

TREATMENT, HUSBANDRY AND REHABIL- ITATION OF OIL-SOAKED BIRDS

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The veterinarian who is interested in caring for wildlife and in the problems involving the environment and who is practicing along the coasts or any major waterways on which petroleum is transported will have to deal with oil-soaked birds.

Oil-soaked birds presented to the clinician must be treated for the following acute conditions: hypothermia, shock and stress, starvation, toxic effects of the oil and acute traumas. Birds that successfully survive the acute stages of exposure to petroleum products then have to face the following chronic problems which the veterinarian must prevent and/or treat: long-term stress, malnutrition, toxicity, aspergillosis, ammonia fume-associated irritation to the mucous membranes, cloacal impaction, bumble-foot-like lesions and sternal bursitis.

IMMEDIATE TREATMENT

The insulatory ability of oiled feathers is reduced, thus allowing body heat to escape at a greatly increased rate. The bird's metabolic rate increases by up to a factor of three to maintain its normal temperature. Since a 3-cm. diameter spot of oil on the breast of a bird can result in severe heat loss, hypothermia is almost always present in oil-soaked birds presented for evaluation and treatment. In addition, the oiled bird ceases to forage for food, resulting in catabolism of subcutaneous fat stores and pectoral muscles for needed energy.

It is imperative that warmth be provided so that these birds can survive long enough to be treated for the other concurrent problems. Piles of rags in the bottom of boxes used to transport these birds and ventilated

boxes of fairly solid structure, such as cardboard, will greatly help in keeping the birds warm. Heaters in clinics and/or treatment centers are also essential to reduce the chilled state of these patients.

Concurrent with hypothermia are shock and stress due to exposure, handling and transport. Following is the recommended precleaning treatment of oil-soaked birds:

1. Loosely wrap the body of the captured bird in cloth (rags, towels or diapers); place it in a covered, ventilated cardboard box (one bird to a box); and immediately transport it to a treatment center. This prevents further ingestion of oil, slows heat loss and minimizes visual stress.

2. Band the bird when it arrives at the center and begin individual records. This allows a biologist to establish differential treatment for purposes of research.

3. Introduce 40 ml./kg. hydrating solution (see Table 1) into the proventriculus (upper stomach) with a No. 14 to 18 French catheter attached to a large disposable syringe. Repeat every hour for the first 3 hours and then 4 times a day thereafter.

4. Administer intravenously or intramuscularly 3 mg./kg. dexamethasone and 1 ml./kg. 50 per cent dextrose. (Intravenous medication can easily be given in the tarsal or wing vein using a 22- to 25-gauge needle.) Place a poncho on the bird and delay further treatment for 30 minutes.

5. Introduce 10 ml./kg. heavy medicinal mineral oil into the proventriculus. Wipe the exterior of the catheter dry before intubation to minimize the possibility of aspiration of the mineral oil. Delay further treatment for 30 minutes.

6. Provide suitable food, deep bedding (except for alcids), and an ambient temperature between 24° and 27° C. (75 to 80° F.).

7. Decide which birds are ready to be cleaned and what cleaning agent is to be used. A decision key is provided in Table 2.

8. Before cleaning, check the bird's record to

determine whether it has had an injection of dextrose and dexamethasone within the previous 4 hours. If not, it should receive another dose and be given 40 ml./kg. 5 per cent dextrose *per os*. Then the bird should be cleaned.

Many birds that have been oiled, having been at sea for a number of days, may be in a state of starvation. This can be easily detected by palpating the keel of the bird. Marked reduction in the muscle mass of the pectoral muscles usually indicates starvation and dehydration. It is best not to attempt to clean birds that are in this state until they have been hydrated, given nourishment and allowed to rest for one to four days. Signs of oil toxicity may be readily apparent, especially if oil is ingested, and include respiratory distress, diarrhea mixed with petroleum and cutaneous inflammation. The enteritis associated with oil toxicity can be controlled by giving orally either neomycin with methscopolamine (Biosol-M®, Upjohn) or kaolin and pectin with neomycin.

