Original Article

The Effect of Abdominal Massage on Chronic Constipation and Constipation Quality of Life in Elderly: A Randomized Controlled Trial

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Abstract

Aims: This study aimed to effect of abdominal massage on chronic constipation and constipation quality of life in elderly.
Methods: This randomized controlled study was conducted with 60 elderly. The subjects were randomized to either the intervention (massage) (n=30) or the control group (n=30). In the intervention group, 10 minutes of abdominal massage was applied for 4 weeks. The effect of abdominal massage on constipation was measured by comparing the averages of the scores obtained before (1st week) and after (5th week) its application.
Results: The constipation symptoms (stool consistency, abdominal bloating, stool volume and number of defecation) were significantly between in the 1st and 5th weeks in the massage group ($p<0.05$). The constipation quality of life scores was decreased significantly in the 5th week in the intervention group ($p<0.05$).
Conclusion: Abdominal massage was found to be effective in some constipation symptoms and constipation quality of life.

Keywords: Abdominal massage, constipation, elderly, constipation quality of life

Introduction

In the elderly, the rate of constipation is high due to the weakness of intestinal muscles, decrease in peristalsis, insufficient fluid and fiber consumption, low physical activity, chronic diseases, and polypharmacy (Forootan, Bagheri, & Darvishi, 2018; Vasanwala, 2009). It is reported that the incidence of constipation in elderly is between 16-50% (Bosshard et al., 2007; Schuster et al., 2015), and about 67% of nursing home residents are diagnosed with constipation (Lamas et al., 2017).

Laxative and enema are used regularly and in the long term in the standard treatment of constipation in nursing homes (Emly, Coopers & Vail, 1998; Fosnes, Lydersen, & Farup, 2011). In a study conducted, 68% of the nursing home residents were found to use laxatives regularly (Lamas et al., 2017). The long-term use of laxatives may cause complications such as fluid-electrolyte imbalance, enteropathy, deficiency of fat-soluble vitamins, colon necrosis, flatulence and abdominal cramps (Andresen & Layer, 2018; Bosshard et al., 2004). Moreover, the cost of laxatives used in the treatment of constipation is high (Woodward, Norton & Barriball, 2010). Due to the fact that there are many side effects of laxatives used in constipation treatment and being high cost direct health professionals to use nonpharmacological methods. In the first step of non-pharmacological measures in constipation management, it is recommended to increase regular physical activity, fluid and fiber consumption (Annells & Koch, 2003; Brandt, et al., 2005). However, there is no consensus reached

on the effectiveness of these methods (Bosshard et al., 2004; Rao & Go, 2010).

The limited effect of the methods used in constipation management necessitates the use of complementary treatments (Bosshard, et al., 2004). One of these methods is abdominal massage application (McClurg, et al., 2011). Abdominal massage is a treatment program in which normal intestinal activities can be trained again. Massage creates a mechanical and reflex effect on the intestines by applying an intra-abdominal pressure, thus initiating peristalsis, and increasing the contraction force by increasing the movement of the mass in the intestines. The massage program can shorten the period of transition in the digestive system and can soften the stool (Emly, 2007).

Despite the fact that abdominal massage has been used for constipation treatment for many years, when studies on this subject are examined, it is observed that there are no randomized controlled studies, that the study samples are small (Emly et al., 1998; Liu et al. 2005; McClurg et al., 2011; Preece, 2002), or that the massage is used in combination with some other initiatives such as digital stimulation, exercise, etc. (Ayaş et al., 2006; Lamas et al., 1993), that the duration of the massage application and the characteristics of the individuals (age, diagnosis, etc.) included in the study are different (Ayaş et al., 2006; Emly, 1998; Lamas et al., 2009; Liu et al., 2005; Preece, 2002). The number of randomized controlled studies examining the effects of massage alone in elderly is inadequate. This study aimed to examine the effect of abdominal massage on chronic constipation and constipation quality of life in elderly.

