

Adverse events associated with venomous insect immunotherapy and clinical outcomes in 82 dogs (2002–2020)

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Background – Limited information is known on adverse events and efficacy associated with venomous insect immunotherapy (VIT) in canine patients.

Objectives – To assess adverse events associated with VIT and perceived efficacy of VIT.

Animals – Records from 82 client-owned animals which received VIT were assessed.

Methods and materials – A retrospective review of records from 2002 to 2020. Clinical history, adverse events during therapy and observations following field stings were collected from all records. Patients were grouped into reactors and nonreactors based on whether or not an adverse event had occurred during therapy. Records were evaluated to determine if a field sting had occurred and the severity of the reaction was compared to pretreatment reaction.

Results – Of 82 patients that were identified, 26 experienced a minimum of one adverse event. No deaths or severe anaphylactic reactions were reported. The most common adverse event was gastrointestinal upset. The overall reaction rate per injection was 2.8%. Only variation in sensitisation level (the minimum concentration of venom which elicited a positive intradermal reaction) was significantly different between groups ($P = 0.014$). Forty-one field challenges in 26 patients were documented. Therapy reduced the severity of reactions in 87.8% of challenges. No deaths were reported.

Conclusion – Venom immunotherapy appears to be a safe and efficacious treatment for prevention of anaphylaxis due to insect stings in canine patients.

Introduction

A variety of stinging insects can induce hypersensitivity reactions through envenomation. In canine patients, the severity of these reactions can vary from local reactions to anaphylaxis and death.¹ Most insects of clinical significance are from one of three insect families in the order Hymenoptera: Apidae (honeybees, bumblebees), Vespidae (hornets, wasps and yellow jackets) and Formicidae (fire ants).² In humans in the United States, prevalence of insect hypersensitivity resulting in severe systemic reactions is estimated to be 3.3%.³ Between 2000 and 2017 there were an average of 62 human deaths per year attributed to stinging insects in the United States.⁴ A recent systematic review of the safety and efficacy of venom immunotherapy (VIT) in human patients concluded that VIT generally is safe and reported a reduction of reaction severity in 77–98% of patients depending on the venom type being evaluated.⁵ The prevalence of

venomous insect hypersensitivity in veterinary patients is unknown. The efficacy and safety of VIT in veterinary medicine also is unknown and only limited data on the subject are available. There is an abstract and an unpublished retrospective study available on the subject of VIT in veterinary patients, both presented at conferences.^{6,7} A report of a canine patient sensitised to human serum albumin while receiving honeybee VIT experiencing a nonlethal anaphylactic reaction has been published, which raises concerns about the overall safety of the therapy.⁸ There also was a positive report of a single dog undergoing testing and immunotherapy for five years without adverse events from therapy and no reactions to observed field stings.⁹ The aim of the present study is to assess the instances of adverse events and clinical outcomes in canine patients receiving VIT.

Methods and materials

In order to identify cases for inclusion, a search of electronic medical record database of a group of dermatology specialty clinics in the southwestern United States and Western Australia was conducted. Patient files which included VIT between the years 2002 and 2020 were included in the study. No patients were actively recruited for the purposes of the study.

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Patients were included in the study if they had received one or more VIT injections before 15 October 2020. Patients were excluded if there were no VIT injections given under the supervision of the speciality clinic or if the electronic medical records did not include information regarding patient monitoring following administration of immunotherapy. There were no limitations on comorbidities or concurrently administered therapies.

Electronic records were reviewed for age, sex, breed, weight, initial reaction to venomous insect sting, results of intradermal test, testing adverse events, venom type and manufacturer used for immunotherapy, the number and schedule of immunotherapy injections, time in study, adverse events associated with immunotherapy, whether or not the induction phase of immunotherapy was completed, why immunotherapy was discontinued (if applicable), comorbidities, and whether or not the patient received an antihistamine premedication. When considering the results of intradermal testing, the minimum concentration of venom which elicited a positive intradermal reaction was termed the "sensitisation level." If present, details of field stings were recorded. Clients were contacted via E-mail survey if no definitive information regarding field stings was present in the record. Recorded responses were associated with case number only with no additional identification about the client maintained.

