

## Lethal consequences of ingested foreign material in seabirds

Ella Carapetis · Aaron J. Machado ·  
Roger W. Byard

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A pied cormorant (*Phalacrocorax varius*) was found sleeping on rocks in a coastal region near Adelaide. Examination revealed entanglement by fishing line with superficial wounds to the left leg. The cormorant was also reported to have ingested a number of fishing hooks, however, the exact location of the hooks was not known. In addition, the bird was found to be underweight and shocked. X-ray examination revealed two ingested fishing hooks embedded in the esophagus in the midneck, and in the stomach (Fig. 1). These had caused the cormorant to be unable to extend its neck for diving, feeding and/or flying. Surgical intervention was undertaken.



**Fig. 1** An antemortem X-ray of a pied cormorant (*Phalacrocorax varius*) showing two ingested fishing hooks embedded in the esophagus in the midneck and in the stomach

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E. Carapetis · A. J. Machado · R. W. Byard (✉)  
Discipline of Pathology, The University of Adelaide,  
Adelaide, SA, Australia  
e-mail: roger.byard@sa.gov.au

E. Carapetis · A. J. Machado · R. W. Byard  
Australian Marine Wildlife Research and Rescue Organization,  
Torrens Island, SA, Australia



**Fig. 2** Removal of a portion of the upper hook during surgery revealing nylon fishing line running down the esophagus attaching to the hook embedded in the stomach

The upper hook was attached by nylon fishing line to the lower hook (Fig. 2) resulting in significant injuries to the stomach wall when the animal had attempted to extend its neck whilst trying to fly and/or dive. The bird died before the second hook could be retrieved.

## Discussion

Ill and/or injured marine animals may be rescued and taken to wildlife centers for examination and treatment. Evaluation of injuries is undertaken to establish causes of death, to identify situations that may be preventable, and to also exclude or identify inflicted injury by humans. This may involve assessment by both veterinarians and forensic pathologists [1].

Seabirds may be particularly vulnerable to injury from fishing material given their scavenging and fishing activities in areas that are also used by humans. They are often attracted to baited hooks because of the resemblance to natural prey. However, once encountered hooks may attach to external parts of seabirds, including the legs and wings, be ingested and attach to the mouth, or be swallowed and cause internal problems. The location of the attached hook usually determines the severity of injury. For example, a fully ingested hook may cause death within a short period of time as a result of perforation of the stomach, heart or great vessels [2–4].

**Table 1** Range of problems that may be identified at necropsy in seabirds resulting from fishing line/hook ingestion

Aerodigestive tract
Injuries to the mouth
Closure of the mouth
Injuries to the oropharynx
Sepsis
Gastrointestinal tract
Perforation
Localized inflammation/sepsis
Intussusception/intestinal obstruction
Intestinal transection
Generalized sepsis

Ingestion of the attached fishing line may also be a problem for birds and animals, as a long line may extend into the intestine causing intussusception or intestinal transection [3]. In addition, two hooks attached to a single piece of fishing line may both embed in the gastrointestinal tract at different levels causing specific problems related to the length of the line, as occurred in the reported case. On occasion this may involve two birds that have become attached to each other and thus are not able to effectively fly, forage, or feed.

The reported case also demonstrates the usefulness of imaging in seabirds that may have ingested fishing gear. The range of lesions and conditions that may be associated with ingested hooks and line is summarized in Table 1 [2–4].

## References

1. Byard RW, Gilbert JD, Kemper CM. Dolphin deaths: forensic investigations. *Med J Aust.* 2001;175:623–4.
2. Dau BK, Gilardi KVK, Gulland FM, Higgins A, Holcomb JB, Leger JS, et al. Fishing gear-related injury in California marine wildlife. *J Wild Dis.* 2009;45:355–62.
3. Casale P, Freggi D, Rocco M. Mortality induced by drifting longline hooks and branchlines in loggerhead sea turtles, estimated through observation in captivity. *Aquat Conserv Marine Freshwater Ecosyst.* 2008;18:945–54.
4. Cooper JM. Fishing hooks associated with albatrosses at Bird Island, South Georgia. *Mar Ornithol.* 1995;23:17–21.