Materials and Methods

Design and participants: This randomized controlled trial was conducted between 01 July and 31 December 2011 in a state nursing home in western Anatolia/Turkey. The population of the study was consisted of elderly people living in a nursing home (n=140). Power analysis was performed to determine the size of the study sample (n=60). According to the power analysis performed after the study (PostHoc), it was found that the sample had 85% power at the 95% confidence interval with an effect size of 0.35. A total of 60 elderly individual were randomly (computer generated randomization) assigned to two groups: intervention (massage, n=30) and control (n=30) (http://www.randomizer.org). The inclusion criteria were: 65 years and over elderly, who diagnosed with constipation, have the ability of conscious, verbal communication and cooperation. Exclusion criteria were: elderly who have cognitive disorder, who aren't capable of perception, who cannot be fed orally, who are wheelchair-bound or bedbound, who have intra-abdominal pathology, dementia, diarrhea, incontinence, fecal impaction, infection in the abdominal region or impaired skin integrity.

Instruments: The data were collected using the Elderly Information Form, the Rome-III Diagnostic Criteria for Constipation Form, the Defecation Diary, the Bristol Stool Form Scale and the Constipation Quality of Life Scale.

Elderly Information Form: This form was prepared with the questions about the socio-demographic characteristics of the elderly and the use of laxatives (Lamas et al., 2009; Arslan Gurol & Eser, 2011).

Rome-III Diagnostic Criteria for Constipation: This form was developed by the Rome Committee in order to standardize the definition of constipation. According to the Rome-III criteria, functional constipation symptoms should start at least 6 months before and last at least 3 days every month for the last 3 months. The elderly who mark the two items in this directive are diagnosed with chronic constipation (Drossman & Dumitrascu, 2006).

Defecation Diary: The "Defecation Diary" is a 1-week follow-up chart in which constipation symptoms and the state of laxative use are questioned with the help of the literature (Lamas et al., 2009; Longstreth et al., 2006; Pamuk, et al., 2003). Symptoms in the Defecation Diary were evaluated as stool consistency (1-5 points), stool volume (1-3 points), straining during defecation (1-4 points), defecation number (1-2 points), bloating (1-2 points), the sensation of incomplete excretion after defecation (1-2 points) and laxative use (1-2 points). Increased scores of stool consistency, stool volume and defecation number, and the decreased scores of distension, straining, the sensation of incomplete excretion after defecation and laxative use indicate that constipation symptoms are reduced.

Bristol Stool Form Scale (BSFS): This form gives information about the changing physical properties and time of the stool while in the colon. According to this scale, there are 7 types of stool. Type 1-2 indicates "constipation"; Type 3-4

indicate “normal defecation”; and Type 5-6-7 indicate “diarrhea” (Lewis and Heaton 1997).

Patient Assessment of Constipation Quality of Life (PAC-QOL) Scale*:* The PAC-QOL is a 28-item self-assessment scale consisting of “Worries/Concerns," "Physical Discomfort," "Psychosocial Discomfort," and "Satisfaction" subscales. Likert-type scale range from 1 to 5. The highest score that can be obtained from the scale is 140, while the lowest score is 28. The higher the score obtained from the scale is, the lower the quality of life is (Marquis et al. 2005).

Procedure: At the beginning of the study, the researcher obtained the first data using the face-to-face interview technique, the Elderly Information Form, the Rome-III Diagnostic Criteria for Constipation Form and the PAC-QOL. The constipation symptoms of the elderly in both groups were followed up using the "Defecation Diary" and "BSS" during the 1st week of the study (for 7 days). For 4 weeks (weeks 2, 3, 4, and 5) starting from the 2nd week of the study, abdominal massage was applied by researcher to the elderly in the massage group. At the end of the study (at the end of the 5th week), the constipation symptoms of both groups were assessed with the "Defecation Diary" and "BSS". At the same time, the PAC-QOL scale was applied to the both groups.

