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Progress in the Treatment of Diarrhea in Children

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Abstract: *Diarrhea in children is a diarrhea-based disease caused by multiple pathogens and factors. The main features are increased frequency of stool, thin (watery stool), usually accompanied by vomiting, food restriction and other phenomena. Its pathogenesis is complex, usually low immunity, unclean diet, cold abdomen, intestinal flora imbalance, bacterial infection, viral infection, etc. can cause diarrhea. The disease has many pathogenic factors, and has a great impact on the growth and development of children as well as physical and mental health. This article will review the latest progress in the treatment of the disease in recent years, in order to provide help and reference for clinicians.*

Keywords: *Infantile diarrhea; pathogenesis; integrated traditional Chinese and Western medicine; treatment progress*

1. Introduction

Pediatric diarrhea is usually more common in the department of gastroenterology. Because the immune function and intestinal absorption function of children are not fully developed, children are often prone to diarrhea. The cause of the disease is complex and the onset is relatively rapid. Not only the frequency of defecation will increase, but also thin stools are often accompanied by nausea, vomiting, and difficulty eating. If there is no timely intervention, severe cases will lead to dehydration and even life-threatening. This article summarizes and summarizes the latest progress in the treatment of diarrhea in children.

2. Overview of the pathogenesis of diarrhea in children

2.1. General factors

Compared with adults, children have weaker body resistance and are more sensitive to changes in weather and surrounding environment, especially when they catch a cold, it is easy to cause diarrhea [1]. In addition, sudden changes in eating habits and intrinsic factors such as overeating can trigger diarrhea.

2.2. Bacterial infection

The body defense ability of children is poor. When Escherichia coli, Gluconococcus aureus, Salmonella, Vibrio cholerae, Campylobacter and non-typhoid bacteria will attach to the surface of intestinal epithelial cells to multiply and release toxins [2] When it invades the intestinal tract, it will produce heat-resistant enterotoxin, which can activate guanylate cyclase and convert guanosine triphosphate into cyclic guanosine monophosphate, thereby causing intestinal epithelial cells to respond to moisture, chlorine, and sodium. absorption has an inhibitory effect. Heat-labile enterotoxin can promote the synthesis of cyclic adenosine monophosphate, which activates adenylate cyclase by binding to receptors on the cell membrane of intestinal epithelial cells, thereby inhibiting the absorption of water, chlorine and sodium by intestinal epithelial cells. ability [3]. Both of these two toxins will cause the water balance and electrolyte disturbance in the body. Most of the intestinal fluid in the small intestine will increase, so it will lead to the loss of water balance and electrolyte disturbance in the body, resulting in a series of diarrhea. symptom. The examinations performed on admission, stool culture, serum CRP, PCT, and serum sTREM-1 assays can all be used for differential diagnosis.

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2.3. Viral infection

The virus is a common cause of disease, mainly including rotavirus, adenovirus, norovirus and calicivirus, all of which may cause diarrhea [4]. Some of the more common viruses include rotavirus and norovirus. The virus can attach and multiply on the columnar epithelial cells at the top of the villi in the small intestine. When it invades the intestinal tract of children, it can also cause degeneration or necrosis of the epithelial cells. At the same time, it also reduces the ability of the small intestine to absorb water and electrolytes and weaken its ability to digest and absorb. When there is too much fluid retention, it will lead to the formation of fluid retention in the intestine of the child, which will further lead to diarrhea symptoms. Most of the children's stools are watery or egg-like, which can occur more than ten times a day, and electrolyte imbalance, dehydration and acidosis will occur [5].

3. Treatment of diarrhea in children

3.1. Chinese medicine therapy

Oral administration of Chinese medicine: Li Guoqing [6] and others randomly divided 100 children into 2 groups, the control group (treated with western medicine montmorillonite powder), and the observation group (treated with Huangqi Jianzhong Decoction), the results confirmed the observation. The syndrome score, symptom disappearance time, incidence of adverse reactions, total effective rate, white blood cell (WBC) count, lymphocyte percentage (LYM%), watery stool ratio and mucus stool ratio in the group were better than those in the control group ($P<0.05$). The effectiveness of Huangqi Jianzhong Decoction is expounded vigorously. Astragalus Jianzhong Decoction is a prescription from "The Synopsis of the Golden Chamber"[7]. In the prescription, Astragalus and Zhigancao can invigorate the middle and invigorate Qi, while Poria can invigorate the spleen and infiltrate dampness. Modern pharmacological studies have shown and confirmed that the glycyrrhetic acid contained in licorice can be used to effectively protect the gastric mucosa, and at the same time, it can also play an anti-inflammatory role, and it can also effectively promote the healing of ulcer wounds. Muxiang is warm in nature and is used to treat diarrhea and belching. Wood fragrance can also be used to relax intestinal muscle spasms, and its antihistamine and antiacetylcholine components can also be used to inhibit the growth of Streptococcus and Gluconococcus aureus. Betel nut is used to break qi, and malt can play a role in strengthening the stomach and digesting food. The combination of various medicines can achieve the effect of benefiting the spleen and warming the kidney [8].Tuina method: Zhu Kunfu [9] and others randomly divided 100 children into 2 groups, the control group (the treatment method was to adopt the conventional treatment method, the doctor gave the children oral rehydration salt to help their digestion, and the treatment Compound pancreatin powder, mummy love and other drugs were used), observation group (the treatment method was to adopt the commonly used TCM massage therapy on the basis of conventional treatment, such as pushing the large intestine, Yunpanmen, rubbing the abdomen, and dividing the yin and yang of the abdomen. Twice a day, every three to five days as a treatment process. The results confirmed that the compliance and medical effects of the observation group were better than those of the control group ($p<0.05$). Pediatric massage can effectively smooth the flow of children. Meridians, run qi and blood, and strengthen the body's disease resistance on the basis of regulating the functions of the viscera.