Adverse events were considered to be any event which could have been attributed to the immunotherapy injection which occurred within 72 h of the injection. If more than one clinical sign was noted, the most severe clinical sign was used for grading. For patients receiving multiple venoms, all injections given in the same day were considered a single treatment. Time in study was defined as duration from first injection to final injection, including both induction and maintenance phases. Any injection which occurred after the initial induction phase was considered to be a maintenance injection irrespective of adjustments in venom dose which may have occurred at the discretion of the supervising clinician.

Field stings were grouped into categories based on the phase of immunotherapy in which they occurred. Induction was defined as the period from first injection to the injection where the total venom dose was equal to the maintenance dose. Maintenance therapy was considered to be the duration from the first maintenance injection until the final injection the patient received. Two additional phases were described: postinduction and postmaintenance. A sting was considered to have occurred in the postinduction phase if the patient received a sting more than four weeks after receiving their final induction injection and had not pursued maintenance therapy. A sting was considered to have been in the postmaintenance phase if it occurred more than two maintenance intervals after the previous maintenance injection (e.g. two months for patients receiving monthly maintenance injections).

Adverse events were graded using a five-point grading system proposed by the World Allergy Organization which previously has been modified to grade adverse events related to immunotherapy in veterinary medicine.^{10–13} Reactions were graded LR for local reactions and I–IV for systemic reactions (Table 1). Reactions which were attributed to immunotherapy which did not fall into this grading scale were classified based on the type of reaction and considered separately from the grading system. This same grading system was applied to both initial sting reaction and field sting reactions, an application which also has been proposed by the World Allergy Organization.¹²

Statistical methods

Patients were divided into two groups based on whether or not an adverse event had occurred. The two-sample proportion z-test was used to compare proportions of male and female patients between groups as well as spayed female and neutered male patients. Because of low patient numbers, proportions of intact male and female patients were compared using a Fisher's exact test. Equality of ages between groups was compared with a two-sample Student's *t*-test. Because most breeds only had a few patients in the data, the comparisons had low statistical power. The concentration at which each patient had a positive intradermal reaction was converted to a log-scale and then a Fisher's exact test was used to compare the distributions. Whether or not patients were premedicated with an antihistamine was compared using a two-sample proportion z-test. Fisher's exact test was used to compare the distribution of comorbidities between groups, and to compare the manufacturer of allergens between groups. For all statistical analyses, the threshold of significance was set at $P < 0.05$.

Results

Of a total of 108 potential cases identified, 82 cases met the inclusion criteria. Twenty-six records were rejected for either not meeting inclusion criteria or containing insufficient data. The median age was 1.8 years (0.3–9.1 years) with a median weight of 9.4 kg (2.5–36.6 kg). Forty-nine patients were spayed females, 21 were neutered males, nine were intact females and three were intact males. A variety of breeds were represented with the most prevalent being mixed breed (28), boxer (eight), pug (eight), French bulldog (six), dachshund (six), golden retriever (three), Yorkshire terrier (three), Chihuahua (two), German shepherd dog (two), Labrador retriever

Table 1. Grading scale for venom immunotherapy and venomous insect sting associated local and systemic adverse events (adapted from Hermann *et al.*¹³)

	Systemic reaction Grade I	Systemic reaction Grade II	Systemic reaction Grade III	Systemic reaction Grade IV
Localised cutaneous reactions (LR)	Grade I	Systemic reaction Grade II	Systemic reaction Grade III	Systemic reaction Grade IV
Localised pruritus at injection site	One organ system affected	More than one organ system affected	Anaphylaxis: any of the signs listed below	Death
Swelling of injection site		OR any of the signs below		
Injection site abscess or infection	Cutaneous Generalised pruritus	Cutaneous Urticaria, flushing, angioedema	Upper respiratory Laryngeal, tongue oedema	
	Upper Respiratory Rhinitis, cough	Lower respiratory Cough or wheezing	Lower or upper respiratory Respiratory failure	
	Conjunctival Erythema, pruritus, tearing	Gastrointestinal Vomiting or diarrhoea	Cardiovascular Hypotension, hypertension	
	Other Lethargy, anorexia, nausea			