Intervention (Massage) group: Abdominal massage was applied 10 minutes, 5 days a week and at least 2 hours after lunch least 2 hours for 4 weeks by the researcher. The subject was given a supine position with his/her head elevated at a 30-degree angle. Hands were heated to prevent the subject from feeling cold and lubricated. The abdominal massage was applied in a clockwise direction over the colons on the abdominal wall. Three basic maneuvers were used: stroking, effleurage and kneading (Emly et al., 1998; Preece, 2002).

Control group: There wasn’t applied any intervention to the control group.

Data Analysis: The data were evaluated using the SPSS 15.0 version. In the data analysis, descriptive tests and comparative statistical methods were performed. The $p<0.05$ values were considered significant.

Ethical considerations: The study was approved by the Ethics Committee of University (no. 2011/005). Elderly individuals were informed about the study and their written consents were obtained.

Results

Seventy percent of the elderly in the massage group and 56.7% of the control group were in the age range of 75-90 years (average age; massage group: 77.00±7.62, control group: 76.13±7.72). According to affective factors the development of constipation in elderly, no statistically significant difference was found between groups when compared in terms of chronic disease, use of laxative, consumption vegetables/fruit, fluid consumption, physical exercise, stress exposure, consumption of caffeinated drinks and smoking ($p>0.05$) (Table 1).

According to table 2, there was a statistically significant difference between the mean scores of stool consistency, stool volume, abdominal bloating and number of defecation of the elderly in the massage group in the 1st and 5th weeks ($p<0.05$), while there wasn’t significant difference between the mean scores of straining during defecation, the sensation of evacuation and the using of laxatives ($p>0.05$). However, there wasn’t significant difference between the mean scores of constipation symptoms of the elderly in the control group in the 1st and 5th weeks ($p>0.05$).

The mean PAC-QOL subscale scores (physical discomfort, psychosocial discomfort, worries/anxiety, satisfaction) and the scale total mean scores of the massage group decreased significantly in the 5th week compared to the 1st week ($p<0.05$). For the control group, the mean scores of physical discomforts, worries/concerns, satisfaction among the PAC-QOL subscales and the scale total mean scores increased in the 5th week compared to the 1st week. This increase was statistically significant ($p<0.05$). There wasn’t any statistically significant difference between the mean scores of the psychosocial discomfort subscale ($p>0.05$) (Table 3).

Table 1. Participants' characteristics (n = 60)

Factors	Groups				x^2	p
	Massage group		Control group			
	n	*%*	*n*	*%*		
Age						
65 - 74	9	30.0	13	43.3	1.148	0.42**
75–90	21	70.0	17	56.7		
Gender						
Female	11	36.7	9	30.0	0.300	0.78**
Male	19	63.3	21	70.0		
Chronic disease condition						
There is	30	100	29	96.7	1.017	1.00**
No	-	-	1	3.3		
Use the drug that causes constipation						
Yes	21	70.0	14	48.3	2.884	0.11**
No	9	30.0	15	51.7		
Laxative use						
Using	18	60.0	19	63.3	0.07	1.00**
Don't use	12	40.0	11	36.7		
Consumption of vegetables/fruit						
5 portion/day	1	3.3	3	10.0	1.091	0.58*
3-4 portion/day	21	70.0	20	66.7		
2 portion/day	8	26.7	7	23.3		
Fluid consumption						
10 glass and above/day	4	13.3	5	16.7	1.224	0.54*
6-9 glass /day	21	70.0	17	56.7		
5 glass and below /day	5	16.7	8	26.7		
Physical exercise						
Never	15	50.0	12	40.0	2.133	0.34*
Sometimes	14	46.7	14	46.7		
Continuous	1	3.3	4	13.3		
Stress exposure						
Exposed	21	70.0	25	83.3	1.491	0.36**
Don't expose	9	30.0	5	16.7		
Consumption of caffeinated drinks						
Yes	20	66.7	13	43.3	3.300	0.11**
No	10	33.3	17	56.7		
Consumption of smoking						
Yes	11	36.7	4	13.3	4.356	0.72**
No	19	63.3	26	86.7		
Total	**30**	**100.0**	**30**	**100.0**		

