debris, after which it was covered with sterile gauze to protect the tissue prior to definitive surgical intervention.

1.5 Determination of Surgical risk

The patient surgical risk was determined allotted American Society of Anaesthesiologists (ASA) physical status of 3 as there is an organ in involved, with a substantive functional limitation as described by ASA classification of physical status, as revised in 2014[13].

1.6 Prognosis

The prognosis is fair as the patient has a physical status of 3(ASA) as there is a substantive functional limitation of the intestinal tract.

2.0 Management Plan

Intestinal Resection and Anastomosis

Intensive Post-Operative Care

2.1 Management procedure:

2.2 Anaesthetic Protocol

For induction of anaesthesia, the turtle was positioned in ventral recumbences, followed with premedication through intramuscular administration of medetomidine at a dose of 0.05 mg/kg [14]. Ten minutes following medetomidine administration, ketamine was also administered intramuscularly at a dose of 10 mg/kg to achieve adequate anaesthetic depth [14].

2.3 Surgical Procedure:

The turtle was placed in dorsal recumbency, and a four-corner draping technique was applied (Figure 3), exposing the protruding gastrointestinal tract. Two self-retaining retractors were positioned along the fracture margins to create adequate space and relieve compression on the herniated gastrointestinal tissue (Figure 4). The damaged segment was carefully palpated and identified with hand. Two intestinal forceps were applied to the viable, undamaged portions of the intestine on either side of the lesion, isolating the affected segment between them.

The damaged intestinal section was incised and resected (Figure 5). Patency of the healthy intestinal ends was confirmed (Figure 6) using a grooved director by flushing with 3ml of normal saline. The viable intestinal ends were then apposed and sutured using 3-0 size Vicryl in a simple interrupted suture pattern (Figure 7). The herniated GIT (Figure 8) was washed and flush with normal saline, and reduced back to its anatomical location in the shell (Figures 9 and 10), a clean sterile gauze was used to closed the opening created as a result of the fracture (Figures 11 and 12).



Figure 3: Draped patient

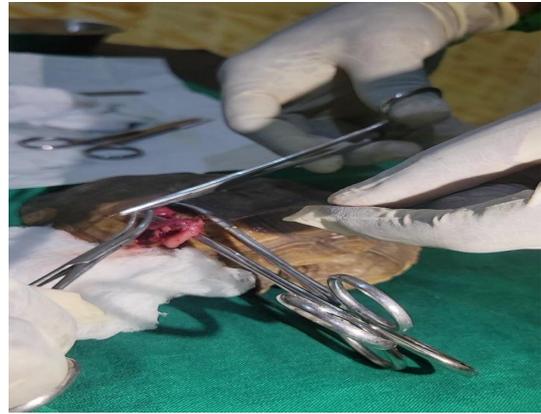


Figure 6: Achieving Anastomosis by suture using Vicryl size 3-0 in a simple interrupted suture pattern

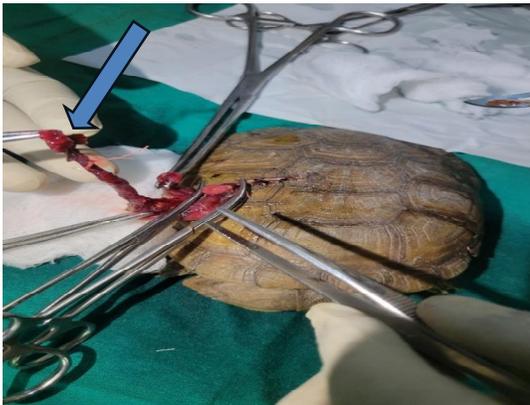


Figure 4: Showing the first part being resected



Figure 7: Showing a complete anastomosis

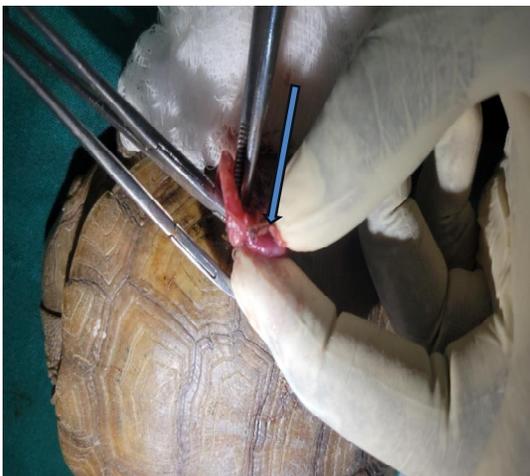


Figure 5: showing d created patency (lumen)



Figure 8: Resected part



Figure 9: Reduction of the anastomosed GIT to its anatomical location



Figure 10: Complete reduction achieved

2.4 Post Operative Care

Table 1: Medication Table

Drug& Concentration	Indication	Dosage	Dose	Route of Administration	Frequency of Administration
Penstrep (10,000 u/ml and 10mg/ml)	Antibiotics	8mg/kg	0.08	IM	5/7
Meloxicam (5mg/ml)	Analgesic	0.4mg/kg	0.08	IM	3/7
Normal Saline (900mg/ml)	Fluid therapy	-	10ml	SC	5/7

2.5 Feeding

The animal was forced feed with 5ml of condensed suspension milk 5× a day for 14 days, the animal was noticed to have started drinking water by itself and regain energy, and the surgical site was assessed and discharged at day 16 post surgery.

