Treating Thermal Burns in Birds

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Introduction

Due to anatomical differences in the thickness and consistency of bird skin, the diagnosis of burns and the depth of burns in birds is complicated. Feathers covering most of the skin also hamper the diagnosis of the extent of burns. Burns, particularly to bird feet appear to take a longer time to heal in comparison to mammalian skin. Methods to diagnose the depth of the burn are discussed. Treatment of burns in birds is also described.

Causes of Burns

Often the cause of the burn is observed by the owner. Free-flying pet birds are at greater risk from accidents in the kitchen. Burning oil in a saucepan, boiling water in pots and hot water in sinks are all potential causes of burns.

For wild birds, electrocution appears to be the most common cause of burns. Thermal burns from bushfires are not commonly seen. Birds are either able to fly away from the fire, or succumb to acute smoke inhalation and thus do not enter into the wildlife rehabilitation system.

The Function of Skin

It is important to remember the role of skin – from this we can appreciate what happens when it is damaged or lost. Skin is the largest organ in the body. It is responsible for keeping fluid in the body. It acts as a barrier to invasion by external organisms – such as bacteria and fungi. It provides a surface that allows us to feel our environment, without being damaged by it. The body is continually replacing the skin – it takes 12 weeks to grow from the deepest level to being shed as dead cells.

Without skin, fluid and electrolytes are lost from the body. The body requires more energy and protein to replace the skin, so metabolic requirements increase two to three times above maintenance. Without the protective barrier, the body is susceptible to infection. Movement becomes painful and further loss of blood and tissues is likely as the underlying tissues are unable to cope with trauma.

Bird skin is different to mammalian skin. The skin is thinner and there is a lack of subcutaneous tissue. The skin has less collagen present than in mammalian skin. Birds have scales on their feet reminiscent of reptile scales. This presents a protected and thicker epithelium. Bird skin also has feather follicles. The skin acts as the part of the aerofoil for flight by supporting the feathers, and providing a streamlined body shape.

The skin repairs over time by progressing through different stages:

1. Inflammatory (debridement phase) which begins immediately and lasts 5 days. Necrotic tissue and infection are removed.
2. Proliferative (grandulation phase) from one to two weeks. Granulation tissue covers the defect and provides a framework of fibroblasts and capillaries over which the skin cells grow
3. Remodelling (skin regrows) which takes from 7 – 28 days, dependent upon the size of the wound.

Classification and Diagnosis of Burns

There are a few things to consider when assessing burns:

- Depth,
- Extent, and
- Location

of the burn

Depth of the burn
This was described as first, second and third degree burns. However, the terminology below is descriptive and easily understood.

1. **Superficial burns**: involves the outermost layer of the skin. This is very painful. The skin is red, but blisters are not seen. Bird skin does not blister as prominently as mammalian skin as it lacks collagen and so superficial burns are easily under-diagnosed. This was a first degree burn. The best example is of this burn is when you burn yourself on a hotplate.

2. **Partial thickness burns**: involve the deeper levels of the skin. It is painful and was known as second degree burns. There are two levels of partial thickness burns:

   Superficial partial thickness: The skin begins to blister but will heal within 2 weeks without scarring.
   Deep partial thickness: The skin is blotchy with red or white areas. Blisters may be present. Nerves have been destroyed as so it is not painful.

3. **Full thickness burn**: destroys the full depth of skin, up to and including tissues below. This will take at least 2 – 4 weeks to heal – dependent on the size of the burn. Escharotomy which involves cutting away the dead skin and suturing fresh edges together may be required for areas with full thickness burns.

Extent of the Burns
The amount of skin that has been burned needs to be considered. As vets, we are unable to induce month-long comas or do extensive skin grafting. Wild birds for rehabilitation must also be able to fly. The welfare of the animal must remain our prime concern. So an assessment of the severity of the burns is needed.

- Burns to less than 15% of the body have a reasonable prognosis
- Burns to 15 – 50 % of the body have a poor prognosis
- Burns to over 50% of the body have no prognosis and prompt euthanasia is required.

Location of the Burns

Some locations of burns may impact on the long-term comfort of the animal.
Damage near joints can lead to car tissue restricting the movement of limbs or digits.
Nail bed damage is common and loss of nails is a common outcome of burns to feet.
Burns may be hidden by feathers and the true extent of the burn is not appreciated until the feathers are removed or slough.
Birds often have burns on their feet and legs as a consequence of landing in hot liquid. The hock often suffers a full-thickness burn as the bird contacts this area on landing and take-off – which may travel up the tibiotarsus due to the 'splash' effect of the liquid. Most toes will suffer only a partial thickness burn. The last digit and nail may also be lost on some toes.

