

# FARNESOL MIXTURE CALCULI IN A LABRADOR DOG

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A six year old female Labrador dog was presented to University Veterinary Hospital, Kokkalai, KVASU with distended abdomen and a history of anorexia and stranguria for a period of three days. Based on radiography and ultrasonography, the condition was diagnosed as urolithiasis. Cystotomy was performed under general anaesthesia to remove the cystic calculi. Chemical composition and structure of the calculi were analysed using Fourier transform infrared spectrometer (FTIR) and found as farnesol mixture of stereo isomers.

**Keywords:** Cystotomy, Dog, Farnesol.

Uroliths are aggregates of crystalline and occasionally noncrystalline solid substances that form in one or more locations within the urinary tract (Koehler *et al.*, 2009). Urolithiasis is the condition of having urinary calculi or uroliths in kidney, ureter, bladder or urethra. Struvite (magnesium ammonium phosphate) and calcium oxalate uroliths are the most common types in dogs and other types include urate, cystine, silicate and mixed stones (Fossum, 2013). Farnesol is a colourless unsaturated liquid alcohol that occurs in various essential oils such as citronella oil or lemon grass oil and also present in plants such as neroli, musk, tube rose and balsam. Accidental ingestion of these plants and oil by the animal leads to the accumulation of farnesol in the urinary bladder and result in the calculi formation. Another cause of accumulation of farnesol in urinary bladder is the inhibition of squalene synthase enzyme in the pathway of cholesterol synthesis. Incidence of these calculi is very rare in animals. Large amount of farnesol derived dicarboxylic acids were excreted in the rat urine treated with fungal metabolite zaragozic acid A, which is a squalene synthase inhibitor (Richard *et al.*, 1997). Cystic calculi can be diagnosed by radiography but the diagnosis becomes challenging if urinary stones are radiolucent (Saini and Singh, 2002; Larson, 2009). A case

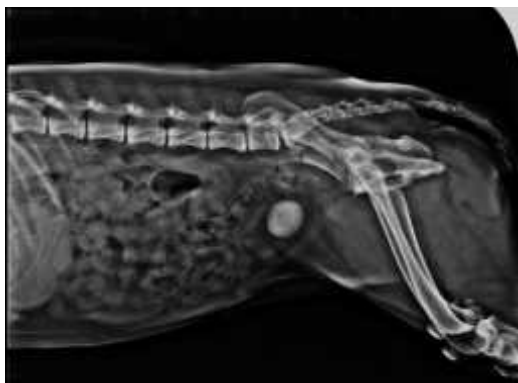
of successful management of urolithiasis in a female Labrador dog is placed on record.

## Case History and Observations

A six year old female Labrador dog was presented to University Veterinary Hospital, Kokkalai, KVASU with distended abdomen and history of anorexia and stranguria for a period of three days. On clinical examination all the haematological and biochemical parameters were found within the normal range. Physical examination of abdomen revealed distended urinary bladder which on palpation elicited pain. Lateral abdominal radiograph revealed radiodense calculi in the urinary bladder (Fig.1). On ultrasonography, hyperechoic structure presenting acoustic shadowing was noticed (Fig.2). Condition was diagnosed as urolithiasis and surgical removal of the calculi by cystotomy was resorted to.

## Surgical Treatment

Animal was premedicated using atropine sulphate at the dose rate of 0.045 mg/kg body weight I/M and sedated with xylazine hydrochloride at the dose rate of 1.0 mg/kg body weight I/M. The general anaesthesia was induced with ketamine hydrochloride at the dose rate of 5.0 mg/kg i/m and maintained with inhalation anaesthesia using 2% isoflurane. Patient was placed on dorsal recumbency and ventral



**Fig.1: Radiograph showing radiodense calculi in the urinary bladder**



**Fig.2: Hyperechoic acoustic shadow in Ultrasonography**



**Fig.3: Urinary bladder with calculi**



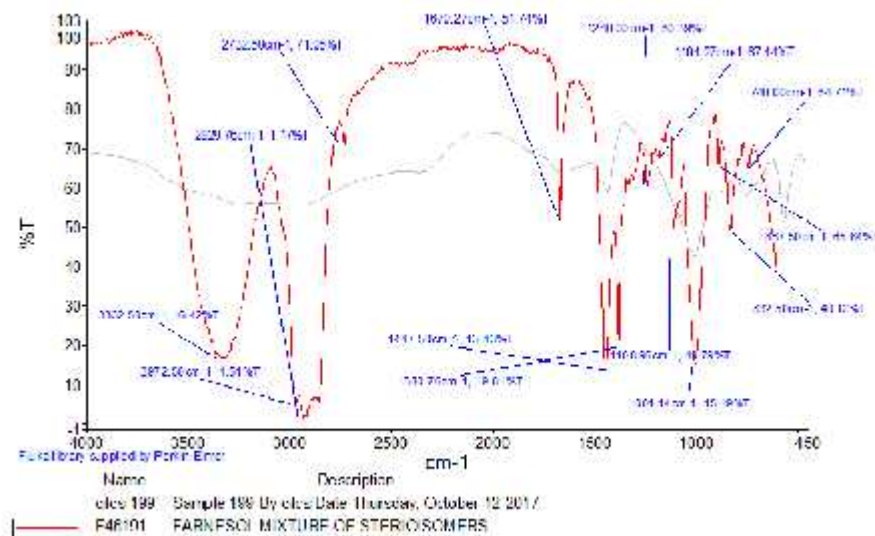
**Fig.4: Relieved calculi**

abdomen was prepared for aseptic surgery. Distended urinary bladder was located and exteriorised after mid ventral incision. A five centimetre long incision was made on the dorsal aspect of urinary bladder (Fig.3) and relieved urine and calculi (Fig.4). The urinary bladder was rinsed with normal saline. Incision on the urinary bladder was closed by Cushing suture followed by Lembert suture pattern using Vicryl size 2-0. The muscles and subcutaneous tissue were also closed with Vicryl and skin incision was apposed with horizontal mattress sutures using nylon. Postoperatively, animal was administered with antibiotic ceftriaxone sodium at the dose rate of 20 mg/kg body weight I/V and analgesic meloxicam at 0.2 mg/kg body weight I/M along with intravenous fluids for five days. The relieved calculi were sent for chemical analysis. Chemical composition and structure of the

calculi were analysed using Fourier Transform Infrared (FTIR) Spectroscopy.

### **Results and Discussion**

The relieved calculi was having 2 × 4 cm dimension and weighed 150g and identified as Farnesol mixture of stereo isomers (Fig.5) using Fourier Transform Infrared (FTIR) Spectroscopy. Accumulation of this calculi in the urinary bladder is potentiated by the accidental ingestion of the plants such as lemon grass, neroli, musk, tube rose and balsam by the animal. On 10th postoperative day the skin sutures were removed as the patient made an uneventful recovery. Definitive diagnosis of the urolith can be made by either radiography or ultrasonography and are successfully managed by surgical methods as also mentioned by Fossum, (2013).



**Fig.5 : Spectrum analysis of the farnesol calculi**

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