Clinical trials of Chinese herbs on short bowel syndrome

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Abstract

The treatment of the short bowel syndrome is the best way to ensure total parenteral nutrition at the initial stage after surgery. However, adaptation to a variety of nutrients improves with time after bowel resection. In general, the transition stage from intravenous feeding (IVF) to oral feeding may take a long time, at least several months. The main reason is due to the remaining intestinal functions. Two patients with short bowel resection were treated with Chinese herbs by oral and intravenous feeding for three weeks after surgery. The application of our clinical methods is useful for patients with short bowel resection for about 3 weeks. From our clinical trials our therapy seems to be the best treatment for such patients.

Key words total parenteral nutrition, intravenous feeding, Kaolin, Cinnamomi Cortex, Polygalae Radix.

Abbreviations TPN, total parenteral nutrition ; IVF, intravenous feeding ; KA, Kaolin (China Clay powder) ; CC, Cinnamomi Cortex (Keihi powder), 桂皮 ; PR, Polygalae Radix (Onji powder), 遠志 ; CH, Chinese herbs (KA, CC,PR).

Introduction

The short bowel syndrome is characterized by severe diarrhea, impaired absorption of fats, protein, carbohydrates, vitamins, minerals, trace elements and other nutrients, leading to anemia, weight loss and impairment of metabolic activities.[1)]

The clinical course of the short bowel syndrome was divided into three stages by Pullan.[2)] The development of intravenous hyperalimentation by Dudrick[3)] has revolutionized the treatment of the short bowel syndrome by, maintaining nutrition until the remaining bowel can adapt itself to oral feeding.[4)]

The shortened bowel is not immediately capable of absorbing high nutrient loads and intestinal adaptation may take much time before intraoral feeding is initiated after surgery.[5)] In two children, TPN was administered for three weeks after intestinal resection after which they received several types of drugs (including Chinese herbs (CH : Kaolin (KA), Cinnamomi Cortex (CC), Polygalae Radix (PR)) with food orally. A weekly determination of the actions of liver function, electrolytes, nitrogen balance was made along with other tests made.[6)] These patients will benefit from TPN. The combination addition of CH (Table II) is based on a set of indirect evidence obtained from our clinical test.

Clinical study

Although about 70 % of intestinal resections are very rare, loss of terminal intestine and the ileocecal valve lead to a severe impairment of clinical aspect, especially when coupled with nutritional problems. The patients received all the required nutrients through TPN for three weeks after the operation. They were permitted to take small volumes of food with several types of drugs orally and with parenteral nutrition. The nutrients regimens are shown in Tables

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Table I Intravenous feeding with oral feeding and nutrients regimen.

Total supplied calories	2,300 Kcal
Oral feeding calories	1,900 Kcal
Parenteral nutrition calories	400 Kcal
Proportion of energy supply	
Carbohydrate 45%	
Fat 30%	
Protein 25%	

I and II.

Case 1

A 13 year old boy was admitted to our unit because of abdominal pain. He was in a state of primary shock at the time of his admission. His blood pressure was 80 / 20 mmHg, hematocrit 43 % and white cell count 24,100/mm^3. X-ray, SU and CT scan revealed an abnormal shadow in the abdomen. He received an emergency laparatomy, and the following symptoms were detected - malrotation of bowel

Table II Combination of drugs.

Kaolin		0.05 mg/kg/day	orally three times
Cinnamomi Cortex		0.05 mg/kg/day	per day, 30 minutes
Polygalae Radix		0.05 mg/kg/day	before meals
Lopranide hydrochloride		0.02 mg/kg/day	
Pancreozymine		5 mg/kg/day	
			By TPN
Water soluble Thiamine		0.02 mg/day	
Vitamins	Riboflavin	0.03 mg/day	
	Niacin	0.2 mg/day	
	Vitamin B_6	0.03 mg/day	
	Folic acid	3 μg/day	
	Vitamin B_{12}	0.03 μg/day	
	Panthoenic acid	0.2 mg/day	
	Biotin	5 μg/day	
	Ascorbic acid	0.5 mg/day	
Fat soluble			
Vitamins	Vitamin A	0.01 mg Retinol	
	Vitamin D	0.04 μg	
	Vitamin K	2 μg	
	Tocopherol	1 mg	
Minerals and trace elements			
	Sodium	1-1.4 mmol/kg/day	
	Potassium	0.7-0.9 mmol/kg/day	
	Calcium	0.11 mmol/kg/day	
	Magnesium	0.04 mmol/kg/day	
	Iron	1 μmol/kg/day	
	Manganese	0.6 μmol/kg/day	
	Zinc	0.07 μmol/kg/day	
	Chloride	1.4 mmol/kg/day	
	Phosphorus	0.15 mmol/kg/day	
	Iodine	0.015 mmol/kg/day	
	Copper	5 μmol/kg/day	
	Molybdenum	48 μmol/kg/day	
	Cobalt	0.1 mg/kg/day	
	Nickel	2.6 μg/kg/day	
	Cadmium	30 mg/kg/day	
	Chromium	7.2 μg/kg/day	
	Selenium	0.033 ppm	
	Fluorine	0.02 ppm	

