

Anxiety, Neurological Impacts, and Other Cognitive, Diagnostic, and Treatment Issues Surrounding European Wasp Stings

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With the recent medical evidence linking depression to inflammation as a direct result of the immune system's response to illness (Almond, 2013), this article highlights the link between European Wasp stings and anxiety for those who have an encephalitic reaction resulting in inflammation and swelling as a result of the sting, with delayed responses of symptoms of anxiety disorders and OCD many months after the initial sting which may be overlooked due to the delayed reaction (Roy, Chatterjee, Deb, & Pandit, 2010; Laplane, Widlocher, Pillon, Baulac, Binoux, 1981; Ghosh, Roy, Bala, 2009). Therapeutic treatments are discussed in the context of these cases in France, Australia and India where these wasp populations have a higher than average incidence of stings reported by clinicians according to the literature reviewed.

Keywords: anxiety, European Wasp, encephalitis

Introduction

McGain, Harrison, and Winkel (2000) report that Australia has a diversity of creatures spewing venom, many of which are capable of inflicting lethal injuries to individuals. European wasps (*Vespula germanica*), while not gaining as much public attention as snake and spider bites in America, are capable of injecting highly dangerous stings. In reference to the widespread distribution of wasps and bees (Hymenopterans), McGaine et al. (2000) assert that this distribution results in their stings as being the leading cause of deaths worldwide from bites and stings. Most deaths are the result of individuals having hypersensitive reactions to the venom.

McGain et al. (2000) note that there is a dearth of publications regarding the circumstances and the number of fatalities in Australia from European wasp stings. They maintain that analyzing lethal incidences would greatly assist in injury prevention, especially as European wasps are intense scavengers, and are thus found in great numbers around areas where humans live and interact where they ought to be considered hazardous. McGain et al. (2000) also find that more European wasp stings occur in the summer months. Therefore, education and emergency kits for those who are novel victims of stings, or who may have life-threatening Hymenoptera venom allergies, are paramount.

What the researchers do not mention, and it was not in their stated remit, are the emotional and psychological aspects affecting vulnerable populations. The mere knowledge that these insects are capable of inflicting lethal doses of venom is in and of itself a major anxiety producing factor, more of which will be

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addressed later herein. There is a palpable paucity of information regarding anxiety, neurological impacts, and other cognitive, diagnostic, and treatment issues surrounding European wasp stings. Pardo indicates the paucity of information on treatments regarding the anxiety and the neurological impacts of European wasp stings (personal communication, February 18, 2016). The overall scarcity of information has meant that no unified approach has yet been taken on the myriad of contributing issues that constitute this topic. This paper follows a narrative in sequentially a story-like fashion, as the various facts about European wasps are woven into a more complete tapestry resulting in a clearer picture of the epistemology to date.

Hymenoptera Venom Allergy

Paschall (2012) reports that Hymenoptera venom allergy is hypersensitivity by an individual to the venom of insects in the insect order Hymenoptera. Allergic reactions may be the result of stings from any number of species found in this order. However, it occurs exclusively systemic in those individuals who have previously been sensitized to the venom.

Some Systemic Signs and Symptoms

Systemic symptoms often involve more than one organ and are usually immunoglobulin E (IgE) mediated (Paschall, 2012). This means that the reactions are divided into what are called immediate-in-time onset reactions and late-phase onset reactions, which are quintessentially symptoms that follow the immediate-in-time symptoms and sustain ongoing symptoms arising out of the original allergic responses. Symptoms of Hymenoptera allergy include: coughs, tightness in the throat, wheezing, labored breathing (dyspnea), and various cutaneous manifestations, such as hives (urticarial) and flushing. Paschall (2012) refers to the presence of nausea, vomiting, and diarrhea, as well as concomitant cardiac signs, which include: arrhythmias, dizziness, hypotension, and loss of consciousness, depending on the severity of an individual's reactions. Some of the aforementioned cardiac symptoms can also be present in severe anxiety and/or panic attacks, which have a confounding effect on both the patient and medical personnel (American Psychiatric Association [APA], 2013).

