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Therapeutic Use of the Medicinal Water „Hunyadi János” in Surgical Patients

By
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The treatment in certain cases of adynamic ileus still raises some problems in abdominal surgery. One of the symptoms of „maladie postoperatoire” is a decreased or lacking intestinal motility. Adynamia of the intestinal tract develops to a certain degree after all abdominal operations, since the operative trauma causes a temporary inhibition of the neuromuscular system. It is not only the operation itself, but also the characteristics of the postoperative condition that promote the development of intestinal adynamia. Such are bedrest wound pain, respiratory depression, as well as decreasing of diaphragmatic movement and intestinal wall tone [9]. The analgetics are also decreasing the tone of the intestinal wall, irritability of nerves and the defecatory reflexes [3].

The motor function is gradually re-established in the different segments of the gastro-intestinal tract after surgery. Peristalsis of the small intestine returns within 24 hours, gastric motility within 48 hours, but paralysis of the colon may persist even for 3 to 5 days. It is often difficult to sharply differentiate between a still „phsiyological postoperative ileus” and an already persisting pathological hypofunction of the bowels. Around the third postoperative day, instead of the relief of gases and the appearance of hunger feeling, the patient is discomforted, distented, has no appetite. At the physical examination meteorism may be palpated and bowel sounds cannot be heard. To control adynamia, first the most simple methods are used, such as blind enema, clyster, or purgation [8]. Obviously, in cases of severe postoperative ileus following abdominal surgery, sympatholytic treatment, as summarized by *Petri* [6], is the up-to-date method of choice.

To enhance bowel movements we looked for a simple laxative which assures the first defecation after the operation relatively quickly, and without causing disagreeable complaints due to irritation of the intestinal wall, excessive peristalsis, severe colic or hypo-gastric hyperaemia.

The aperient „Hunyadi János”, a natural medicinal water being in use as laxative since 1863, was tried out at our department. This aperient water of Buda (part of Budapest, on the right bank of the Danube) containing sodium sulfate, magnesium sulfate and sodium cloride, finds its application in form of a drinking cure primarily in patients suffering from internal diseases such as chronic constipation, gallbladder and biliary duct diseases, certain cases of hepatopathies and chronic pancreatitis.

In the course of examinations, we aimed at answering two questions:

1. To what degree is the medicinal water „Hunyadi János” effective in starting bowel movements during the postoperative period, if used as a single purgation and not in form of a drinking cure?

2. How does the medicinal water influence the electrolyte balance in operated patients; does the discharge of pasty, watery stool cause potassium or sodium loss?

Material and methods

The effect of the aperient water „Hunyadi János” was examined in 43 cases of general surgery. The youngest patient was 24, the oldest 82 years of age (average 56 years). Among the patients 26 were women and 17 men.

The fallowing operations were carried out:

	No. of cases
Cholecystectomy	21
Transduodenal sphincterotomy	4
Choledocho-duodenostomy	1
Gastrectomy	5
Abdominal wall reconstruction	4
Appendectomy	3
Hernioplasty	2
Surgery of piles	3

The medicinal water was given to patients in whom the intestinal activity had not started spontaneously until the third postoperative day and discomfort and meteorism had developed.

In the morning of the 3rd postoperative day, as a single laxative, half glass of „Hunyadi János" (100 ml diluted with an equal amount of tap water) was given, which the patient consumed cold or lukewarm on an empty stomach 1 hour before breakfast.

According to the effectivity of the water the patient were ranged into 3 groups:

A.) *Good response*: abundant defecation, bowel movements started.

B.) *Moderate response:* discharge of small amount of faeces, moderation of meteorism.

C.) *No response.*

The electrolyte concentrations were measured in 30 patients. Among these, 14 were ranged into the control and 16 into the treated group. Serum sodium and potassium levels were determined in both groups on two occasions: on days 3 and after operation.

