

High Altitude Pulmonary Edema (HAPE)
in Buddhasothorn Hospital: A rare case in Thailand
ภาวะ High altitude pulmonary edema (HAPE)
ในโรงพยาบาลพุทธโสธร : รายงานผู้ป่วยหายากในประเทศไทย

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Abstract

High altitude pulmonary edema is a life-threatening form of high altitude sickness that develops in unacclimatized individuals at altitudes over 2,500 meters which is rare case in Thailand. We report case a 58-year-old Thai female who traveled high altitude greater 2,500 meters above sea level and develop high altitude pulmonary edema. After she admitted at Buddhasothorn hospital, Thailand. The treatment was succeeded with oxygen therapy, diuretic drug, dexamethasone and calcium channel blocker. Herein, this report demonstrates the high altitude pulmonary edema's patient care experience in Buddhasothorn hospital in Thailand.

Key words: High altitude pulmonary edema, High altitude sickness, Thailand

บทคัดย่อ

ภาวะ High altitude pulmonary edema เป็นภาวะที่พบได้ในพื้นที่ความสูงเหนือระดับตั้งแต่ 2,500 เมตร ซึ่งเป็นภาวะอันตรายถึงแก่ชีวิตได้และพบไม่บ่อยในประเทศไทย รายงานผู้ป่วยอายุ 58 ปี มีประวัติเดินทางไปในพื้นที่สูงและมีอาการ high altitude pulmonary edema ซึ่งได้เข้ารับการรักษที่โรงพยาบาลพุทธโสธร ประเทศไทย โดยผู้ป่วยตอบสนองต่อการรักษาด้วยออกซิเจน ยาขับปัสสาวะ สเตียรอยด์ และยาในกลุ่ม calcium channel blocker รายงานนี้เป็นรายงานประสบการณ์การรักษาผู้ป่วย high altitude pulmonary edema ในประเทศไทย

คำสำคัญ : High altitude pulmonary edema, High altitude sickness, ประเทศไทย

Introduction

High altitude pulmonary edema symptom is one of the life-threatening form of high altitude sickness⁽¹⁾. High altitude pulmonary edema's patients are usually occurred in travelers who have experience to the high-altitude greater than 2,500-3,000 meters.^(2,3,4) The mechanism of this disease starts from non-cardiogenic pulmonary edema, which resulted from hypoxia that leads to pulmonary vasoconstriction, extravasation fluid leakage on pulmonary capillary beds level and pulmonary edema.^(5,6,7) Patients do not always have the acute leading mountain sickness symptoms such as headache, nausea or vomiting.⁽⁴⁾

Therefore, high altitude pulmonary edema is the prevalence symptom of the high altitude in geographical area about 2,500-3,000 meters above sea level, and this symptom does not commonly occur on the area lower than 3,000 meters. In Thailand, the highest peak of mountain is at Doi Inthanon, which is only 2,565 meters elevation. Consequently, high altitude pulmonary edema is the rare case in Thailand, and the physician experience is limited to the symptom. Herein, this report provides the high altitude pulmonary edema's patient care experience in Buddhasothorn hospital in Thailand.

Patient Case Report

A 58-year-old Thai female had been traveled to Zhong Dian, China for 3 days before doctor's visit. The average altitude of Zhong Dian is 3,300 meters above sea level. During her stayed in Zhong Dian, patient had headache and short breath. Two days before doctor's visit, she continued traveling to blue moon valley, which the average altitude is greater than 4,000 meters above sea level. After that, she had more exhaust and hard to lay flat on back. After she came back to Thailand then she immediately hospitalized at Buddhasothorn hospital.

The physical examination revealed that she had a tachypnea respiratory rate at 24 times/min, orthopnea, 88% of oxygen saturation at room air, fine crepitation both lungs, no engorgement of neck vein and no pitting edema at both legs. Chest radiography found that there was an alveolar infiltration in both lungs that was prominent in lower lung zones, normal heart size and no pleural effusion, which corresponded to the non-cardiogenic pulmonary edema. Electrocardiogram and echocardiogram were normal. Therefore, patient was diagnosed as high altitude pulmonary edema (HAPE).

Patient was treated by oxygen therapy and intravenous injection of furosemide 40 mg once daily for 2 days as well as intravenous injection of dexamethasone 5 mg every 6 hours. Patient responded well to initial dexamethasone and furosemide treatment since the first day. On the second day of treatment, she could lay flat on back and required less oxygen. The vital sign assessment was consistent, thus, the medications included oral administration of nifedipine 5 mg via every 8 hours, no further furosemide injection but still had the intravenous injection of dexamethasone 5 mg every 6 hours. The chest radiography was followed every 2 days. The pulmonary edema was obviously decreased, and the shortness of breath was recovered that resulted in no longer oxygen therapy within 3-4 days. The oxygen saturation level was normal. The total hospital admission was 4 days.

Discussion

High altitude pulmonary edema (HAPE) is the life-threatening condition. The diagnosis depends on patient's history and physical examination especially the history of present illness related to high altitude. Patients do not always have any underlying disease nor the leading symptom of acute mountain sickness such as headache, nausea or vomit. Nevertheless, the acute mountain sickness signs will provide a clue to prevent self-high altitude pulmonary edema.^(1,4)

Both acute mountain sickness and high altitude pulmonary edema should be informed to the tourists who will encounter to high altitude in order to prevent any health problems. Due to the less oxygen at high altitude (hypoxia), it leads to pulmonary vasoconstriction and increased pulmonary vascular pressure, which results in extravasation fluid leakage on pulmonary capillary beds level and pulmonary edema. Therefore, the prevention of this symptom is pre-acclimatization to the low oxygen level. Acetazolamide medication is reported to prevent high-altitude illness.^(8,9) Plus, there was a study showed that the taken of acetazolamide one day before ascending to altitude would reduce the risk and the severe effect from high altitude pulmonary edema. However, the preventive mechanism remains unclear. Additionally, dexamethasone is also reported to prevent high altitude illness and high altitude pulmonary edema via the reduction of systolic pulmonary artery pressure mechanism, which then reduces the high altitude pulmonary edema.⁽¹⁰⁾ Nonetheless, after high altitude pulmonary edema symptom manifestation, patients will be treated by oxygen, furosemide, dexamethasone and calcium channel blocker medicine, e.g. nifedipine, which aiming to the pulmonary vasodilating effects.^(11,12,13,14,15) The effects of these condition are decreasing pulmonary vascular pressure, extravasation fluid leakage and then will ultimately recover the pulmonary edema.

All in all, the prevention of high altitude illness and high altitude pulmonary edema is necessary for the tourists who will encounter to high altitude especially more than 2,500–3,000 meters elevation above sea level. The preventive medicine and treatment are also crucial for Thai physicians since the trend of travelling abroad to the ascending altitude is increasing.

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Picture No 1: Chest radiography at date of hospitalization (April,19 2017) until date of discharge (April,23 2017). Chest radiography show non cardiogenic pulmonary edema at the first date of admission and response to treatment.

