症例報告

A case of successful resuscitation after helium gas inhalation

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——Summary——（Jpn J Clin Toxicol 2017；30：251–253）

Case：We report successful resuscitation after inhalation of helium gas. A man in his 20s, with a history of depression, placed his head in a plastic bag connected to a helium tank by a hose in an attempt to commit suicide. The patient's Glasgow Coma Scale score was 3 when an ambulance with a physician arrived at the scene. Disturbance of consciousness and convulsions were confirmed. He was sedated, and oxygenated via a tracheal tube until arrival at our emergency department.

Outcome：The patient was treated with continuous infusion of crystalloid fluids and mechanical ventilation in the intensive care unit, and discharged on day 9.

Conclusion：The rapid improvement of oxygenation was effective to resuscitate the patient who had inhaled helium gas, although diminished attentiveness remained.

Key words：helium gas, suicide, low oxygen

INTRODUCTION

Helium gas, which is commercially available, is generally used to inflate balloons, and is rarely used to commit suicide. When the lungs are full of helium gas, they lack oxygen. Therefore, the inhalation of helium gas may result in death[1)～5)], and is described as a method to commit suicide on the Internet.

Most suicide attempts using this gas have resulted in death, with no case report of survival being published to date. We here describe a patient who survived a suicide attempt involving the inhalation of helium gas due to early oxygenation.

CASE REPORT

A male in his 20s, with consciousness disturbance, had a previous history of depression. His mother discovered him in his room, and called an ambulance. The patient had placed his head in a plastic bag connected to a helium gas generator by a hose in an attempt to commit suicide.

At the time of the arrival of an ambulance with a physician, the patient's blood pressure was 137/97 mmHg, heart rate was 103 beats per minute, respiratory rate was 15 breaths per minute, percutaneous oxygen saturation was 99%（10 liters per minute of oxygen），and the body temperature was 36.5°C. His consciousness was 3 on the Glasgow Coma Scale. Al-

though the pupillary size was 5 mm in both eyes, the light reflex was normal. Neither anisocoria nor a conjugate deviation was detected. The patient had clonic convulsions for approximately 5 minutes. He was diagnosed with anoxia caused by the inhalation of helium gas. Since spontaneous respiration was weak, tracheal intubation was performed to improve oxygenation. The patient was transported to the Emergency Department of our hospital.

On arrival, the patient was in a coma, but had stable vital signs. Electrocardiographic findings were normal. He did not have a previous history of attempted suicide. He had been receiving venlafaxine, cloxazolam, brotizolam, and flunitrazepam for the treatment of depression, but did not attempt to take an overdose of these drugs. Blood tests and computed tomographic（CT）scans of the head were unremarkable. The period of time for which the patient had inhaled helium gas was unknown, but a maximum of 3 hours was estimated. The patient was admitted to the intensive care unit（ICU）. The continuous infusion of crystalloid fluids and mechanical ventilation were performed. On day 2, his consciousness recovered, and he was extubated. His hospital stay was uneventful. On day 9, the patient was discharged. Examination of his higher brain function revealed attention deficit. However, this did not affect his daily life.

DISCUSSION

Helium gas is generally used to inflate balloons. Most individuals who have inhaled this gas in excess die, and no case report of survival has been published to date[1)～5)]. The cause of death due to helium gas inhalation is anoxia. Since the gas is not poisonous, it is not regarded as death by poisoning. Fatality depends on the duration of anoxia. In the case of survival, it is unclear what sequelae may occur. In the present case, attention deficit was identified as a sequela. To the best of our knowledge, this is the first published report of a case of successful resuscitation after helium gas inhalation.

The patient attempted to commit suicide by placing his head in a plastic bag connected with a helium gas generator in his room. Therefore, it was clear that inhaling this gas had led to consciousness disturbance. Since the gas is colorless, odorless, and tasteless, it is difficult to diagnose patients affected by it[2)3)]. Neither blood testing nor CT scanning detects abnormalities. Autopsy examination is also of no avail for diagnosing these cases of anoxia due to helium gas inhalation.

His helium generator was a new model without oxygen mixture. However, it was difficult to estimate the residual quantity of a used tank and inhalational quantity. It is possible that the plastic bag over the patient's head was not completely enclosed, and the duration of inhalation may have been short.

There is no specific medication to treat patients affected by helium gas. The improvement of oxygenation is the only effective treatment method. In the present case, the emergency medical team performed oxygenation via a tracheal tube, which was continued in ICU, resulting in successful resuscitation. Once a diagnosis of hypoxia due to helium gas inhalation is established, oxygenation needs to be promptly performed.

CONCLUSION

We herein reported a case of successful resuscitation after helium gas inhalation. Since most suicide attempts using this gas result in death, no case report of survival had previously been published. In the present case, early oxygenation was the key to successful resuscitation, although attention deficit as a sequela remained.

Conflict of interest

None.

References

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要　旨

症例は20歳代，男性。意識障害のため当院ドクターカー出動となった。患者は自殺企図のため自室にヘリウムガスボンベを持ち込み，ホースをつなぎ，頭からビニール袋をかぶってガスを吸入していた。接触時，血圧137/97 mmHg，脈拍103回/min，呼吸数15回/min，SpO_2 99％（10 L），GCS 3，体温36.5℃であった。約5分間の間代性痙攣発作あり，鎮静後，気管挿管施行し当院搬送となった。血液検査，頭部CT上は明らかな所見は認めなかった。入院後ICUで経過観察とした。第2病日に，指示動作可能であったため抜管とした。その後の経過にとくに問題はなかった。高次脳機能評価を行い，軽度の注意力低下を認めたが，大きな障害はなかった。第9病日に退院となった。ヘリウムガスは，ガス自体に毒性はないが，高濃度になると酸素欠乏による低酸素症になることがある。治療としては，酸素投与などの対症療法となり，解毒剤・拮抗剤はない。今回の症例では，意識障害，痙攣発作を生じたが，大きな障害を残さず改善した。