* Chi Square Test, ** Fisher Chi Square Test

Table 2. The comparison of the score means of constipation symptoms of the elderly in the 1st with 5st weeks (n = 60)

Constipation symptoms	Groups	Times of Evaluation		t	p
		1st week	5st week		
		Mean±SD	Mean±SD		
Stool consistency	Massage	3.63±1.42	6.06±1.98	-7.592	0.00
	Control	5.13±1.43	5.03±1.51	0.441	0.66
Stool volume	Massage	3.47±1.33	5.30±1.91	-7.959	0.00
	Control	4.30±1.02	4.47±1.12	-0.348	0.73
Straining	Massage	8.13±2.60	7.76±2.47	0.917	0.36
	Control	6.96±2.09	6.80±1.21	0.491	0.62
Defecation number	Massage	2.70±0.70	3.43±0.97	-5.430	0.00
	Control	3.20±0.71	3.20±0.80	0.00	0.00
Bloating	Massage	4.30±1.36	2.63±0.96	6.774	0.04
	Control	4.43±1.10	4.50±1.33	-0.320	0.75
Incomplete excretion	Massage	1.93±0.98	1.90±0.80	0.205	0.83
	Control	2.03±0.80	1.73±0.82	1.725	0.09
Frequency of laxative use	Massage	2.80±1.64	2.60±1.69	1.989	0.06
	Control	2.66±1.64	2.66±1.66	0.000	0.00

Paired samples test

Table 3. The comparison of the constipation quality of life subscale and scale total score means of the elderly in the 1st with 5th weeks (n = 60)

Scores type	Groups	Weeks (X±Ss)		t	p
		1st week	5st week		
		Mean±SD	Mean±SD		
Physical discomfort	Massage	14.53±2.73	10.90±2.75	10.26	0.00
	Control	13.33±2.50	14.10±2.45	-2.43	0.00
Psychosocial discomfort	Massage	20.90±5.01	15.90±5.14	11.58	0.00
	Control	18.06±4.71	18.90±4.12	-1.73	0.09
Worry/anxiety	Massage	37.80±5.65	27.43±6.92	15.12	0.00
	Control	34.83±5.90	36.46±4.95	-2.71	0.01
Satisfaction	Massage	17.90±3.32	17.13±3.47	2.47	0.01
	Control	16.70±2.07	17.30±2.23	-3.07	0.00
PAC-QOL total	Massage	93.63±11.21	73.13±13.35	16.73	0.00
	Control	84.73±10.92	88.56±9.16	-3.28	0.00

*Paired samples test

Discussion

There are many factors that cause constipation in elderly. These factors include inadequate fluid and fiber intake, reduction of physical activity, stress, drugs, etc. (Bouras & Tangalos 2009; Forootan et al., 2018). Side effects of many drugs are known to cause constipation in elderly (Bouras & Tangalos, 2009; Korkmaz et al., 2011). In our study, it was determined that the elderly in the massage and control groups had similar situations in terms of laxative use, vegetable/fruit consumption, daily fluid intake, physical activity/exercise and drug use which leads to constipation. The fact that these factors causing constipation were similar in the elderly in both groups supports our study.