Some Neurological Issues

Although neurological manifestations of Hymenoptera stings are not that common in the United States, there are significant cases that have been reported from all around the globe (Jimenez-Sanders, Behrouz, & Tsakadze, 2015). These include: strokes, cranial neuropathies, myasthenia gravis, and anaphylaxes. The latter of which there will be more detailed comment and observation.

Jimenez-Sanders et al. (2015) describe a unique case history involving European wasp sting induced encephalitis. This case involved a 49-year-old male patient who presented with allergic encephalitis accompanied by gelastic status epilepticus. Gelastic epilepsy can be defined as seizures that begin with highly inappropriate and/or non-contextual laughter, which lasts all of 45-seconds, if that (Epilepsy Action, 2016). It is not a pleasant laughter, and it has a vibrant, hollow sound. These prodromal features presage what is then a more typical seizure. The rarity of such a seizure is emphasized, especially as it is more prevalent in young boys. The case demonstrates the power of the European wasp venom, and its unpredictable consequences in a range of susceptible yet unsuspecting individuals.

Roy, Chatterjee, Deb, and Pandit (2010) cite a case from India, which states that a single Hymenoptera

sting may result in encephalitis and that neurological complexities manifest days and weeks after the initial bite. The authors review a case of a three-year-old girl who was considered to be in perfect health until being stung by a wasp. She was hospitalized with headaches, vomiting, seizures, and intense fatigue. Upon examination, it was established that she had multiple stings.

Mingomataj, Bakiri, Ibranjic, and Sturm (2014) report on what should be kept in mind regarding unusual neurological and immunological reactions to Hymenoptera stings. These include: delayed inflammatory symptoms of the nervous system and acute kidney injury. Volders, Smits, Folkersma, and Tjan (2012) describe an unusual neurological consequence of massive wasp stings. There is relevance in the word massive because of the following facts. In Australia, the Victorian State Government (2015) states that unlike a bee, which has a solitary sting, the European wasp has the capacity to sting an individual repeatedly. In addition, the European wasp emits a distinct pheromone, which summons other European wasps in the area to join in the attack.

Volders et al. (2012) report that a 45-year-old man was admitted to the hospital after being stung by more than 50 of the *Vespula Germanica* species of wasps. While mowing his lawn, he unintentionally disturbed a nest of wasps. Amongst his predictable clinical feature, the patient also suffered a sudden loss of consciousness (LOC). In the Emergency Department (ED), the patient vacillated between responsiveness, LOC, and interrupted speech. His LOC periods lasted up to three minutes after which he would regain consciousness spontaneously. He demonstrated a lack of orientation as to time and place, unable to recall anything that occurred. These LOC moments appeared to occur every two to three hours.

Upon discharge, after six days of hospitalization, he could not recall his time in the hospital when he suffered LOC. Four months after discharge he was still reporting truncated weekly episodes of a lesser consciousness and concomitant short-term memory deficits. Volders et al. (2012) caution that the neurologic reactions post European wasp stings remain diverse; they are likely to emerge within minutes of a sting or even days thereafter; and that their initial condition may be deceptive, with no harbinger of the severe and life threatening complications other than clinicians remaining vigilant and suspicious in these cases. Amongst other medications, the patient was given one milligram of Clonazepam, a benzodiazepine.

Anaphylaxis

Anaphylaxis can be described as a sudden, potentially lethal allergic reaction (Glaser, 2015). Symptoms have a sudden onset and rapidly escalate in severity in a matter of minutes. There are those incidences where symptoms take a more gradual path and only manifest in severity 24 to 48 hours later; however, the more rapid that it escalates, the greater the threat will be to the individual. It is the first exposure to the stimulus that sets the scene for future anaphylactic episodes by creating an inherent hypersensitivity in the individual. Thus, what occurs is that one's immune system abreacts to a specific allergen that one has been previously exposed. While many triggers exist, including shellfish, latex, antibiotics, and tartrazine food coloring, this paper focuses on Hymenoptera.

