Leo: linear foreign body in a young cat

Linear foreign bodies can cause life-threatening illness in cats, with ingestion resulting in plication of the intestine and potentially perforation and peritonitis. In this case a young cat ingested a cotton thread which became anchored at the base of the tongue and caused bunching of the intestines, resulting in clinical signs of vomiting, lethargy and ptalism. The thread was removed via coeliotomy and three incisions into the duodenum and jejunum. The cat recovered uneventfully with the risks of complications such as peritonitis reduced by prompt presentation by the owners, good aseptic surgical preparation and technique and close perioperative monitoring. Cotton, wool, string and other linear fabrics or rubber bands should be kept away from cats to reduce the risk of linear foreign body.

Linear foreign bodies are a serious, potentially life-threatening condition causing partial or complete intestinal obstruction following ingestion of thread, wool or string. This case study discusses the nursing challenges involved in the perioperative care of a cat requiring surgical removal of an ingested piece of thread.

Signalment
Leo is a 7-month-old male neutered domestic shorthaired cat. He is the only cat of the household, an indoor-outdoor cat, is up to date with worming, flea treatment and vaccinations and is fed a standard complete wet and dry diet.

History
Leo was brought into the clinic due to acute onset lethargy and inappetence, less than 24 h after he was seen playing and subsequently ingesting a piece of cotton sewing thread. His owners initially were not concerned about the ingestion as they believed it wasn’t a significant length of thread and hoped that it would pass through his intestines without a problem. Leo started vomiting a few hours after thread ingestion, and, although he ate his breakfast the next morning and held this down, the fact that he was
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becoming increasingly subdued and salivating excessively prompted the owners to contact the clinic.

**Physical examination**

On examination in the clinic Leo was quite stressed, bright and alert but had a tender abdomen. No intestinal bunching was felt and, unfortunately, I was unable to examine his mouth (particularly the base of his tongue where linear foreign bodies can lodge) due to his anxiety.

With the recent history of ingestion of a piece of thread, linear foreign bodies were discussed at length in the consult room. I discussed with the owner the need for me to visualise the base of his tongue as this is an anchor point for thread. Abdominal radiographs were also recommended to detect any obvious signs of obstruction, plication of his intestines or even peritonitis.

Leo was admitted for further diagnostics and premedicated with low dose acepromazine (0.01 mg/kg) and buprenorphine (0.03 mg/kg). This provided moderate sedation and allowed intravenous catheter placement and induction of anaesthesia with propofol.

On induction, adequate oral examination was achieved and a thin piece of white thread was seen looped around the base of the tongue (Figure 1), passing down into the oesophagus (Figure 2), confirming our suspicion of a linear foreign body.

Leo was placed on intravenous fluids (Hartmann’s at 10 ml/kg/h using a fluid pump), oxygen and isoflurane and Leo’s owner was called to discuss the findings. Options included cutting the thread at the base of the tongue and seeing if Leo passed the thread himself or...
performing an exploratory laparotomy to remove the thread through an enterotomy. A surgical treatment was elected by the owners.

Preoperative intravenous antibiotics were given 30 mins prior to surgery (cefazolin 22 mg/kg IV).

Lateral radiographs of Leo’s abdomen showed no evidence of peritonitis or severe plication of his intestines but there was a suspicious ‘bunching’ and some gas present in his intestines.

Leo was prepared for surgery and a ventral midline coeliotomy was performed. The thread was cut at the base of the tongue to enable its removal from the enterotomy. The full intestinal tract was examined and no gross abnormalities were visualised, the duodenum and part of the jejunum were exteriorised from the abdomen and the abdomen was packed off with laparotomy sponges which had been moistened with warmed sterile saline.

A moist laparotomy sponge was also placed over the exteriorised intestines to prevent desiccation from the hot operating lights. A small longitudinal incision was made in the anti-mesenteric border of the duodenum and the string was visualised and grabbed using forceps (Figure 3). There was tension on the string which prevented complete removal from this incision. To avoid further trauma to the intestinal wall by excessive force, the string was cut at this point and the rostral portion removed. The incision was closed using simple interrupted pattern and monofilament absorbable 4–0 suture material. A further two incisions needed to be carried out on the anti-mesenteric border of the jejunum to remove the remainder of the thread (Figure 4). The area was flushed with warmed sterile saline and omentum was laid over the incision sites.

No spillage of any intestinal contents occurred during the laparotomy so, after removal of the laparotomy sponges, and a change of surgical...
gloves, the abdomen was closed routinely using three layers. Leo was monitored closely on recovery for any signs of vomiting, hypothermia and pain. His fluid rates were reduced to 2.5 ml/kg/h and he was given buprenorphine (0.02 mg/kg IM q4–6h).

Nursing priorities and treatments

This case illustrates many important nursing tasks:

- monitoring anaesthesia and assessing vital signs regularly throughout the surgery;
- ensuring appropriate temperature is maintained during anaesthesia and on recovery (Figure 5) by regular temperature checks and providing heat pads or other warming methods if temperature declines;
- ensuring strict surgical asepsis is maintained by appropriate patient preparation, flushing using sterile saline solution and providing suction;
- maintaining appropriate volume status and correcting any electrolyte imbalances by providing adequate fluid therapy during surgery and on recovery and monitoring blood pressure and vital parameters to assess response to fluid therapy;
- maintaining a patent IV line with regular checks and ensuring patient is not overhydrated by careful patient assessment;
- ensuring all laparotomy sponges and swabs are counted at the start of surgery and prior to abdominal closure;
- assessing the hospitalised patient for any signs of pain using an easy to follow in clinic pain scoring system, for example the Glasgow Composite Measure Pain Scale (CMPS) (see Measuring acute pain in the cat with the Glasgow Composite Measure Pain Scale Feline Focus 2015; 1(6); 187-194);
- ensuring the hospitalised patient gets adequate nutrition by determining its energy requirements and encouraging the patient to eat while in the hospital (Figure 6).
**Outcome**
Leo made an excellent recovery and the day after surgery had improved significantly and was eating small amounts of food easily. He was discharged that afternoon with buprenorphine 0.02 mg/kg sublingually q4–6h and a special gastrointestinal diet for a few days postoperatively.

