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Analysis of Clinical Characteristics of Stress Response in the Digestive System Caused by Altitude Sickness

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Abstract: Research background; At an altitude of more than 3,000 m in the plateau area, the oxygen is very thin, which can easily lead to adverse reactions that are difficult to adapt to such as hypoxia, cerebral edema, pulmonary edema, gastrointestinal diseases, etc. This adverse reaction is called altitude sickness, which may cause plateau disease to a certain extent. Research purpose; China belongs to mountainous and hilly areas, and there are countless plateau areas in the southwest, and there are many residents with plateau diseases. In highland areas, in order to reduce altitude sickness and other situations, it is very necessary for us to study the mechanism and treatment process of altitude sickness. Research method; This study conducted a statistical analysis from the statistics of altitude sickness patients from Daocheng county-level medical institutions in Ganzi Prefecture, Sichuan Province from 2010 to 2023. Analysis of the clinical characteristics of cerebral edema, pulmonary edema and gastrointestinal diseases due to altitude sickness, and study the mechanism and principle of occurrence. Research results; The plateau area is an environment prone to hypoxia. Such an environment is most prone to pulmonary edema and cerebral edema. In the study, we found that acute plateau reaction can solve the problem by inhalation of oxygen, but clinically, pulmonary edema, cerebral edema, etc., as well as gastrointestinal diseases.

Keywords: Plateau Reaction, Alpine Disease, Cerebral Edema, Pulmonary Edema, Gastrointestinal Disease, Blood Oxygen Saturation

1. Introduction

The medical community has been studying diseases such as altitude sickness for many years, but there are many residents who cause altitude sickness in the plateau area. Local doctors are difficult to deal with, and some residents even have symptoms such as cerebral edema, pulmonary edema, gastrointestinal diseases, etc. due to the further aggravation of altitude sickness [1]. Mild clinical manifestations of altitude sickness include drowsiness, general weakness, cleft nails and lips, faster breathing, numbness of limbs, etc. [2]. When the patient's acute altitude sickness is not treated in time, the patient's hypoxia is further aggravated, and cerebral edema, pulmonary edema and gastrointestinal diseases may occur clinically. Patients with basic diseases, such as hypertension, hyperglycemia, etc., may have an emergency state of basic diseases, and the disease is very difficult to control [3-5]. The main manifestations of gastrointestinal diseases have a lot to do with the degree of hypoxia and time. When the degree of hypoxia is not heavy and the time is not long, it is mainly manifested as abdominal distension, indigestion, abdominal pain, diarrhea and other manifestations. When the degree of hypoxia is further aggravated, the mucosa of the gastrointestinal tract ischemia and hypoxia, necrosis, the displacement of the flora in the intestine, clinically, fever, mucus and blood stool, severe sepsis, and even death. When residents in plateau areas have altitude sickness, in addition to paying attention to cerebral edema and pulmonary edema, we still need to be alert to gastrointestinal diseases, because the gastrointestinal tract can still cause fever, gastrointestinal infections, and even mucus blood stools. Gastrointestinal diseases caused by altitude sickness can still lead to serious complications and even death. Therefore, clinicians must pay

the same attention.

2. Research on the Mechanism of Plateau Reaction

The stress changes and mechanisms of the body after the acute plateau reaction. The state of hypoxia in the body → sodium/potassium pump lacks ATP [6] → lack of energy in muscle tissue activity; leading to fatigue, lack of energy in brain tissue; leading to tissue edema; at the same time, brain tissue and endocrine system regulates and stimulate sympathetic nerve and vagus nerve excitation [7-10] → cerebrovasodilation, cerebral edema further aggravated. The pulmonary blood vessels are full and dilated, and the breathing is faster. When the body regulates the hypoxia process, pulmonary edema occurs [11-13]. Vascular contraction in the gastrointestinal tract distributes blood flow to important organs, including the heart, brain, kidney, lungs, etc. After gastrointestinal ischemia, mucosal ischemia, hypoxia, necrosis, flora displacement in the intestinal tract, fever, mucus blood stool, severe sepsisemia, and even death [14-16]. As shown in Figure 1.