DermNet NZ (2016) reiterates that anaphylaxis is a medical emergency and those at risk should be supplied with epinephrine (EpiPen), and counseled along with relatives and/or caregivers on how and when to utilize it. The site also reports that there have been secondary Parkinsonian symptoms and cerebral infarction. This is a type of ischemic stroke resulting from a blockage in the blood vessels supplying blood to the brain.

Immunotherapy for European Wasp Stings

Boyle et al. (2012) maintain that the most effective treatment protecting venom allergic individuals from sting-induced anaphylactic reactions is Venom Immunotherapy (VIT). This protocol involves injecting the allergic individual with miniscule amounts of the allergen, in this case European wasp venom. Subcutaneous injections are administered over quite a few years, with the amount of venom incrementally increasing to the point that the individual has become desensitized, or at least far less sensitive to the allergen.

Spheksophobia

Olesen (2014) defines spheksophobia as the persistent fear of wasps, in which the individual suffers a panic attack at the sight of, or even thought of wasps. Its etymology roots lie in the Greek word “spheco” for wasp, and the Greek word “phobos” for fear or dread. Olesen (2014) deftly explains the avoidant behaviors that can follow spheksophobic individuals. Those who have been stung, and those who have witnessed a bystander reaction to another person or persons being stung, often develop avoidant behavior, which may manifest itself in panic disorder with or without agoraphobia and/or somatic symptom disorder (APA, 2013).

There is a caveat about somatization; it is one that affects the psychological aspects of allergy sufferers. Knott (2014) states there can exist a discrepancy between the perception of an allergy and its true prevalence as a result of flawed self-reporting. He points out that in a select number of cases it is more socially acceptable to admit to having an allergy than admitting having psychological and/or emotional struggles. Extrapolating his point, it is conceivable that individuals with social anxiety, for instance, would avoid an outdoor picnic by stating they have an allergy to European wasps. In similar vein, an individual who suffers from performance anxiety or low self-esteem may avoid playing outdoor team sports, or participating in physical exercise at school by claiming an allergy to wasp stings. If not wasps, they may proffer an allergy to something else, such as freshly mowed grass or the dust in a school. The very word allergy can embrace a breadth of interpretation, covering much human pain and suffering (Knott, 2014).

Olesen (2014) also raises the issue of both parental admonitions and media highlighting of European wasp stings in the etiology of anxious avoidant and phobic behavior. Parents and caregivers, motivated by protective behaviors, warn children not to go out and play for fear of being stung by wasps. The television news will often display the more extreme instances of wasps attacking individuals, and this matrix becomes so solidified in the minds of susceptible and vulnerable individuals, that intense fear often overrides reason.

In addition, the use of the EpiPen and/or VIT, which is a series of long-term subcutaneous injections, would present secondary anxiety issues for individuals diagnosed with blood injury phobia, as classified in the DSM-V as specific phobia (300.29) (APA, 2013). Knott (2014) also draws attention to the difficulties, at times, of distinguishing between the real effect of avoiding perceived allergens and the subsequent parental attention that is gained by younger children. Even if it is not classified as such, many blood phobia individuals, especially children, remain anxious about physician/nurse-administered injections, and even more anxious about having to administer some sort of subcutaneous self-puncture. This has implicit ramifications for the psychodynamics of non-adherence (Alfonso, 2011).

Non-Adherence

Alfonso (2011) states that focusing on the interface between attachment theory and psychodynamic theory has extended the profession’s knowledge and grasp of the psychodynamics of non-adherence. He states that attachment theory is based on the premise that early childhood experiences with primary caregivers, by a

process of internalization, predetermine the manner in which individuals relate to others in adulthood. Ciechanowski et al. (2004) reviewed the correlation between attachment styles and non-adherence in treatment. Their resultant hypothesis was that specific attachment styles exert a correlation with adherence in those who are medically ill. They conclude that psychotherapeutic interventions, when using information elicited from attachment literature, can greatly assist in coaxing adherent behaviors in patients who are initially non-adherent to medical regimens, can have a positive result. This result focuses on previously non-adherent patients understanding the value of collaboration in relationships. This would mean the letting go of excessive self-reliant traits, relinquishing control, and the promotion and manifestation of trust as adults.