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**Cat Friendly Clinic priorities**

We try to follow the Cat Friendly Clinic guidelines (www.catfriendlyclinic.org) and make the hospitalised patient as comfortable as possible by reducing stress. There are a number of ways to achieve this including gentle handling, feline only wards and pheromone sprays. A very informative diagram gives recommendations applicable at each location in a typical veterinary clinic in the AAFP/ISFM Feline Friendly Nursing Care Guidelines, 2012.1 Other important ways to be cat friendly include:

- From the first phone call made by the cat’s owner to book the appointment we discuss ways to reduce stress of transporting the cat to the clinic and also discuss options with appointment times to avoid the stress of sitting beside a dog in the waiting room.
- We have a cat stand in our waiting room and encourage clients to place their cat at a height on the stand in the carrier while they are waiting for the appointment rather than leaving the carrier on the floor.
- The consult room table is sprayed between all consults for hygiene and to remove any smell of the previous patient. We use pheromone spray or diffusers daily in the waiting room, consultation room, prep room and hospital ward.
- Unfortunately, we do not have separate cat and dog wards in our clinic but we try to avoid direct visualisation of other animals as much as possible, provide covers over cages, opportunities for cats to hide, and discharge any noisy dogs as soon as possible.
- We use gentle handling, towel restraint, quiet clippers and EMLA cream prior to blood sampling or catherisation and of course patience with our patients.
- Hospitalised cats are provided large cages lined with yoga mats and Vetbed that have a box/hooded bed enabling them to hide and owners are always encouraged to come and visit during the hospital stay.
- We try to keep noise to a minimum, especially in the kennel area and when cats are recovering from anaesthetic.

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**Tips**

Not every clinic has a feline only ward but clinics can still be cat friendly by minimising contact (visual, auditory or olfactory) in the following ways:

- cage fronts should be covered;
- procedures could be timed so cats are treated one day, dogs the next;
- noisy dogs should be discharged as soon as possible;
- anxious cats could be hospitalised in a collapsible cage elsewhere in the hospital;
- hospitalised cats should be given opportunities to hide in their cage.
An informative discharge advice handout was given to Leo’s owners advising monitoring Leo for signs of inappetence, lethargy or vomiting and to contact the clinic if they were at all concerned. A soft Elizabethan collar was provided. Leo was brought back 3 days after his surgery for a recheck and 10 days later for suture removal and the owners reported he was doing very well and back to his normal lively self the day after surgery (Figure 7). In future the family are going to be very careful about not leaving any thread or string around the house.

Discussion
The most common sites for a linear foreign body (FB) to anchor in the cat are the base of the tongue or the pylorus of the stomach. A thorough oral examination, paying particular attention to the base of the tongue should be undertaken in any cat presenting with acute vomiting. As Leo was quite stressed due to the car journey thorough oral examination was impossible, emphasising the need for communication with our clients about ways to reduce the stress of the visit. This will not only reduce their cat’s stress levels but also make it easier for the vet to perform a thorough clinical examination and reach a quicker diagnosis.

When a linear FB becomes anchored at the base of the tongue or at the pylorus of the stomach, normal peristalsis of the intestines propels the FB along the intestine until it becomes taut. As this peristalsis continues, the intestines become plicated (folds like a fan or accordion) and the linear FB acts as a saw which can lead to full thickness laceration of the intestine potentially causing life-threatening peritonitis. The earlier the diagnosis of a linear FB is made, the less trauma caused to the intestines and the better the prognosis.

Conservative management may be carried out in some circumstances by cutting the anchor point below the base of the tongue and allowing the FB to pass while being closely monitored in a hospital environment. This may avoid the need for surgery and can have a good prognosis if the cat is presented less than 2 days after known ingestion, but owners must be made aware of the risk of complications and the potential need for emergency surgery.

Key point
Linear foreign body removal may necessitate multiple incisions into the intestine, potentially increasing the risk of peritonitis and sepsis.
patient is essential when dealing with the gastrointestinal tract, as for any surgery. Linear FB removal often requires multiple incisions in the intestinal tract, leading to increased surgery times and increased risk of complications like stricture and sepsis. Multiple incisions in the gastrointestinal tract were one risk factor for higher mortality in a large study of dogs and cats with intestinal FBs. Assistance from the nursing team by using suction and flushing the abdomen with copious amounts of sterile warmed fluids is important in helping reduce the risk of bacterial contamination.

Buprenorphine was administered as analgesia for Leo and perhaps should have been given IV to provide a greater magnitude of anti-nociception, faster speed of onset and longer duration of action compared to other routes. Certainly regular reassessment of the hospitalised patient is very important as the duration of action of buprenorphine has been found to be shorter than what is commonly published.

Significant advances in pain assessment have occurred over the last few years with the production of new clinical tools that can be used on the feline patient in a clinical setting. Combining a facial scale, that shows changes in feline facial expression during differing degrees of pain with the Glasgow CMPS-feline, will help us gain a more accurate assessment of each individual patient.

References

Foreign bodies are an uncommon but important cause of illness in cats. Many cases are preventable by raising owner awareness, one of the aims of the Keeping Cats Safe Campaign. The Campaign is run by International Cat Care in conjunction with the Veterinary Poisons Information Service and Agria Pet Insurance. For more information see: http://icatcare.org/keeping-cats-safe