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Review Article

Emergency Dermatoses

KeijiSugiura*, Mariko Sugiura

Department of Environmental Dermatology and Allergology, Daiichi Clinic, Nakaku, Nagoya, Japan

***Corresponding author:** KeijiSugiura, Department of Environmental Dermatology and Allergology, Daiichi Clinic, Nakaku, Nagoya, Japan. Tel:+81522040834, E-mail: ksugiura@daiichiclinic.jp

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Introduction

Some dermatoses require emergency treatment. A previous report found that 15% - 20% of patients visiting family physicians and emergency departments developed dermatoses[1], and Anatoli [1] reported that about 5% to 8% of all emergency department visitors have skin complaints. Because many dermatoses are visible, acute dermatoses are very prominent and induce patients to seek treatment. Most dermatoses are not life-threatening diseases; although rare cases requiring emergency treatment are occasionally seen. Here, we describe some emergency dermatoses induced by infection, allergy, and trauma, to help make many physicians aware of emergency dermatoses and to improve the care of people with these conditions.

Keywords: Allergy; Dermatoses; Emergency; Infection; Trauma

Infection

Necrotizing fasciitis

Necrotizing fasciitis can occur after trauma or surgery, and lead to rapidly progressive necrosis of the deep fascia and subcutaneous tissue. Skin manifestations include swelling with pain, erythema and burgundy skin color with bulla and hematoma, and indurated edema with bad-smelling. General symptoms include high fever with an anguished look. The two types of bacteria that cause this disease are group A beta-hemolytic s*treptococci* and *Staphylococcus aureusin* type 2, and non-group A *streptococci*, gram-negative enterococci or aerobic bacilli, peptostreptococcus and mixed anaerobes in type1[2-4]. The risk factors of this fasciitis are diabetes, immunosuppression, vascular disease, drinking alcohol, and trauma. If physicians suspect this condition, early treatment by surgical debridement of necrotizing tissue and broad-spectrum antibiotics with hospitalization is needed. Without rapid, correct treatment, patients develop shock, sepsis, organ failure and poor prognosis. It has been reported that up to 70% of patients develop sepsis [2,3].

Tetanus

Tetanus is a common acute neurological disease in developing countries. Tetanus is caused by clostridium tetani infection via a cutaneous wound. A venom, tetanospasmin, affects the peripheral and central nerves, thus resulting in sympathetic nerve activation such as general cramps, arrhythmia, changes in blood pressure, respiratory arrest and hyperhidrosis. It is important to keep the wound clean, and one way to prevent tetanus is to cleanse the wound promptly. This disease can be prevented by a vaccine; the World Health Organization (WHO) recommends the administration of three doses of a tetanus toxoid [5].

Allergy

Anaphylaxis

Anaphylaxis was first described in 1902 [6]. The incidence of anaphylaxis ranges from 1.5 to 7.9 per 100,000 person-years, and about 0.3% (95% CI 0.1-0.5) of the European population was reported to experience anaphylaxis [7]. Most cases of anaphylaxis are caused by food products (32.2%), drugs (29.2%), and insect venom (19.3%) [8].

There are three main clinical types of food allergy, including anaphylaxis, Food-Dependent Exercise-Induced Anaphylaxis (FDEIA), and Oral Allergy Syndrome (OAS) [9]. Anaphylaxis and FDEIA are life-threating reactions. Worm [10] reported that in children, the most frequent trigger is food, and in adult cases insect venom and drugs are frequent triggers. A previous report showed that the most common foods to induce these reactions were shellfish and peanuts [11], and another report showed the most common food allergens to be cow milk, egg, peanuts, tree nuts, soy, and shellfish [12]. The kinds of foods that cause anaphylaxis vary depending on eating habits, religion, country, and local area.

The most common drugs that cause anaphylaxis have been

found to be Nonsteroidal Anti-Inflammatory Drugs (NSAID) and antibiotics [13,14]. Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) are life-threating drug allergy.

Systemic allergies against insects have been reported in up to 3-8.9% of adults and 1% of children [15-19]. Insect allergies are well-known to be caused by *Hymenoptera* and formicidae[14]. *Hymenoptera* stings can result in very severe anaphylaxis [20]. Bees are divided into apids and vespids, and vespids can sting repeatedly. Aphids usually sting once and leave the stinger in the skin. In cases of vespid stings, the clinical symptoms are more severe than with aphid stings. Anaphylaxis requires rapid treatment with hospitalization. If the patient does not receive medical treatment, he or she will develop shock symptoms. It is recommended that outdoor laborers and patients with bee allergies always have an epinephrine auto-injector (EpiPen®) in their possession.

