

EFFECTS OF OSTEOPATHIC MANIPULATIVE TREATMENT IN THE BILIARY DYSKINESIA

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Abstract: Objectives: This study aimed to evaluate Osteopathic Manipulative Treatment (OMT) effects on biliary dyskinesia using paired ultrasound with elliptical vesicle measurement. **Methods:** Sixty-four individuals with biliary dyskinesia were enrolled in this study (14 men and 50 women) and divided into two groups, the treatment group that received OMT in the global and gallbladder area (visceral manipulation) and the control group that received only global OMT. Two ultrasound exams, fasting, and 50 minutes after breakfast were performed to exclude lithiasis diagnosis and measure volume (Dodds elliptical method) and ejection fraction and percentage of gallbladder before and after 30 days of treatment. **Results:** The ejection and filling gallbladder percentage increased significantly after 30 days in the OMT group. **Conclusion:** OMT may be a noninvasive strategy for the treatment of biliary dyskinesia. **Keywords:** acalculous biliary disease Biliary Dyskinesia; Gallbladder Dyskinesia; Osteopathic Manipulation; Osteopathic manipulative treatments

INTRODUCTION

Biliary Dyskinesia (BD) is characterized by changes in gallbladder motility due to a disorder in the ejection fraction or filling percentage. BD is classified as a disease biliary not specified based on the International Code of Diseases (ICD-9) number 575.8 [1,2]. Approximately 10 to 15% of people in the Western world develop gallbladder disease [3], which has a high prevalence in the US [4, 5, 6].

In either the ejection fraction or the percentage of filling, an abnormality in vesicular function causes a reduction in vesicular motility and bile acid secretion, biliary stasis, and lithogenic bile [7]. Patients with BD present pain after eating, similar to cholecystitis [4].

Surgical intervention (cholecystectomy) is considered a standard gold treatment for BD [8]. Video-laparoscopic or abdominal-opening cholecystectomy can lead to many postoperative side effects, such as infections, respiratory infections, dysfunction of Oddi's sphincter, and duodenal dysmotility. Also, it can cause a hormonal change related to cholecystokinin secretion [9, 5].

New approaches should be considered to reduce cholecystectomies in BD cases. Osteopathic manipulative treatment (OMT) can be a choice to improve the function of the biliary ejection vesicle, thus reducing the symptoms of dyskinesia.

OMT is a noninvasive treatment performed through manual manipulation leading to a homeostatic balance, which integrates all systems (circulatory, respiratory, visceral, neurological, cranial, and biopsychosocial) [10]. The American surgeon Dr. Andrew Taylor had created OMT in 1874. OMT's basis is somatic dysfunction (functional changes in one or more systems in the body structure, usually identified based on pain and functional disability in a given region).

There is no study published on OMT in patients with BD; only one case study has been described as an osteopathic approach to treat the painful symptoms of BD [11]. Hence, this study aimed to evaluate the effect of OMT in patients with BD.

MATERIALS AND METHODS

PATIENTS

This is a retrospective study in which data were collected clinical routine established between November 2009 to August 2011 in a hospital in Rio de Janeiro. This study was approved by the Ethics Committee of Federal Fluminense University number 2.280.104.

One hundred twelve medical records were selected from subjects who reported, during a gastroenterologist consultation,

some discomfort or pain in the region of the right upper flank. All subjects were referred for diagnostic investigation through ultrasonography to exclude biliary lithiasis and verify the fasting and post-fasting ejection fractions with elliptical measurement in the longitudinal and transverse axes the vesicle. After these examinations, patients with lithiasis were not included in this study, and patients were referred for evaluation and manipulative osteopathic treatment.

Sixty-four patients were enrolled in this study (14 men and 50 women). The treatment group received global and visceral OMT (structural gallbladder manipulation) (6 men and 28 women), and the control group received only global OMT (8 men and 22 women).

ULTRASOUND EVALUATION

An upper abdominal ultrasound examination was performed before and 30 days after OMT. Patients were advised to take two tablets of dimethicone before each of their three main meals and avoid the following foods: meat, vegetables, beans, and gassy or alcoholic drink.

