



Ear pinnae of a lop rabbit show skin burns, phlebitis and necrosis after daily cleaning with chlorhexidine

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Rabbit skin is delicate and sensitive. It is easily irritated by external substances. It can result either from a hypersensitivity reaction to a foreign body, an acute reaction to a chemical agent, or a photoreaction to a systemic chemical.

Since the types of skin reactions can be difficult to differentiate, their location on the body is helpful in identifying the causes of the condition. Chemical agents harmful to rabbit skin include:

- Natural and acid/alkali chemical irritants

lead to the destruction of the skin's fatty protective layer, changes in the natural moisture balance, and transepidermal fluid loss. As a result, the skin is deprived of its natural protection and the irritant can penetrate deeper into the tissue with



Figure 1 : Gizmo, a small castrated lop rabbit living in an enclosed garden, which he shares with a Flemish Giant rabbit, 2 cats, 2 dogs and 4 hens. None of the other animals show any sign of skin lesion. Picture: Veronique Arnoldi

increased toxicity, causing further damage. Due to the release of cytokines by keratinocytes the skin typically becomes inflamed, edematous, and erythematous within minutes of contact. If the exposure leads to death of the epithelial cells, chemical burn and skin ulcers will develop.

- Urine. Urine scald dermatitis can relate to poor husbandry (e.g., infrequently cleaned cages or litter boxes, leading to urine soaked resting surfaces), obesity, or compromised health (Figure 2). The latter can result in the improper functioning of the urethral sphincter, which controls urine retention and voiding of the bladder, or in the inability to assume a correct stance for urination due to, e.g., fracture, congenital deformation, hip

dysplasia, or arthritis.

- Application of chemicals, such as undiluted disinfectants intended for use in humans (e.g., overly concentrated povidone-iodine, chlorhexidine or urea-containing solutions), that lead to immediate chemical burning in rabbit skin (toxidermia/toxicoderma);
- Chemical agents used in routine household tasks: solvents, liquid detergents and floor waxes, carpet cleaners, plant fertilizers.
- Physical irritants, including:
 - Friction. It leads to unnatural and rapid abrasion of the fur that covers the soles;
 - Moisture/Humidity. Certain conditions such as dry air and wet/moist skin lead



Figure 2: Urine scald dermatitis accompanied by alopecia in a paralyzed rabbit. Picture: MediRabbit



Figure 3: Pine processionary caterpillars (*Thaumetopoea pityocampa*) release stinging, toxin containing hairs into the air, which can cause microtraumatic wounds to the skin and intense pruritus. Picture: MediRabbit

to deviation from the natural moisture balance in the skin, rendering the latter more sensitive to attacks by foreign bodies;

- Plant or insect hairs. Irritants causing dermatitis can be of plant or animal origin. Some plants possess irritating barbs or spicules; insects such as the processionary caterpillar (*Thaumetopoea* sp. or *Cnethocampa* sp.) release stinging, toxin containing hairs into the air, which can cause microtraumatic wounds to the skin and intense pruritus (Figure 3). The nose, eyes, eyelids, and ears are mainly affected.
- Agents photochimiques présents dans la peau entraînant des dermatites actiniques lors d'exposition au soleil. Dans ce cas, les paupières, le nez et les oreilles sont particulièrement affectées, mais cette condition peut aussi apparaître dans d'autres régions du corps de lapins avec un pelage clair ou blanc.

Photoactive chemicals can be of chemical origin (e.g., NSAID analgesics such as ketoprofen, antibiotics such as trimethoprim sulfa and tetracycline, or corticosteroids) or pigments present in plants, e.g., clover, alfalfa, rye grass, buckwheat, and St John's wort.

Secondary photo-sensitive dermatitis relates to liver failure and the inability to properly excrete the transformed photoactive chlorophyll molecule

phyloerythrin. It then accumulates in the blood circulation and leads to photosensitivity of the skin. Shelter from the sun and removal of all sources of UV light should bring immediate relief.

The response of the skin and the severity of the dermatitis induced by irritants depend on several factors:

- Frequency of exposure and recurrence;
- Duration of exposure;
- Concentration of the chemical; Pre-existing skin damage;
- Temperature;
- Moisture content of the skin.

Hypersensitivity to chlorhexidine

- Chlorhexidine is a biguanide molecule with broad-spectrum and long-lasting bactericidal and fungicidal properties. It is used to clean a skin wound, disinfect the skin before an injection or prior to catheterization.

