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Veterinary Dermatology

ORIGINAL ARTICLE

The safety of rush immunotherapy in the management of canine atopic dermatitis—230 cases

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Abstract

Background: The duration of the induction phase of allergen-specific immunotherapy conventionally is a period of several weeks, during which the volume of an allergen solution, administered by injection, is gradually increased until the maintenance dose is reached. In rush immunotherapy (RIT), the induction period is abbreviated to achieve a faster improvement in clinical signs of atopic dermatitis (AD) compared to conventional immunotherapy.
Objective: The aim of this retrospective study was to evaluate the safety of RIT in 230 dogs with AD and report any adverse effects (AE).
Animals: Two hundred thirty client-owned dogs.
Materials and Methods: Medical records of dogs receiving RIT between 2012 and 2021 were analysed and observed AE were investigated. All dogs underwent RIT following a protocol of subcutaneous allergen extract injections, given hourly with an incrementally increasing volume from 0.1 to 1.0 mL.
Results: Adverse effects were documented in 6 of 230 (2.6%) dogs. Five of these dogs (2.2%) showed mild gastrointestinal signs (1 of 5 vomiting, 4 of 5 diarrhoea) and one patient an increase in body temperature by 1.5°C. These occurred at different stages of the RIT protocol. All AE were graded as mild and self-limiting.
Conclusions and Clinical Relevance: Based on these data, supervised RIT in dogs appears to be a safe procedure to achieve the maintenance dose of allergen immunotherapy earlier with infrequent and mild AE.

KEYWORDS
allergy, canine, dog, immunotherapy

INTRODUCTION

Canine atopic dermatitis (cAD) is a multifactorial allergic skin disease, characterised by pruritus and a typical clinical presentation.[1] Currently the only therapy for cAD, which specifically modifies the immunopathogenesis is allergen (-specific) immunotherapy (AIT).[2] The goal of AIT is to downregulate the hypersensitivity response in allergic patients. Based on our current knowledge, treatment with AIT is characterised by a shift from a T-helper 2 cell (Th2) biased response to a more balanced immunological milieu with an increase of regulatory T cells and, consequently, interleukin (IL)-10. Additionally, a rise in both total and allergen-specific immunoglobulin (Ig)G and a decrease of allergen-specific IgE is measured.[3] These findings are similar to those found in humans.[3] Successful immunotherapy should lead to a long-term improvement of clinical signs and a reduction in pruritus and skin inflammation.

In veterinary medicine, AIT has been used in dogs, cats and horses for the management of atopic dermatitis (AD), atopic asthma and urticaria.[3]

Allergen immunotherapy consists of an induction period followed by maintenance therapy. During the induction, allergens are administered in increasing amounts at intervals over a defined period of time, depending on the recommendations of the manufacturer of the allergen extract. Typically for subcutaneous AIT, the induction period extends from 6 to 12 weeks.[4] Thereafter, maintenance therapy is commenced, whereby a fixed

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dose of allergen in solution is injected at regular intervals. However, the dose and frequency of maintenance therapy generally is adapted to the individual patient dependent on the clinical response and adverse effects (AE).

The efficacy and safety of conventional subcutaneous AIT in atopic dogs has been demonstrated in a number of studies.[3–5] Less information is available on rush, sublingual and intralymphatic immunotherapies.[6–12] A recent study showed a low risk of AE using a protocol with a shortened induction phase for subcutaneous AIT of approximately four weeks.[13]

With rush immunotherapy (RIT), the maintenance dose is reached within one or few days.[14–16] The aim of this rush protocol is to induce a rapid immune response, and consequently a more rapid improvement of the clinical signs of cAD. Additionally this is easier and less confusing for the owner as the maintenance dose is administered at regular time intervals. This rush protocol has been evaluated with aqueous[6,16] and alum-precipitated allergens.[15]

The aim of this study was to retrospectively evaluate adverse effects of RIT using alum-precipitated allergens in a larger number of patients.

