



A Comprehensive Diagnostic Study of Upper Gastrointestinal Disorders in Dogs

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ABSTRACT

Background: Upper gastrointestinal tract (GIT) disorders in dogs are a significant concern in veterinary medicine, as they can lead to various clinical manifestations ranging from mild discomfort to severe systemic illness. The upper GIT encompasses the oesophagus, stomach and duodenum, with disorders affecting these organs potentially resulting in symptoms such as vomiting, inappetite and dehydration. Given the wide range of possible conditions that can affect the upper GIT in dogs, early and accurate diagnosis is essential to initiate appropriate treatment and management strategies. The present study investigated the affections of GIT in dogs.

Methods: During the study period, from May to October 2024, 2042 dogs were screened, presented at VCC, College of Veterinary Science and Animal Husbandry, Jabalpur (M.P.). Among them, 132 dogs were suspected of having GIT affections, out of which 30 dogs were selected for radiographic, abdominal sonography and endoscopic examination in which 28 dogs were confirmed to have upper GIT affections.

Result: The overall occurrence of upper GIT affections in dogs was recorded as 01.37% and among the suspected dogs, it was 21.21%. The most consistent clinical signs observed were chronic vomiting (100%), followed by inappetite (92.86%), dehydration (89.29%), retching (57.14%), haematemesis (32.14%), weight loss (28.57%), ptyalism (21.43%) and dysphagia (10.71%). The ultrasonographic, radiographic and endoscopic examination revealed higher occurrence of chronic gastritis 50.00% (14/28) followed by gastric ulcers and erosions 35.71% (10/28), gastric foreign body 10.71% (3/28), oesophagitis 07.14% (2/28), megaesophagus 03.57% (1/28) and sialocele 03.57% (1/28).

Key words: Abdominal sonography, Endoscopic examination, Megaesophagus, Radiographic, Upper gastrointestinal tract disorders.

INTRODUCTION

The upper gastrointestinal tract (GIT) plays a crucial role in enzymatic digestion and nutrient absorption, making its proper functioning essential for maintaining overall health in dogs. Disorders of the upper GIT, such as gastro-oesophageal reflux disease (GERD), oesophageal strictures, gastric ulcers and pyloric stenosis are among the most commonly encountered conditions in veterinary medicine (Mathai *et al.*, 2013). These pathologies, often caused by dietary indiscretions, pharmacological agents, infections or systemic diseases, manifest through clinical signs such as anorexia, vomiting, dehydration and weight loss (Jenkins *et al.*, 1991; Schaer, 2006). If left untreated, they can lead to significant morbidity and mortality, emphasizing the importance of accurate and timely diagnosis.

Achieving a definitive diagnosis of upper GIT disorders often requires a combination of clinical evaluations and advanced diagnostic modalities, including radiography, ultrasonography and endoscopy. Radiography provides an initial assessment of structural abnormalities, while ultrasonography offers non-invasive visualization of parietal structures and dynamic processes within the abdominal cavity. However, these techniques may fail to detect subtle mucosal lesions or intraluminal abnormalities. In such cases, gastrointestinal endoscopy emerges as an indispensable tool (Shaheen *et al.*, 2010). *In vivo* visualization of organ surfaces enables rapid

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assessment of pathological changes, with color-accurate imaging offering advantages over ultrasonography and radiography (Sasikala *et al.*, 2018). Gastrointestinal endoscopy with intestinal biopsy is the diagnostic test of choice; this direct and minimally invasive technique enables high resolution visualization of the oesophagus, stomach and proximal duodenum while simultaneously allowing tissue sampling for definitive histological diagnosis (Bhavani *et al.*, 2023). Furthermore, endoscopy facilitates therapeutic interventions such as foreign body

retrieval and mucosal biopsy collection (Burgener *et al.*, 2009).

The integration of radiographic, ultrasonographic and endoscopic approaches ensures a comprehensive diagnostic strategy, enabling early detection and effective management of upper GIT disorders, improving outcomes, survival and reducing suffering in companion animals (Steffen *et al.*, 2009). The aim of this study was to compare diagnostic in the affections of GIT in dogs.

