

Short-Term Quality-of-Life Improvement in Patients with Median Sternotomy: A Brief Review about Osteopathic Manipulative Treatment

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ABSTRACT

Cardiac surgery is a common procedure for patients with coronary artery and/or valve disease, and several postoperative complications can increase morbidity and prolong patients' hospital stays. A specific osteopathic manipulative treatment protocol addressing potential sequelae of surgical procedures via a median sternotomy approach may be useful and beneficial in patients undergoing cardiac surgery. In the present case we report our results on a 59-year-old woman presenting with persistent atypical chest pain and a 10-year history of valvular heart disease with previous and recent decompensated heart failure episodes and surgical procedures via a median sternotomy approach. The osteopathic manipulative treatment was focused mainly on quality of life improvement. The results showed a general improvement in clinical condition, subjective feeling of

wellbeing and moreover in perception of negative emotions such as depression and anxiety and of chest and/or low back pain with a consequent significant reduction in drug usage. A specific osteopathic manipulative treatment protocol addressing such potential sequelae of surgical procedures via a median sternotomy approach could potentially represent a very useful and cost-effective therapeutic approach and may be considered as a valid treatment option in these patients.

Key words: Osteopathic manipulative treatment; Median sternotomy; Quality-of-life improvement

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INTRODUCTION

Cardiovascular diseases rank as the number one cause of death in the United States, and coronary artery disease accounts for the majority of the morbidity and mortality associated with such pathological conditions^[1]. Coronary artery bypass graft (CABG) surgery is a common procedure for patients with coronary artery disease, and several postoperative complications can increase morbidity and prolong patients' hospital stays^[2,3].

Many studies have evaluated interventions to decrease complications and quickly return patients to pre-morbid functioning. It has been documented that a specific osteopathic manipulative treatment (OMT) protocol addressing such potential sequelae of surgical procedures via a median sternotomy approach (e.g. hypomobility and somatic dysfunction of the thoracic region of the spine and rib cage, disruption of fascial patterns through the mediastinum, back pain, and limited or distorted function of the diaphragm) may be beneficial in patients undergoing procedures via

this surgical approach⁴¹. Moreover, the well-organized pilot study by O-Yurvati *et al*⁵¹ clearly demonstrated short-term positive effects of OMT following CABG surgery, and a potential beneficial effect of OMT can also be hypothesized following all the surgical procedures performed via a median sternotomy approach.

In the present case, we report our results on a patient presenting with atypical chest pain after recent replacement of a degenerated tricuspid bioprosthesis by mechanical prosthesis and previous bioprosthetic tricuspid valve replacement and mitral valve plasty and then replacement by mechanical prosthesis. All the surgical procedures were performed via a median sternotomy approach, and the OMT was focused mainly on Quality of Life (QoL) improvement. In particular, our aim was to lower the levels of perceived pain and of anxiety/depression symptoms, that are generally common after cardiac surgery and significantly worsen QoL and prognosis⁶⁻⁸¹.

CASE REPORT

A 59-year-old woman presenting with persistent atypical chest pain had a 10-year history of valvular heart disease with previous and recent decompensated heart failure episodes and surgical procedures via a median sternotomy approach: mitral valve plasty, mitral valve replacement by mechanical prosthesis 5 years later, tricuspid valve replacement by bioprosthesis 3 more years later and more recently replacement of degenerated tricuspid bioprosthesis by mechanical prosthesis; associated comorbidities were hypertension, diabetes mellitus and mild obesity with a body mass index of 33.5 Kg/m². After cardiac surgery the patient underwent an intensive cardiovascular rehabilitation program with clinical and hemodynamic stabilization, optimization of medical therapy and good functional recovery (functional capacity ~4 METs). ECG, coronary angiogram and chest X-ray did not show any acute condition. Transthoracic echocardiography revealed mild left ventricular hypertrophy and diastolic dysfunction with normal global and regional contractility (ejection fraction 68%, wall motion score index 1) and no signs of prosthesis dysfunction nor pericardial injury. The patient also underwent exercise testing and chest computed tomography, and life-threatening plausible causes of the chest pain were excluded. The patient's medical therapy included beta-blockers, angiotensin II receptor blockers, diuretics, statins, oral anticoagulation and oral hypoglycemic agents and proton pump inhibitors. The prescribed analgesic was paracetamol (500 mg every 4-6 hours as needed): a benzodiazepine was also prescribed (alprazolam 0.25 mg as needed) and an antidepressive therapy was hypothesized but not prescribed by the caregiver.

The patient was evaluated by participant-completed and previously validated Outpatient Osteopathic SOAP (Subjective, Objective, Assessment, Plan) Note and Note – Follow-up Forms (SNFs) to obtain answers to 17 outcome-based questions that the profession must address to meet the new challenges and demands of outcome-based research¹⁹⁻¹²¹. Chest pain was evaluated by the previously validated visual analogue scale (VAS)¹³¹, low back pain by the Italian version of the Roland Disability Questionnaire (RDQ)¹⁴¹, and anxiety-depression-stress rates by the Hamilton Rating Scale for Anxiety/Depression (HAM-A/HAM-D)^{15,161} and the Perceived Stress Scale (PSS-14)^{17,181}.