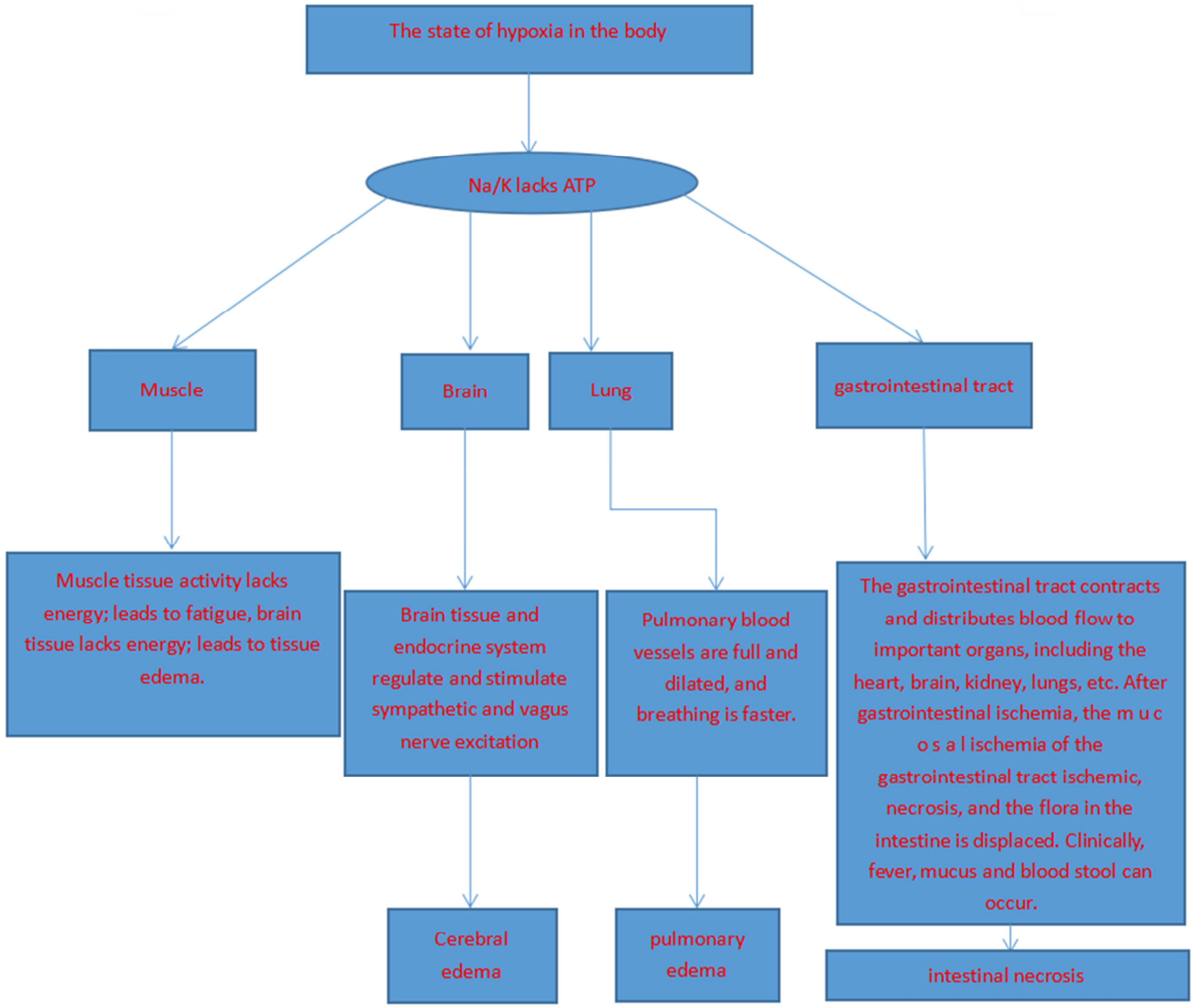

Figure 1. *Research on the stress changes and mechanisms of the body after acute plateau reactions.*