In the treated group the aperient water was given on the 3rd postoperative day after the determination of electrolyte concentrations. Since the effect developed already on the same day, the post-defecation determination was performed on the morning of day 4.

The patients of both groups were well comparable according to age, sex and type of operation. In both groups the same kinds of narcotics were used. The postoperative drug treatment, the oral and intravenous fluid intake as well as the fluid loss caused by other factor than defecation were identical in both groups.

Electrolyte levels were measured by flame photometry. The statistical analysis of the results was performed by Student's *t*-test.

Results:

The results of examinations are summarized in Tables I-III.

The effect of the medicinal water in starting postoperative bowel movements is shown in Table I.

Table I.

Effect of the medicinal water „Hunyadi János" in starting postoperative peristalsis $n^+ = 43$

Group	A Good	B Moderate	C No response	Total
No. of patients	25 (58.3%)	11 (25.5%)	7 (16.2%)	43 (100%)

+n = No. of patients

The changes in serum sodium and potassium levels in response to consumption of the aperient water and their statistical analysis are given in Tables II and III, respectively.

Table II.

Changes of serum Na concentration caused by medicinal water „Hunyadi János" in surgical patients.

	Control group (n = 14) x ± SEM mEq/l	Treated group (n = 16) x ± SEM mEq/l	p
Day 3 /before water consumption/	140 ± 2	142 ± 3	<0,6
Day 4 /after water consumption/	141 ± 3	141 ± 4	>0,9
p	<0,8	<0,9	

x = mean value, n = number of patients, p = significance level, SEM = standard error of mean

Table III.

Changes of serum K concentration caused by medicinal water „Hunyadi János" in surgical patients

	Control group (n = 14) x ± SEM mEq/l	Treated group (n = 16) x ± SEM mEq/l	p
Day 3			

/before water consumption/	4,5 ± 0,4	4,6 ± 0,3	<0,9
Day 4 /after water consumption/	4,6 ± 0,3	4,3 ± 0,2	<0,5
p	<0,9	<0,5	

For abbreviations see Table II.

Discussion:

Medicinal waters belong to the group of laxatives which exert a therapeutic action by inhibiting absorption. The effect depends on their salt concentration. The diffusibility of ions through the intestinal wall is different. Among the anions especially SO_4 ions are absorbed incompletely [4].

The laxative effect of the medicinal water „Hunyadi János" is also explained by its bitter salt ($MgSO_4$) and sodium sulfate (Na_2SO_4) content. When these poorly absorbed salts are consumed in a concentrated solution, they increase the osmotic pressure of the bowel content, absorb water and electrolytes into the intestinal lumen. The inflow of digestive juices dilutes the bowel content and restores isotonia. The watery bowel content stimulates the peristalsis of the large intestine. However, this process is very slow, and the evacuation of faeces occurs only within 10 to 16 hours. Consequently, the concentrated hypertonic aperient water is diluted first.

If, however, the medicinal water is consumed in a diluted, nearly isotonic solution, no significant dehydration occurs. The solution dilutes simply the bowel content, hinders the dehydration of faeces and the formation of masses of abnormally hard fecal matter, scybala, and sets off the discharge of faeces within 2 to 4 hours after intake. The fluid bound by the incompletely absorbed SO_4 ions washes the intestinal walls, reduces the absorption of harmful decomposition products, and the gases, bacteria and toxins accumulated during the first postoperative days in the adynamic colon are relieved and discharged.

The laxative effect of the medicinal water may be explained not only by the dilution of bowel content and the stretching-tensive effect of the larger fluid amount on the intestinal wall. The poorly absorbed $MgSO_4$ bindes calcium in the intestinal wall and stimulated peristalsis is produced in this way too. Besides, sulgates may be converted in the bowel to hydrogen sulfide which is one of the natural stimuli of bowel movements [4].

As it is appears from the Table IV., „Hunyadi János" medicinal water contains SO_4 ions, which play an important role in the mechanism of action of these laxatives, in a significantly higher concentration than „Mira sodium sulfated" and „Mira natural" medicinal waters preferred in the clinical practice as laxatives [7].