Diagnosis of the depth of burns

It can be difficult to assess the depth of the burn on appearance initially. As the necrotic skin dies over the first 3 – 10 days, the depth of the burn becomes more apparent.
One tool to assess depth is done at the initial cleaning and assessment. When the burned skin is bathed for the first time, necrotic skin becomes pale. Normal skin with intact blood supply will keep its colour. Skin that has lifted off from its blood supply becomes pale when immersed in water.
Another tool that can be used to assess the severity of the wound is to needle prick the area. This is particularly useful on digits. Superficial and partial thickness burns will bleed. Full thickness burns have destroyed the blood supply to the area, and thus the wound will not bleed when pricked by a needle. As this is painful to perform, the bird should be anaesthesised for this procedure.
Assessment of pain could also be used to assess depth. However, pain assessment in animals is subjective at best, and it is also important to consider that around every non-painful full thickness burn is an area of partial thickness burn.

Treatment of burns

Many burns can be treated successfully but the owner needs to understand that the treatment will take from one to two months, and require regular rechecks, anaesthetics and bandage changes. Skimping on bandage changes will only prolong the time that it takes to heal the burn and thus represents false economy.

Initial treatment must also encompass first aid. Behind every burn is a patient that also needs to be treated!

Initial Assessment

This should include:

- **Hydration status**: look for skin tenting, collect blood to check for elevated PCV/TPP.
- **Demeanour:** quiet, anxious, avoiding normal interaction
- **Breathing**: check for depth, frequency in view of looking for possible smoke inhalation.
- **Weigh** the animal to monitor for ongoing fluid loss.
- **Examine** the entire animal. Lift or wet feathers to check for further burns. Check for burns around the nose and inside the mouth.

Supportive care

Burns require 2 – 3 times the metabolic requirement for maintenance. There is an increased requirement for protein for exudates and for the formation of skin.
Some of these patients will have decreased mobility and thus getting to the food provided may be difficult. Crop-feeding or force-feeding, particularly in the first few weeks to meet the increased requirement and reduced mobility is suggested to ensure that metabolic requirements are met.

As there are increased losses of fluids due to skin defects, this should also be addressed by subcutaneous, intraosseous or oral fluids.

Medication
It is suggested to swab burns for pathogens, particularly those that have been exposed for longer than 24 hours, and base antibiotic selection on the results. However, a broad-spectrum antibiotics, such as Amoxicillin with clavulanic acid, that have action against likely skin and environmental pathogens can also be started while waiting for results. Antibiotic cover is required during the debridement phase – and thus antibiotics may be given for 1 – 2 weeks.
Pain relief is essential for the welfare of the burnt bird. Non-steroidal antiinflammatories, eg: meloxicam or Carprofen, can be used for the first 1 – 2 weeks. In some cases, pain relief is required for longer – and if the medication is stopped, careful assessment of the bird is required, and pain relief reinstituted if limb holding, weight loss, inappetance, reluctance to move is observed. Most pet bird owners are familiar with the pet bird, and gain the ability to assess their bird's pain.

Treatment of the Burns
If the burn is observed by the owner calling for advice, then ask the owner to bathe the area in tepid running water for 10 minutes – ideally without getting too many feathers wet. The bird should be traveled in a covered, warm container to get to the vet clinic with absorptive toweling flooring. This immediate first aid will prevent the severity of the burn and the 'microwave' effect – where the burn spreads under the burnt skin.
This should be performed under anaesthesia. Partial thickness burns are very painful. Debridement of necrotic tissue is also painful. Wriggly, bitey birds slow the procedure time!

- It is appropriate to use **disposable gloves** when treating full-thickness burns to prevent the transfer of bacteria from your hands to the burn.
- Trim or plucked singed feathers so that the skin can be examined.
- Bathe burns in tepid 0.9% **saline** for 5 – 10 minutes. The longer time is necessary initially and can be reduced over time – but is performed each bandage change. Change the water when it becomes dirty.
- With sharp scissors, trim away any flaps of dead skin. The more aggressive you are initially, the quicker the debridement phases passes.
- Lightly dry the burns with **cotton gauze** or cotton toweling. Cotton wool balls leave strands of cotton on the wound and should not be used.
- For the first 3 – 5 days while the wounds debride, a **saline wet to dry bandage** is changed daily. Moisten cotton gauze with sterile saline. Then apply dry cotton gauze over the top and then wrap.
- After the initial debridement, apply **Silvazene** (Smith & Nephew) to the affected areas liberally. Cover all burnt surfaces. Application of Silvazene can cease when there is a complete covering of skin.
- Apply a layer of **Melonin** (Smith & Nephew) shiny side to the burn.
- **Paraffin gauze** (Jenolet, Smith & Nephew) can be used on bird's feet very successfully as it appears to keep the foot skin moist. However, it must be well-bandaged to prevent contamination of the feathers with paraffin.
- Wrap the feet so that the bird can perch normally. Self-adhesive, lightweight bandage material such as **Coplus, Vetrap** can be used.
- After 5 days, bandage changes can be performed every second day. Do not delay changes longer than two days as Silvazene is only active for 24 hours.
- **Acticoat 7** (Smith & Nephew), can be used after the first week for animals that require regular anaesthetics for bandage changes – this dressing stays moist and releases silver over a 7 day period. Apply sterile water (not saline) to the dressing prior to application.

Intrasite can be used to increase moisture under the dressing. Do not use Silvazene with Acticoat 7 as silver toxicity may occur.

References

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