3.2. Western medicine method

Cai Yun, Wang Jiarui [10] and others randomly divided 86 children into 2 groups, the control group (using Bacillus subtilis live bacteria granules for treatment), the observation group (using montmorillonite powder) Combined with Bacillus subtilis dual live bacteria granule treatment), the results confirmed that the total effective rate of medical treatment in the observation group was 96.67%, and the control group was 93.02%. Abdominal pain relief time, stool recovery time, body weight growth rate and serum prealbumin level after 2 weeks of treatment in the observation group were better than those in the control group ($P<0.05$). Montmorillonite powder is a commonly used medicine for antidiarrheal. Montmorillonite is mainly composed of double-layer structure of aluminum and magnesium silicate and heterogeneous charge distribution. Such a unique structure provides strong binding capacity for adsorption activity. It absorbs not only water but also toxins, bacteria and viruses, which in turn reduces the adhesion of pathogenic factors to the intestinal lining. It can prevent pathogenic factors from entering the blood circulation [11] and strengthen the function of the mucosal barrier, and can promote the rapid recovery of damaged mucosa.

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3.3. Integrated traditional Chinese and Western medicine therapy

Hu Wenjun [12] and others carried out rehydration and correction of electrolyte imbalance in 30 children, and oral administration of montmorillonite powder (1 bag/d under 1 year old, divided into 3 doses; 1- For 2 years old, 2 bags/d, take the medicine in 3 times; for over 2 years old, 3 bags/d, divide the medicine into 3 times) and apply Chinese medicine (Poria 10g, Taizishen 15g, Astragalus 10g, Atractylodes 8g, small 10 g of fennel and 5 g of Coptis chinensis are ground into powder, mixed with vinegar, and applied to the umbilicus of the child. Children can be treated with combination of traditional Chinese and Western medicine such as Pinellia 5g, and the total effective rate of medical treatment effect is 93.34%, and the results are more significant. Western medicine infusion can quickly replenish nutrients and body fluids, thereby correcting electrolyte imbalance. Montmorillonite powder can effectively protect the intestinal mucosa [13]. Because most sick children cannot accept traditional Chinese medicines that taste bitter and unpleasant to drink, they often adopt the method of applying umbilical cord, which can effectively relieve the pain of children.

4. Discussion

Pediatric diarrhea is one of the most common diseases in the department of gastroenterology. The etiology and pathogenesis of the disease are relatively complex. Without timely intervention, the disease will worsen and lead to dehydration, electrolyte imbalance, etc., which will affect the physical and mental health and growth and development of children. It has a great influence. With the continuous improvement of medical technology and the opening of information, there are currently many treatment methods. On the basis of anti-infection and anti-viral treatment, Western medicine combined with montmorillonite powder and Bacillus subtilis is added. Live bacteria granules for treatment; at the same time, there is a traditional Chinese medicine decoction Huangqi Jianzhong Decoction for treatment; there are also a series of treatments such as oral montmorillonite powder + traditional Chinese medicine compressing the navel, acupuncture, massage, etc., all of which have achieved satisfactory clinical results. Western medicine treatment is mostly effective, and infusion can quickly replenish nutrition and body fluids, and at the same time correct electrolyte imbalance. Traditional Chinese medicine has an irreplaceable position to improve the medical experience of children and minimize side effects through external application of traditional Chinese medicine, massage and other external treatment methods. With the continuous development of medicine in the motherland, traditional Chinese medicine is more and more favored by children and their families, and traditional Chinese medicine has been continuously improved and standardized in diagnosis and treatment. With the continuous progress of medicine, the diagnosis and treatment of diarrhea in children will be continuously improved to ensure the healthy growth of children.

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