(two) and vizsla (two), with one each of Akita, American pit bull terrier, Australian cattle dog, beagle, Belgian Malinois, Boston terrier, cavalier King Charles spaniel, cockapoo, English setter, Pembroke Welsh corgi, Rhodesian ridgeback, miniature schnauzer, soft-coated Wheaten terrier and standard poodle. Reported comorbidities included atopic dermatitis (20), cutaneous adverse food reaction (six), patellar luxation (two) and a nonspecified seizure disorder (two).

Testing protocols to select the venoms to be used for desensitisation were not standardised among the participating clinics. However, general protocols were similar and performed in a manner comparable to intradermal testing for allergen-specific immunotherapy. Drug withdrawals were similar to those for intradermal tests: two weeks for oral or topical antihistamines and topical glucocorticoids, one month for oral glucocorticoids and two months for injectable long-acting glucocorticoids. Patients were sedated with dexmedetomidine. A square patch was shaved on the patient's lateral thorax to allow administration of intradermal injections. A saline control of 0.05 mL was injected at the start of testing along with a histamine control of equivalent volume which was injected at the start of testing and repeated every 10 min thereafter. Venoms to be tested were diluted to 0.0001 µg/mL and administered at the same 0.05 mL volume. Injection concentration increased by 10-fold intervals every 5 min to a maximum concentration of 10 µg/mL for all venoms except honeybee, which was tested up to 100 µg/mL. The sites were monitored for wheal formation. Reaction grading varied among clinicians with some grading on a subjective 1–4 scale (with a 2 or higher considered positive), some grading with a binary subjective "positive" or "negative" scale, and some measuring wheal diameter. Over the study period individual clinicians used different grading scales. A reaction to any venom other than honeybee which occurred at 10 µg/mL and that did not have at least a weak positive reaction at lower concentrations was considered an irritant reaction. Honeybee reactions were considered true positive reactions up to a concentration of 100 µg/mL. Venoms were selected for desensitisation if a positive result was found on the intradermal test.

Desensitisation protocols were not standardised among participating clinics. The induction phase most often was initiated at a concentration of either 0.1 µg/mL or 1.0 µg/mL. Patients received weekly subcutaneous injections starting at 0.05 mL progressing to 0.1 mL, 0.2 mL and 0.4 mL. This process was repeated, increasing the concentration of allergen administered by 10-fold (e.g. 0.1 µg/mL, then 1.0 µg/mL, then 10 µg/mL) up to 100 µg/mL. At 100 µg/mL, after the 0.4 mL treatment, the volume was increased weekly to 0.6 mL, 0.8 mL and then a final volume of 1.0 mL of 100 µg/mL. A different induction protocol used a starting concentration of 0.1 µg/mL and progressed from 0.05 mL to 0.1 mL, 0.2 mL, 0.3 mL and 0.4 mL, repeating as described previously until a final dose of 0.4 mL at 100 µg/mL was reached. Once the maximal dose for a given protocol was reached, patients received monthly maintenance injections at the discretion of the supervising clinician. If more than one venom was to be administered, the total

treatment volume was divided so that each venom contributed an equal proportion. Some clinicians administered different venoms concurrently and some separated venom injections by as much as 2 h. All patients were monitored in-clinic following injections, although the duration of monitoring was rarely specified. If an adverse event occurred, modifications to these protocols were made at the discretion of the supervising clinician. This included reductions in dose or repeated doses without increasing concentration.

The median duration of venom immunotherapy was 475.5 days (1–3,537 days). The total number of injections across all patients was 1,944 with a median of 16.5 injections per patient (1–101 injections). There were 1,276 induction injections with a median of 15 injections per patient (1–66 induction injections). There were 668 maintenance injections with a median of 0.5 per patient (0–86 maintenance injections). Forty-one patients received one or more maintenance injections with a median of 13 per patient (1–86 maintenance injections). Forty-four patients received venom extracts manufactured by ALK (USA), 28 received extracts manufactured by HollisterStier Allergy (Spokane, WA, USA), seven received extracts manufactured by both companies, and three received extracts manufactured by Stallergenes Greer Australia (Warriewood, WA, Australia). Fifty-one patients received antihistamine premedication.

