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Case Report

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A Pediatric Case of Burn Associated with Kawasaki Disease

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Abstract

Introduction: Kawasaki disease is known as mucocutaneous lymph-node syndrome. This paper present and discuss a rare case of burn associated with Kawasaki Disease.

Case presentation: The case was an 8 months-old female who was injured by scald burn on her jaw, chest, and right thigh. On day 5 of injury, she had high fever without any symptoms of wound sepsis. At the same time, she had systemic rash with conjunctival inflammation, red tongue, swollen lips and erythema of the peripheral extremities. We diagnosed that the fever was caused by KD. Intravenous immune globulin and aspirin were administered, which lead to her clinical condition to improve and she was discharged on day 21 of injury.

Conclusions: While some agents have been suspected, the cause of KD is still unknown. It is not so easy to diagnose KD on pediatric burn patients. It is necessary to rule out infection-related disease before applying the diagnostic criteria for KD. One should bear in mind the possibility of KD if we find pediatric burns with fever and systemic rash regardless of wound infection.

Keywords: wound sepsis, pediatric burn, systemic rash, intravenous immunoglobulin

Introduction

Kawasaki disease (KD), known as mucocutaneous lymph node syndrome, is a rare disease in which blood vessels throughout the body become inflamed. The most common symptoms include fever that lasts for more than five days and not affected by usual medications. Symptoms include

large lymph nodes in the neck, rash in the genital area, and red eyes, lips, palms and soles of the feet. KD affects between 8 and 67 per 100,000 people under the age of five except in Japan, where it affects 124 per 100,000. It is much less common for over 5 years-old. Boys are more commonly affected than girls. We experienced an 8-month-old female baby admitted to the hospital with second degree scaled burn of 13% TBSA. Five days after admission, she had high fever and skin rash with 5 of 6 clinical symptoms and signs of KD. This clinical report discusses the relationship between burn and KD, and diagnosis and treatment of KD in burn children.

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Case Report



Figure 1. Appearance of burn wounds on admission.

An 8 months-old female accidentally toppled the electric water-boiler kettle on the table, and suffered scald burn from the boiling water spilled on the table. She sustained superficial dermal burns on her jaw, chest and right thigh (Figure 1). Her burn wound covered 13% of the total burn surface area (TBSA). No pathogenic vital signs were recognized except body temperature of 37.5 °C.

Primary fluid resuscitation was administered to ensure urine volume of 0.5 to 1.0 mL/kg/h or more, after admission. Burned wounds were treated with basic fibroblast growth factor (bFGF) during daily dressing changes.

On day 4 after injury, fever temperature was above 39°C, however, leukocytosis or elevation in the serum CRP was not observed. There were no signs of wound sepsis including offensive odor or purulent exudate. We discontinued the use of the dressing materials, considering the possibility of allergic response to the dressing material. Hence, we changed it to silver-containing non-stick coating material made of hydro-fiber (AQUACEL™ Ag) and gauze that was applied over the wound.

On day 5 after injury, the body temperature was still elevated at above 40 °C. Atypical rash was observed on the trunk and limbs (Figure 2). Hyperemia of ocular conjunctiva, redness of the lip, pharyngeal mucosa, irregular rash and edema on the limb extremity appeared. No pathogenic bacteria were cultured from blood samples. ASLO test was also negative. EKG findings and



Figure 2. Atypical rash observed on the trunk and limbs.

urinalysis were within normal range. Her fever lasted more than 5 days, and her symptoms satisfied five of the six diagnostic criteria set for KD, therefore she was diagnosed as Kawasaki Disease.

From day 6 of injury, she was administered with 2 g/kg of IVIG and 40 mg/kg of aspirin. The fever subsided on day 7 of injury. The administration of aspirin was continued for 7 days in high dose, followed by low dose administration for 2 months. After the diagnosis of KD was made, UCG studies were performed weekly during admission and followed after discharge. The series of UCG studies have not revealed any evidence of coronary artery aneurysm. All the wounds became epithelialized, and she was discharged 21 days after admission.

Discussion

Kawasaki disease was first described in 1967 by T Kawasaki [1]. This patient was diagnosed as KD, because she had 5 of 6 clinical symptoms and signs of KD [2] on day 5 after injury. There are very few clinical reports about Kawasaki disease associated with burn injury. Feng *et al.* [3] reported on a case of less than 5 years-old. Even if TBSA is small, KD can occur. TSST-1 (Toxic Shock Syndrome Toxin-1) produced by *Staphylococcus aureus* or Methicillin-Resistance *Staphylococcus aureus* (MRSA) infection in the pathogenesis of KD is not found in all cases of wound site infection.

While various agents have been suspected, the cause of KD is still unknown. We also found no evidence of wound infection and TSST-1 in this case (Table 1). Based on these reports, it is worth remembering that there is

decrease in immune function or wound infection as results of childhood burn injury. Fever during burn injury often involves infection, but in the absence of symptoms of wound infection but with high fever despite the

Table 1. Case reports of burns associated with Kawasaki Disease.

.year	author	age	gender	%TBSA	Onset day	notes
2000	Kojima, <i>et al</i>	9m	m	15	9	MRSA(+),TSST-1*(+)
		1y1m	f	20	7	MRSA(+),TSST-1*(+)
2010	Nakagawa, <i>et al</i>	11m	m	1	4	
		1y9m	m	3	2	TSST-1*(+)
2011	Feng, <i>et al</i>	<5y	unknown	unknown	2	
2016	this case	8m	f	13	5	

*TSST -1: toxic shock syndrome toxin 1

possibility of KD in pediatric burn cases with fever and systemic rash regardless of wound infection. Feng *et al* [3] also advocated KD may be suspected in burn children younger than 5 years-old if they had fever and skin rash at the same time. However, it is also necessary to rule out Scarlet fever, Stevens-Johnson syndrome, toxic shock syndrome, before diagnosing KD.

Sobouti *et al.* [4] measured the amount of blood immunoglobulin on infantile burn patients under 6 years old on 3-5 days after injury. Although the drop in the serum concentration of immunoglobulins is irrespective to the burn size, more severe burn is associated with more decrease in the serum levels of IgA, IgM, IgG and its subclasses. Jefferson *et al.* [5] examined the effect of immunoglobulin administration after injury on patients with burns of TBSA > 40% who were 18 years of age or younger. They concluded prophylactic IVIG-B is associated with a reduction in the incidence of septic episodes and decreased the length of hospital stay following major thermal injury.

Although the etiology of KD is unknown [6], the association of KD may occur due to

administration of antipyretics, accompanied by rash could be associated with KD. We speculate that the association of KD with burn injury in this patient may be related to stress or injury-induced immunologic changes, skin or tissue antigen release, weakened skin barrier or another micro-organism infection.

Intravenous immunoglobulin and high dose aspirin are recommended for the treatment of KD [7]. Aspirin is used in high dose for its anti-inflammatory properties and in low dose for its antithrombotic effect [7]. Both intravenous immunoglobulin and aspirin were administered to this patient, resulting good outcome. It is not so easy to diagnose KD on pediatric burn patients. It is necessary to rule out infection-related agents and apply the diagnostic criteria for KD.

Conclusion

A rare case of pediatric burn associated with Kawasaki Disease was reported and discussed.

Learning Point

One should consider the possibility of Kawasaki Disease regardless of wound sepsis or not, if skin eruptions are

accompanied with high fever in pediatric burn patients.

Competing of Interests

The authors have no conflict of interests.

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