MATERIALS AND METHODS

Study design and study objects

This was a retrospective study of 230 dogs receiving RIT at the Centre for Clinical Veterinary Medicine, LMU Munich between 2012 and 2021. All dogs were client-owned. Owing to the retrospective nature of the study, an approval by the Ethics Committee of our institution was not required. The diagnostic work-up for all patients included ruling out differential diagnoses such as ectoparasites, infections or other pruritic skin diseases as appropriate and described elsewhere.[17,18] Once the allergic aetiology was confirmed, flea allergy was ruled out by appropriate insect control, and food allergy by an elimination diet over a period of 8–10 weeks, followed by a provocation with the dogs' previous food if clinical signs improved during the diet. When food allergy was ruled out or the food trial did not lead to complete clinical remission, inciting allergens were further investigated by intradermal and/or serum testing for allergen-specific IgE, if the owner opted for treatment with immunotherapy. Subsequently, individual relevant allergens were included in the allergen extract used for immunotherapy based on the history and test results of each patient.

Rush immunotherapy

On the day of the RIT, the dogs were either hospitalised for the day, or the owner stayed with the dog on the clinic's premises for the entire duration of the RIT and monitored the dog for possible AE. When hospitalised, the dogs were housed and constantly monitored in the intensive care unit. In every patient, an intravenous catheter was placed before the first injection and removed again one hour after the last injection. An emergency medication kit was ready to use in case of an anaphylaxis. Before each new injection of allergen extract, dogs underwent a complete physical examination; respiratory rate, heart rate, capillary refill time and body temperature were measured, and any abnormalities noted. These were recorded in an individual spreadsheet for each patient.

Allergen extracts used for RIT were alum-precipitated. One bottle of allergen extract contained a maximum of four individual allergens. Concentrations of the different allergens are listed in Table 1. For the majority of patients the allergen extract contained four allergens.

For the RIT, dogs initially received 0.1 mL of the allergen solution administered subcutaneously. After one hour and a full clinical examination without abnormal findings, 0.2 mL of the extract were given subcutaneously, after another hour 0.4 mL, then 0.8 mL and finally 1 mL. Subcutaneous injections were administered randomly to the dorsal interscapular or lateral lumbar area; no specific protocol was followed for choosing injection sites. At one hour after the last injection, dogs were sent home on maintenance therapy, initially on 0.8 mL every three weeks, which was later changed to 1 mL every four weeks during the time period under investigation. The final dose and frequency of extract injections for maintenance therapy were further adapted to each individual patient as described previously.[4]

Data collection

Medical records of all 230 dogs receiving RIT at the Centre for Clinical Veterinary Medicine, LMU Munich between 2012 and 2021 were analysed, and AE documented in the electronical files were recorded.

TABLE 1 Allergen concentrations per vial.

Concentration per pollen extract/allergen	1000 NU[a]/mL
Concentration per epithelium extract/allergen	100 µg/mL
Except for sheep epithelium	10 µg/mL
Concentration per yeast extract/mould extract/allergen	100 µg/mL
Concentration per mite extract/insect extract/allergen	100 NU/mL
Except for *Aedis*, flea, *Culex tabanus culicoides*	1000 NU/mL
Except for housefly	10 NU/mL

[a]NU, noon unit, defined as follows: the amount of allergen extract obtained from 1 g raw material is by definition equivalent to 10^6 NU.

RESULTS

Study participants

Two hundred thirty dogs underwent RIT during 2012–2021. Of those, 88 (38%) were male intact, 40 (17%) male neutered, 61 (27%) female intact and 41(18%) female neutered. The male: female ratio was 1.25, implying that male individuals were slightly over-represented. No comparison with the hospital population was carried out.

The weight of the dogs ranged from 3 to 69 kg, with a median weight of 22 kg. At the time of the RIT, the patients were between 1 and 12 years old (median age four years). The most frequent breeds were French bulldog (26 of 230, 11%), Labrador retriever (24 of 230, 10%), Golden retriever (14 of 230, 6%) and German shepherd dog (13 of 230) (6%). All breeds are listed in Table S1.

Adverse effects

Only 6 of 230 (2.6%) dogs showed AE. Five of these dogs (2.2%) showed mild gastrointestinal signs: 1 of 5 had an episode of vomiting after the last injection of the RIT, while 4 of 5 dogs developed diarrhoea. Three of the four dogs with diarrhoea had one episode each; it was not documented which injection resulted in the single episode of diarrhoea in these patients. One of the four dogs had several episodes of diarrhoea. In all of these patients, RIT was continued as per protocol. Three of those dogs with diarrhoea, including the dog with several episodes of diarrhoea, were known to develop gastrointestinal upset in stressful situations. There were no recordings in the patients' files of further AE following the injections of maintenance therapy conducted at the hospital. There was no information available for injections conducted by the referring or local veterinarian.