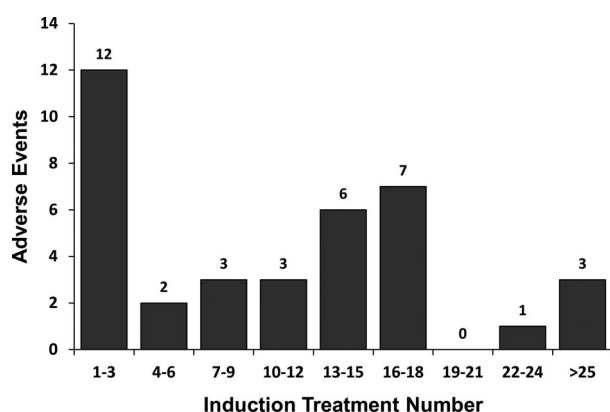
The most common presenting complaint following envenomation before testing and immunotherapy administration was anaphylaxis (79), followed by urticaria (two) and angioedema (one). The median number of venom extracts to which a patient was sensitised was one. Fifty-nine patients were sensitised to a single extract, 13 were sensitised to two, seven were sensitised to three and two were sensitised to four extracts. The most common sensitivity was honeybee (75 sensitisations), followed by yellow jacket (15), white-faced hornet (eight), yellow hornet (eight), wasp (six) and mixed vespids (two). One patient was not tested before starting immunotherapy. Therapy was initiated based on the client witnessing the envenomation and subsequent reaction along with positive identification of the stinging insect. The median number of extracts a patient received was one (one to four extracts). Twelve patients did not complete induction. A single patient had adverse events cited as the reason for discontinuation of therapy during the induction phase. Of the remainder, five were lost to follow-up and in six cases the owner elected discontinuation for reasons unrelated to immunotherapy.

Table 2. Number of adverse events by grade reported in two phases of venomous insect immunotherapy in 82 dogs

Treatment reactions	All	Induction	Maintenance
Grade LR	2	0	2
Grade I	12	9	3
Grade II	38	28	10
Grade III	0	0	0
Grade IV	0	0	0
Human albumin sensitisation	3	0	3
Total	55	37	18

Table 3. Number of individual clinical signs reported in two phases of venomous insect immunotherapy in 82 dogs

Individual clinical signs	All	Induction	Maintenance
GI	30	23	7
Lethargy	6	5	1
Urticaria	6	3	3
Pruritus	5	3	2
Erythema (cutaneous)	4	3	1
Human albumin sensitisation	3	0	3
Ptyalism	2	2	0
Facial oedema	2	0	2
Injection site discomfort	1	0	1
Injection site abscess	1	0	1
Papules	1	0	1
Total	61	39	22

**Figure 1.** Number of adverse events in 82 dogs during induction phase of venomous insect immunotherapy by treatment number (number of injections).

Fifty-five of 1,944 injections resulted in adverse events, with 61 individual clinical signs reported (Tables 2 and 3). No Grade III or IV events were reported. Gastrointestinal upset was the most commonly reported adverse event (49.2%) with <10% each of lethargy, cutaneous erythema, urticaria, ptyalism, injection site discomfort, injection site abscess, papules, pruritus, facial oedema and sensitisation to human serum albumin. Twenty-six patients (31.7%) reported one or more adverse events with an average of 2.1 reactions per patient (median 1.5 reactions). The majority of reactions (37 of 55) occurred during induction with a median reaction Grade II. Twelve of the 37 induction reactions occurred during the first three treatments (Figure 1). When the population was considered as a whole, the average number of reactions per patient was 0.7 (median 0 adverse events) and reactions occurred in 2.8% of treatments. No adverse events related to intradermal testing were reported.