Polyvagal Theory in This Context

According to Polyvagal Theory, including neuroception, the breadth of human social behaviors is limited by the structures of one's physiology (Porges, 2004). Fear is mediated and reliant on the evolution of neural circuits, which manifest to protect more adaptive behaviors in initial primitive vertebrates. To mobilize or immobilize certain behaviors, this neural circuitry acts rapidly without an individual even realizing it. On the contrary, neuroception also gives off strong signals as to when an environment is safe, and that the *dramatis personae* in that environment are in fact to be trusted. The mechanics that enable defensive behaviors are equally rapidly disabled.

Where then does this find a contextual home regarding the European wasp sting issue? Many victims of stings are children (Manassis, 2012). There are many children whose attachment has been severely compromised and even ruptured. Porges (2004) maintains that they can be helped if new paradigms are established aimed at direct stimulation of the social engagement systems of children. In addition, he postulates that altering the caregiving environment in order for it to be a safer and less mobilizing or immobilizing environment. While parents cannot predict at birth which children will have allergic responses to allergens, including European wasp stings, it is understood that parental focus on retooling, refining, and reevaluating the environment in which a secure attachment can thrive will greatly benefit children with a range of reactions to wasp stings.

This brings Alfonso (2011) and his attachment work on non-adherence full circle. It demonstrates the interdependence and benefits of collaborative practitioner models. While emphasizing the role of attachment in all children, the remit of this treatise narrows the overall focus to aspects of European wasp stings. In this regard, anaphylaxis and the anxiety that understandably surrounds it deserve greater introspection and research. Manassis (2012) has done just this in her seminal work on managing anxiety related to anaphylaxis in childhood.

Managing Anxiety and Anaphylaxis: Child and Adult Involvement

Manassis (2012) reports that anxiety symptoms are common not only in children prone to anaphylaxis, but also in their parents. The recognition of parallel parental and/or caretaker anxiety is in and of itself a critical factor. This treatise hypothesizes that it is possible that a range of not mutually exclusive factors may come into play. Is it the subconscious exertion of Freudian projection by parents in which they project their anxieties onto their children (Newman, Duff, & Baumeister, 1997)?

Jacoboni (2008) raises the critical discovery of the mirror neuron. These are neurons that dramatically fire back not only when an animal acts but also when the animal observes the same action performed by another

individual. The neuron is believed to literally mirror the behavior of the other, as if the observer was exuding such behaviors. In addition to their own anxieties borne out of parental concern and protectiveness, are these mirror neuronal neurobiological forces at work? This is an area that deserves further research.

In parallel, while the anxiety of the anaphylactic child is completely understandable, the reciprocal causation model and social learning theory emphasizes observational learning, imitation, and modeling (Bandura, 1986). This theory reflects on the contiguous links between behaviors, individual variation, and an individual's environment. Therefore a question that has to be asked as aspects of systemic anxiety are examined, is whether parental and/or caregiver anxiety exacerbates the anaphylactic child by virtue of Bandura's (1986) view on reciprocal causation. This too begets the question whether one assumes stereotypically that parents are by nature greater worriers than their children, and from a neurobiological standpoint, whose mirror neurons are reflecting back, those of the child or the parent (Jacobini, 2008)? Again, further research would be indicated in this area.