MATERIALS AND METHODS

Location and place of work

The study was conducted over six months (May 2024 to October 2024) at the Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University (N.D.V.S.U), Jabalpur, Madhya Pradesh (M.P.). Dogs presented to the Veterinary Clinical Complex with clinical signs such as inappetite, vomiting, hematemesis, weight loss and retching were thoroughly examined for upper GIT affections.

Radiography

The X-ray examination was done using a 100 mA Multimobil-10 X-ray machine. Lateral and ventrodorsal radiographical views of the cervical region, thorax and abdomen were taken to rule out the structural abnormalities of the oesophagus, stomach and duodenum (Fossum and Hedlund, 2007).

After plain radiography, contrast radiography was performed to localize stomach lesions. Contrast medium (2-4 ml/kg) was administered *via* a lip pouch, nasogastric, or orogastric intubation. Radiographs were taken immediately and at 10-minute, 30-minute, 3-hour and 24-hour intervals (Rendano, 1981).

Abdominal ultrasonography

Abdominal ultrasonography was performed by using Philips HD7 XE Ultrasound machine with 3-12 MHz linear array transducer. Animal was placed in dorsal or lateral

recumbency, with the cranial portion oriented to the viewer's left on sagittal scans and the right side to the viewer's left on transverse scans. Right lateral recumbency was used to examine the pyloric region and left lateral recumbency was used for the fundus.

Endoscopy

A gastroscopic examination was performed using a Karl Storz endoscope (Germany), which has a diameter of 10.1 mm and a working length of 3000 mm. The anatomical components of the gastrointestinal flexible multipurpose a video gastroendoscope included an insertion tube, an umbilical cord, a light guide connector and the distal tip (Fig 1).

The preparation of dogs for the endoscopic procedure involved withholding food overnight or for 12-24 hours and water for 4-6 hours to prevent plugging of the suction channel and ensure better mucosal visualization.

Anaesthetic protocol for endoscopic examination

Dogs were sedated using Atropine Sulphate @ 0.02-0.04 mg/kg body weight intramuscular, Xylazine Hydrochloride @ 1-1.5 mg/kg body weight intramuscular and Diazepam @ 1-2 mg/kg body weight intravenous. General anaesthesia was achieved with Ketamine hydrochloride @ 5-10 mg/kg body weight intramuscular and maintenance of anaesthesia was done with Ketamine hydrochloride.

Positioning of the animal

Dogs were put in left lateral or dorsal recumbency with extended head and neck position for performing oesophagoscopy and gastroduodenoscopy to facilitate visualization of stomach curvature during gastroscopy (Williams, 2004).

Endoscopic observation and evaluation

Upper gastrointestinal endoscopy procedure included oesophagoscopy, gastroscopy and duodenoscopy (Romain and Martinez, 2019).

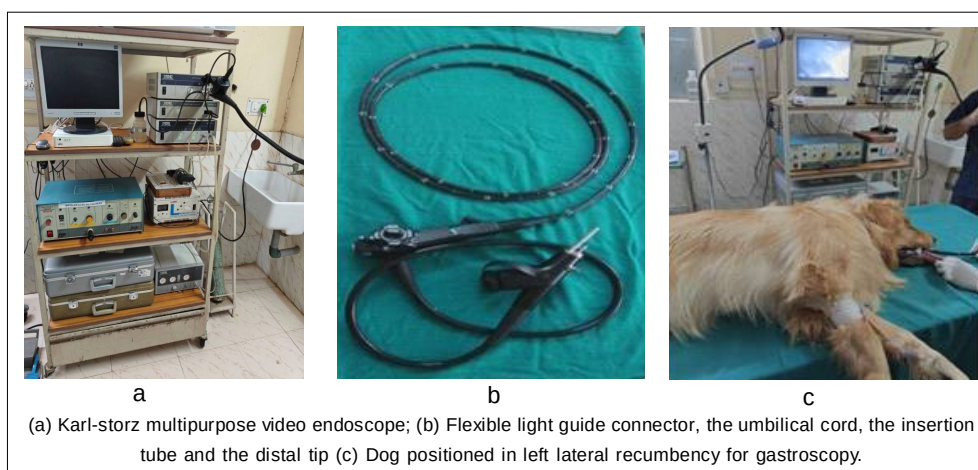


Fig 1: Endoscopy setup.