3. Analysis of Clinical Characteristics of the Research Results

This study statistics that there have been 14567 alpine patients in outpatient emergency and inpatient departments in Daocheng County Medical Institutions from 2010 to 2023. 189 inpatients were analyzed in terms of diagnosis and treatment ability; 35 referrals due to severe cerebral edema, pulmonary edema and other diseases. There are 34 deaths due to serious complications and accidents, as shown in Figure 2. From clinical manifestations, 12,353 patients with mild hypoxia, 246 patients with cerebral edema, 1,372 patients with pulmonary edema, and 596 patients with gastrointestinal diseases, as shown in Figure 3. 3 people/times gastrointestinal bleeding and 234 diarrhea. 301 people/times abdominal pain, 58 people/times indigestion and abdominal distension, see Figure 4.

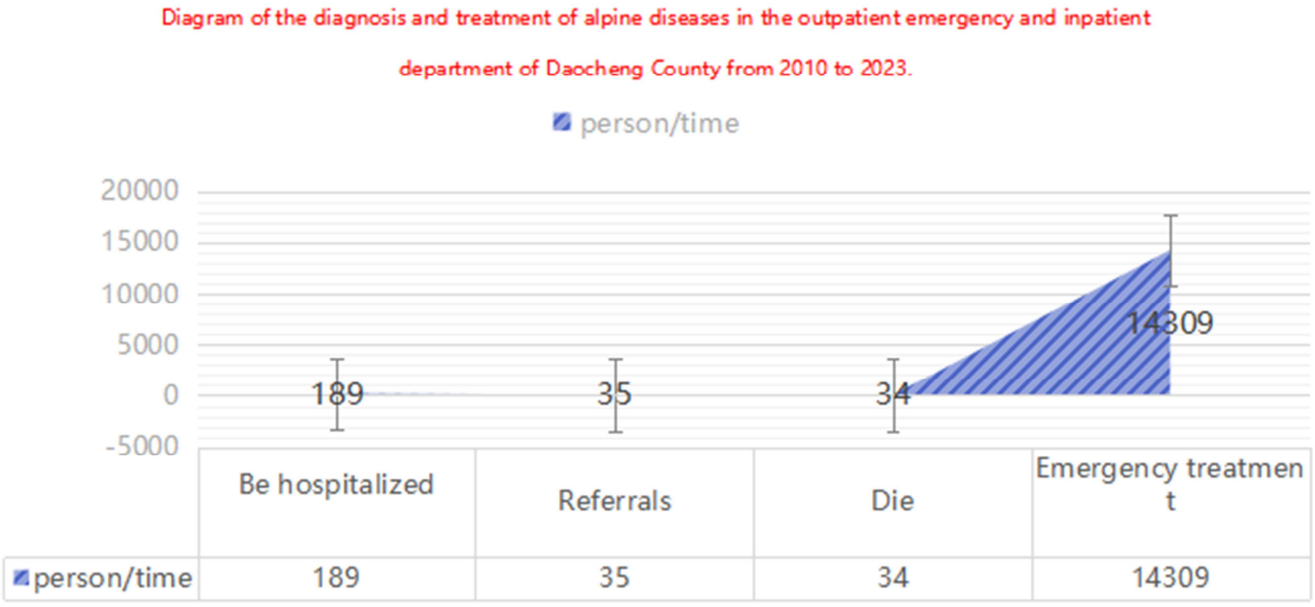

Figure 2. *Diagram of the diagnosis and treatment of alpine diseases in the outpatient and emergency department of Daocheng County from 2010 to 2023.*

