

CASE REPORT

Pulmonary Injury from Waterproofing Spray During a Hike

Tomonori Harada, MD, PhD; Yukio Hirabayashi, MD, PhD; Yuriko Takayama-Isagawa, MD; Hiroto Sakamoto, MD; Makoto Kawaishi, MD; Hiroyuki Hara, MD, PhD; Shin Aizawa, MD, PhD

From the Nihon University School of Medicine Tokusawa Clinic, Nagano, Japan (Drs Harada, Hirabayashi, Takayama-Isagawa, Hara, and Aizawa); the Division of Anatomical Science, Department of Functional Morphology, Nihon University School of Medicine, Tokyo, Japan (Drs Harada, Hara, and Aizawa); the Division of Hematology, NHO Matsumoto Medical Center, Nagano, Japan (Dr Hirabayashi); the Division of Digestive Surgery, Nihon University School of Medicine, Tokyo, Japan (Dr Takayama-Isagawa); the Matsumoto City Hospital, Nagano, Japan (Dr Sakamoto); and the Division of Respiratory Diseases, Department of Internal Medicine, Jikei University School of Medicine, Tokyo, Japan (Dr Kawaishi).

A 48-year-old man developed general fatigue, dyspnea, and fever at an altitude of 1562 m from the morning of the first day of a 3-day hike. Despite pharyngeal discomfort and mild general fatigue, he felt that the symptoms were not sufficient to abandon his plan. He usually required 1.5 hours to reach Tokusawa (6.4 km from the starting point at an altitude of 1500 m), but this time he required 2.5 hours and slept briefly upon arrival at Tokusawa due to extreme fatigue and respiratory discomfort. His symptoms became aggravated, so he presented at a mountain clinic with oxygen saturation at 80% and body temperature of 37.6°C. He was diagnosed with hypoxemia due to pneumonia and/or other disease(s) and was evacuated to a hospital where a chest computed tomography scan revealed ground glass opacity and infiltrative shadows. He was treated for pneumonia, but another doctor discovered during follow-up that the patient had sprayed 300 mL of a waterproofing aerosol on mountain equipment in a nonventilated, enclosed area of his home on the night before starting out on the hike. Therefore, waterproofing spray was considered to have caused pulmonary damage. Self-reporting or appropriate questionnaires are the only means of identifying this type of injury. The differential diagnosis of pulmonary problems in an outdoor setting should include toxic aerosol exposure from waterproofing spray.

Keywords: waterproofing spray, aerosol, pulmonary injury, hiking

Introduction

Protection against becoming wet is essential for safe and comfortable outdoor activities.^{1,2} Waterproofing or leather protector compounds containing fluoropolymers, silicone resins, petroleum hydrocarbons, or other solvents are sprayed onto surfaces to repel water and dirt. However, these products can cause acute lung injury when applied in poorly ventilated areas.^{3–5} The elapsed time to development of symptoms such as shortness of

breath, chest tightness/pain, dry cough, throat pain, headache, nausea/vomiting, fever, lightheaded/dizziness, and general fatigue and fever varies from <15 minutes to 24 hours after inhaling an aerosol.^{4,6–9} However, leisure activities in remote areas could proceed before symptoms of delayed onset appear or worsen.

We describe a patient presenting with pharyngeal discomfort, general fatigue, respiratory discomfort, and fever that developed while hiking at an altitude of 1562 m. He was initially diagnosed with hypoxemia due to pneumonia and/or other disease(s), but further information suggested that inhaling 300 mL of waterproofing spray caused the pulmonary damage.

Case Report

A 48-year-old Japanese man presented with pharyngeal discomfort, general fatigue, dyspnea, and fever at a

The content of this manuscript was formally presented at the 7th World Congress of Mountain and Wilderness Medicine, August 1, 2016, in Telluride, Colorado, USA.

Corresponding author. Tomonori Harada, MD, PhD, Division of Anatomical Science, Department of Functional Morphology, Nihon University School of Medicine, 30-1 Ohyaguchikamicho, Itabashi-ku, Tokyo 173-8610, Japan; e-mail: harada.tomonori@nihon-u.ac.jp.

Submitted for publication April 2017.

Accepted for publication July 2017.