Gallbladder volume was measured via an elliptic measurement suggested by Dodds [12,13], in which the transverse axis and longitudinal axis are measured. The following formula applied: $V=0.52 (L \times W \times H)$, where $0.52 = a \text{ constant}$, and $V= \pi/6 (L \times W \times H)$ measured using a Siemens device (Adara Sonoline with a 4.5 MHz transducer) during fasting and 50 minutes after breakfast (50 g of bread, 106 g of strawberry skim yogurt and 30 g of cheese).

OMT

After the second ultrasound, the patient was referred for an osteopathic consultation consisting of anamnesis (with an appropriate evaluation form) and the signing of a consent

form for the manual approach after the following were provided: information about osteopathy and its effects, a description of the physical and functional evaluation and manipulations corresponding to the dysfunctions evidenced during the physical exam.

The standardized form used in this study contained personal, demographic, and anthropometric data as well as data on the main complaint (MC), the reason for consultation, the patient's current disease history (CDH), symptom intensity, and attenuating and aggravating factors, associated symptoms, past pathological history (PPH), social and family history (SH and FH), complementary examinations and functional physical examination findings obtained through a global assessment of the musculoskeletal system to identify asymmetries (in the hip and lower back), an assessment of the global dynamics, and an intersegmental segmental assessment of the thoracic and cervical spine to identify mobility restrictions and dysfunctions resulting from DBA (i.e., associated dysfunctions) [14,15].

A palpatory evaluation of the diaphragm's consistency and resistance and the abdominal region was performed to verify the density and consistency of the subcutaneous tissue. [16]

Immediately following the physical examination, manual treatment with gallbladder normalization techniques, a diaphragm muscle approach, and manual treatment for associated thoracic and cervical spine dysfunctions were initiated. Treatment was completed with fascial rebalancing among the pelvic, lumbar, thoracic, and cervical regions [14,15,17].

After 30 days, the patients again underwent an upper abdominal ultrasound examination, as described above.

STATISTICAL ANALYSIS

The Shapiro-Wilk test was applied to test sample distribution. The results were expressed as the mean \pm SD (standard deviation), median (interquartile range), or percentage, as applicable. Student's *t*-test was used to compare the variables and groups with normal distributions, and the Wilcoxon test was used for nonparametric data. A significance level of 5% was accepted. The statistical analyses were performed using SPSS 24.0 software (Chicago, IL, USA).

RESULTS

The patients' characteristics are shown in Table 1, and there was no difference between

the groups. Nevertheless, regarding the parameters presented in Table 2, there was a difference in the measured volume values obtained during fasting and post-fasting in either group.

There was a tendency to reduce the percentage of ejection after one month in the control group ($p = 0.067$), and, in the OMT group, this percentage has increased significantly ($p = 0.014$). There was also a significant increase in the gallbladder filling after 30 days in the OMT group (visceral and total). Figure 1 shows the percentage of gallbladder ejection detected in both groups (OMT and control group).

Parameters	OMT group (n=34)	Control group (n=30)	P values
Age (years)	45.9 \pm 10.4	45.6 \pm 10.3	0.89
BMI (kg/m ²)	25.7 \pm 3.4	25.5 \pm 4.3	0.85
LDL (mg/dL)	119.7 \pm 45.7	133.4 \pm 37.2	0.37
HDL (mg/dL)	54.7 \pm 9.3	51.2 \pm 20.9	0.67
Total Cholesterol (mg/dL)	189.7 \pm 44.5	209.0 \pm 37.0	0.19

Data expressed with mean \pm SD.

Table 1. Biochemical and clinical profile of the patients.

Parameters	OMT group (n=34)			Control group (n=30)		
	Fasting	Post fasting	<i>p</i> value	Fasting	Post fasting	<i>p</i> value
Ultrasound I - (pre OMT)	19.4 \pm 10.7	12.7 \pm 8.4	0.001	22.4 \pm 11.7	12.3 \pm 6.9	0.012
Ultrasound II - (after 30 days OMT)	22.7 \pm 9.8	12.8 \pm 7.4	0.001	19.9 \pm 8.1	12.3 \pm 5.6	0.091

Table 2. Volume values of the gallbladder measure in the fasting and pos fasting in OMT group and in the control group.