When the patients that experienced adverse events were compared to those that did not, there was no statistically significant difference in age, sex, breed, weight, sensitisation type, venom extracts administered, manufacturer, or whether or not the patient received an antihistamine before injection administration ($P > 0.05$). Amongst patients that experienced adverse events, there was a greater variation in sensitisation level which elicited a positive intradermal reaction ($P = 0.014$; Table 4.). Not

Table 4. Distribution of reactors and nonreactors by lowest dilution which elicited a positive reaction on intradermal test

Intradermal test positive reaction dilution ($\mu\text{g/mL}$)	Reactors	Nonreactors
1×10^{-5}	1	0
1×10^{-4}	2	0
1×10^{-3}	2	1
1×10^{-2}	4	4
1×10^{-1}	6	10
1×10^0	3	23
1×10^1	4	8

all patients had sensitisation level definitively recorded in their medical records.

Twenty-six patients had documented field challenges with 41 total challenges reported. Thirteen challenges occurred in the induction phase, four in the postinduction phase, 21 in the maintenance phase, and three in the postmaintenance phase. Envenomation reactions were less severe than initial reaction in 36 of 41 challenges. Five challenges resulted in reactions of equal severity (Grade III). Two occurred in the induction phase, two occurred in the postinduction phase, one occurred in the postmaintenance phase and none occurred in patients receiving maintenance injections. No reactions of greater severity were reported, and no deaths were reported. Twenty-one of 26 patients had reduced severity of reaction for all challenges. The median reaction grade was LR. The only phase of therapy that had uniformly reduced severity of reaction was the maintenance phase. The longest duration between last immunotherapy injection and a field sting with a reduced reaction severity was 26 months. The client email survey had five respondents with no field challenges reported.

Discussion

In this retrospective study, adverse events were reported in <3% of administered injections across all phases of therapy. In addition, in nearly half of all instances the primary complaint was digestive upset. Based on this, there appears to be a good margin of safety for VIT. To further illustrate this, there were recorded instances of patients receiving incorrect concentrations of the extracts during the course of therapy without reaction. In one instance a patient received 100 times the intended venom dose without adverse effects. No patients had reported adverse events when transitioning between extracts from different manufacturers. The significance of the variation in sensitisation level remains uncertain.

Human serum albumin is present in VIT products as a stabiliser following dilution. Human serum albumin administration previously has been demonstrated to cause hypersensitivity reactions in dogs including two deaths in one report, although the report used a more concentrated solution of human albumin delivered intravenously at greater volumes than would be used in immunotherapy.¹⁴ The development of anti-human albumin antibodies was documented.¹⁴ Three dogs were reported to have been sensitised to human serum albumin based on intradermal test results in the current study. Two of these patients had been reported previously in the

literature.⁸ All three patients experienced adverse events during VIT. In two of these three patients, adverse events were attributed to sensitisation to albumin based on resolution of signs after transition to a product without the human albumin stabiliser. In the third, it was believed to be an incidental finding because the patient was not experiencing adverse events at the time of testing. The true extent and significance of this sensitisation remains uncertain as patients are not routinely evaluated for this sensitivity.

It should be noted that the amount of human albumin in VIT products differ by manufacturer. When considering the products produced by ALK used in this study, the albumin is a component of the powder which then is diluted to a final concentration of 0.06% human serum albumin.¹⁵ Although it cannot be removed from the product, it does become more dilute as the product is diluted for the induction injections. However, with a standard 1.0 mL maintenance injection the patient will receive six times as much human albumin as venom protein. Products from both HollisterStier and Stallergenes Greer utilise a separate diluent containing 0.03% human albumin.^{16,17} Although this is a lower dose of albumin at a maintenance level, the diluent is used for all dilutions. As a result, the concentration of albumin is not reduced at initial induction dosing. Because of these differences in manufacture, it is possible to prepare the products manufactured by either HollisterStier or Stallergenes Greer without any human albumin present using diluents provided with other allergen immunotherapy products. Practitioners seeking to employ this therapy should take this into consideration when selecting VIT providers. Although there was no association with manufacturer and adverse events, use of diluents without albumin stabiliser has become standard practice at the clinics participating in this study.