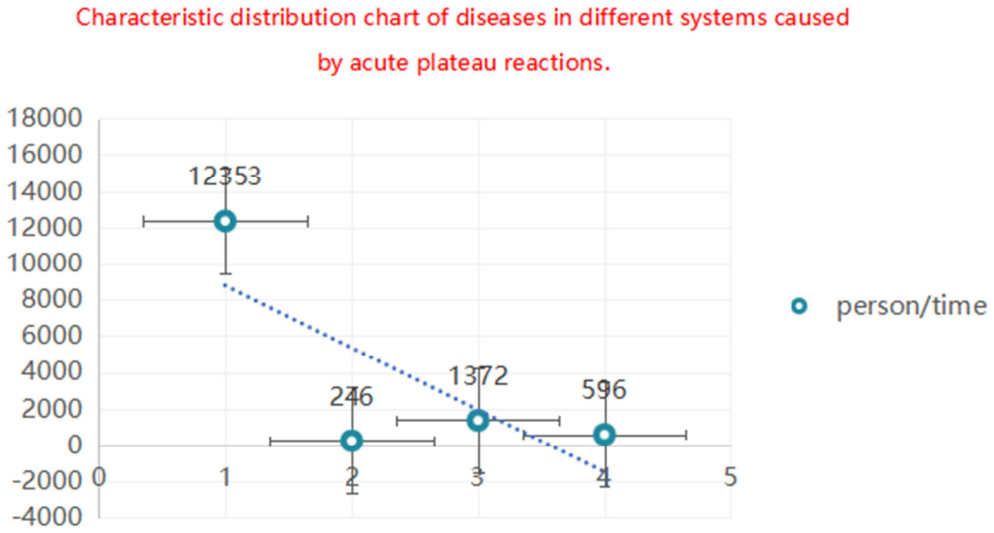

Figure 3. *Characteristic distribution chart of diseases in different systems caused by acute plateau reactions.*

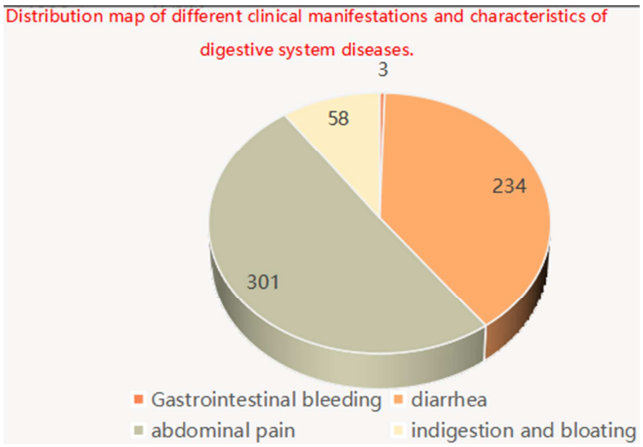

Figure 4. *Distribution of different clinical manifestations of diseases of the digestive system.*

4. Discussion

In this study, it can be seen that the clinical manifestations caused by acute altitude sickness are different, such as the nervous system, digestive system, respiratory system, etc. [17]. Acute altitude sickness in the plateau area is mainly caused by diseases of the nervous system and respiratory system [18], while other systems still react. Clinically, the digestive system is easy to be ignored, but clinically, there are many patients with digestive system diseases caused by acute altitude sickness. Therefore, this study has clinical significance. Digestive system diseases are mainly characterized by diarrhea and abdominal pain. In rare cases, serious digestive tract complications, that is, gastrointestinal bleeding, can occur after severe hypoxia and abnormal regulation. Prevention and treatment of acute altitude sickness. In the plateau area, it is recommended that everyone eat

light and easily digestible food and control drinking. Patients with mild acute altitude sickness clinical symptoms can take oxygen, rest, and avoid strenuous activities. See the hospital in time when there are clinical manifestations of cerebral edema, pulmonary edema and digestive tract diseases. Avoid serious complications caused by aggravation of hypoxia. For clinical treatment, treatment is carried out according to the specific manifestations of the patient. Mild hypoxia can improve symptoms by inhaling oxygen. For pulmonary edema, cerebral edema and other manifestations, they should be treated in accordance with the principle of disease treatment. Patients who cannot be diagnosed and treated in time should be referred in time.

5. Conclusion

The plateau area is an environment prone to hypoxia. Such an environment is most prone to pulmonary edema and cerebral edema. In the study, we found that acute plateau reaction can solve the problem by inhalation of oxygen, but clinically, pulmonary edema, cerebral edema, etc., as well as gastrointestinal diseases. Such gastrointestinal diseases cannot be ignored! Clinically, everyone needs to pay attention to this kind of disease!

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