Parameters	OMT group (n=34)	Control group (n=30)	P values
% Ejection I - pre OMT	33.5 \pm 20.2	41.6 \pm 20.8	0.12
% Ejection II - post OMT	44.8 \pm 19.9	34.4 \pm 17.4	0.027
% Gallbladder filling	20.5 (0 - 35.0)	0 (0.0 - 9.0)	0.0001

Table 3. Volume values of gallbladder ejection before and after OMT in the patients and control group.

The percentage of ejection, presented a tendency to decrease after one month in the control group ($p = 0.067$) and increased significantly ($p = 0.014$) in the OMT group.

Figure 1- Schematic representation in the boxplot of the percentage of gallbladder ejection fraction

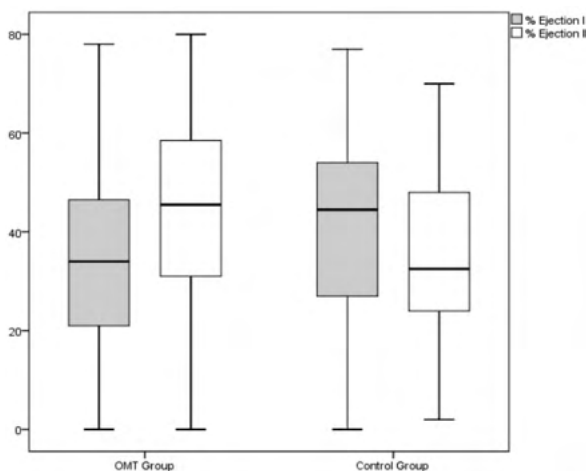


Figure 1: Gallbladder ejection percentage before and after intervention in both groups studied

DISCUSSION

This study aimed to evaluate the effect of OMT in patients with BD. We observed that OMT improved the ejection fraction function, vesicular emptying, and the percentage of filling. This result shows that OMT could be an approach of choice for this disease, whereas surgical procedures specific for lithiasis cases could be performed in patients with contraindications for OMT.

The removal of the vesicle with functional alterations (BD) may cause some damage to physiological functions since the activity of the hormone CCK releases the bile salts, the secretion of which is altered; another factor is the dysfunction of the sphincter of Oddi, which is a postoperative complication of cholecystectomy, as discussed by Stawowy et al. [18]. They observed a postoperative syndrome characterized by pain [9]. Other complications

were also reported by Coccoline et al. [19], such as morbidity, mortality, bleeding encountered during the surgical procedure, long hospitalization time, and postoperative infections. Sassa et al. highlighted that one complication of the laparoscopic video procedure is the alteration in urine volume in the immediate postoperative period [20]. A retrospective study published by Pihl et al. explored alterations in biliary normokinetics in many subjects with cholecystectomies by video laparoscopy who were carriers with BD [21]. The authors proposed osteopathy as a therapeutic option to reduce the symptoms of DB and positively reinforced the application of OMT without surgery in this disease [11].

When comparing the proposed OMT guidelines with current options, it was observed that noninvasive and ambulatory procedures reduce costs, hospitalization, and surgical intervention. This study's central findings support OMT as a therapeutic option for DB with intervention in the region of involvement of this organ based on ultrasonographic diagnosis paired with the elliptical measurement of the vesicle in the fasting and post-fasting periods. This is a noninvasive and low-cost procedure that involves comparisons of volumetric measurements obtained at 30 days after the intervention to reduce symptoms and achieve functional improvement of the organ by improving the ejection fraction percentage of filling stimulated by OMT. This treatment may reduce the number of cholecystectomies, which should be performed only in cases of cholelithiasis.

The treatment for acalculous cholecystitis established by the surgical community to reduce the symptoms of cholecystitis needs to be reviewed because it is a high-cost, invasive and risky procedure applied only to reduce pain, and a therapy that instead promotes the improvement of ejection

function or the percentage of filling of this dysfunctional organ and is noninvasive should be considered, as presented in this study.

LIMITATION

The little bibliography on the visceral osteopathic approach limited the discussion since only one article addressing the study's theme was found.

CONCLUSION

In conclusion, this study shows that OMT seems to be an excellent therapeutic strategy to improve the gallbladder function in patients with BD.

SOURCE OF FUNDING

None declared

CONFLICT OF INTEREST

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest or financial conflict with the subject matter or materials discussed in the manuscript.

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