

Effects of Roasted Burdock Powder on Simple Chronic Constipation - A Pilot Study

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We have investigated the effect of roasted burdock powder on the chronic constipation. This is a placebo-controlled prospective randomized crossover study. Ten subjects with chronic constipation took 2 kinds of supplementary diets for 2 weeks each. Control was simple freeze-dried miso soup and the experimental diet was that supplemented with 10 g of burdock powder. They reported their daily bowel habit. Bowel movement was also evaluated by radiopaque markers method. Seven cases completed the study. There were no significant differences in bowel frequency and stool consistency between two kinds of dietary supplementation, though burdock powder showed a tendency to increase bowel frequency and make stools softer. No adverse event was observed. Our preliminary results guarantee that the effects of burdock powder on the bowel habit should be re-examined in a larger study in future.

Key words: burdock, dietary fiber, chronic constipation

INTRODUCTION

Chronic constipation not only impairs quality of life, but may also cause several intestinal diseases, including ischemic colitis, hemorrhagic rectal ulcers,

and diverticulitis of the colon. [1, 2, 3]

In addition to laxative administration, various dietary modifications have been reported to be effective for controlling bowel habits, [4] with a dietary fiber-rich diet most frequently recommended. Among dietary fiber-rich foods, burdock contains large amounts of water-soluble and -insoluble dietary fiber. [5, 6] However, raw burdock is hard in taste and difficult to consume, and its water-soluble dietary fiber content is easily reduced during the softening process.

Recently a new roasting method has been developed by which burdock can be softened in taste without losing water-soluble fiber. After the roasting process, the burdock is powdered for easier intake and as much as 20 g of dietary fiber can be taken daily by its ingestion.

The effect of burdock powder has not yet been examined in patients with chronic constipation. In the present feasibility study, we tried to estimate the potential therapeutic effect of burdock powder for chronic constipation and to find the possible adverse effects for a future large scale study.

MATERIALS AND METHODS

1. Subjects

Ten women with chronic constipation were enrolled in this study. We defined chronic constipation as less than twice weekly bowel habits. Pregnant, possibly pregnant, and lactating subjects were excluded, as were those, taking laxatives or prokinetics on an on-demand basis and subjects with drug induced constipation. The protocol of this study

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was evaluated and approved by the ethical committee of Shimane University School of Medicine, and informed consent was obtained from all enrolled subjects.

2. Study design

This was a placebo-controlled prospective randomized crossover study. The subjects took 2 kinds of supplementary diets for 2 weeks each, with a 1-week washout period between them. The placebo supplementary diet (control) was freeze-dried *miso* soup and the experimental diet was freeze-dried *miso* soup supplemented with 10 g of burdock powder. Both of the supplementary diets were the same flavor, color and package. This study was blind study for patients with *miso* which removed the smell of burdock. The supplementary diets were taken twice daily, at breakfast and dinner, with their usual diet for 2 weeks. Thus, the daily administration of burdock powder during the administration period was 20 g. The order of the supplementary diets for each subject was randomly chosen.

3. Evaluation

The subjects were asked to record the frequency of defecation and stool consistency in a daily diary using a 5-point Likert scale during each 2-week administration period. Likert scale means that stool consistency is softer when a patient records the higher point. In addition, they took a Sitzmarks[®]

capsule (Konsyl Pharmaceuticals, INC, Easton, MD, USA) containing 20 small radiopaque markers in the morning of the 9th observation day. On the 14th observation day (last day of the 2-week observation period), abdominal X-ray photographs were obtained to count the number of remaining radiopaque markers in the colon and identify the locations of the remaining markers.

Comparisons of data obtained during the experimental and control periods were done with a Wilcoxon signed-ranks test, with $P < 0.05$ considered to be statistically significant.

RESULTS

Ten women with simple chronic constipation were enrolled in the study. Two of those who took laxatives on an on-demand basis during the observation period were excluded from analysis, while 1 subject could not continue to drink *miso* soup because of its salty taste and was released from the study prematurely. As a result, 7 subjects completed the protocol and were finally analyzed. The mean age of the analyzed subjects was 51 years old (23-75 years). In 7 subjects, 2 have stable persistent chronic hepatitis and 1 has asymptomatic biliary calculus. 2 subjects take ursodeoxycholic acid regularly and 1 subject takes magnesium oxide regularly. No adverse effect was found during the study and burdock powder was easily taken by the