In one other patient, there was an increase in body temperature by 1.5°C, from 38.2°C to 39.7°C. Consequently, it was decided to discontinue RIT after the third injection (0.4 mL). The temperature had normalised again one hour later to 38.7°C, and the dog was sent home with no further induction injections. Subsequently in this dog, maintenance immunotherapy was commenced four weeks after the RIT at a dose of 1 mL every four weeks following the conventional protocol, with no further complications.

Three of the six dogs developing AE were Labrador retrievers, the other breeds were a Yorkshire terrier, a miniature bull terrier and a Hovawart mix.

The dogs developing AE underwent RIT in the years 2012, 2014, 2016 (2/6), 2018 and 2020. The two dogs from 2016 were related and lived in the same household and also underwent RIT simultaneously on the same day.

The composition of the allergen extracts of the dogs developing AE is listed in Table 2. The solution for 4 of 6 patients contained four allergens, the two others contained three allergens. Five of six extracts contained *Dermatophagoides farinae* (DF), 3 of 6 *Tyrophagus putrescentiae* (TP). One of six extracts contained *Malassezia*, 1 of 6 *Aspergillus fumigatus* and 1 of 6 Mosquito; the other allergens of the extracts were composed of different grass and weed allergens.

In all dogs which had developed AE during RIT, maintenance immunotherapy was continued and none of the patients developed further AEs after immunotherapy injections.

DISCUSSION

In our study, we found AE in 6 of 230 patients (2.6%). The gastrointestinal tract is considered the primary shock organ of the dog, so that vomiting and diarrhoea have to be regarded as possible AE during immunotherapy.[19,20] Five of six dogs in our study showed mild gastrointestinal symptoms. It is unclear if these observed clinical signs truly reflect an immunological reaction caused by the RIT, or if they could have developed as a result of the stress experienced by the dogs associated with being at the veterinary hospital for the day and undergoing several examinations with subsequent subcutaneous injections. In a previous study administering subcutaneous RIT with alum-precipitated allergens, vomiting was reported as an AE in 1 of 20 patients,[15] similar to observations during our study.

One patient developed an increase in core body temperature. This could have been a true effect of immunotherapy or, alternatively, a consequence of stress. For this particular dog, there is no further information permitting a differentiation of those two reasons. An increase in body temperature was not detected in this patient during other visits to the hospital, yet measurement usually occurs at the beginning of the consultation and is not repeated in patients with a normal body temperature. This has not been observed in any other patient of the clinic, nor was it reported in other published studies to the best of the authors' knowledge.

In people, the primary shock organs are considered to be the lungs and the heart,[21,22] a fact that explains the need for thorough surveillance and close monitoring of patients undergoing RIT as treatment for allergic disease. In cats, the respiratory tract predominates as primary shock organ.[20,21] For that reason, we prefer not to conduct RIT in cats. Instead, at our clinic immunotherapy treatment for feline patients is conducted following the conventional protocol. Nevertheless, there are publications in the literature on successful RIT in single cases of feline atopic patients without occurrence of AE.[23,24]

One of the earliest reports describes the case of a dog receiving RIT in 1999.[25] Patterson gave daily injections over several weeks to the patient, his own dog, with increasing amounts of allergen extract administered subcutaneously until a maintenance phase was reached, which was defined according to clinical effectiveness. No AE were reported. In another study, 10 injections of increasing amounts of allergy extract were injected subcutaneously every 30 min to 10 dogs and no AE were reported.[9] In a sublingual RIT conducted

TABLE 2 Patients developing adverse effects during rush immunotherapy.

