

# Simultaneous Beating Heart Coronary Artery Bypass Surgery and Modified Radical Mastectomy

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## ABSTRACT

Concomitant surgeries for unrelated diseases can be performed to minimize the risks associated with surgery and general anesthesia. In treating a male patient with breast cancer and severe coronary artery disease, we used the beating heart technique for a coronary artery bypass graft to avoid the negative effects of on-pump bypass on the possible acceleration of tumor growth. In this report, we present a unique case of concomitant off-pump coronary artery bypass graft surgery and modified radical mastectomy in a 56-year-old man.

## INTRODUCTION

As longevity and the incidence of cardiovascular disease increase, the need is increasing for concomitant surgeries for the treatment of cancer and heart disease. Breast cancer is the most common cancer among women in the United States. Although only 1% of all breast cancer patients are male, the frequent presence of life-threatening coronary artery disease makes it important to recognize the various treatment options when cancer and coronary artery disease occur together [Stalsberg 1993]. Male breast cancer is usually self-diagnosed, with an approximately 22-month delay from the onset of symptoms to diagnosis [Heinig 2002]. Consequently, combined procedures are a viable option for treating patients with severe forms of both conditions. Simultaneous surgery offers various benefits, including reductions in risk, recovery, and cost; however, not all patients are good candidates for combined surgical procedures. Prior studies have documented the benefits of off-pump cardiac surgery in reducing rates of complication [Cantero 2012]. For cancer patients requiring open-heart surgery, the use of the beating heart technique can be especially important in reducing the potential risk of tumor hemorrhage due to heparinization, as well as embolic metastasis caused by the use of cardiopulmonary

bypass [Kumar 2001]. We present the case of a 56-year-old man with breast cancer and coronary artery disease who was a strong candidate for simultaneous radical mastectomy and off-pump coronary artery bypass graft (CABG) surgery.

## CASE REPORT

A 56-year-old man presented to our institution with a mass in his left breast following a biopsy and attempted excision of the tumor at a different hospital 2 weeks prior. The pathology report revealed the growth of a grade 2 invasive ductal carcinoma presenting estrogen and progesterone hormone receptors. Additionally, the surgical border surrounding the resected mass tested positive for tumor tissue. The patient consented to a modified radical mastectomy to excise the remaining tumor tissue. During the preoperative examination, he complained of exertional angina pectoris, and a cardiology consultation led to a diagnosis of ischemic heart disease. A coronary angiogram revealed an ostial lesion in the left anterior descending coronary artery and stenosis in the right coronary artery, with 97% and 70% occlusion, respectively. Owing to the severity of the vessel stenosis, the patient was indicated for CABG surgery prior to the mastectomy. A subsequent evaluation revealed the potential for simultaneous surgery in a single session with 2 separate incisions. After a risk-benefit analysis, we determined that combined CABG and mastectomy minimized the risks of infection and all other potential complications associated with multiple surgeries. Concomitant surgery permitted immediate removal of the tumor and alleviation of the myocardial ischemia.

We used a Stewart incision to perform a modified radical mastectomy and dissection of an axillary lymph node. Cardiac surgery was then initiated with a median sternotomy. The heart was stabilized with the Starfish Heart Positioner and Octopus 3 Tissue Stabilizer (Medtronic, Minneapolis, MN, USA). We used the beating heart technique to avoid tumoral complications, such as embolic metastasis. We used a full skeletonized technique to harvest the left internal thoracic artery for grafting; no lymphadenopathies were observed. The saphenous vein was excised by an open-leg no-touch procedure. Following preparation of the grafts, myocardial revascularization was performed under beating heart conditions with no peri- or postoperative complications.

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After the sixth postoperative hour, the patient was extubated and transferred out of the intensive care unit the following day. No drainage from the surgical wound was evident. Throughout the patient's hospital stay, no pulmonary dysfunction or infection was observed. The patient was discharged on postoperative day 6. He was seen 1 week later for a follow-up appointment; no surgical abnormalities were apparent. The patient was referred to oncology for further treatment, including the initiation of radiation therapy.

## DISCUSSION

The increased incidence of cardiovascular disease makes this type of case more common and the need for simultaneous treatment options increasingly relevant. A careful preoperative evaluation of such factors as condition severity, proximity of the tumor to the heart tissue, and the ability to recover from multiple surgeries is necessary to determine a patient's candidacy for concomitant surgery. Additionally, simultaneous surgery offers a variety of benefits, including better outcomes, shorter recovery times and hospital stays, and lower costs.

In addition to the known risks of on-pump surgery, using cardiopulmonary bypass with cancer patients has been hypothesized to increase the risk of accelerated tumor growth and dissemination. Furthermore, the blood's contact with the surface of the extracorporeal pump during bypass triggers a systemic inflammatory response, which can weaken the immune system and stimulate additional tumor growth [Cantero 2012]. Advances in technology make beating heart surgery a more viable option for cancer patients in need of CABG. Furthermore, off-pump CABG surgeries produce lower rates of blood transfusion, respiratory complications, reoperation for perioperative bleeding, and embolic events [Lamy 2012].

Previous published case reports of combined cardiovascular and oncologic surgeries have documented radical mastectomy and on-pump or off-pump CABG, depending on the accessibility of the stenotic vessels [Aydin 2006; Konagai 2006]. To our knowledge, however, this report is the first of a case of a radical mastectomy followed by an off-pump, 2-vessel revascularization in a male patient. We performed the mastectomy procedure before the revascularization to prevent an embolic

event and decrease the risks associated with heparinizing the patient, had cardiopulmonary bypass been necessary.

Although concomitant surgeries do offer certain benefits, additional risks on cardiac graft function are associated with radiation therapy performed after mastectomy. Because of the proximity of the breasts to the heart, radiation therapy to the chest may cause damage to the initial grafts, potentially requiring future revascularization. Studies have suggested an increased risk of thromboembolic events due to certain chemotherapeutic agents. Additionally, ionizing radiation can cause endothelial damage and increase atherosclerosis due to oxidative stress [Sanon 2010]. Additional research is necessary, however, to determine the long-term risks associated with radiation therapy immediately following CABG procedures.

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