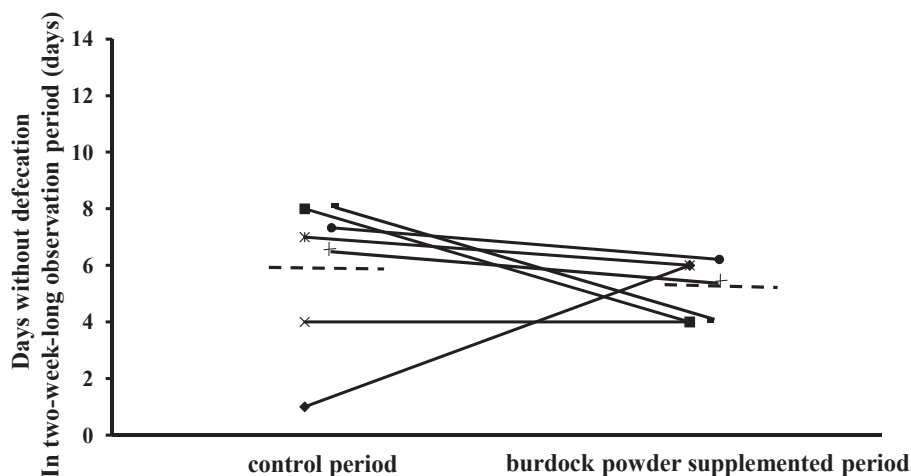


Fig. 1. Numbers of days without defecation during the experimental and control periods for each subject. Data from the same patient are connected by a solid line. Broken lines represent the means.

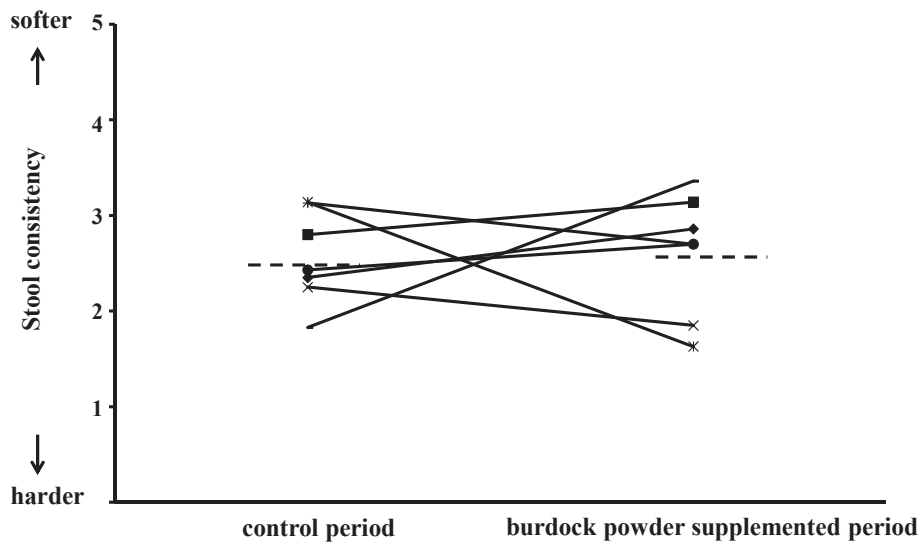


Fig. 2. Stool consistency during the experimental and control periods. Data from the same patient are connected by a solid line. Broken lines represent the means.

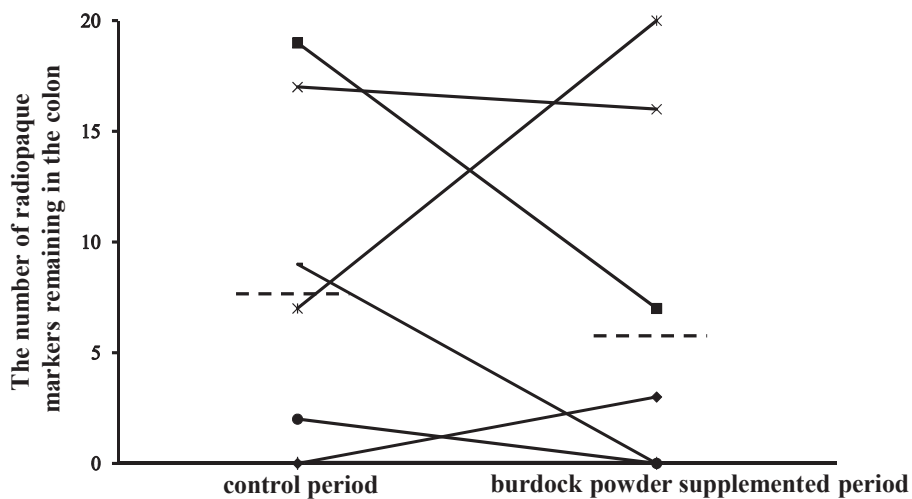


Fig. 3. Numbers of radiopaque markers remaining in the colon at the end of the experimental and control periods. Data of the same patient are connected by a solid line. Broken lines represent the means.

enrolled subjects.