Manassis (2012) asserts that given the serious nature of anaphylaxis, some anxiety may even be adaptive because the anxiety-prone or anxiety-primed child is less likely to take risks than less anxious children. However, there are some cases in which debilitating anxiety is counterproductive (Manassis, 2012). Children are prevented from regular school attendance and absent themselves from social activities systemically and eco-systemically. Children with hymenoptera allergies may seek to avoid all outdoor activities, and when at school, may balk at the idea that their parent and/or caregiver leave the classroom. With the incipient fear being that they have an anaphylactic episode, that presence of the secure attachment figure would mitigate their embarrassment and heighten their safety by virtue of knowing how to truncate the episode.

If the child has a blood injury phobia, they too might rely on a parent and/or caregiver to use the EpiPen. In America, most schools will not permit teachers to administer any form of medication, let alone puncture the skin. Thus, if a child is unable or unwilling to self inject subcutaneously, the proximity of the attachment figure would be paramount in both the case of the child and the parent. Manassis (2012) emphasizes that chronic intransigent and extreme restrictive daily living is medically contraindicated and must be addressed to recalibrate a child's normative developmental trajectory (Berger, 1998).

Treatment Interventions

It should be kept in mind that some medical interventions regarding anaphylaxis affect both the parent and the child anxieties. In fact, the evolution of this research treatise points more and more to the systemic model of treatment in that all members of the family system are affected by a unitary member's allergies. Monga and Manassis (2006) found that children allergic to European wasp stings were far less anxious post venom immunotherapy than prior to the therapy. However, their levels of anxiety remained elevated if they were administered the EpiPen without immunotherapy taking place.

In looking at behavioral aspects of anxiety, Manassis (2012) recommends the unwrapping of avoidance in anaphylactic children, both by parent and child. She suggests that a diary of some sort be kept detailing regularly avoided places, people, and situations. For children with insect sting induced anaphylaxis who avoid the outdoors, there is a recommendation that the initial desensitization take place in the winter when there are far less, if any, flying insects. Compton et al. (2004) state that while initial desensitization practices are anxiety provoking, this cognitive intervention reduces anxiety over time, as the feared stimulus is desensitized. Some children may not participate without parental or caregiver accompaniment. Manassis (2012) suggests that

initially parents and caregivers cooperate but slowly fade their support. These suggestions echo the zone of proximal development and social learning promulgated by Vygotsky (2004), intrinsically the scaffolding model.

Manassis (2012) suggests that practice suggestions should be long enough, up to twenty minutes, allowing for the child's anxiety to peak and then plateau and descend; permitting premature truncation from the exercise will dilute any positive effects of the desensitization process. Monga and Manassis (2006) and Manassis (2012) state that a progress chart is often useful in motivating children. Points and stickers awarded even for the most modest of attempts are effective in treatment, whereas with older child and adolescents, more tangible rewards, such as more television time or computer time are equally effective motivators. Compton and colleagues (2004) conclude that as confidence is gained, greater steps are taken and incentives being increased, usually result in graduated mastery until there are few, if any, situations that a European sting allergic child would avoid. Upon reviewing the literature and reviews, it is apparent that cognitive-behavioral psychotherapy remains the most effective treatment of choice. In addition, family therapy, structural, or strategic is also indicated as adjunctive therapy to the cognitive-behavioral intervention with the identified patient.

This additional emphasis on the adjunctive requirement for family systems therapy is predicated on the parental aspects of anxiety, their own anxiety, and that of their child. There may even be indications for emotionally focused therapy (EFT) for parents who need dyadic assistance in working through their emotions (Johnson, 2004). There is a myriad of anecdotal information and research on the effects of chronic health conditions of children on parental relationships (American Association for Marriage and Family Therapy [AAMFT], 2015). EFT, buttressed by outcome studies, has a standardized set of steps to both deescalate marital tensions and soften blamers, while actively reengaging distressed couples (Johnson, 2004).