Oesophagoscopy

The anesthetized animal was put in left lateral or dorsal recumbency with a mouth gag. The endoscope was directed dorsally through the oropharynx to visualize the cranial oesophageal sphincter, with air insufflation dilating the cervical oesophagus for clear visualization. Advancement was done only with a visible lumen, retracting if unclear.

Gastroscopy

In the stomach, the rugal folds were assessed for color and thickness before air insufflation, which separated the folds for orientation and detection of abnormalities (e.g., ulcers, masses, foreign bodies). The endoscope advanced along the greater curvature to the angularis incisura, visualizing the pyloric antrum and examining the gastric fundus. Retroflexion enabled inspection of the cardia, fundus and surrounding structures, with the pyloric sphincter showing normal motility.

Duodenoscopy

The endoscope was passed through the pyloric sphincter into the proximal duodenum, distinguishing the pyloric wall from the duodenal lining with visible microvilli.

RESULTS AND DISCUSSION

The overall occurrence of upper GIT affections in dogs

An epidemiological study was conducted to know the occurrence of GIT affections in the dog population presented to the veterinary clinical complex (VCC), Jabalpur, over six months from May 2024 to October 2024. The overall

occurrence of upper GIT affections in dogs is summarized in Table 1. The findings of the current study indicated an occurrence of upper GIT affections in 21.21% of clinically suspected dogs at VCC, Jabalpur. In comparison, Suryavanshi *et al.* (2018) reported 35% of dogs, primarily exhibited oesophageal and gastric abnormalities. While these occurrence rates differ from those in previous studies, such discrepancies may be attributed to variations in experimental design, diagnostic techniques and procedural methodologies used to estimate the occurrence of upper GIT disorders.

Clinical manifestations associated with upper GIT affections in dogs

During the study of upper GIT affections in dogs, various clinical manifestations were observed among the affected dogs. Vomition was the most prevalent clinical sign occurring in 100% of cases (28/28), followed by inappetence *i.e.*, 92.86% (26/28), dehydration *i.e.*, 89.29% (25/28), retching *i.e.* 57.14% (16/28), hematemesis *i.e.*, 32.14% (09/28), weight loss *i.e.*, 28.57% (08/28), ptialism *i.e.*, 21.43% (06/28) and dysphagia *i.e.*, 10.71% (03/28) (Fig 2).

Vomiting, weight loss and anorexia have been reported as the most common clinical signs in dogs with chronic gastritis. The results of this study were in agreement with Shabestari *et al.* (2008), Lidbury *et al.* (2009), Colakoglu *et al.* (2017), Seim-wikse *et al.* (2019), Maheshwarappa *et al.* (2020) and Manzoor and Rasool (2024). Colakoglu *et al.* (2017) specifically reported episodic vomiting (54.5%) followed by weight loss (27.3%). Whereas, the other clinical signs (polyuria, polydipsia, ascites, icteric skin, cataract, weakness) were observed by Nakang *et al.* (2019) and Khanduri *et al.* (2021). The interplay of inflammation, impaired gastric motility, mucosal irritation, altered hormonal regulation and psychological factors contributes to vomiting and anorexia in chronic gastritis. The intermittent vomiting may result from objects intermittently obstructing the pylorus due to peristaltic movements, which was in accordance with, Boag *et al.* (2005), Hayes (2009) and Kalundia (2012).

Table 1: Overall occurrence of upper GIT affections in dogs.

Particulars	No. screened	No. affected	Occurrence (%)
Total dog population	2042	28	01.37
Dogs suspected for upper GIT affections	132	28	21.21



Fig 2: Clinical signs related to upper GIT affections in dogs.

Distribution of upper GIT affections in dogs

Among the 28 dogs diagnosed with GIT affections, gastritis was the most prevalent affection, observed in 50.00% of cases (14/28). This was followed by gastric ulcers and erosions in 35.71% (10/28), gastric foreign bodies in 10.71% (3/28), oesophagitis in 07.14% (2/28), megaoesophagus in 03.57% (1/28), oesophageal nodule in 03.57% (1/28) and sialocele in 03.57% (1/28) (Table 2; Fig 3, 4 and 5).

Lateral abdominal radiographs revealed the presence of foreign bodies, including radio-opaque objects such as

Table 2: Distribution of upper GIT affections in dogs.

