

Case Report Rapport de cas

Putative peanut allergy-induced urticaria in a dog

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Abstract — A 9-year-old, spayed male schnauzer dog was presented with vomiting, diarrhea, generalized erythema, pruritic urticaria and conjunctival hyperemia after ingestion of peanut. The history, clinical signs, and histopathology of the lesions were compatible with a hypersensitivity reaction. The clinical signs resolved rapidly after treatment with prednisolone and antihistamine. This is the first report of urticaria caused by peanut ingestion in a dog.

Résumé — **Urticaire putative induite par une allergie aux arachides chez un chien.** Un chien mâle Schnauzer stérilisé âgé de 9 ans est présenté avec des vomissements, de la diarrhée, un érythème généralisé, de l'urticaire pruritique et une hyperémie conjonctivale après l'ingestion d'arachides. L'anamnèse, les signes cliniques et l'histopathologie des lésions sont compatibles avec une réaction d'hypersensibilité. Les signes cliniques se sont résorbés rapidement après le traitement avec de la prednisolone et des antihistaminiques. Il s'agit du premier rapport d'urticaire causé par l'ingestion d'arachides chez un chien.

(Traduit par Isabelle Vallières)

Can Vet J 2012;53:1203–1206

Food allergy, especially peanut allergy, can occur as a fatal anaphylactic reaction in humans (1,2). Nausea, vomiting, urticaria, angioedema, progressive respiratory symptoms, hypotension, and dysrhythmias may develop within minutes to a few hours after ingestion of the food (3). Food allergy may cause various dermatologic and gastrointestinal signs in dogs but the incidence is not known. Food allergy was first described in dogs in 1967 (4), and subsequent studies have identified many food allergens (5,6). Beef, dairy products, lamb, fish, poultry, egg, wheat, barley, and other foods have been identified as common food allergens in dogs (5–10). In this report, we describe a dog with clinical signs of hypersensitivity accompanied by skin lesions, especially urticaria caused by ingestion of peanut.

Case description

A 9-year-old spayed male schnauzer dog was presented with acute onset of vomiting, diarrhea, and severe urticaria the same day it had ingested peanut. The amount of peanut ingested by the dog was unknown. There were no known exposures to environmental allergens, insect bites, or other food allergens. The referring veterinarians treated the dog with an anti-inflammatory dose of prednisolone and fluid for 2 d. Because there was no

response to the therapy and the urticaria worsened, the patient was referred to our hospital.

Upon presentation, the dog was normothermic, tachypneic (60 breaths/min), mildly dehydrated and had abdominal distension with pain. Systolic blood pressure was normal (138 mmHg, Cardell Model 9401; Sharn Veterinary, Tampa, Florida, USA). The abnormal skin lesions at presentation were generalized erythema, pruritic urticaria, and conjunctival hyperemia (Figure 1). Diascopy was performed by applying pressure with a glass slide and blanched erythema revealed vasodilation (Figure 2). A hemogram was normal and serum chemistry profiles showed mild azotemia (urea nitrogen, 12.1 mmol/L; reference range (RR): 2.9 to 3.3 mmol/L and creatinine, 176.8 mmol/L; RR: 44.2 to 114.9 mmol/L), and elevated alanine transaminase (74 U/L; RR: 19 to 70 U/L) and aspartate aminotransferase (63 U/L; RR: 15 to 43 U/L) activity. The dog had no recent vaccination or drug therapy. An 8-mm skin punch biopsy (KAI Sterile Dermal Biopsy Punch; Kai Industries Co., Seki City, Japan) was obtained on demarcated urticarial lesions at the right axillary area including adjacent normal skin. The biopsy sample was fixed in 10% neutral formalin, processed for paraffin embedding, and stained with hematoxylin and eosin (H&E) for histologic examination. Histology showed an edematous superficial dermis with wide spaces between collagen fibers. Dermal lesions consisted of diffuse superficial perivascular inflammation in the urticarial areas. Vessels in the dermis were mildly dilated and congested. Eosinophilic and mastocytic inflammation were diffusely present in the superficial dermis (Figure 3). Based on the history, skin lesions, and histological findings, the dog was diagnosed with peanut allergy induced urticaria. Prednisolone (Solondo, Yuhan Medica, Seoul, Korea), 1 mg/kg body weight (BW), PO, q12h, chlorpheniramine (Peniramin; Yuhan Medica, Seoul, Korea), 0.5 mg/kg BW, PO, q8h, and pentoxifylline (Trental; Handog Pharm, Seoul, Korea), 10 mg/kg BW, PO,

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Figure 1. Generalized raised erythematous lesions developed as an acute urticarial reaction associated with peanut allergy. Note the conjunctival hyperemia (A), well-demarcated erythematous lesions at the axillary area (B and D), and the inner thigh (C).