through 360 volvulus, and necrosis of the entire small intestine. The patient was subjected to an anastomosis from the proximal jejumun to the bowel which included the duodenum. The ileocecal valve and the large intestine were normal. He was given nutrients by TPN during a period of three weeks after the operation. The treatment of this patient was performed according to the schedule described before. He had decreased diarrhea and also recovered clinical signs of short bowel syndrome. Gradually, for example, the disabsorption of nutrients from the points of view of clinical aspects was determined three weeks after operation (Fig. 1). Laboratory data were within normal ranges without operation scar.

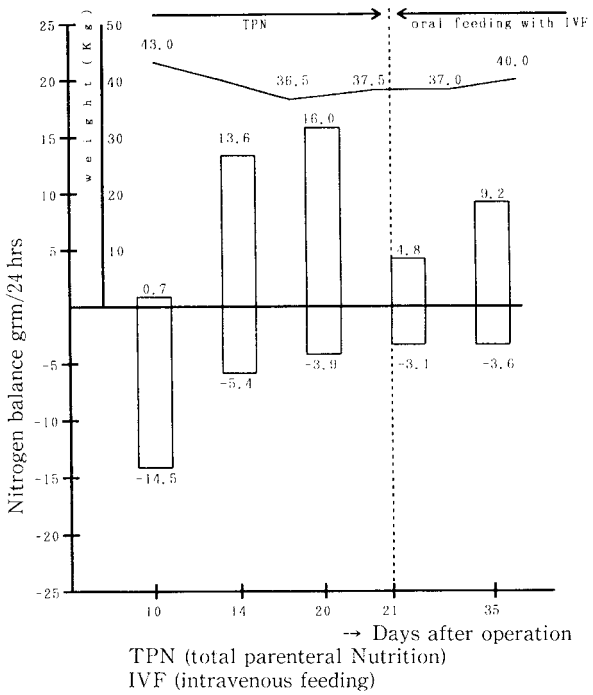

Fig. 1 Nitrogen balance and weight changes during the study of case 1.

Case 2: 12 year old boy

He was hospitalized for severe abdominal pains. The patient underwent an emergency operation once he recovered from his state of shock. A massive intestinal resection was performed, the case of which was a superior mesenteric vascular occlusion with resultant extensive infarction, hematocrit 39 % and white blood cell count 20,000/mm^3 at the time of hospitalization. Fortunately, the remaining section of the intestine could adapt sufficiently to maintain life while 30 % or loss of the small intestine and ileocecal valve was normal. After intestinal resection, TPN was performed (for nutrients regimen see Table I). The patient maintained excellent health and registered a weight gain 21 days after the operation (Fig. 2). He received the nutrients by oral feeding and intravenous feeding (see → Table I, II) three weeks after operation.

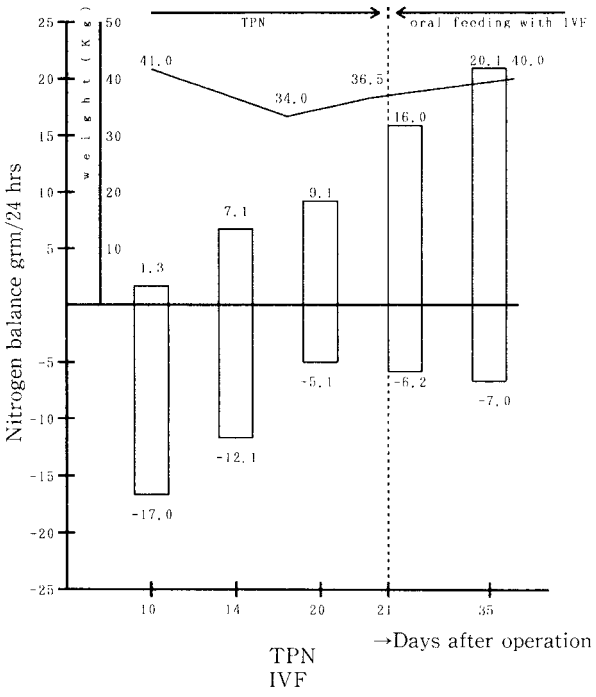

Fig. 2 Nitrogen balance and weight changes during the study of case 2.