Traumas associated with capture and wave and sea action should also be treated. Fractures, lacerations, contusions, avulsions and other traumatic injuries should be treated as for any other patient. When antibiotics are needed, those with a broad spectrum seem to be most helpful. Chloramphenicol given intravenously is effective against a wide range of pathogens affecting wildfowl. When possible, culture and sensitivity studies are helpful. Injuries requir-

ing anesthesia can be handled well using Ketaset® (Bristol) or nitrous oxide-fluothane anesthesia. Ketaset has been our anesthetic of choice in almost all cases, at a dose of 0.5 to 1.0 mg./15gm. of body weight.

Since the feet of most water birds are particularly sensitive to drying and heat, bland ointment such as A and D ointment®, (Schering), petrolatum or a lanolin-based ointment should be applied on a regular basis. Accurate medical records should be kept on each patient, for as long as the patient is under medical supervision. Admittance weight, cloacal temperature and observations should be recorded in addition to treatments and other clinical impressions.

TREATMENT OF CHRONIC PROBLEMS

Birds whose feathers do not regain waterproofing and insulating qualities must be kept a considerable length of time. During this period, many of the chronic problems listed above develop. Long-term stress may be associated with population density, light exposure, temperature, noise and salt. All these factors must be considered in order to reduce stress to its lowest possible level.

Malnutrition is frequently a problem with birds kept for any length of time. An adequate diet is essential. Fresh or frozen fish or substitute foods, such as dog food pellets and commercial duck foods, can be used for some species.

Long-term oil toxicity is difficult to treat. The degree of toxicity depends upon the amount of oil absorbed by the birds upon first exposure to the petroleum product. The liver, kidneys, spleen, intestinal mucosa and heart can be affected by petroleum products. Depending upon the individual bird and which organ or organs are affected, the symptoms of toxicity will vary over a period of time.

Aspergillosis is a common problem encountered in wildfowl kept in captivity for long periods of time. Using bedding material that will not encourage the growth of *Aspergillus* seems to be the most practical way of preventing it. Rags, foam rubber, serval or crushed sugar cane and pine shavings seem to make the best bedding for birds. Straw and hay should not be used. All bedding should be changed regularly and frequently.

Although a number of drugs have been

Table 1. Medications and Solutions

<i>Corticosteroid:</i>	
Dexamethasone	3 mg./kg. intramuscularly or intravenously once or twice daily only
<i>Intestinal antispasmodic:</i>	
Biosol-M® (Upjohn)	3 drops/kg. orally every 6 hours
<i>Gastric demulcent:</i>	
Kaopectate® (Upjohn)	10 mg./kg. stomach tube every 4 hours
<i>Hydrating solution</i> (hypotonic, for dehydration and hypoglycemia):	
Mix:	5 gm. (1 level teaspoon) table salt
	25 ml. 50% dextrose or 12 gm. table sugar (3 level teaspoons)
	1 liter (or 1 quart) fresh water
	Administer 40 ml./kg. by stomach tube
<i>Isotonic sugar solution</i> (approximately 5%):	
Mix:	100 ml. 50 per cent dextrose or 50 gm. table sugar (4 level teaspoons)
	1 liter (or 1 quart) fresh water
	Administer 40 ml./kg. by stomach tube

used for the treatment of aspergillosis, none has proved to be practical or effective. If the bedding is not changed regularly, the ammonia fumes produced by decomposing droppings cause serious irritation to the conjunctiva and nictitating membranes. Good sanitation is of primary importance at all times.

Most sea birds are used to defecating in water. Birds kept out of water will frequently develop impactions of the cloaca. Mineral oil inserted through the vent will help to relieve this problem, but often, just making sure the birds enter water periodically will suffice.