Figure 2. Diascopy was performed on a dog diagnosed as having peanut allergy. Blanching erythema was achieved by pressing with a glass slide.

q12h treatment was initiated for 1 wk then tapered. The dog was reevaluated weekly for 1 mo after presentation during which the lesions had completely resolved without side effects and recurrence (Figure 4). Treatment was discontinued and the dog was assessed monthly for 2 more months; there was no evidence of recurrence.

Cutaneous adverse food reaction involving urticaria is uncommon in dogs and is extremely rare in cats. The reaction is a cutaneous hypersensitivity reaction that is manifested as an edematous skin disease (8–11). In humans, life-threatening anaphylactic reactions due to peanut and other nut allergies are well-known (3,12); however, there have been no clinical reports describing cutaneous adverse food reaction related to nut allergies in dogs and cats. Extracts of peanut, walnut, and Brazil nut have been tested for allergenic response in dogs as a canine model of food allergy (13). The dogs were sensitized

subcutaneously with the allergens in alum and intradermal skin test, IgE immunoblotting to nut proteins, and oral challenges with the nuts were performed. The authors demonstrated that nut extracts elicited clinical responses in dogs that were similar to those in humans and that the peanut extract was more allergenic than the other nut extracts (13). Peanuts (*Arachis hypogaea*) belong to the legume family and 2S albumins, vicilins, and legumins seed storage proteins are major allergens (1,13). Specific IgE antibody produced in response to the allergen results in degranulation of mast cells and release of histamine, which is thought to be the major mediator of anaphylaxis (14). Late-phase response to IgE-mediated mast cell degranulation and type III hypersensitivity response to immune complexes also contribute to cutaneous adverse food reaction (15). This may be the cause of the eosinophilic infiltration and chronic inflammation in cutaneous adverse food reaction (1).

In this case, the dog showed immediate hypersensitivity reaction after ingestion of peanut. Diascopy performed to determine whether the lesions were hemorrhagic or inflammatory showed that there was vasodilation. Histopathological results were not specific for urticaria with peanut hypersensitivity, and due to ethical considerations a challenge was not conducted. However, other diagnoses such as folliculitis, vasculitis, erythema multiforme, and mast cell tumors were ruled out. Moreover, the history and clinical symptoms also support the diagnosis of peanut allergy in this dog. Management of this dog consisted of glucocorticoids and antihistamines. Dramatic improvements were achieved within a week and no recurrence was noted during a 3-month follow-up period.

In conclusion, this is the first report of naturally occurring urticaria in a dog caused by peanut ingestion. A diagnostic