Five subjects showed increased frequency of bowel movement during the experimental period as compared to the control period (Fig. 1). Also, the mean bowel frequency observed during burdock powder administration was higher than that observed during the simple *miso* soup administration, though the difference was not statistically significant.

Stool consistency became softer during the experimental period in 4 of 7 subjects (Fig. 2). In ad-

dition, mean consistency was softer during burdock powder administration, though the difference with the control period was not significant.

The number of radiopaque markers remaining in the gut 5 days after the administration was decreased in 4 of 7 cases in the experimental period (Fig. 3), as was the mean number of markers. The position of the most proximally located radiopaque marker in the gut did not differ between the 2 periods.

DISCUSSION

Burdock has been used as an alternative medicine in China for centuries for intestinal disorders. This root vegetable contains large amounts of water-soluble and -insoluble dietary fiber and polyphenol, which are considered to affect and normalize intestinal flora.

The water-soluble dietary fiber contained in burdock is mainly composed of inulin and fructooligosaccharides, [7] which have been reported to increase the numbers of colonic lactic acid bacteria and *Bifidobacteria*. [8] In addition, water-insoluble dietary fiber components, such as hemicelluloses and lignin, contained in burdock are thought to increase stool volume and improve chronic constipation.

According to a National Health and Nutrition Survey recently conducted in Japan, adult males and females consume approximately 15.1 and 14.7 g, respectively, of dietary fiber each day. [9] Intake of larger amounts of dietary fiber is reported to be associated with stimulated bowel movement, [10, 11] and that greater than 20 g in a day is considered to increase fecal output and normalize bowel movement. [12] Thus, dietary supplementation with burdock powder is expected to be an easy means of increasing dietary fiber even in elderly individuals who have difficulty consuming a large amount of dietary fiber directly from their diet.

Chronic constipation may be associated with the increasing production of secondary bile acids in the possible development of colitis. [13] Secondary bile acids in the intestines is also reported to cause DNA damage and oxidative stress, and induce pro-inflammatory properties by activating nuclear factor κ B (NF- κ B). [14] Dietary polyphenols, such as phenolic acid, which are found in large quantities in burdock, can reduce secondary bile acids in feces. Therefore, burdock consumption may help suppress inflammatory colonic conditions related to chronic constipation. [15] In a future larger study, the composition of bile acids in feces can help to evaluate the effects of burdock powder. However, in the present study we did not investigate it.

Dietary vegetables contain a wide variety of free radical-scavenging antioxidants, such as flavonoids, polyphenols, and antioxidant vitamins. Among them,

burdock is known to have high radical scavenging activity. [16] Takebayashi *et al.* reported that burdock had the highest hydrophilic oxygen radical absorbance capacity (ORAC) by weight among 'common vegetables' eaten in Japan. [17]

In the present study, there was no statistically significant difference for mean bowel frequency and stool consistency between the experimental and control periods, probably because of the small number of subjects investigated. On the other hand, administration of burdock powder for 2 weeks tended to increase the frequency of bowel movement and make stools softer. The effect of longer administration of burdock powder may be tested in future. Thus, the result of this pilot study guarantees the value of a future larger study to further evaluate the effects of burdock powder on bowel movement and stool solidity.

Another important finding of this pilot study is the lack of adverse effects of burdock powder ingestion. Since burdock is a commonly consumed vegetable in Japan, no adverse effect from its powder was expected. None of our subjects complained of adverse effects, though one subject was unable to consume *miso* soup daily because of its saltiness. Therefore, we consider that burdock powder should be investigated as an alternative anti-constipation agent without significant side effects in a future larger study.

In summary, burdock powder was not shown to be effective for chronic constipation in this small pilot study. Nevertheless, our findings suggest that its effects should be re-examined with a greater number of subjects.

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None

Conflicts of interest statement

Junji Inoue is an employee of Ahjikan co., LTD, and a stockholder of the corporation.

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