It can also be used to disinfect skin before a surgical procedure. The use of

chlorhexidine should never be used during a surgery of the middle or the inner ear, or surgery exposing tissue of the nervous system, as it leads to deafness and toxicity, respectively. In rabbits, the use of povidone iodine to disinfect skin is, however, preferred.

Chlorhexidine is available in different forms, as 0.1%, 0.15% and 0.2% solutions and as a 1% cream or gel. Severe irritation or chemical burns have been reported to occur immediately after application of a product containing chlorhexidine, or after a few hours. The observed reactions include the formation of vesicles, burns, allergic contact dermatitis, which may be accompanied by dyspnea, and anaphylactoid/anaphylactic shock.

Experimental application of chlorhexidine on the skin up to 3 days showed no inflammation of the dermal tissue in rabbits. Little information is available on longer use on the skin in this animal. Prolonged contact with chlorhexidine or use on damaged skin should, however, be avoided to prevent adverse skin reaction and burns. Wiping off or rinsing the excess solution accumulated in skin fold with a sterile solution may be necessary, although it will shorten the antiseptic action of the disinfectant.

Clinical features

The skin becomes inflamed, swollen, and erythematous and began to fissure. Vesicular, pustular, or scaly eruptions; macules, papules, and/or blisters appear (Figure 4). In severe cases secondary



Figure 4: Blister formation after contact of the skin with a solution of chlorhexidine gluconate in two different rabbits: Grijsje, a 7 years old female, and Stampi, a 3 year old female. Top: skin immediately after contact with chlorhexidine. Bottom: after a week, with scalding of the skin. Pictures: MediRabbit

pyoderma is accompanied by lichenification and/or development of crusts and the affected area becomes alopecic. The

damage can spread to surrounding regions and cause phlebitis or necrosis of deeper tissues. Secondary bacterial or fungal



Figure 5: After a skin problem of the ear pinnae attributed to the presence of parasites, Gizmo's ears were treated daily with a diluted chlorhexidine solution (0.5%) during 3 weeks. The skin condition worsened and led to the burning of the epidermis with penetration into the dermis, phlebitis and necrosis of the central ear vein. Picture: Veroniaue Arnoldi

infections can develop in the affected skin. In that case, the use of an antibiotic may be indicated during the healing phase.

Contact dermatitis should be differentiated from parasitic infections (e.g., *Sarcoptes scabiei*, *Demodex* sp.), candidiasis, fungal dermatitis, cellulitis, secondary skin conditions associated with renal disease, and drug-related atopic dermatitis. When there is a doubt, a biopsy should be performed to confirm the diagnosis.

The case of Gizmo

Gizmo, a 5 months old castrated male lop rabbit, lives in a developing country where veterinary care is difficult. He developed a skin irritation on both his ears that was diagnosed as mange or scabies. No skin scraping, microscopic analysis and biopsy were done to confirm the diagnosis. Gizmo also never showed excessive scratching of the ears at that time. Animals living in the same household also did not show any signs of the presence of skin parasites.

It was recommended to clean the skin of the ears with a 0.5% chlorhexidine solution every day, accompanied by a weekly injection of ivermectin.

Cleaning of the ears with the chlorhexidine solution was done during 30 days. The skin on the ears became irritated, alopecic, accompanied by erosive dermatitis and superficial partial thickness burns. A rarely reported secondary effect was



Figure 6: Appearance of the skin of the right ear after discontinuing the daily chlorhexidine cleaning and applying a healing cream during a few days. Picture: Veronique Arnoldi

observed: phlebitis with ischemic necrosis was observed at the tip of the ear pinna. It

progressed along the central vein in the right ear, splitting it into 2 halves (Figure 5).

After a check-up visit, the chlorhexidine treatment was immediately discontinued and a cream promoting the healing of damaged skin has been applied on the skin (Figure 6, 7). While older cutaneous lesions healed, new wound continued to appear. During this phase, it is imperative to keep the rabbit in an environment free of flies and other parasitic insects.

The condition is painful. If the rabbit exhibits signs of pain, an analgesic can be administered.

The skin has started to heal slowly. Prognosis is good.

Acknowledgement

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Figure 6: Lesions of the right ear after a few weeks. They started to heal slowly after a week after the chlorhexidine treatment was stopped, but new ones continued to appear too. Picture: V. Arnoldi

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Figure 7: Lesions of the right ear after 2 months. Skin has almost healed and hair has grown back on the ear. Picture: V. Arnoldi

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