	Miniature bull terrier	Yorkshire terrier	Labrador retriever 1	Labrador retriever 2	Labrador retriever 3	Hovawart mix
Age at time of RIT (years)	4	6	2	8	9	8
Weight (kg)	14	5	23	27	31	25
Month of RIT	March	January	November	November	November	January
Year of RIT	2012	2014	2016	2016	2018	2020
Adverse effect	Vomiting	Diarrhoea	Diarrhoea/>1	Diarrhoea	Increase in body temperature	Diarrhoea
Allergens included	Oak (*Quercus* spp.) DF TP	Mosquito Orchard grass (*Dactylis glomerata*) DF English plantain (*Plantago lanceolata*)	Hazel (*Corylus avellana*) Kentucky bluegrass (*Poa pratensis*) Bermuda grass (*Cynodon dactylon*) Velvet grass (*Holcus lanatus*)	Orchard grass (*Dactylis glomerata*) Meadow foxtail (*Alopecurus pratensis*) DF TP	Aspergillus (*A. fumigatus*) DF TP	Meadow foxtail (*Alopecurus pratensis*) Upright pellitory (*Parietara officinalis*) DF *Malassezia*

Abbreviations: DF, *Dermatophagoides farinae*; TP, *Tyrophagus putrescentiae*.

in 20 dogs, 11 doses—at least 60 min apart—were given over a period of 26 h.[8] Mild pruritus was seen in 10 of 20 (50%) and vomiting in 2 of 20 (10%) dogs.[8] In another study, severe pruritus also was noted in 7 of 30 (23%) dogs, and generalised wheals and swollen eyelids in one patient, when administering most injections during intradermal RIT .[16] As a result of the severe pruritus, RIT was discontinued in the affected patients. When changing to an exclusive subcutaneous administration protocol, the same authors later published several studies where severe pruritus was not noticed in any of the animals.[6,15] Intradermal immunotherapy was performed in cats with an Actinomycetales extract for treatment of feline atopic skin syndrome. In this study, 17 cats received five intradermal injections over a period of one year, intradermal injections were described as well-tolerated and no AE were reported for any of those cats.[26] In humans, there is only one report on intradermal injections for immunotherapy to the best of the authors' knowledge.[27] Injections were administered twice weekly for the first three weeks, and thereafter the frequency was reduced following a protocol. The study reported immediate wheal-type reactions at the injection site in 74% of the patients ($n = 25$), while pruritus only increased occasionally within 24 h. It remains speculative whether or not there might have been higher rates of pruritus with repeated injections every 30–60 min, as carried out in the canine patients.[27]

In human medicine, protocols often recommend premedication with antihistamines, glucocorticoids or leukotriene mediators before RIT.[28] However, based on the results in the present study, 224 of 230 dogs would have been unnecessarily medicated. Furthermore, all reported AE in this as well as in previous studies were mild, self-limiting or responded fast to antihistamines when administered after occurrence of AE, and consequently it seems a reasonable alternative to treat AE of RIT in dogs as they occur. Nevertheless, owing to the possible risk (in a worst case scenario) of a life-threatening anaphylactic shock, all patients always should be tightly monitored, with an intravenous catheter in situ, to allow immediate and adequate intravenous access in case a severe AE should arise. Staff monitoring the procedure need to be carefully and thoroughly instructed about recognising early signs of an anaphylaxis and emergency medication sets should be ready for use when conducting RIT. The authors regard a qualified and well-instructed team as an essential component for safe conduction of RIT in canine patients.

Adverse effects to subcutaneously applied injections during immunotherapy in human medicine are in general classified as either local or systemic reactions.[29] Local reactions would show clinically as erythema, swelling or pruritus at the injection site, while systemic reactions could range from mild, such as lethargy or pruritus, to very severe, life-threatening anaphylaxis, clinically manifesting with, for example hypotension or airway constriction. A unified grading system for these reactions was proposed by Cox et al.[29] Following this human grading system, all veterinary-reported AE observed in context with RIT

can be graded as mild systemic reactions. Evaluation of local reaction is limited in veterinary patients, possibly as a consequence of the dense haircoat. Consequently, those may not be recognised easily. A similar grading system as used in human medicine, adapted to species of interest in veterinary medicine, could be useful, both for clinical practice and scientific research, to standardise classification of the severity and treatment of AE.

A possible, controversial, increased risk factor for AE in human immunotherapy is conducting the RIT at the time of the year with highest activity of pollen, contained in the allergen extract used.[30] This did not seem to be an issue in the patients developing AE in the current study, as RIT was conducted in five of those six dogs during late autumn or winter months in central Europe, when no pollination occurs (Table 2). Furthermore, in 2 of 6 dogs with AE the allergen extract did not contain any pollen allergens. However, we cannot be sure if the AE might have been even more severe if RIT had been conducted during pollination season.