Manifestation	Frequency (n=28)	Per cent (%)
Chronic gastritis	14	50.00
Gastric ulcer and erosion	10	35.71
Gastric foreign body	03	10.71
Oesophagitis	02	07.14
Megaoesophagus	01	03.57
Oesophageal nodule	01	03.57
Sialocele	01	03.57

marbles and radiolucent items like clothes, within the stomach. The radiographs also showed a distended stomach with a gravel-like appearance due to impacted contents, alongside a slight increase in the soft tissue density of the stomach wall. This soft tissue density increase is likely indicative of oedema or mild inflammation, possibly due to foreign body obstruction or irritation from the gastric ulcers. These findings were consistent with Gianella *et al.* (2009).

Ultrasonography also identified mildly echogenic masses within the stomach, suggestive of foreign body impaction, which, combined with the observed reduction in gastric motility, strongly points to gastric stasis. The increased mucosal thickness observed in ultrasonographic images further emphasizes the presence of gastritis. Ultrasonographic alterations observed in the present study agree with the observations made by Penninck (2002) and Frank (2013). Ultrasonographic examination of gastric ulcers revealed a disruption in the normal gastric mucosa, marked by the formation of crater-like lesions that diminished the gastric mucosal layering. The ulcerated borders showed increased thickening due

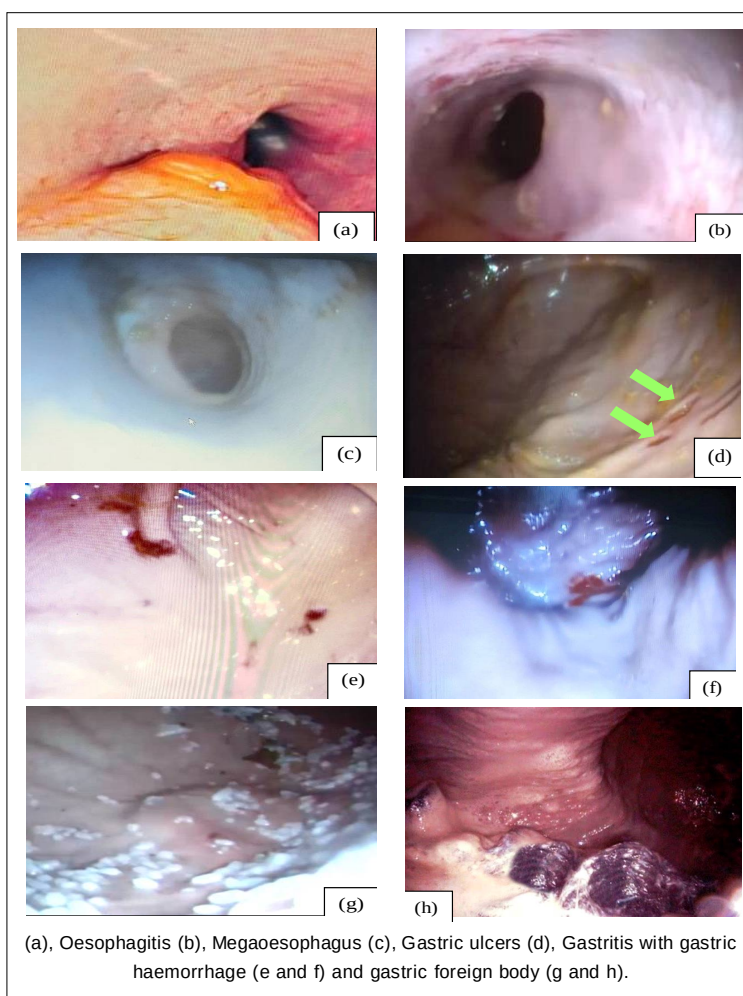


Fig 3: Endoscopic imaging of Oesophageal nodule.

to inflammation. Furthermore, compared to healthy dogs, gastric motility was found to be slow, suggesting a malfunction in gastric peristalsis that is probably related to the inflammatory and ulcerative processes taking place in the stomach. These findings align with those reported by Kealy *et al.* (2011) and Sagar (2016).