Lesions of the joints, very similar to bumblefoot in domestic fowl, are frequently encountered. To date, every conceivable form of treatment for these joint lesions has been tried. Success has been uniformly poor but we believe that prevention through the use of proper bedding and access to water can be accomplished. Sternal bursitis, similar to breast blisters in chickens, is also frequently seen. This is best treated as an open, granulating wound. Topical proteolytic enzymes, chloramphenicol, furacin dressing and powder and hydrogen peroxide are all helpful in treating these open lesions.

CLEANING AND REHABILITATION

In addition to the above medical care, a veterinarian may also be asked to advise and to help with the capture, preliminary treatment, transportation, cleaning, rehabilitation and release of oil-soaked birds.

Birds should be transported one to a box, preferably in a cardboard box with a top large enough to hold an adequate supply of soft, warm bedding. Birds should not be cleaned until they are adequately hydrated, warm, out of shock and not in a state of starvation. The cleaning method employed should completely eliminate the oil from the feathers but should not produce long-term reduction in waterproofing and insulating effects of the feathers.

The following is an annotated list of current cleaning methods:

Cleaning with Solvent. The first requirement is for human safety. Shell Sol-70® has produced fair results and does not ignite easily (flash point 40° C. or 104° F.), but once burning, it burns fiercely. Therefore, it is necessary to ban smoking and provide adequate fire extinguishers. The

area should be well-ventilated and everyone should wear a suitable respirator and protective clothing, boots, gloves, masks and hoods.

Warm solvent (35° C. or 95° F.) is placed in 3 to 5 basins, and the bird is given serial baths, taking care not to damage feathers.

Following the baths, the plumage must be rinsed out with flowing solvent. We have built a portable unit that dispenses warm solvent under pressure to 12 nozzles arranged in 6 stations. For lightly oiled birds this rinsing unit is all that is needed for cleaning. When the bird is clean, it is blotted with clean diapers and thoroughly dried with a warm-air dryer such as those used for show dogs.

Final steps in the process involve hydration and rest in a "drunk tank" for 6 to 9 hours until the bird recovers from its intoxicated state caused by the solvent. The bird can then be immediately placed in a pool with easy egress, where it can swim, preen, drink and eat. An audiovisual teaching package is available to train volunteers in the details of this cleaning technique.

Cleaning with Mineral Oil. When cleaning with mineral oil, use all the techniques used for cleaning with a solvent except for warm-air drying. Respirators, fire extinguishers and the drunk tank are unnecessary. The bird must be warm and introduced to water gradually, since its plumage will neither be waterproof nor provide effective thermal insulation for some days after cleaning.

Cleaning with Detergent. We simply have not been able effectively to clean nor subsequently to release aquatic birds in excellent condition using detergent. Those who have been successful recommend serial baths of a 1 per cent detergent solution warmed to 40° to 45° C. (104° to 113° F.). Thorough rinsing with jets of warm water (40° to 45° C.) is necessary to remove hydrophilic detergent residues.

The reason for our lack of success with this method is probably related to the types of polluting oil we have been encountering. Most of the birds we have received were covered with either very aged heavy oils or lubricating oils, neither of which can be readily emulsified by detergents.

(Please refer to Table 2 for a treatment and cleaning key.)

Following cleaning, good husbandry and rehabilitation is instituted. The plumage of water birds will deteriorate when kept out of water because of contamination, mechanical disruption and diminished care by the bird. Seabirds in the wild depend upon the impeccable condition of their plumage for protection from the cold air and water, and when kept in warm and dry surroundings, they neglect their plumage to some extent.

