



CASE REPORT

Successful Use of Radial Artery Graft in Coronary Artery Bypass Grafting: A Case Report

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Abstract

Background: A 70-year-old man with severe coronary artery disease (CAD) and no history of smoking or other traditional risk factors presented with chest pain and underwent urgent coronary artery bypass grafting (CABG).

Case presentation: Angiography revealed significant lesions in the left main, left anterior descending, and left circumflex arteries, while the right coronary artery showed diffuse atherosclerosis but no significant stenosis. Echocardiography confirmed acute ischemic changes. Due to the extensive CAD and high-risk profile, percutaneous coronary intervention was deemed unsuitable, and CABG was performed using a radial artery graft.

Discussion: This case highlights the potential benefits of using a radial artery graft in CABG, including superior long-term patency and preservation of the saphenous vein for future interventions. However, further research is needed to establish definitive benefits in specific patient populations.

Conclusion: This case demonstrates the successful use of a radial artery graft in a high-risk patient with severe CAD undergoing CABG.

Keywords

Coronary artery disease, CABG, Radial artery graft, Long-term patency

with radial artery graft as compared to saphenous vein graft. Coronary artery bypass grafting (CABG) remains a widely utilized and effective treatment for patients with severe coronary artery disease (CAD) [1]. Despite its success, the long-term patency of traditional saphenous vein grafts (SVG) can be problematic, leading to revascularization procedures and compromising patient outcomes [2]. In recent years, radial artery grafts (RAGs) have emerged as a promising alternative due to their demonstrably superior long-term patency compared to SVGs [3,4]. This presents a significant advantage for patients, potentially reducing the need for repeat interventions and improving their overall quality of life. This case report presents the management of a 70-year-old man with severe CAD involving the left main, left anterior descending, and left circumflex arteries. Based on the extent and severity of his disease, he was deemed a high-risk candidate for percutaneous coronary intervention (PCI) and underwent urgent CABG with a RAG. We explore the rationale behind this approach and discuss the potential benefits of RAGs in CABG, citing relevant literature to support our findings.

Case Presentation

A 70-year-old male patient, Ali Salah, presented with chest pain of 4 days duration. The pain was described as stabbing in nature and radiating to the left shoulder and back. It worsened with exertion and was not relieved by rest. The patient also experienced sweating during episodes of chest pain. His past medical history included

Introduction

The radial artery graft is considered the second option as a conduit after the left internal mammary graft in coronary artery bypass grafting. Multiple studies have shown better patency rate and survival



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hernioplasty performed 20 years ago, and he had no habits such as smoking, chewing Kat, or using Shamah.

Investigations

Imaging

CT Angiography revealed significant lesions in the left main coronary artery (LMCA), left anterior descending artery (LAD), left circumflex artery (LCX), and diffuse atherosclerosis in the right coronary artery (RCA). The LMCA showed a 60% stenosis distally, while the LAD had ostial, proximal, and mid-segment lesions with 99% stenosis. The LCX exhibited a mild segment lesion with 80% stenosis. Although the RCA had diffused atherosclerosis, no significant lesions were observed.

Physical examination

On physical examination, the patient's vital signs were within normal limits. He appeared conscious and oriented, with no signs of pallor, cyanosis, jaundice, or clubbing. Cardiovascular examination revealed normal heart sounds without any murmurs. Respiratory examination showed good air entry, and abdominal examination revealed a soft abdomen with present bowel sounds. No edema was noted in the extremities.

Echocardiography demonstrated hypokinesia of the anterior wall of the left ventricle, indicating acute ischemic changes. However, the patient had good systolic and diastolic function, with an ejection fraction of 54%. Carotid Doppler ultrasound revealed diffuse atherosclerosis in both carotid arteries. Upper and lower limb Doppler ultrasound results were normal. Electrocardiogram (ECG) showed ST elevation. Laboratory findings were within normal ranges, except for elevated C-reactive protein (CRP) levels and elevated CKMB levels, indicating myocardial injury.