The OMT was performed by the same experienced osteopathic physician (VB) in a quite similar manner two times per month for two months, and consisted of 40 minutes of various techniques established in the osteopathic medical profession^{19,201}. The aims were to alleviate anatomic deformation of the rib cage caused by

median sternotomy and to improve respiratory breathing mechanics. With the subjects supine, osteopathic physician performed gentle manipulation of the thoracic myofascial tissue and rib cage, including indirect myofascial and localized lymphatic drainage techniques, in an attempt to improve lymphatic flow away from congested tissues and to balance ligamentous tension. Briefly, balanced ligamentous tension, indirect myofascial release of the sternum, indirect release of the respiratory diaphragm, occipito-atlantal decompression, rib raising and Sibson's fascial release were applied; in addition, we included in our protocol the craniosacral therapy approach (CST), which could potentially represent as well a robust tool to approach the cardiovascular pathophysiology²¹¹.

During the OMT protocol no symptoms such as fatigue, dyspnoea or palpitations were reported, and a subjective evaluation suggested that the patient progressively felt better needed less pain medication. Heart rate, systolic–diastolic–mean blood pressure and haemoglobin oxygen saturation remained unchanged; furthermore, a complete clinical examination with resting electrocardiography was performed at baseline and at the end of the OMT protocol showing no significant differences nor variations of any kind. On the contrary, from baseline to the end of the OMT protocol VAS, RDQ, HAM-A/HAM-D and PSS-14 results all showed a slight amelioration, thus suggesting a general improvement in clinical conditions, subjective feeling of wellbeing and in perception of negative emotions such as depression and anxiety and of chest and/or low back pain with a consequent significant reduction of drug usage. The final outcome was a consistent improvement in QoL.

DISCUSSION

The present case report well highlights the usefulness and efficacy of a specific OMT protocol addressing such potential sequelae of surgical procedures via a median sternotomy approach as previously described⁴¹.

In the well-organized pilot study by O-Yurvati *et al*⁵¹ it was clearly demonstrated that OMT had immediate physiologic effects following CABG; these effects included beneficial physiologic hemodynamic changes in cardiac function (as measured by cardiac index) and in perfusion (as measured by thoracic impedance and haemoglobin oxygen saturation) following postoperative OMT. The changes in hemodynamic parameters were suggestive of a shorter stay in the recovery room and other potential short-term and long-term health benefits, and the authors concluded that the beneficial effects of OMT observed are likely the result of improvements in fluid homeostasis, including lymphatic fluid flow.

In this case, the patient did not undergo CABG surgery, the OMT protocol was not performed in the immediate post-operative period and the patient was in clinically and hemodynamically stable conditions. On the other hand, our aim was principally to lower the levels of perceived pain and of anxiety/depression symptoms, that are generally common after cardiac surgery and significantly worsen QoL and prognosis⁶⁻⁷¹.

In particular, the reported 15% to 20% prevalence of uni-polar depression among cardiac surgery patients is consistent with that found generally among cardiac patients²²¹. Comparatively, the point prevalence among the general population is 5% to 9% for females and 2% to 3% among males²³¹, suggesting that cardiac surgery patients have a higher prevalence of depression than community samples. Self-reporting estimates of anxiety are also variable. Anxiety is particularly high for cardiac surgery patients while on the waiting list with an unknown surgery date²⁴¹; after surgery,

while anxiety may decrease to below pre-operative levels, the severity of anxiety does not necessarily remit to below sub-clinical levels and may warrant intervention^[25]. Nonetheless, anxiety and depression are often misdiagnosed. A survey of 796 cardiovascular physicians determined 71.2% of respondents asked fewer than half of their patients with CAD about depression^[26]. Some authors have recommended depression screening following CABG surgery as a way to improve pathways to recovery^[27], though the American College of Cardiology and American Heart Association 2004 guideline update on CABG surgery^[28] highlight that pre-operative screening may simply sensitize staff and family members to post-operative distress and mood changes. The American Heart Association recently indicated that evidence exists for depression screening in CAD patients^[29], stating it is reasonable in instances where patients have access to case management, in collaboration with their primary care physician, and a mental health specialist.

In addition, given that the patient had history of heart failure, OMT could represent an innovative therapeutic platform via its beneficial effects on fluid homeostasis. In fact, the disruption of efficient breathing mechanics caused by the anatomic deformation of the chest during cardiac surgery tends to cause postoperative restriction of the normal respiratory mechanism and, therefore, restriction of lymphatic flow. The use of manipulative techniques that improve lymphatic flow and restore normal respiratory function can help relieve fluid accumulation^[9]. In this context our findings support to previously published case reports that have indicated that OMT improves fluid homeostasis and speeds recovery in some patients who have undergone median sternotomy or other thoracic surgical procedures^[4,30,31].

CONCLUSION

Persistent pain and anxiety/depression symptoms are generally common after cardiac surgery and significantly worsen QoL and prognosis. Although further in-depth large clinical case-control studies with longer duration of follow-up are necessary to confirm our hypothesis and experiences, a specific OMT protocol addressing such potential sequelae of surgical procedures via a median sternotomy approach could potentially represent a very useful and cost-effective therapeutic approach and may be considered as a valid treatment option in these patients.

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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