Clinical Integration of Osteopathic Manipulative Medicine

Internal Medicine: Post-Operative Osteopathic Manipulative Treatment (OMT) of Coronary Artery Bypass Graft Patients

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Introduction:
Coronary Artery Bypass Graft (CABG) surgery is a procedure utilized to relieve angina & reduce the risk of mortality in patients with coronary artery disease (CAD). The procedure is performed approximately 800,000 times worldwide each year. Alternatives to CABG for CAD primarily include smoking cessation, medical management for angina, hypertension, hypercholesterolemia, and tight blood sugar control (in diabetics), and/or percutaneous coronary intervention (PCI). According to the 2004 ACC/AHA CABG guidelines, CABG is the preferred treatment for patients who either have left main coronary artery disease, three-vessel disease, or diffuse coronary artery disease not amenable to treatment with a PCI. During the CABG procedure, a durable conduit (an artery or vein from elsewhere in the patient's body) is harvested and later grafted onto the heart to bypass the patient’s atherosclerotic arteries and improve myocardial blood supply.

Some of the major post-operative complications related to CABG (both in the short term and in the long term) include myocardial dysfunction, cerebral ischemia, acute kidney injury, cardiac tamponade, pulmonary infections, pulmonary embolism, deep vein thrombosis, atrial fibrillation, depression, chronic kidney disease, and aortic dissections. Such complications are associated not only with the operation itself, but also maybe secondary to the anesthesia, the cardiopulmonary bypass, and the sternotomy. Medical therapy to prevent complications after CABG includes anti-platelet agents, anticoagulants, beta-blockers, strict blood glucose control, statin therapy, and prophylactic antibiotics against a potential surgical site infection. Other adjunctive therapies to minimize complications staus-post CABG include rapid extubation,
incentive spirometry, and normothermic versus hypothermic perfusion

The following review seeks to elucidate recent evidence of the benefits of osteopathic manipulative treatment as related to the post-operative management of CABG patients.

**Patient presentation of CABG candidate:**

Coronary artery bypass surgery alleviates the blockages that exist in the heart as a result of coronary artery disease. Symptoms of CAD may include, but are not limited to, the following:

- Chest pain (Typical and/or Atypical)
- Diaphoresis
- Back Pain
- Fatigue
- Palpitations
- Arrhythmias
- Dyspnea

Unfortunately, symptoms usually occur in advanced cases of CAD. As the coronary arteries narrow, the level of ischemia to the heart muscle increases. Eventually this will result in a myocardial infarction, and if not treated timely enough - myocardial death.

**Differential diagnosis of CAD:**

- Angina Pectoris
- Aortic Dissection
- Atherosclerosis
- Buerger’s Disease
- Cardiomyopathy
- Cocaine induced Coronary Artery Vasospasm
- DM I and II
- Giant Cell Arteritis
- Hypertension
- Myocardial Ischemia
- Myocarditis
- Pericarditis
- Prinzmetal’s Angina
- Pulmonary Embolism (PE)
- Unstable Angina

**Clinical pearls:**
CABG is a surgical procedure reserved for CAD patients who would benefit more from bypass surgery over medical therapy and/or PCI. Post-operative management of CABG recipients seeks to limit the risk of developing myocardial infarction, cerebrovascular accident, infections, deep vein thrombosis, PE, post-operative atelectasis, acute kidney injury/chronic kidney disease

**Osteopathic Manipulative Medicine Integration:** Sympathetic chain ganglia along the T1-T5 region are responsible for sympathetic control of the heart. There is a strong correlation of T1-T5 TART changes, C2 dysfunction, and upper rib dysfunction in patients with known cardiovascular disease. Additionally, it is reasonable to surmise that TART changes may occur in the cervical region secondary to intubation and the tissue trauma associated with open cardiac surgery will leave the patient with dysfunctions to the thoracic cavity as well as diaphragm region. Therefore, post-operative treatment with OMT has been geared towards these dysfunctions.