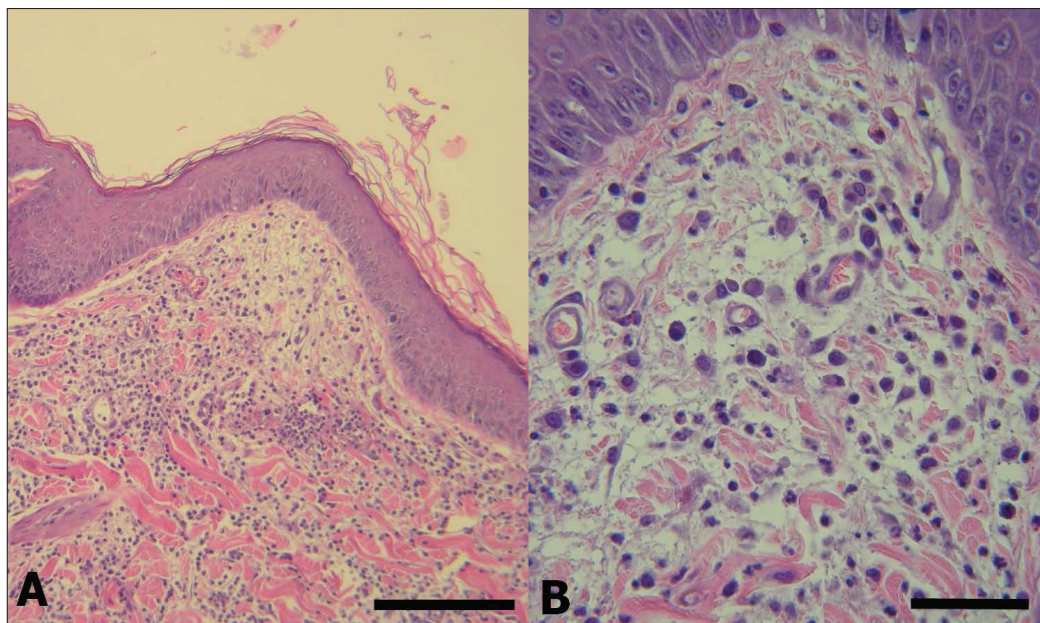


Figure 3. Skin biopsy from an acute urticarial lesion in a dog with peanut allergy. A – Note the edematous superficial dermis and interstitial dermatitis with mononuclear cells, neutrophils, eosinophils, and mast cells [hematoxylin and eosin (H&E) stain; bar = 200 μ m]. B – High power magnification of A (H&E stain; bar = 50 μ m).

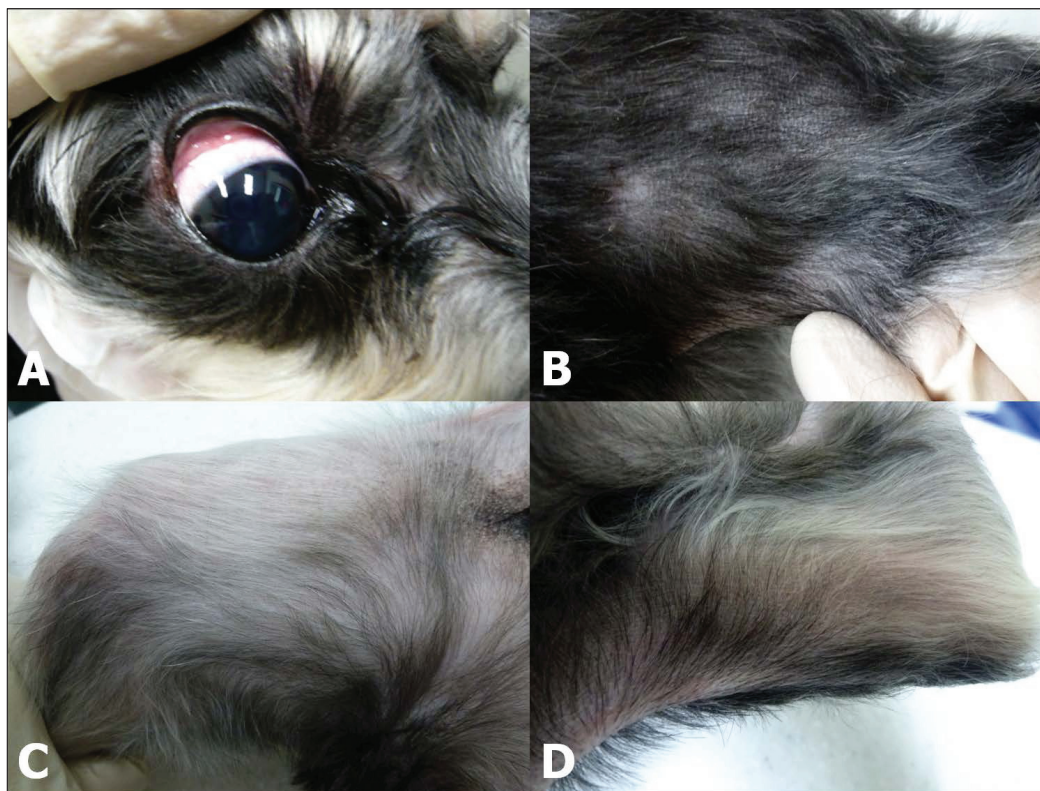


Figure 4. Four weeks after therapy with prednisolone and chlorpheniramine, the dog's gross lesions (A – conjunctiva, B and D – axillary area, and C – inner thigh) had completely resolved.

and therapeutic approach to this dog was described. The dog responded well to the immunosuppressive and antihistamine treatments; prevention by exposure avoidance is the first line of management in peanut allergy.

Acknowledgment

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MEST) (No. 2010018275).