Venom immunotherapy appears to be protective in the majority of canine patients that receive it. It is uncertain what duration of therapy is needed for the onset of this protection and how long the therapy remains effective. Based on these uncertainties, the recommendation is to pursue ongoing monthly maintenance injections. Patients receiving maintenance injections were the only group totally protected when receiving challenge stings.

When the results of the present study were compared to the previously noted unpublished retrospective study which included a cat, a horse and a gibbon in addition to canine patients, there were several differences. Of initial presentations, 74.2% would have been classified as Grade III reactions, rather than 96.3% in the current study.⁷ In the retrospective study, 7.1% of dogs experienced adverse events compared with 31.7% of patients in the current study.⁷ There is not sufficient information to determine the per injection reaction rate. There were nine reported challenges in both dogs and a cat with 55.6% of patients having reduced severity of reaction, which was lower than the 80.7% reported in this study.⁷

The findings of the current study were similar to a retrospective study in human medicine in which 43.8% of people experienced adverse effects. However, unlike the current study, the majority of their adverse events occurred during the maintenance phase; 26.7% of

patients compared with 3.7% in the current study.¹⁸ Their most common adverse event was local reaction (50%) and 93.75% of patients had reactions to field stings which would have been graded LR or lower using the grading system in the current study.¹⁸

There were multiple limitations of the present study. It was retrospective in nature and there was not standardisation of the therapies the patients received. An important point in this regard is that one clinic in this study routinely administered only induction injections. As a result, maintenance reactions may have been under-reported because exactly half of the patients in the study did not receive any maintenance injections. This may have biased the data toward induction reactions being more common than they are in reality. However, when considering only those patients which received one or more maintenance injections, the majority of adverse events still occurred in the induction phase at 61.7% compared with 67.3% when considering the population as a whole. Another example of protocol variation was the patient that was not tested before starting immunotherapy. Although the sting event and subsequent reaction were observed, this is not recommended. Testing should always be performed before immunotherapy is administered. Additionally, owing to incomplete records, some data were not available for all patients such as specific sensitisation levels.

Only approximately one third of patients received a field challenge. As a result, it may not be possible to draw broad conclusions about efficacy of the therapy. It was not possible to definitively determine if some delayed adverse reactions were related to immunotherapy or other comorbidities and concurrent therapies. If they could be related to the therapy, they were reported as such which may have led to over-reporting of adverse events.

In conclusion, VIT appears to be a well-tolerated and efficacious therapy in the majority of canine patients.

Author contributions

Trenton Ewing: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing-original draft, Writing-review & editing. **Charli Dong:** Conceptualization, Methodology, Resources, Writing-review & editing. **Mona Boord:** Conceptualization, Methodology, Resources, Writing-review & editing. **Yinan Fang:** Formal analysis, Methodology, Software, Validation, Writing-review & editing.

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Résumé

Contexte – Nous avons peu d'information sur les effets secondaires et l'efficacité associés à l'immunothérapie contre les insectes venimeux (VIT) chez le chien.

Objectifs – Déterminer les effets secondaires associés au VIT et l'efficacité perçue du VIT.

Sujets – Les données de 82 animaux de clients qui ont reçu une VIT ont été évaluées.

Matériels et méthodes – Une revue rétrospective de données de 2002 à 2020. Les commémoratifs, les effets secondaires au cours du traitement et les observations suivant les zones de piqûres ont été collectées de toutes les données. Les patients ont été regroupés en réactifs ou non réactifs selon la présence ou non d'effet indésirables observés au cours du traitement ; les données ont été évaluées pour déterminer si une zone de piqûre s'est développée et la sévérité de la réaction a été comparée à la réaction de prétraitement.

Résultats – Sur les 82 patients qui ont été identifiés, 26 ont présenté au moins une réaction indésirable. Aucun décès ou réaction anaphylactique sévère n'a été rapportée. L'effet secondaire le plus fréquent était gastro-intestinal. Le taux de réaction total par injection était de 2.8%. Seule une variation de la sensibilisation (la concentration minimale de venin qui provoquait une réaction intradermique positive) était significativement différente entre les groupes ($P = 0.014$). Quarante et un champs de 26 patients ont été documentés. Le traitement a réduit la sévérité de la réaction dans 87.8% des tests. Aucun mort n'a été signalé.