The mean scores of the constipation symptoms in the massage group were compared between the 1st and 5th weeks. It was found out that the abdominal massage was applied for four weeks, it provided softening in the stool consistency of the elderly which is similar to our study, Cevik et al. (2018). The effect it was determined that it softened their stool consistency by the abdominal massage applied for 45–60 minutes for a period of 30 days to 22 elderly with constipation. Turan and Atabek Asti (2016) found out that the abdominal massage applied to the patients who couldn't defecate in the first 3 days after orthopedic surgery softened the stool consistency. In the study carried out by McClurg et al. (2011), it was determined that diet, fluid intake, activity, good defecation posture training and 4 weeks of abdominal massage provided to the patients with constipation and multiple sclerosis (MS) resulted in the softening of stool consistency. In two different studies carried out on children with constipation, abdominal massage provided softening in the stool consistency (Bromley, 2014; Moss, Smith, Wharton & Hames, 2007) In addition to these studies showing similar results to our study, there was also a study showing that abdominal massage didn't affect stool consistency (Lamas, et al., 2009). Apart from a study conducted, findings obtained from the others are parallel with the results of our study.

One of the most common constipation symptoms that elderly complain about is the decrease in stool volume (Fosnes et al., 2011; Hakverdioglu Yont et al., 2011). It was observed in the present study that the abdominal massage increased the stool volume in the elderly. In the study carried out by Cevik et al. (2018), it was found out that the abdominal massage increased the stool weight of elderly. However, the study of Lamas et al. (2009) showed that the massage application didn't change the stool size of the patients. This result, which is observed to be inconsistent with the present study, may be attributed to the fact that the duration of the massage applied to the abdominal region (for 7 minutes) is shorter than that in our study and that the intensity of the pressure applied during the massage is different.

Abdominal massage can provide peristaltic stimulation in patients with constipation, shortens the colonic transit time, and increases intestinal movements (Sinclair 2011). It was determined that abdominal massage in our study increased the defecation number in the elderly. In the study of Cevik et al. (2018), it was found out that the participants for the number of defecations was increased, after the implementation of abdominal massage. Turan and Atabek Asti (2016), it was found out that the patients to whom abdominal massage was applied had more frequent defecation than the control group. Lai et al. (2011) stated that abdominal massage with aroma oils and plain abdominal massage they applied to cancer patients with constipation increased the intestinal movements of the patients. In the study of Lamas et al. (2009), it was determined that abdominal massage increased the frequency of defecation. In a study, it was determined that the abdominal massage applied for four weeks increased the frequency of defecation in patients with MS (McClurg, Hagen, Hawkins & Lowe-Strong, 2011).

In a different study, it was stated that the abdominal massage applied to a 64-year-old single patient who was diagnosed with myelopathy and had the defecation difficulties provided rectal waves leading to defecation (Liu, et al., 2005). In the study carried out by Hu et al. (2013), it was found out that the abdominal massage applied 5 times a week to the patients with spinal cord injury (n=20) for a period of 12 weeks shortened the defecation period. In the study of Resende et al. (1993), 12 weeks of exercise and abdominal massage application were found to increase intestinal movements in patients. In the study of Harrigton and Haskvitz (2006), 10-minute abdominal massage applied daily for a period of 13 weeks to an 85-year-old patient with chronic

constipation who couldn't benefit from stool softening agents was reported to provide the normal intestinal frequency. Ayas et al. (2006) determined that the abdominal massage applied for 15 minutes for a period of 2 weeks to 24 patients who had a spinal cord injury in addition to fiber support in the diet and digital stimulation reduced the total colonic transit time. However, because of the limitations such as the small size of the sample group, the lack of the control group and the research design, the researchers stated that the results of the study aren't appropriate for determining the effectiveness of the treatment. Findings obtained from our study and many other studies suggest that the application of abdominal massage increases the number and frequency of defecation.

It is stated that bloating and flatulence complaints are severe in elderly with constipation (Hakverdioglu Yont, et al., 2011). It was determined in the present study that the abdominal massage application reduces bloating in elderly. In a study on the effects of abdominal massage on gastrointestinal symptoms in patients with constipation, it was stated that the massage reduces abdominal pain (Lamas, et al., 2009). In the study conducted by Preece (2002), the abdominal massage applied for 5 days for a period of 6 weeks reduced flatulence and distension. In the study carried out by Lai et al. (2011), it was concluded that abdominal massage with aroma oils and plain abdominal massage applied to cancer patients with constipation decreased bloating. In a study on the effects of abdominal massage on intestinal functions in patients with spinal cord injury, it was determined that the abdominal massage applied for 15 minutes after digital stimulation had a significant effect on bloating and pain (Ayaş et al., 2006). Findings obtained from the studies are similar to the results of our study.