In 1989, Rogers and Starzinski created an OMT treatment protocol for post-operative management that had been in place for approximately 10 years. Since then, very little research has been done regarding the direct effect of postoperative OMT on cardiac surgical patients. It was not until the new millennium that more studies were pursued in regarding the role that OMT may have in post-operative care. There are two particularly interesting studies that look at the effect of OMT for post-operative care of the CABG patient.

In 2013, Wieting et al. discussed the effect of OMT on post-operative medical and functional recovery of CABG patients. They hypothesized that OMT would promote a bowel movement sooner than post-operative patients without treatment, help patients increase their functional independence measure scores (FIM – evaluated by grooming, toileting, transfers, and walking), and that time to discharge would be sooner for the OMT treatment group. Using a double blind, randomized model, seventeen patients were relegated to the OMT group (OMM + conventional post-operative care), eighteen patients to the placebo group (OMM placebo + conventional post-operative care), and eighteen to the control group (conventional post-operative care only). The techniques utilized included indirect myofascial release of the thoracic inlet, rib raising with continuous stretch of the paraspinal muscles to the L2 vertebral level, and soft tissue cervical paraspinal muscle stretch with suboccipital muscle release. The rationale of using these techniques was to normalize sympathetic tone, improve lymphatic drainage and rib cage mobility, and relieve somatic dysfunctions incurred from intubation. The study ultimately did not find any statistically significant difference in all measured variables – FIM scores, length of stay or time to bowel movement post-operatively. However, it appears that daily OMT does have a positive correlation with the convalescence of CABG patients.

O-Yurvati et al. sought to evaluate the hemodynamic effect of OMT immediately after CABG surgery. Measurements of cardiac function were assessed pre-OMT versus post-operative OMT in order to compare treatment effects using quantifiable measures of thoracic impedance, mixed venous oxygen saturation, and cardiac index. Interestingly, the OMT was performed on the patients while they were paralyzed and sedated – which further minimized any subjective variables. The following techniques were used – balanced ligamentous tension of thoracic spine and ribs, indirect myofascial release of the sternum, OA decompression, rib raising, and Sibson’s fascial release. The study found statistically significant improvements in cardiac function (as
measured by cardiac index), and in perfusion of blood throughout the body (as measured by thoracic impedance and mixed venous oxygen saturation). Such results may suggest that OMT can improve the hemodynamic physiology of CABG patients after surgery, which may improve patient recovery time.

**Osteopathic Structural Examination:** Will find numerous viscerosomatic changes, chapman reflex points, and trigger points in relation to CAD and status-post CABG

- Chapman points: Anterior 2nd ICS on the Left
- Trigger points: Pectoralis Muscle between ribs 5 and 6 halfway between nipple line and the sternum – associated with supraventricular tachycardia
- Viscerosomatic Reflexes
  - Subjective Pain found on left chest radiating down left arm and up the jaw
  - Palpable TART findings/areas of acute facilitation (boggy and edematous) T1-T6 on the left
  - Palpable TART findings/areas of acute facilitation in the cervical spine
- Inhalation/Exhalation dysfunctions of the ribs due to sternotomy
- Occipital-Atlantal Dysfunction

**Possible Treatments Options:**

- Balanced Ligamentous Tension of Thoracic Spine/Ribs
- Indirect Myofascial Release of the Sternum
- Doming the Diaphragm
- OA Decompression
- Soft tissue cervical myofascial tissue release with suboccipital muscle release
- Rib raising
- Thoracic inlet myofascial release

**Related evidence based medicine articles:**


**Citations:**

2. Eagle, KA; Guyton RA; Davidoff R et al. (October 5, 2004). "ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee


5. Rogers FJ, Starzinski ME. The challenges of OMT in postsurgical management of cardiac patients. *J Am Osteopath Assoc*. 1989;89(10):1274, 1277