Discussion and Summary

After intestinal resection, parenteral nutrition should be supplemented with an elemental diet as soon as possible in order to optimize adaptation.[7] Parenteral nutrition is the best treatment for short bowel syndrome at the initial stage of intestinal adaptation[2] after operation. The remaining intestine is gradually restored at the adaptation stage, called intestinal adaptation.[2] This is the best way (see → nutrition

regimen→Table I and Table II) based on our clinical results of cases 1 and 2. Our belief that patients with massive bowel resection will benefit from parenteral nutritional support is based on a set of indirect evidence.

Malnutrition is common among hospitalized patients, particularly those whose ability to digest and absorb orally or enterally administered nutrition is interrupted by surgery.[8] Those patients became also catabolic after surgical operations, i.e., during the metabolic response to TPN after inactivation when there was a loss of urinary nitrogen when TPN was given during the post operation catabolic phase. The administration of TPN for prolonged periods of time, and to critically ill patients has produced reports of several micronutrients.[9] However, such micronutrients were included in our menu (Table II). After massive resection of the small intestine, the remaining portion undergoes both structural and functional adaptive changes.[10-12] Absorption of a variety of nutrients improves with time once basic resection has been performed as we have indicated.

However, the shortened bowel is not immediately capable of absorbing high nutrient loads and intestinal adaptation may take several weeks to occur once intraluminal feeding is initiated. But we don't know exactly the minimum length of small bowel necessary to sustain life with only oral nutrition. The effects of the short bowel syndrome include gastric hypersecretion, increased intestinal motility and bacterial overgrowth. The transition time of luminal content is also reduced in the shortened intestine. Hence the time of contact between luminal nutrients, exocrine pancreatic secretions, and biliary secretions is reduced. The enterohepatic circulation of bile salts and the excess admission of bile salts into the large bowel are increased. The incidence of cholelithiasis also increases after intestinal resection.[13]

Naturally, pancreatic examination and enterohepatic circulation may be interrupted by the changes in the mechanism of that area after massive bowel resection. Dehydration and electrolyte imbalance may occur rapidly and pose a serious risk to the patient after massive bowel resection.

Generally, complex carbohydrates, proteins, and fats are digested into their basic components and are absorbed as they proceed down the bowel. The shortened bowel syndrome is largely due to the secondary effects of loss of active transport systems and increased activity.[14] The patients were given combination drugs during the transition periods between intestinal resection and intestinal adaptation.

KA can increase the absorption of water from the intestine, and can be seen through X-ray instruments as in barium enema examination, and decreases the peristaltic movement of the bowel.[15-17] PR (glycyrrhizic acid) contains dexoycorticosterone. The action of herbs increases the retention of sodium ions and water, and potassium ion excretion.[18]

CC is highly aromatic and antiseptic, and contains bark. The bark is useful for checking diarrhea, especially if PR has the ability to restore hepatocellular canges, e.g., chronic cell impairment of the liver. Glycyrrhizae Radix was found to have a significant effect in patients with hepatocellular carcinoma generally, such herbs have good effects on enterohepatic circulation's impairment and pancreatic activity.[19]

The combination of vitamins, minerals and CH has good effects on the metabolic activity of patients with short bowel resection during the transition periods between intestinal resection and adaptation. It is important that transition to oral feedings be made gradually over several weeks, again depending on the condition, and degree of activity of the existing small bowel. A large feeding volume is helpful for the absorptive capacity of the remaining bowel cannot be restored to the pre-operation level.

Patients with intestinal resection are at an increased risk of contracting complications, for example, cholethiasis, renal stones, functional pancreatic insufficiency and so on.

Finally, CH has a long history of as long as 3,000 years or more, and many clinical results have been recorded. The combinations of CH are very complicated due to their chemical structure and their effect. It is impossible to resolve such things within short periods of time. We have studied and investigated their application in clinical trials for several years.

We cannot report on the final analysis and effects of CH at the moment. However, we have obtained rather interesting results from clinical daily work performed on several patients.

We could not find any clinical reference related to these clinical experimental results in the last several years. Those clinical findings have shown good results from the points of view of financial and social (several recoveries) outcomes as compared with the results of the general Western clinical therapy.

和文抄録

短腸症候群，即ちなんらかの疾病により小腸，大腸の多部分切除を受けた患者は頻回に及ぶ下痢および各種栄養素の消化吸収能の低下を伴う。これまでは完全術後栄養法により腸機能の回復までの期間，生体の栄養を補給したが，これはあくまでも急性期のみに限定される。当然Home Parenteral Nutritionも臨床では通常行われているが，私の経験では1970年から1980年までの臨床成績を比べて，和漢薬の応用により腸機能の回復が早く，また合併症の減少を著しく認めた。これらの方法は医学上だけでなく，経済的にも合理的であると考えている。

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