Stevens-Johnson Syndrome (SJS) andToxic Epidermal Necrolysis (TEN)

SJS and TEN are life-threating drug allergies. Most cases of SJS and TEN are drug induced [21], with 80-90 % of TEN cases [22] caused by drugs including sulfa drugs, antibiotics, NSAIDs, and antiepileptic agents [23]. SJS is also referred to as mucocutaneoocular syndrome; MCOS, and it is a serious erythema multiforme type of drug-induced eruption. This is an epidermal necrotizing disorder characterized by as erythema, bulla, epidermal necrosis, mucosa erosion, and desquamated skin. SJS can often progress to TEN, and the incidence of death is approximately 20-30%. In such cases, widespread skin disorders can be seen, and it can result in fluid loss, electrolyte imbalance, skin barrier breakdown, easily infection (bacteria, fungal), ocular disability, corneal ulcerations, and an inability to regulate body temperature. These symptoms can result in high fever, hypotension, painful burning, tachycardia, conjunctivitis, melena, renal failure, respiration failure, and coma.

Food-Dependent Exercise-Induced Anaphylaxis(FDEIA)

The first case of this anaphylaxis was reported in 1979 [24]. It is triggered by exercise (physical activity) after the consumption of allergenic foods. Common allergens that can cause FDEIA are tomatoes, peanuts, cereals, shellfish, oranges, milk, mushrooms, flour and soybeans [25-29]. Most cases of FDEIA occur within 2-3 hours after eating. Often, when students develop FDEIA, it occurs in physical education class after lunch. It is important for individuals with FDEIA to avoid allergens before exercise. Patients who consume allergens should rest quietly for at least 2-3 hours afterward.

Urticaria

Urticaria or angioedema with respiratory symptoms (dyspnea, wheezing, cough) or interstitial symptoms (abdominal pain, diarrhea) involve not only urticaria but also edema of the respiratory or gastrointestinal tract. These symptoms can lead to suffocation or ileus depending on the case. It is recommended that a fast-acting steroid injection be administered

Trauma

Extensive or Airway (Respiratory Tract) Burn

Extensive burns can cause dehydration within 1 hour and infection can develop within 48 hours, and such cases require intensive care. Replenishment of water and infection prevention are essential treatments in the early stage of an extensive burn. Extensive burns can have many different causes, such as traffic accidents, occupational burns and even to taking an excessively hot bath.

Airway (respiratory tract)burns lead to inflammation or necrosis of the mucus membrane of the trachea. Signs of airway burns include scorched skin around the mouth and nose and the scorching of nose hairs. Airway burns can be caused by accidental explosions, fire, smoking under oxygen treatment and others. When a physician sees a patient with these signs, it is important to maintain the airway for breathing, even just in suspected cases.

Chemical Burns

Chemical burns make up 3-5% of all burns [30] and cause 30% of burn-associated deaths[31,32]. Chemical burns can be caused by six different processes, namely reduction, oxidation, corrosion, vesication, desiccation, and protoplasmic poisoning, and such burns result in protein denaturation [33,34]. Denatured tissue protein can't regenerate as protein; it needs to be removed. Chemical substances remain and cause progressive destruction of tissue until they are inactivated by tissue reactions [35], and this often results in deep burns. A widespread chemical burn can lead to organ failure in other organs. Because the depth of the burn and the failure of other organs depend on the duration of the contact with chemical compounds [36-39], the wound must be washed and debrided immediately.There are various compounds causing chemical burns as follows [40]:

- Acids: acid burns cause coagulative necrosis;
- Alkalis: alkalis cause liquefactive necrosis that may progress to deeper tissues;
- Bases: bases lead to deep burns and cause liquefactive necrosis of the tissue;
- Organic solutions: organic solutions are absorbed quickly and cause disorders in other organs;
- Phenol (carbonic acid): phenol absorption causes cardiac arrest, renal failure, and liver failure;
- Hydrofluoric acid: hydrofluoric acid affects cell membranes and produces coagulation necrosis with severe pain;
- Chromic acid: chromic acid penetrates cell membranes and

causes coagulative necrosis, renal failure, and liver failure;

- Cement: cement is a common cause of chemical burns and is classified as an alkali;
- Tar: tar causes liquefactive necrosis; and
- Hydrochloric and sulphuric acids: hydrochloric and sulphuric acids cause coagulative necrosis.

The essential treatments and management techniques for chemical burns are wound evaluation[36-39], neutralization[41], removal of the chemicals, debridement, and re-assessment of the injury[40].