The abdominal massage wasn't effective on the complaints of elderly about straining during defecation. Similarly, to our study, Ayaş et al. (2006) found out that the massage didn't change the straining of the patients during defecation. However, Cevik et al. (2018) found out that the abdominal massage, the elderly for straining defecation decreased. Besides 10-minute abdominal massage applied to one patient by Harrigton and Haskvitz (2006) was determined to provide the patient's normal intestinal function without straining or digital assistance. Many factors can change the effectiveness of abdominal massage, such as the number of weekly applications, the duration of massage sessions, and the intensity of the pressure applied during the abdominal massage (Lamas, et al., 2009). Similar and different study results suggest that constipation symptoms are affected by these factors.

The abdominal massage in the present study didn't change the frequency of the use of laxatives by the elderly. Similarly, to our study, Lamas et al. (2009) also found out that the massage application didn't change the use of laxatives. However, in two studies conducted on adults and children, it was found out that abdominal massage reduced the frequency of laxative use (Bromley 2014; Resende et al. 1993). Similarly, to the results of this study, Hu et al. (2013) also found that it was effective in reducing the dose of glycerin enema. McClurg et al. (2011) determined a decrease in the use of laxatives in one patient. In the study of Resende et al. (1993) and McClurg et al. (2011), additional interventions besides the application of abdominal massage increased the effectiveness of the massage, suggesting that they reduced the frequency of laxative use. However, the fact that the average age of patients was lower compared to our sample group may be another factor affecting the results of the study.

Since constipation affects physical, mental and social areas (Lai et al. 2011), the health-related quality of life of individuals is also negatively affected (Rao & Go 2010; Sun et al., 2011). Inadequate intestinal management causes a decrease in the comfort and quality of life of elderly (Gallegos-Orozco, Foxx-Orenstein, Sterler & Stoa, 2012). It is stated that abdominal massage improves intestinal peristalsis and eliminates bloating in addition to having a positive effect on the psychosocial state (Emly et al., 1998) and increasing the health-related quality of life (Bromley 2014; Lamas, Lindholm, Engstroam & Jacobsson, 2010). In our study was indicated that abdominal massage decreases the physical and psychosocial discomfort, and worries/concerns of the elderly in the massage group, and increase their satisfaction and total PAC-QOL. There was an increase in the physical discomfort and worries/concerns of the elderly in the control group, and a decrease in their satisfaction and total quality of life. However, there was no change in

the psychosocial discomfort of the group. The abdominal massage with aroma oils applied by Lai et al. (2011) to cancer patients with constipation was reported to improve the physical sub-dimension of the patients' quality of life, and the normal abdominal massage was reported to improve the psychosocial sub-dimension.

In a different study, it was determined that the abdominal massage applied to patients who couldn't defecate within the first 3 days after surgery decreased the physical discomfort, psychosocial discomfort, worries/concerns dimension mean scores and the PAC-QOL total mean scores of the patients (Turan & Atabek Asti 2016). In the study of McClurg et al. (2016) on patients with Parkinson's disease, it is stated that abdominal massage application improves the quality of life by alleviating constipation symptoms. Findings obtained from our study and other studies conducted indicate that the abdominal massage application increases the quality of life of patients.

Conclusion: In this study, it was concluded that the abdominal massage application increased the stool volume and the defecation number, softened the stool consistency, reduced bloating and improved the quality of life in the elderly. However, it didn't affect straining during the defecation and the sensation of inability to fully defecate and the frequency of laxative use. There is a need for further randomized controlled abdominal massage studies with different durations and periods and applied with different additional interventions that will provide evidence in this regard.

Limitations: The study was conducted only one nursing home.

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