Conclusion – L'immunothérapie au venin semble être sûre et efficace pour la prévention de l'anaphylaxie due aux piqûres d'insecte chez le chien.

Resumen

Introducción – existe escasa información acerca de los efectos adversos y la eficacia asociados con la inmunoterapia contra insectos venenosos (VIT) en pacientes caninos.

Objetivos – evaluar los eventos adversos asociados con la VIT y la eficacia percibida de la VIT.

Animales – se evaluaron los historiales de 82 animales de propietarios particulares que recibieron VIT.

Métodos y materiales – una revisión retrospectiva de los historiales entre 2002 y 2020. Se recopilaban de todos los pacientes seleccionados la historia clínica, los efectos adversos durante la terapia y las observaciones tras picaduras de campo. Los pacientes se agruparon en reactivos y no reactivos en función de si había ocurrido o no un evento adverso durante la terapia. Se evaluaron los historiales para determinar si se había producido una picadura en el campo y se comparó la gravedad de la reacción con la reacción previa al tratamiento.

Resultados – de 82 pacientes que fueron identificados, 26 experimentaron al menos un efecto adverso.

No se informaron de muertes ni reacciones anafilácticas graves. El efecto adverso más común fue malestar gastrointestinal. La proporción de reacción global tras inyección fue del 2,8%. Sólo la variación en el nivel de sensibilización (la concentración mínima de veneno que provocó una reacción intradérmica positiva) fue significativamente diferente entre los grupos ($P = 0,014$). Se documentaron 41 exposiciones de campo en 26 pacientes. La terapia redujo la gravedad de las reacciones en el 87,8% de los animales afectados. No se reportaron muertes.

Conclusión – la inmunoterapia frente al veneno parece ser un tratamiento seguro y eficaz para la prevención de la anafilaxia debida a picaduras de insectos en pacientes caninos.

Zusammenfassung

Hintergrund – Es gibt nur limitierte Information über das Auftreten von Nebenwirkungen und Wirksamkeit im Zusammenhang mit giftiger Insekten Immuntherapie (VIT) bei caninen Patienten.

Ziele – Die Nebenwirkungen im Zusammenhang mit VIT sowie die wahrgenommene Wirksamkeit von VIT sollten erfasst werden.

Tiere – Die medizinischen Dateien von 82 Tieren in Privatbesitz, die VIT erhielten, wurden erfasst.

Methoden und Materialien – Eine retrospektive Review der Patientenkarteen, die aus der Zeit von 2002 bis 2020 stammten. Die klinische Historie, Nebenwirkungen während der Therapie und die Beobachtungen nach Stichen im Freien wurden von allen Karteien herausgesucht. Die Patienten wurden in Reaktoren und Nicht-Reaktoren eingeteilt, je nachdem ob während der Behandlung eine Nebenwirkung auftrat oder nicht. Die Karteien wurden evaluiert, um festzustellen, ob Stiche im Freien stattgefunden hatten und ob der Schweregrad der Reaktionen zu Reaktionen vor der Behandlung verglichen worden waren.

Ergebnisse – Von den 82 verifizierten Patienten, erlitten 26 mindestens eine Nebenwirkung. Es waren keine Todesfälle oder schwere anaphylaktische Reaktionen beschrieben. Die häufigste Nebenwirkung war eine Magenverstimmung. Die insgesamt Reaktionsrate betrug pro Injektion 2,8%. Nur die Variation des Empfindlichkeitslevels (minimale Konzentration des Giftes, welches eine positive intradermale Reaktion auslöste) war zwischen den Gruppen signifikant verschieden ($P = 0,014$). Einundvierzig Feldprovokationen waren bei 26 Patienten dokumentiert. Bei 87,8% der Provokationen reduzierte die Therapie den Schweregrad der Reaktionen. Es wurde von keinen Todesfällen berichtet.