Jellyfish, Snake and Spider with Venom Bite

Jelly Fish Stings

There are about 150 million cases of jellyfish stings per year [42]. There are five classes in the phylum Cnidaria: *Cubozoa* (box jellyfish), *Scyphozoa* (true jellyfish), *Hydrozoa* (Portuguese Man O' War, fire corals, and hydroids), *Anthozoa* (sea anemones and true corals), and *Staurozoa* (Stauromedusae) [43,44]. *Cubozoa* (box jellyfish) are the most dangerous jellyfish; they are found in harbors and shallow waters [44, 45]. The venom of Cubozoa is a cardiotoxin, and Cubozoa stings can lead to death in less than 30 seconds [46]. Cubozoa are divided two subgroups: Carybdeids with four smaller tentacles, and Chirodropids with large multi-tentacles [47,48]. Carybdeid stings cause severe life-threatening systemic symptoms which are collectively referred to as Irukandji syndrome [49,50].

Chirodropids are the most life-threatening animal in the world and are found in the summer months in both the Northern and Southern Hemispheres. They sting in shallow water and cause envenomation [49]. A few hours after being stung by a Chirodropid, swelling, blistering, and necrosis occur. If the victim does not rapidly receive first aid or medical treatment, he or she will stop breathing within a few minutes after the envenomation and die [49]. The Australian Resuscitation Council (ARC) recommends vinegar application, tentacle removal, and ice-pack application.

Snake bites

Snake bites cause many symptoms depending on the kind of snake or venom encountered. The frequency of snake envenomation was 421,000 to 1,842,000 cases and the number of deaths among these cases was 20,000 to 94,000 each year [51]. The prevalence of snake bites is 13.33 in South and Southeast Asia, 12.59 in Latin America and 11.11 cases in sub-Saharan Africa / 100,000 inhabitants [52-54]. Most snake bites occur in South and Southeast Asia, Sub-Saharan Africa, and Latin America [55-57]. Surprisingly, in only one country, India, which has the most snake bite deaths in the world, the number of deaths ranges between 15,000 and 50,000 a year [58]. The mortality rate of snake bites depends upon the species and size of the snakes, the amount of venom, the site of the bite, the presence of bacteria in the mouth of the snake, and the human action taken after the snake bite [58].

The gender breakdown of snake bite victims shows that more males than females suffer from snake bites, most likely because males engage in more outdoor activities than do females [59,60]. Most snake-bite victims are farmers and laborers, especially in rural areas; also, 55% of snake bites occur in the early morning (before 6 am) [58]. One possible explanation for this timing is that farmers and laborers start working early in the morning and most snakes are active in the night and early morning.

At present, there is a global antivenom crisis. The WHO estimates that it needs about 10 million vials of antivenom each year to control the effects of snakebite envenomings[56, 61], although low prospects for commercial returns and a lack of interest have hampered the advance of antivenom technology [62].

Spider Bites

There are more than 50,000 spider species in the world, and about 4% of them are considered dangerous to humans [63-67]. Spider venom can cause several tissue disorders; these venoms are divided into two main types, neurotoxins and necrotoxins[63,68]. Spider venom affects muscular systems and blood cells and results in breathing difficulties and death. Surprisingly, the toxicity of some spider venoms is 15 times than that of the typical viper [67].

Previous reports found that the frequency of spider bites is highest during warm seasons (August in the northern hemisphere) [69-73]and during times when spiders are active (8:00-20:00) [74]. The symptoms caused by spider bites include both local (erythema, edema, itching, burning, and pain) and systemic reactions (dyspnea, hypotension, anxiety, vomiting, diarrhea, and fever).

FormicidsBites

More than 12,500 species of ants have been reported [75]. Ants possess poison glands in the posterior part of their bodies [76], and the ant venoms that cause anaphylaxis are spray acids and alkaloids derived from piperidine [25, 26,77,78]. The poison glands of ants secrete a variety of chemicals which vary between ant queen and workers [76]. Sting reactions are normally immediate local reactions (pain, swelling, and erythema at sting sites within 1-4 hours after ant stings), immediate large reactions (a reaction larger than 10 cm in diameter persisting for longer than 24 hours), general cutaneous reactions (pruritus and urticaria), systemic reactions and delayed-type hypersensitivity [79], and life-threatening systemic reactions (anaphylaxis).

Systemic allergic reactions (anaphylaxis) were reported to occur in about 2% of fire-ant sting cases [80,81]. One way to prevent spider or formicids bites is to wear long-sleeved shirts, pants, and gloves sprayed with insecticide.

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