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Coronary Artery Bypass Grafting by Total Arterial Revascularization in a Patient with Elephantiasis

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ABSTRACT

Elephantiasis, characterized by chronic lymphatic obstruction and massive limb swelling, poses significant challenges in surgical management due to altered anatomy, difficulty in vein harvesting, impaired wound healing, and an increased risk of infection and fluid imbalance. These complications become especially critical when major procedures like coronary artery bypass grafting (CABG) are required. In such patients, standard surgical approaches may be compromised, demanding tailored strategies to minimize risk and optimize outcomes. We present a rare case of CABG using total arterial revascularization (TAR) in a patient with elephantiasis, illustrating the complexities of operative planning and execution in the presence of severe lymphatic disease. This case emphasizes the importance of preoperative assessment, multidisciplinary collaboration, and meticulous intraoperative technique. Careful postoperative monitoring is also essential to prevent complications and ensure successful recovery. Our report highlights that individualized approaches can lead to favorable outcomes even in technically demanding situations, demonstrating the viability of arterial grafting in anatomically and physiologically demanding scenarios.

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Introduction

Coronary artery bypass grafting (CABG), now in its sixth decade of clinical use, remains the most frequently performed cardiac surgery worldwide. While CABG using total arterial revascularization (TAR) offers superior long-term patency and outcomes compared to traditional vein grafting, its application in patients with complex comorbidities presents significant challenges (1). Elephantiasis, a condition marked by chronic lymphatic obstruction and massive limb swelling, complicates surgical planning due to altered anatomy, impaired wound healing, and a heightened risk of infection and fluid imbalance (2). Rare but serious complications such as compartment syndrome of the lower legs (3) and saphenous vein graft aneurysm (4) further

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underscore the complexity of care. This report presents a rare and complex case of CABG performed with TAR in a patient with elephantiasis, highlighting the need for meticulous preoperative assessment, innovative intraoperative strategies, and vigilant postoperative care to ensure successful outcomes in anatomically and physiologically demanding scenarios.

Case Presentation

A 62-year-old male with a history of chronic lymphatic edema presented with progressive exertional angina and dyspnea. He had a history of diabetes, smoking, hypertension (HTN), hyperlipidemia (HLP), and ischemic heart disease (IHD) with a history of percutaneous coronary intervention (PCI) on the left anterior descending (LAD). Physical examination revealed extensive bilateral lower limb non-pitting edema consistent with elephantiasis, along with markedly thickened skin and signs of chronic lymphatic obstruction (Figure 1, B). Echocardiography showed reduced left ventricular ejection fraction (LVEF) (30%) with non-significant valvular heart pathology. Coronary angiography demonstrated severe three-vessel disease. Because of the extent of coronary artery disease (CAD) and reduced LVEF, CABG was indicated. Due to concerns about lower limb vein harvesting and long-term graft patency, a TAR strategy was selected, utilizing left internal thoracic arteries and the left radial artery after performing Allen's test.

On-pump beating CABG was performed via median sternotomy. Bypass grafting was performed by left internal mammary artery (LIMA) to LAD and radial artery to patent ductus arteriosus (PDA) & OM sequential anastomoses (Figure 1, A). Cardiopulmonary bypass was successfully weaned, and the patient was transferred to the intensive care unit in stable condition. The postoperative course was uneventful, and the patient was extubated after 6 hours and discharged home on his fifth day. After one year of follow-up, the patient was in satisfactory condition and was symptom-free.

Figure 1. A) Radial artery harvest B) Elephantiasis with markedly thickened skin and signs of chronic lymphatic obstruction.

Discussion

Coronary revascularization in patients with elephantiasis carries significantly higher risks due to fragile skin, impaired lymphatic drainage, and difficulty in positioning. These factors increase the chances of wound complications, infections, and persistent swelling. TAR becomes a logical and forward-thinking choice in this context. It avoids using saphenous veins, which may be damaged or unusable in swollen limbs, and instead relies on arterial grafts known for their long-term durability. This approach not only sidesteps the challenges posed by diseased lower extremities but also aligns with current evidence favoring multi-arterial techniques.

This clinical case demonstrates the feasibility of performing TAR in a patient with

elephantiasis (filariasis or non-filariasis lymphedema), despite the unique anatomical and physiological challenges it presents. Elephantiasis significantly elevates surgical risks due to severe limb edema, complex patient positioning, and chronic lymphatic stasis (3), which increase the likelihood of wound infections, cellulitis, lymphangitis, and mediastinitis (4). The case confirms that TAR is a viable option even in anatomically complex and high-risk patients. In such patients, TAR is a rational choice: arterial grafts, especially the internal thoracic artery, offer superior long-term patency and reduce the need for re-intervention. Moreover, TAR avoids harvesting saphenous veins from compromised lower limbs, thereby minimizing edema and infection risks. These advantages are supported by scientific evidence, which emphasizes the durability and safety of arterial conduits in high-risk populations. This strategy aligns with contemporary evidence and offers a reliable solution in complex surgical scenarios.

A new study by Ren et al. supports TAR as a superior strategy, showing improved graft patency and survival benefits in high-risk patients where re-operation poses significant risks (5). The 2025 Cleveland Clinic review reinforces this by advocating multi-arterial grafts to enhance longevity and reduce cardiac events. These findings, supported by Ramsingh et al., establish TAR as an evidence-based approach rather than a workaround for comorbid conditions (6). To optimize outcomes, a multidisciplinary heart team including cardiology, cardiac surgery, vascular surgery, infectious disease, anesthesiology, and nursing is essential for personalized perioperative planning. As emphasized by Riojas et al., structured collaboration is critical to managing the complex anatomy and comorbidities in such patients (7).

As emphasized by Hendriks et al., these perioperative measures are critical in this vulnerable population. Effective management of wound, infection, and edema in patients with elephantiasis undergoing TAR requires meticulous preoperative skin assessment, infection-prevention protocols, and tailored positioning to avoid pressure on edematous limbs (8). Lymph-protective dressings and early compression therapy post-hemostasis help reduce edema and promote healing, while pharmacologic strategies including anticoagulants, beta-blockers, statins, and tight glucose control must be protocolized to minimize infectious and ischemic risks. Intraoperatively, TAR does not demand rigorous graft quality assurance in this case.

Conclusion

This case highlights the feasibility of total arterial CABG in patients with severe lymphatic disease. Elephantiasis introduces anatomical and physiological complexities that require individualized surgical planning and vigilant perioperative care. TAR offers a durable solution in high-risk patients, and with appropriate multidisciplinary coordination, successful outcomes are achievable even in anatomically challenging scenarios.

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