The publications in the veterinary literature on RIT in animals use a variety of protocols. Different routes of administration (sublingual[8] vs. intradermal[16] vs. subcutaneous[6,9,15]), numbers of injections administered, volume of allergen solution and time intervals between injections make direct comparisons difficult.

In human medicine, these variations in rush- and ultra-rush IT protocols, used mainly for venom immunotherapy, also are present, and numerous adaptations and variations have been tested over the last two decades.[31,32] By adapting protocols, the safety of RIT in human medicine has improved.[28,33] In a recent retrospective study presenting such a modified RIT protocol for the treatment of seasonal and perennial aeroallergies, the total rate of AE during RIT in 362 patients was as low as 4.7 and no fatality was reported.[28] This cited modified protocol presents a novel one day, eight-step outpatient modified environmental RIT (MERIT) protocol with use of a systemic premedication regimen. The MERIT protocol consists of a 1-day rush protocol, followed by gradual build-up to the full maintenance dose. In the rush part, this protocol had extended the time interval between the injections to one hour instead of 30 or 15 min, as reported in other studies. This increased timespan between the injections was intended to allow sufficient observation time for AE, as AE occurring during MERIT were observed mostly between 30 and 60 min after an injection. This observation of AE later than 30 min after an injection had already been reported in 1996 by Sharkey et al.[34] The MERIT protocol decreased the duration of the build-up phase by 50%. In veterinary medicine, to the best of the authors' knowledge, there is currently no MERIT protocol reported. However, the interval between injections is usually 60 min in the recent publications about RIT in dogs,[12,15] reaching maintenance in one day without the need for a further gradual build-up.

Immunotherapy is a long-term treatment that, for a successful outcome, requires a close interaction between patient owner and veterinarian as well as regular visits at the veterinary clinic or practice, so owner compliance is a big influencing factor for the success of the therapy.[35] Reducing the number of vet visits by accelerating the induction period to one day seems a very reasonable advantage to improve owner compliance. There also is a trend observed in human immunotherapy that shortening the induction phase and reducing the amount of injections improved adherence to the therapy among the patients.[36]

Conclusions

Based on the available data, we consider RIT to be a safe procedure to conduct under veterinary supervision in canine patients. RIT has the aim of a faster amelioration of clinical signs of cAD. In addition, there is less chance of confusion and dosing errors when the induction period occurs in a veterinary hospital or specialist practice. Further randomised and preferably blinded studies with larger numbers of patients would be desirable also to compare the efficacy of RIT with its conventional counterpart.

AUTHOR CONTRIBUTIONS

Tamara Weitzer contributed to data curation, investigation, formal analysis and writing—original draft preparation. **Ralf Mueller** contributed to conceptualisation, project administration, supervision and writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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Résumé
Contexte: La durée de la phase d'induction de l'immunothérapie allergénique spécifique est classiquement une période de plusieurs semaines, pendant laquelle le volume d'une solution d'allergènes, administrée par injection, est progressivement augmenté jusqu'à atteindre la dose d'entretien. Dans la « rush » immunothérapie (RIT), la période d'induction est raccourcie afin d'obtenir une amélioration plus rapide des signes cliniques de dermatite atopique (DA) par comparaison à l'immunothérapie conventionnelle.
Objectifs: Le but de cette étude rétrospective est d'évaluer l'innocuité de la RIT chez 230 chiens atteints de DA et de rapporter tout effet indésirable (EI).
Animaux: 230 chiens détenus par des propriétaires.
Matériels et méthodes: Les dossiers médicaux des chiens recevant une RIT entre 2012 et 2021 sont analysés et les EI observés sont étudiés. Tous les chiens ont subi une RIT suivant un protocole d'injections sous-cutanées d'extraits d'allergènes, administrées toutes les heures avec un volume progressivement croissant de 0,1 à 1,0 ml.
Résultats
Des effets indésirables ont été documentés chez 6 des 230 (2,6 %) chiens. Cinq de ces chiens (2,2%) ont présenté des signes gastro-intestinaux légers (des vomissements pour 1 chien sur 5, des diarrhées pour 4 chiens sur 5) et pour un chien une augmentation de la température corporelle de 1,5°C. Ceux-ci se sont produits à différentes étapes du protocole RIT. Tous les EI ont été classés comme légers et se sont résolus spontanément.
Conclusions et pertinence clinique: À partir de ces données, la RIT sous contrôle médical chez le chien semble être une procédure sûre pour aboutir plus rapidement à la dose d'entretien d'immunothérapie allergénique avec des EI peu fréquents et légers.