The findings of the endoscopy of the present study were accordance with Shabestari *et al.* (2008). However, contrast with Simpson (2006), Verma *et al.* (2020) and Ransingh *et al.* (2023). Shabestari reported the 40% of dogs suffered with chronic gastritis. The confirmed diagnosis was made by gastroscopy, which revealed mucosal thickening, granularity, friability, erosions and frank hemorrhages, which could be due to an inflammatory response resulting in the recruitment of phagocytes into the mucosa and neutrophil infiltration, which amplify the

inflammatory response by releasing chemotoxins and further damaging the gastric mucosa, dilating the submucosal arterioles and increasing mucosal blood flow. However, Suryavanshi *et al.* (2018) and Verma *et al.* (2020) reported gastric ulcers and erosions in 4.76% and 21% dogs, respectively. Gastric ulceration is multifactorial condition resulting from various etiological agents, including gastric mucosal damage by physical agent, disruptions in its chemical integrity and impairments in the mucosal repair processes (Parrah *et al.*, 2013).

In the current clinical study, the identified gastric foreign bodies included towel and plastic debris lodged in the stomach. Similarly, previous studies by Michels *et al.* (1995), Fossum and Hedlund (2007) and Dilip Kumar *et al.* (2009) reported various gastric foreign bodies. Foreign body ingestion is commonly observed in dogs due to their

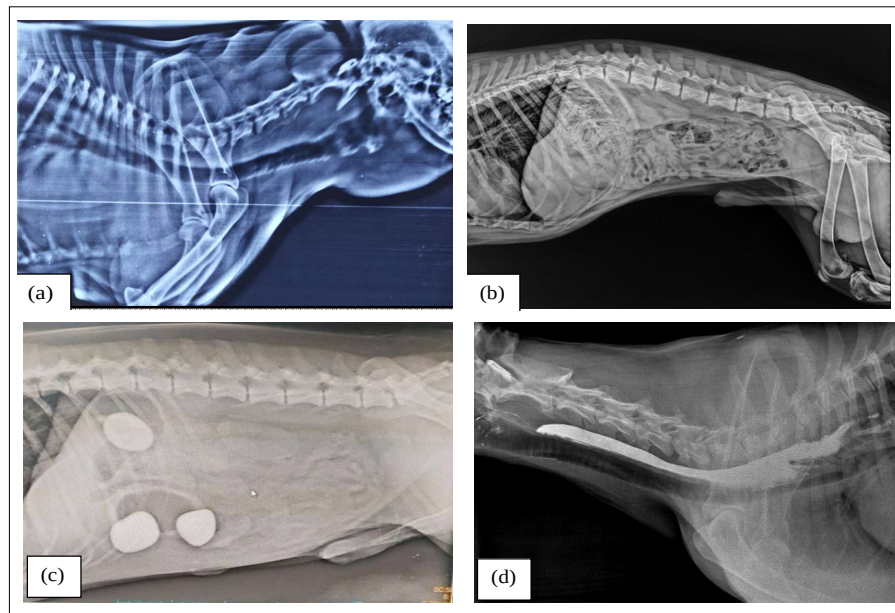


Fig 4: Radiographic imaging of (a) Sialoceles, (b) radiolucent foreign body within the stomach, (c) radio-opaque foreign body within the stomach and (d) Megaesophagus.

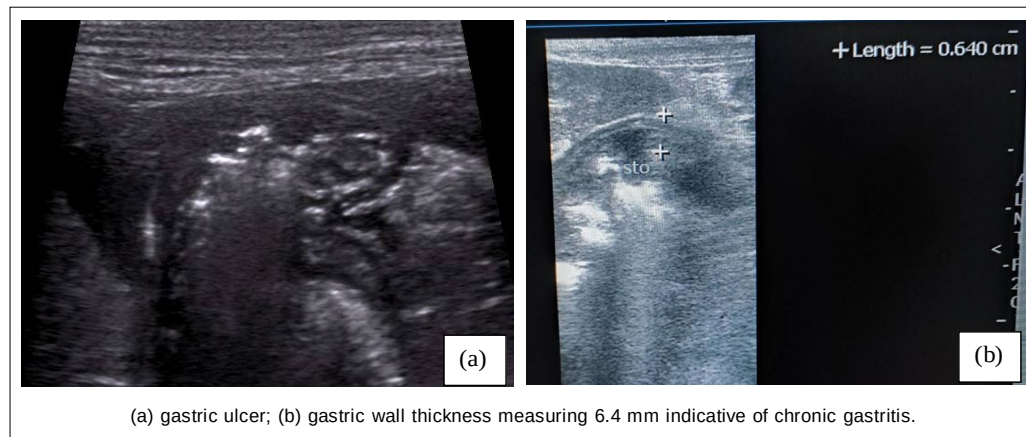


Fig 5: Ultrasonographic image.