Table IV.

Concentration of sulfate ion dissolved in 1 litre water (according to Schulhof [7])

Medicinal water	SO_4		
	mg	mg equivalent	Than's equivalent %
Mira sodium sulfated	12.984,0	365,70	83,70
Mira natural	18.792,0	391,5	78,79
Hunyadi János	27.728,16	577,66	95,03

The medicinal water „Hunyadi János" was used successfully after surgical interventions by *Dollinger* [1] and *Kovács* [5], and after gynaecological operations by *Elischer* [2].

According to our observations the medicinal water „Hunyadi János" was effective in starting bowel movements in 36 of the 43 examined patients (84%, groups A+B). After the consumption of the water 25 patients (58%) discharged pasty, watery stool in abundance besides the relief of bowel gases and cessation of discomfort and meteorism. In these patients peristalsis was re-established and from the 4th postoperative day their stool discharge was spontaneous and regular. Moderate response was observed in 11 patients (26%). Although in response to the medicinal water, meteorism was alleviated, gases were relieved to a low extent and stool was discharged in small amounts. These patients required the further application of purgative. In 7 patients (16%) the expected response was not observed. These two latter groups consisted almost without exception of middle-aged adipose women operated because of colelythiasis who had had a constipating physique independently of the operation.

According to the results of electrolyte concentration determinations, on the 3rd postoperative day the mean serum Na level in 16 patients of the control group was 142 ± 3 mEq/l

before the consumption of the aperient water. On day 4, after the intake of the medicinal water, a mean value of 141 ± 4 mEq/l was measured in the same patients; the difference is statistically not significant ($p < 0,9$). There was no significant difference between the mean Na levels of the control group and treated group, either on day 3 ($p < 0,6$) or on day 4 ($p > 0,9$) following operation. The values of 14 patients of the control group measured on day 3 and 4 did not significantly differ either ($p < 0,8$).

The results of K concentration measurements showed practically the same steadiness. In the treated group the mean value of 4,6 ± 0,3 mEq/l measured before the water consumption changed to 4,3 ± 0,2 mEq/l-re after the water intake; the difference is not significant ($p < 0,5$). Similarly, no statistical difference was observed between the K levels measured on days 3 and 4 in the treated and the control patients ($p < 0,9$ and $p < 0,5$).

Summarizing the results of the electrolyte studies it is concluded that the medicinal water „Hunyadi János" used in diluted form for postoperative purgation does not influence the electrolyte balance and does not cause significant sodium or potassium loss.

In agreement with *Széchy* [9] we are also of the opinion that postoperative enema or purgation should not be forced „routinely", since in a great number of patients the discharge of stool sets off also spontaneously. However, in adipose women with constipating physique, in aged patients with emphysema, or chronie bronchitis, in smokers, or in patients with septum deviation accompanied by aerophagia and flatulance the operation and postoperative environmental effects may provoke symptoms of adynamic ileus to a higher probability. In these patients it is indicated to initiate peristalsis which may be done generally by a minimal intervention. On the basis of our examinations we found the natural medicinal water „Hunyadi János" to be an easily applicable, reliable and harmless laxative.

Summary

The laxative effect of the medicinal water „Hunyadi János" for starting postoperative peristalsis was studied in 43 general surgery patients. In response to 100 ml medicinal water diluted with 100 ml tap water, consumed in the morning of the 3rd postoperative day, 58% of the patients discharged within 3 to 4 hours pasty, watery stool in abundance. Moderate response was observed in 26% and no response in 16% of the patients. According to the results of examinations the medicinal water used for a single purgation does not significantly influence the electrolyte balance of operated patients. Comparing the serum Na and K values of 16 treated and 14 control patients, no significant difference was observed. The natural medicinal water „Hunyadi János" Proved to be an easily applicable, reliable and harmless laxative in the treatment of mild forms of postoperative adynamic ileus.

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