Resumen
Introducción: La duración de la fase de inducción de la inmunoterapia específica con alérgenos habitualmente es un período de varias semanas, durante el cual se aumenta gradualmente el volumen de una solución de alérgeno, administrada por inyección, hasta alcanzar la dosis de mantenimiento. En la inmunoterapia rápida (RIT), el período de inducción se abrevia para lograr una mejoría más rápida en los signos clínicos de la dermatitis atópica (AD) en comparación con la inmunoterapia convencional.
Objetivos: El objetivo de este estudio retrospectivo fue evaluar la seguridad de RIT en 230 perros con AD e informar cualquier efecto adverso (AE).
Animales: 230 perros de propietarios particulares.
Materiales y Métodos: Se analizaron las historias clínicas de perros que recibieron RIT entre 2012 y 2021 y se investigaron los AEs observados. Todos los perros se sometieron a RIT siguiendo un protocolo de inyecciones subcutáneas de extracto de alérgeno, administradas cada hora con un volumen creciente de 0,1 a 1,0 ml.
Resultados: Se documentaron efectos adversos en 6 de 230 (2,6 %) perros. Cinco de estos perros (2,2 %) mostraron signos gastrointestinales leves (1 de 5 vómitos, 4 de 5 diarrea) y un paciente un aumento de la temperatura corporal de 1,5 °C. Estos ocurrieron en diferentes etapas del protocolo RIT. Todos los AEs se clasificaron como leves y autolimitantes.
Conclusiones y relevancia clínica: en base a estos datos, la RIT supervisada en perros parece ser un procedimiento seguro para lograr antes la dosis de mantenimiento de la inmunoterapia con alérgenos con AEs leves y poco frecuentes.

Zusammenfassung
Hintergrund: Die Dauer der Induktionsphase der Allergen-spezifischen Immuntherapie liegt generell bei einigen Wochen, wobei während dieser Zeit das Volumen der Allergenlösung, welche als Injektion verabreicht wird, graduell erhöht wird, bis eine Erhaltungsdosis erreicht ist. Bei der Rush Immuntherapie (RIT) wird die Induktionsphase abgekürzt, um rascher eine Verbesserung der klinischen Zeichen der atopischen Dermatitis (AD) im Vergleich zur konventionellen Immuntherapie zu erzielen.
Ziele: Das Ziel dieser retrospektiven Studie war es, die Sicherheit der RIT bei 230 Hunden mit AD zu evaluieren und eventuelle Nebenwirkungen (AE) zu beschreiben.
Tiere: 230 Hunde in Privatbesitz.
Materialien und Methoden: Die medizinischen Karteien von Hunden, welche zwischen 2012 und 2021 eine RIT erhielten, wurden analysiert und beobachtete AE wurden untersucht. Alle Hunde erhielten die RIT einem Protokoll folgend, wonach die Allergenextrakte mittels subkutaner Injektion verabreicht wurden und das Volumen stündlich um 0,1 bis 1,0 mL zunahm.
Ergebnisse: Nebenwirkungen wurden bei 6 der 230 (2,5%) der Hunde dokumentiert. Fünf dieser Hunde (2,2%) zeigten milde gastrointestinale Zeichen (1 von 5 zeigte Vomitus, 4 von 5 hatten Durchfall) und ein Patient zeigte eine um 1,5 °C erhöhte Körpertemperatur. Diese Ereignisse traten zu verschiedenen Stadien des RIT-Protokolls auf. Alle AE wurden als mild bis selbst-limitierend beurteilt.
Schlussfolgerungen und klinische Bedeutung: Basierend auf diesen Daten scheint eine RIT unter Beobachtung bei Hunden ein sicheres Procedere zu sein, um die Erhaltungsdosis der Allergenimmuntherapie früher zu erreichen, wobei nur seltene und milde AE auftraten.