2.6 Advice to the Client

Post-operative care instructions were thoroughly communicated to the caregiver, which include strict confinement of the animal for at least two weeks in a clean, secure and dry enclosure to minimize movement and facilitate fracture healing. The caregiver was also advised to monitor the fracture opening daily for signs of infection, discharge or erythema. A gradual reintroduction to physical activity was recommended after the initial confinement period, under close supervision. Preventive measures, such as controlled enclosures or barriers, were recommended to mitigate the risk of future vehicular or accidental trauma.



Figure 11: Day 7 Post-Surgery (Recovery Stage)



Figure 12: Recovery Stage (Day 16 post-



Figure 13: Complete Healed Fracture line (Day 35 Post-surgery)



Figure 14: Animal 35 Days Post-Surgery



Figure 15: On Presentation



Figure 16: 35 days post-surgery

3.0 Results

Postoperatively, the injured chelonians recovered uneventfully from anaesthesia. It was feeble but sensitive throughout the first 72 hours, with a gradual improvement in limb retraction and behavioral activity. The revealed no indications of prolonged bleeding, coelomic infection, or wound dehiscence in the post-surgery. Voluntary water intake, responsiveness and movement had also gradually improved by day 10. Faecal excretion was observed by the third week of the post-surgery. The patient showed nearly normal activity levels, sufficient hydration, and functional gastrointestinal recovery at 30 days post-surgery (Figures 13 and 14), no surgical problems were noted during the recuperation period.

4.0 Discussion

Shell fractures are commonly recognized in chelonians, while intestinal protrusion and perforation remain relatively rare and are less documented, particularly in juvenile chelonians. This present case contributes valuable clinical evidence supporting the feasibility of surgical approaches in such cases. Intestinal rupture in chelonians can result from blunt force trauma due to fast increases in coelomic pressure, compression of viscera against the stiff shell, or organ displacement through fracture sites (Figure 15) [15]. Due to their decreased body mass, thinner shells, and diminished physiologic reserves, juvenile chelonians are especially vulnerable, increasing the risk of internal damage and perioperative mortality [16].

Diagnosis of intestinal injuries in chelonians is often delayed because clinical signs are nonspecific and can be masked by shell anatomy [17]. In this case, the presence of intestinal protrusion through the right shell fracture allowed

for prompt recognition of intestinal involvement, helping in early surgical decision-making. Early intervention is critical, as prolonged exposure of intestinal tissue increases the results in contamination, ischemia, and septic coelomitis [18]. Intestinal resection and anastomosis are rarely reported in chelonians due to technical difficulty and concerns regarding healing capacity and post-operative complications [19]. However, principles of intestinal surgery, a traumatic tissue handling, and preservation of blood supply, tension-free apposition, and meticulous anastomosis remain applicable in all animal species [20]. The use of absorbable suture material in a simple interrupted pattern, as employed in this case, is agrees with the recommendations for reptile intestinal surgery and allows for secure closure while accommodating tissue healing [21].

Anaesthetic management poses additional challenges in reptiles, particularly juveniles, due to the difference in drugs metabolism and sensitivity to hypothermia [22]. Medetomidine-Ketamine combination used in this case has been documented as an effective and commonly utilized protocol in chelonians, which provides adequate immobilization and analgesia with acceptable recovery profiles [23,24].

Postoperative care was a critical determinant of success, while fluid therapy, antimicrobial administration, analgesia, thermal support, and assisted feeding are essential to the support recovery and also minimized complications such as dehydration and infection [25]. The favorable outcome observed in this case aligns with previous reports indicating that, when managed appropriately, chelonians can recover successfully from severe traumatic damages that were previously considered fatal [26]. This case reinforces the confidence of not equating severe chelonian trauma with a hopeless prognosis, with appropriate surgical intervention and intensive postoperative care, even juvenile chelonians with intestinal perforation can achieve successful recovery (Figure 16).

5.0 Conclusion

The findings show that surgical intervention should be considered as a viable, lifesaving option in chelonians presenting with traumatic intestinal damage. Documentation of such cases contributes to the limited body of literature on gastrointestinal

surgery in reptiles and supports evidence based clinical decision-making in exotic animal practice.

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Conflict of Interest

The authors declared no conflict of interest.

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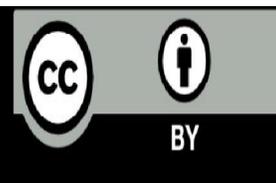
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