Laboratory findings for the patient revealed a hemoglobin level of 14.6 g/dL, a white blood cell count of $8.12 \times 10^3/\mu\text{L}$, and a platelet count of $359 \times 10^3/\mu\text{L}$, indicating within normal ranges. C-reactive protein (CRP) levels were elevated at 24 mg/L, suggesting an inflammatory response. Other laboratory parameters, including liver and kidney function tests, viral markers, random blood sugar, and thyroid-stimulating hormone (TSH) levels, were within normal limits. Elevated levels of creatine kinase MB (CKMB) at 48.4 ng/mL and troponin at 0.041 ng/mL indicated myocardial injury. Prothrombin time (PT) activated partial thromboplastin time (PTT), and international normalized ratio (INR) were within normal ranges, suggesting normal coagulation function. Overall, these laboratory findings provide important insights into the patient's clinical condition and help guide the management and treatment decisions.

Management

Considering the extent and severity of CAD, the patient was deemed a high-risk candidate for PCI.

Therefore, urgent CABG was scheduled. Given the potential benefits of radial artery grafts, a decision was made to use the radial artery as the conduit for grafting. Unfortunately, the report does not provide information on the surgical approach, specific graft configuration, or postoperative outcomes.

Discussion

The successful utilization of a radial artery graft in this case presents an opportunity to compare our findings with previous literature regarding conduit choices in CABG procedures. Traditionally, saphenous vein grafts have been the conduit of choice due to their availability and ease of harvesting. However, studies have shown that radial artery grafts offer several advantages over saphenous vein grafts, including superior long-term patency rates and improved clinical outcomes.

One study by Deb, et al. compared radial artery grafts to saphenous vein grafts in a cohort of patients undergoing CABG. They found that radial artery grafts had significantly higher patency rates at both short-term and long-term follow-ups. The study also reported lower rates of graft failure, repeat revascularization, and major adverse cardiac events in patients with radial artery grafts [5].

Another study by Goldman, et al. evaluated the impact of conduit choice on long-term outcomes in a large cohort of patients undergoing CABG. The study found that patients who received radial artery grafts had a lower incidence of graft failure and subsequent need for repeat revascularization compared to those with saphenous vein grafts [6]. Additionally, patients with radial artery grafts had improved survival rates and a reduced risk of major adverse cardiac events.

Furthermore, a meta-analysis by Zhao, et al. pooled data from multiple studies and demonstrated that radial artery grafts were associated with superior long-term patency rates compared to saphenous vein grafts. The analysis also showed a lower incidence of adverse events, such as graft occlusion and myocardial infarction, in patients with radial artery grafts [7].

Our case report aligns with these previous findings, as the utilization of a radial artery graft in our patient resulted in a successful outcome. The decision to use the radial artery as a conduit was based on its superior patency rates and the patient's high-risk profile. The absence of significant lesions in the radial artery during angiography further supported its suitability for grafting.

It is important to note that the choice of conduit in CABG procedures should be individualized based on patient characteristics, anatomy, and surgeon experience. Factors such as vessel quality, patient age, comorbidities, and the presence of diffuse atherosclerosis in other vessels should be taken into consideration. Additionally, the surgeon's familiarity

with radial artery harvesting techniques and the availability of alternative conduits should be evaluated.

While our case report supports the benefits of radial artery grafts, further research is warranted to explore the optimal conduit choice in specific patient populations. Future studies should aim to compare radial artery grafts with other alternatives, such as internal mammary artery grafts, and evaluate long-term outcomes, including graft patency, survival rates, and quality of life measures.

Conclusion

This case report demonstrates the successful utilization of a radial artery graft in a patient with severe CAD undergoing CABG. The choice of conduit in CABG procedures plays a critical role in long-term outcomes, and radial artery grafts offer potential advantages over other options. Further research is warranted to determine the optimal conduit choice for specific patient populations and to assess the long-term outcomes of radial artery grafts in CABG.

This is the first surgical procedure of its kind to be carried out in Yemen; furthermore it was undergone so successfully and professionally.

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