indiscriminate feeding habits, the tendency to explore their environment, this behavior often termed pica, can be influenced by several factors, including nutritional deficiencies, boredom, anxiety, or underlying medical conditions such as gastrointestinal diseases (Evans and Adams, 2010).

The findings of the present study include oesophagitis in 07.14% of dogs. Similarly, Suryavanshi *et al.* (2018) confirmed reflux oesophagitis through endoscopic findings of mucosal erythema, haemorrhage and thickened folds. Similar endoscopic findings have been documented by Guilford (1990), Gualtieri and Olivero (2006), Glazer and Walters (2008) and Meineri *et al.* (2008). Reflux oesophagitis in dogs occurs when gastric contents, including acid and bile, flow back into the esophagus, causing inflammation. Contributing factors include increased gastric acid production, incompetent lower oesophageal sphincter (LES), delayed gastric emptying and anatomical abnormalities like hiatal hernia (Castell *et al.*, 2004).

The findings of our study well collaborate with Ross *et al.* (1995), Gualtieri (2001) and Johnson *et al.* (2009). They collectively described megaesophagus as a neuromuscular disorder, underscoring its etiology related to dysfunction in the neuromuscular control of the oesophagus. Suryavanshi *et al.* (2018) revealed megaesophagus in 18 (42.86%) dogs.

In the current clinical study oesophageal nodule was diagnosed in 03.57% of dogs with the help of endoscopy as observed by Yildirim *et al.* (2007), Mylonakis *et al.* (2008) and Suryavanshi *et al.* (2018). They reported the presence of an oesophageal nodule characterized as a broad-based protuberance with a nipple-like orifice in the same anatomical location. The presence of such an intraluminal oesophageal nodule with a nipple-like orifice is strongly suggestive of a *Spirocerca lupi* infestation.

Sialoceles, a condition characterized by the accumulation of saliva resulting from leakage of the salivary gland or duct, is the most prevalent form of sialoadenopathy in dogs (Torres *et al.*, 2024). It can present in various locations, including cervical, periorbital and orbital regions (Guinan *et al.*, 2007 and Landy *et al.*, 2021). The causes of sialoceles include trauma, foreign bodies and sialoliths, although in many cases, the exact etiology remains unclear (Landy *et al.*, 2021).

CONCLUSION

The study highlights the significant prevalence of upper gastrointestinal (GIT) disorders in dogs, emphasizing the critical role of accurate and timely diagnostic methods for effective management. The integration of radiography, ultrasonography and endoscopy provides a comprehensive approach for diagnosing conditions such as gastritis, gastric ulcers, foreign body impactions and oesophageal disorders. The most prevalent symptom was found to be gastritis, which was followed by stomach ulcers and foreign bodies. Clinical symptoms like vomiting, appetite loss and weight loss were prominent in dogs with this ailment.

Ultrasonographic and endoscopic findings revealed various abnormalities, including disrupted mucosal layers, thickened gastric borders and sluggish motility, which are indicative of underlying inflammation and obstruction. These findings emphasize the importance of early detection using advanced diagnostic tools to improve treatment outcomes and overall canine health. The study also observed a range of oesophageal disorders, including oesophagitis and megaesophagus, further reinforcing the need for a thorough diagnostic approach. In order to fully comprehend the range of GIT affections and their regional variations, future study should concentrate on increasing the sample size. Additionally, exploring the long-term outcomes of different treatment protocols for conditions like chronic gastritis, gastric ulcers and oesophageal disorders could provide valuable insights for improving management strategies. Advancements in non-invasive diagnostic methods, such as the use of biomarker testing and improved imaging technologies, may further enhance early detection and treatment efficacy.

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Informed consent

All animals' procedures for the experiments were approved by the Institutional Animal Ethics Committee.

Conflict of interest

The authors declare that they have no conflict of interest.

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