Schlussfolgerung – Insektengift Immuntherapie scheint eine sichere und wirksame Behandlung bei der Prävention von Anaphylaxie aufgrund von Insektenstichen beim caninen Patienten zu sein.

要約

背景 – 犬症例における有毒昆虫免疫療法 (VIT) の有害事象および有効性については、限られた情報しか知られていない。

目的 – 本研究の目的は、VITに関連する有害事象およびVITの有効性の認識を評価することであった。

被験動物 – VITを受けたオーナー所有犬 82 頭の記録を評価した。

材料と方法 – 2002年から2020年までの記録を回顧的にレビューした。臨床歴、治療中の有害事象、野外で虫に刺された後の観察結果をすべての記録から収集した。治療中に有害事象が発生したかどうかで、動物を反応症例および非反応症例に分類した。記録は、野外で虫刺されが発生したかどうかを評価し、反応の重症度を治療前の反応と比較した。

結果 – 特定された82頭の症例のうち、26頭が最低1回の有害事象を経験した。死亡例や重篤なアナフィラキシー反応は報告されなかった。最も多かった有害事象は胃腸障害であった。注射1回あたりの全体的な反応率は2.8%であった。感作レベル（皮内反応が陽性となった毒物の最小濃度）の変動のみがグループ間で有意に異なっていた ($P = 0.014$)。26頭の症例における41回の野外チャレンジが記録された。治療により87.8%の症例で反応の重症度が減少した。死亡例は報告されなかった。

結論 – 毒物免疫療は、犬症例の虫刺されによるアナフィラキシーを予防するための安全で効果的な治療法であると思われる。

摘要

背景 – 关于患犬使用有毒昆虫免疫疗法(VIT)副反应和有效性的信息有限。

目的 – 评估VIT的副反应和VIT的知觉疗效。

动物 – 评估82只接受VIT的家养动物的病历记录。

方法和材料 – 对2002年至2020年的病历记录进行回顾性调查。从所有病历中收集临床病史、治疗期间的副反应和田间蜇咬后的观察结果。根据治疗期间是否发生副反应，将病患分为有反应和无反应组。评估病例记录，以确定是否发生田间蜇咬，并将反应的严重程度与给药前反应进行比较。

结果 – 在选出的82名病患中，有26名发生了至少一起副反应。未报告死亡或重度过敏反应。最常见的副反应是胃肠道不适。每次注射的总反应率为2.8%。组间仅致敏水平（引起皮内阳性反应的最小毒液浓度）变化存在显著差异($P = 0.014$)。记录了26例病患的41次田间攻毒。治疗降低了87.8%攻毒反应的严重程度。无死亡报告。

结论 – 毒液免疫治疗似乎是一种安全有效的治疗方法，可预防犬被昆虫蜇咬引起的过敏反应。

Resumo

Contexto – Pouco se sabe a respeito dos eventos adversos e eficácia associada à imunoterapia para insetos venenosos (IIV) em pacientes caninos.

Objetivos – Avaliar os eventos adversos associados à IIV e sua eficácia observada.

Animais – Os prontuários de 82 animais de clientes que receberam IIV foram avaliados.

Métodos e materiais – Os prontuários foram revisados retrospectivamente entre 2002 e 2020. Dados de histórico clínico, eventos adversos durante a terapia e observações após picadas a campo foram extraídos de todos os prontuários. Os pacientes foram agrupados em reagentes e não reagentes baseado na ocorrência ou não de eventos adversos durante o tratamento. De maneira geral, a frequência de reação por injeção foi de 2,8%. Apenas a variação no grau de sensibilização (a concentração mínima do veneno capaz de gerar uma reação intradérmica positiva) foi significativamente diferente entre os grupos ($P = 0,014$). Quarenta e um desafios a campo em 26 pacientes foram documentados. O tratamento reduziu a gravidade das reações em 87,8% dos desafios. Nenhuma morte foi relatada.

Conclusão – A imunoterapia com veneno parece ser um tratamento seguro e eficaz na prevenção de anafilaxia causada por picadas de insetos em pacientes caninos.