要約
背景: 従来、アレルゲン特異的免疫療法の導入期は数週間であり、その間に注射で投与するアレルゲン溶液の量を徐々に増やし、維持量に到達させる。ラッシュ免疫療法(RIT)では、従来の免疫療法に比べ、アトピー性皮膚炎(AD)の臨床症状の改善をより早く達成するため、導入期の期間を短縮している。
目的: 本レトロスペクティブ研究の目的は、ADの犬230頭を対象にRITの安全性を評価し、有害事象(AE)を報告することであった。
供試動物: オーナー所有犬 230 頭。
材料と方法: 2012年から2021年の間にRITを受けた犬のカルテを解析し、観察されたAEを調査した。すべての犬は、アレルゲンエキスの皮下注射のプロトコールに従ってRITを受け、0.1~1.0mLまで漸増した量を1時間ごとに投与した。
結果: 230頭中6頭(2.6%)に副作用が認められた。このうち5頭(2.2%)に軽度の胃腸症状(5頭中1頭が嘔吐、4頭が下痢)、1頭で体温が1.5°C上昇した。これらは、RITプロトコルの異なるステージで発生した。すべてのAEは軽度であり、自己限定的であると評価された。
結論と臨床的関連性: これらのデータから、犬における監視下RITは、アレルゲン免疫療法の維持量を早期に達成するための安全な方法であり、頻度の低い軽度のAEを伴うと考えられる。

摘要
背景: 过敏原特异性免疫疗法的诱导期通常为数周 , 在此期间 , 通过注射给药的过敏原溶液的体积逐渐增加 , 直到达到维持剂量。在快速免疫疗法(RIT)中 , 与传统免疫疗法相比 , 诱导期缩短是为了更快地改善特应性皮炎(AD)的临床症状。
目的: 本回顾性研究的目的是评估RIT在230只AD犬中的安全性 , 并报告所有不良反应(AE)。
动物: 230只客户拥有的犬。
材料与方法: 分析2012年至2021接受RIT治疗的犬病历 , 观察AE。所有犬都按照皮下注射过敏原提取物的方案进行了RIT , 每小时注射一次 , 体积从0.1毫升逐渐增加到1.0毫升。
结果: 230只犬中有6只(2.6%)出现不良反应。其中5只犬(2.2%)表现出轻微的胃肠道症状(5只犬中有1只呕吐 , 5只腹泻中有4只腹泻) , 1名患犬体温升高1.5°C。这些症状发生在RIT方案的不同阶段。所有AE均分级为轻度和自限性。
结论和临床相关性: 根据这些数据 , 监督犬RIT似乎是一种安全的程序 , 可以在罕见和轻度AE的情况下尽早达到过敏原免疫疗法的维持剂量。

Resumo
Contexto: A duração da fase de indução da imunoterapia alérgeno-específica é, convencionalmente, um período longo de várias semanas em que o volume da solução alergênica, administrado por via injetável, é gradualmente aumentado até se alcançar a dose de manutenção. Na imunoterapia acelerada (*Rush immunotherapy* – RIT), o período de indução é abreviado para que se possa obter uma melhora nos sinais clínicos de dermatite atópica (DA) mais rapidamente comparado à imunoterapia convencional.
Objetivos: O objetivo deste estudo retrospectivo foi avaliar a segurança da RIT em 230 cães com DA e relatar quaisquer efeitos adversos (EA).
Animais: 230 cães de clientes.
Materiais e métodos: Os prontuários de cães recebendo RIT desde 2012 a 2021 foram analisados e os EA observados foram investigados. Todos os cães foram submetidos à RIT seguindo um protocolo de injeções de extratos alergênicos por via subcutânea administrada a cada hora em volumes crescentes de 0,1 a 1,0mL.
Resultados: Efeitos adversos foram documentados em 6 de 230 (2,6%) cães. Cinco destes cães (2,2%) demonstraram sinais gastrointestinais leves (1 de cinco teve vômito e 4 de 5 tiveram diarreia) e um paciente apresentou aumento de 1,5ºC na temperatura corporal. Isto ocorreu em diferentes estágios do protocolo de RIT. Todos os EA foram classificados como leves e auto-limitantes.
Conclusões e Relevância Clínica: Baseado nestes dados, RIT supervisionada em cães parece ser um procedimento seguro para se alcançar a dose de manutenção de imunoterapia alérgeno-específica mais rapidamente com EA leves e infrequentes.