Despite the advantage that EFT has also been used with chronic illness, there are other forms of couple therapy, which have proven to be as effective as EFT. Manassis (2012) emphasizes that parental anxiety is a sufficient issue with anaphylactic children and other allergies. There are at least two questionnaires now developed to evaluate parents of allergic children. Focusing on this parental anxiety, Mandell, Curtis, Gold, and Hardie (2005) came to the conclusion that individuals of children who had multiple allergies or had experienced anaphylaxis were the most anxious subset of parents. Akesson, Worth, and Sheikh (2007) found that adolescents with anaphylaxis experienced more parental overprotection than those with allergies perceived to be less severe. It appears that mainly mothers manage the management of children's allergies, and thus, they are considered more vulnerable to anxiety (Manassis, 2012).

Professionals may also become anxious in dealing with individuals with severe allergies (Hawkes, Mulcair, & Hourihane, 2010). Hawkes et al. (2010) cited the fact that Irish General Practitioners frequently admit children to hospitals that have egg allergies while they undergo vaccinations. This, despite their admission, is not considered any form of medical emergency requiring the protection of inpatient status.

Further Strategies for Dealing With Excessive Parental Anxieties

Manassis (2012) outlines a compendium of strategies, interventions, and proactive steps that would help ameliorate excessive parental anxieties. In mentioning that families should recognize that they are psychologically distressed, she is implicitly advocating for the aforementioned family therapy interventions

where necessary. There should be effective psycho-education that would help families transition the management of the allergic individual to self-management, fading away family and/or parental management. Manassis (2012) emphasizes that children with insect-sting related anaphylaxes should have VIT and EpiPen injectors. Over time, children graduate into their next level of developmental age appropriate phases. Parents need to be instructed in how to relate to these changes. It would potentially reduce their anxieties upon understanding what worked with a frightened seven-year-old may be wholly inappropriate or futile with a rebellious thirteen-year-old.

AAMFT (2015) indicate that siblings are often left out of the loop. They may respond to the extra attention that their allergic sibling gets by vacillating between empathy one day, resentment the next day, and *schadenfreude* the next. Parents require assistance in dealing with sibling issues when one child is severely allergic, and thus, support groups, parental networking, and ongoing psychotherapy are all indicated as part of an ongoing treatment plan.

It should also be remembered that some anaphylactic prone individuals have pre-existing psychological difficulties, such as attention-deficit/hyperactivity disorder (ADHD) (Monga & Monassis, 2006). This overlay may complicate treatment plans. The capacity to forget, the admonitions and precautions, as well as the carrying, or mislaying, of an EpiPen, are merely some of the issues that will require different forms of intervention and treatment. The premorbid personality is also to note. Some anxiety-prone children with anaphylaxis may have presented with clinical anxious and/or depressive features prior to the first anaphylactic episode. Psychiatric and/or psychological evaluations, and subsequent treatment interventions, should not be deferred or minimized because the perception of the larger physical threat or mortality. This would merely elevate the anaphylaxis as an even greater presence in an individual's life and exacerbate co-occurring conditions if left untreated.

Application to Clinical Work

This topic has had a profound effect on the writer's clinical work. During the intensive research period, it emerged that many patients and their parents face problems regarding allergic members of their families. Albeit that in the geographical area where the writer resides hymenoptera stings are not as critical as in other regions and countries, it did emerge that food and peanut allergies are prevalent and a source of excessive anxieties to parents and children. In addition, those individuals, either parents or colleagues, who had an asthmatic child or sibling, spoke with deep emotion about the worry, concern, and toll that allergens can take on families and marriages. The literature on stings is not confined to wasp allergens in the same manner that literature about asthma and peanut allergies can be extrapolated to contribute greatly to the understanding of the dynamics affecting sting anaphylaxes. The propensity for those with wasp venom allergies to become avoidant and phobic perhaps distinguished this group more so from others in that one can more easily avoid peanuts at a picnic, than one can avoid a wasp sting. This topic has energized the writer to seek out this population more in depth and to provide more psycho-education to patients and their families. It is sorely lacking in the writer's geographical region. Ultimately, the writer is now motivated to delve deeper into this subject matter as part of her dissertation for her doctorate in clinical psychology (Psy.D.) at California Southern University with supervision and mentoring by Professors like co-author Dr. Pardo, who inspired this article and line of research.

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