Table 2. Treatment and Cleaning Key

1. Clear the mouth and nostrils of oil. Go to 2.
2. Administer IV: 3 mg./kg. dexamethasone and 1.5 cc./kg. 50 % dextrose. Go to 3.
3. a. Oil is nearly solid and caked on. Go to 4.
b. Oil is fairly fluid or gooey. Go to 5.
4. Use a catheter to introduce 40 cc./kg. water into the proventriculus. Go to 6.
5. Clearing oil from digestive tract: Rapidly introduce 150 cc. water by catheter into the proventriculus. Follow in 15 minutes with 15 cc. mineral oil. Go to 8.
6. a. Bird is energetic and alert, its cloacal temperature is within 1° C. of normal and it shows no signs of hydrocarbon toxicosis.* Go to 14.
b. Bird is weak and hypothermic or shows some symptoms of toxicosis. Go to 7.
7. Feed and water for 2 days. Provide considerable warmth. Go to 6.
8. a. Oil is easily emulsified by detergents.** Go to 9.
b. Oil is *not* easily emulsified by detergents. Go to 10.
9. a. Oil is *not* completely nontoxic.† Go to 6.
b. Oil is *not* completely nontoxic. Go to 11.
10. a. Bird is showing severe symptoms of hydrocarbon toxicosis.* Go to 12.
b. Bird is showing mild symptoms of hydrocarbon toxicosis. Go to 13.
c. Bird is showing minimal/no symptoms of hydrocarbon toxicosis. Go to 14.
11. a. Bird is showing severe symptoms of hydrocarbon toxicosis.* Go to 12.
b. Bird is showing some symptoms of hydrocarbon toxicosis. Go to 15.
c. Bird is showing no symptoms of hydrocarbon toxicosis. Go to 14 or 15.
12. Euthanize.‡
13. Clean in warm mineral oil. Go to 6.
14. Clean in warm solvent.
15. Clean in warm detergent solution.

* Symptoms of hydrocarbon toxicosis include anorexia, inability to digest foods, asthenia, ataxia, opisthotonos, blood in stool, convulsions. In wild birds, anorexia is often a result of stress and not of toxicosis.

** To determine: Mix 0.1 cc. of oil with 100 cc. 3% detergent solution.

† Only mineral oil (white oil) and most vegetable oils are nontoxic.

‡ The decision to euthanize might also be dependent upon the scarcity of a particular species or the estimated recuperative capabilities of individual birds.

Putting a weakened bird immediately into a harsh environment is not the answer, because exposure adds to the bird's state of

exhaustion and stress. Intermediate steps are needed such as lightly spraying the bird occasionally or placing it into a pool that is somewhat protected from the weather and from which the bird can easily leave. In practice, a properly cleaned bird may be put into a protected artificial pool 8 hours after cleaning and then may be put into an unprotected environment (with plenty of food) within two or three days. One observation is that many aquatic birds refuse to remain in the water of a small pool (1.2 meters square) but will more willingly remain in the water of a larger pool (2 m. x 3 m.). Pools must have constant surface overflow, since bird droppings contain large amounts of fish oils which in still water will form a surface film and will re-oil birds' feathers.

Many questions still remain. Is there a cleaning method that will allow immediate release? What are the species' specific dietary requirements? What specific drugs and antibacterials, if any, would be more effective, and at what levels should they be administered? Are released birds able to survive and breed?

Great progress has been made in the care and treatment of oil-soaked birds as of this writing. Whereas three to four years ago, a 2 per cent survival rate was good, present methods now are producing a 50 per cent return to the wild. Since birds are excellent biologic monitors of the oceans and shore areas, these efforts are worthwhile.

Recently a number of excellent publications have been printed on this subject and are listed below for supplementary reading.

SUPPLEMENTARY READING

- Clark, R. B., and Kennedy, J. R.: Rehabilitation of Oiled Sea Birds. Newcastle-upon-Tyne, England, University of Newcastle-upon-Tyne, 1968.
- Naviaux, J. L.: After Care of Oil Covered Birds. Pleasant Hill, California, National Wildlife Health Foundation, 1972.
- Recommended Treatment of Oiled Sea Birds. Newcastle-upon-Tyne, England, Department of Zoology, University of Newcastle-upon-Tyne, 1972.
- Stanton, P. B.: Operation Rescue. Washington, D.C., The American Petroleum Institute, 1972.