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References

1. du Plessis K, Steinman H. Practical aspects of adverse reactions to peanut. *Curr Allergy & Clin Immunol* 2004;17:10–14.
2. Johnson RF, Peebles RS, Jr. Anaphylactic shock: Pathophysiology, recognition and treatment. *Semin Respir Crit Care Med* 2004;25:695–703.
3. Sampson HA. Peanut allergy. *N Engl J Med* 2002;346:1294–1299.
4. Walton GS. Skin responses in the dog and cat to ingested allergens. Observations on one hundred confirmed cases. *Vet Rec* 1967;81:709–713.
5. Jeffers JG, Meyer EK, Sosis EJ. Responses of dogs with food allergies to single-ingredient dietary provocation. *J Am Vet Med Assoc* 1996;209:608–611.
6. Paterson S. Food hypersensitivity in 20 dogs with skin and gastrointestinal signs. *J Small Anim Pract* 1995;36:529–534.
7. Verlinden A, Hesta M, Millet S, Janssens GP. Food allergy in dogs and cats: A review. *Crit Rev in Food Sci Nutr* 2006;46:259–273.
8. Kennis RA. Food allergies: Update of pathogenesis, diagnoses, and management. *Vet Clin Small Anim* 2006;36:175–184.
9. Gaschen FP, Merchant SR. Adverse food reactions in dogs and cats. *Vet Clin Small Anim* 2011;41:361–379.
10. Martín A, Sierra MP, González JL, Arévalo MA. Identification of allergens responsible for canine cutaneous adverse food reactions to lamb, beef and cow's milk. *Vet Dermatol* 2004;15:349–356.
11. Medleau L, Hnilica KA. Hypersensitivity disorders. In: *Small Animal Dermatology: A Color Atlas and Therapeutic Guide*, 2nd ed. Philadelphia, Pennsylvania: WB Saunders, 2006:160–161.
12. Leung DY, Sampson HA, Yunginger JW, et al. Effect of anti-IgE therapy in patients with peanut allergy. *N Engl J Med* 2003;348:986–993.
13. Teuber SS, Del Val G, Morigasaki S, et al. The atopic dog as a model of peanut and tree nut food allergy. *J Allergy Clin Immunol* 2002;110:921–927.
14. Untersmayr E, Jensen-Jarolim E. Mechanisms of type I food allergy. *Pharmacol Ther* 2006;112:787–798.
15. Day MJ. The canine model of dietary hypersensitivity. *Proc Nutr Soc* 2005;64:458–464.

Answers to Quiz Corner Les réponses du test éclair

1. d) Epidural anesthetics should not be used when there is trauma, bleeding, or infection at the injection site.
d) Les anesthésiques épiduraux ne devraient pas être utilisés en présence de traumatisme, d'hémorragie ou d'infection au site d'injection.
2. c) Immature forms include band cells.
c) Les formes immatures comprennent les neutrophiles non segmentés.
3. a) Omentum adheres to the intestinal incision rapidly, creating a fluid-tight seal.
a) L'omentum adhère rapidement à l'incision intestinale, créant ainsi un bouchon étanche contre les fuites.
4. a) The degree of callus formation is inversely related to the stability of a fracture.
a) Le degré de formation du cal osseux est inversement relié à la stabilité de la fracture.
5. a) This tumor secretes erythropoietin.
a) Cette tumeur sécrète de l'érythropoïétine.
6. b) *Clostridium piliforme* (formerly *Bacillus piliformis*) causes Tyzzer's disease.
b) *Clostridium piliforme* (anciennement *Bacillus piliformis*) cause la maladie de Tyzzer.
7. a) Hypovitaminosis A causes increased cerebrospinal fluid pressure accompanied by papillary edema and at times central nervous system signs.
a) L'hypovitaminose A cause une augmentation de la pression du liquide cérébrospinal accompagnée de l'œdème papillaire et, parfois, de signes du système nerveux central.
8. a) The unilateral and developmental nature of this lesion makes lymphosarcoma the most likely possibility.
a) La nature unilatérale et l'évolution de cette lésion indiquent que le lymphosarcome constitue la possibilité la plus probable.
9. a) Given the history and the signs, this is the most likely diagnosis. Scrotal swelling is not marked in all stallions with acquired inguinal or scrotal hernia.
a) D'après l'anamnèse et les signes, la hernie inguinale est le diagnostic le plus probable. L'enflure scrotale n'est pas marquée chez tous les étalons qui souffrent d'une hernie inguinale ou d'une hernie scrotale.
10. a) Inguinal herniorrhaphy is indicated to correct the problem and to prevent recurrence. Resection and anastomosis of small intestine may also be necessary.
a) La herniorraphie inguinale est indiquée pour corriger le problème et empêcher une rechute. La résection et l'anastomose d'une partie du petit intestin peuvent aussi être nécessaires.