Editorial

Precision and targeted therapy in cardiac surgery

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Comment on: Gulack BC, Kirkwood KA, Shi W, *et al.* Secondary surgical-site infection after coronary artery bypass grafting: A multi-institutional prospective cohort study. J Thorac Cardiovasc Surg 2018;155:1555-62.e1.

Submitted Aug 17, 2018. Accepted for publication Sep 12, 2018.
doi: 10.21037/jtd.2018.09.90
View this article at: http://dx.doi.org/10.21037/jtd.2018.09.90

With more than 300,000 cases being performed annually in the United States alone, a coronary artery bypass grafting (CABG) is the preferred method for revascularization for most patients that are suffering from a multivessel coronary artery disease or diabetes (1). Secondary to its long term patency and survival benefits, if suitable and surgically feasible, the left internal mammary artery remains the conduit of choice for the bypassing of the left anterior descending coronary artery (2). Moreover, the use of a second arterial conduit, whether it is the right internal mammary artery or a radial artery, has gained increased attention since the 1990's. This is due to the practices varying greatly in this time-period, due to the perceived conflicting ideas about the long-term outcomes about a total arterial revascularization in a coronary artery procedure (3). Nevertheless, the great saphenous vein remains the most widely used conduit for a coronary artery bypass surgery. There are some factors that make the great saphenous vein a compelling option. For example, harvesting is relatively easy, it is readily available in most cases, it is resistant to spasm, and its patency has been extensively studied (1,4).

The traditional method for harvesting the great saphenous vein involves making a large incision on the patient's leg. Unsurprisingly, this incision is associated with more pain, which can result in a less and more delayed mobility and ambulation, thereby prolonging hospitalization. I is also associated with wound complications such as an including infection or an aesthetically unappealing scar (1). With this method, wound complications are typically seen in about 2–24% of the cases, conferring a significant health and economic burden (5). After the development of the endoscopy as a new technology for surgery in the 1990's, endoscopic vein harvesting was incorporated in cardiac surgery to address some of the challenges of a traditional open vein harvesting. In the ensuing years, endoscopic vein harvesting has rapidly grown in popularity with many centres across the world, adopted as the primary option. A prospective randomized parallel-group trial demonstrated that endoscopic vein harvesting was associated with a lower amount of post-surgical complications when it was compared to the traditional open vein harvesting method (5).

In this multi-centre prospective cohort study, Gulack *et al*. analyzes the patient risk factors and processes of care which are associated with a secondary surgical-site infection (SSI) after coronary artery bypass surgery. The authors should be applauded for conducting the study, and addressing an important issue in cardiac surgery. The study has a few strengths; for example, a large sample size of 2,714 patients, as well as having a clear, comprehensive, and elegant design. It also has an impressive follow-up completion rate of 98%, and appropriate statistical analysis to go along with it all. Gulack and colleagues have acknowledged that the study was not powered to examine the endpoint of SSI, so its predictive power is limited. They also highlight that the follow-up duration of 65 days may have been too short for fully identifying patients who had developed an SSI post CABG. By virtue of the data available for this cohort study, it was unfortunate that the authors were not able to capture more details; such as technique

of open vein harvest or whether or not an endoscopic vein harvest was initially planned. Nevertheless, their results had showed there was a 3% increase in the rate for being afflicted by a secondary SSI, which the study had associated this increase with an increased body mass index and packed red blood cell transfusion. Interestingly enough, this study didn't find any increase in post-operative hyperglycemia when determining the risk-factors for acquiring an SSI.

Like other studies of its kind, Gulack *et al*. highlight the main advantages of endoscopic vein harvesting technique which is reducing the wound area. This leads to the improved cosmetic outcomes and the lowered incidence of a lower limb morbidity rate which is related to wound infection, hematoma, seroma, lymphedema, lymphorrhea, saphenous neuropathy and neuralgia. In the grand scheme of things, it is suggested that these benefits also maintain the cost-effectiveness of endoscopic vein harvesting (6). Despite this, endoscopic vein harvesting has not been free of controversy, as some groups have suggested a lower graft patency for intermediate all the way to long-term follow up studies. They have attributed this compromised outcome to the endothelial damage elicited by using a scope (7-10). On the other hand, there are different types of studies which have illustrated the safety of endoscopic vein harvesting, and have dismissed the concerns regarding a higher graft patency failure rate (11-14). In reality, graft patency rates can probably be mediated in endoscopic vein harvesting by an experienced user. However, more studies, with more of particularly randomized controlled trials, are needed to fully assess the clinical outcomes of endoscopic versus open vein harvesting (15,16).

To further aid patient recovery post cardiac surgery, our group assessed the safety and efficacy of prophylactic negative pressure wound therapy (NPWT) following an open saphenous vein harvest in cardiac surgery (17). This single-centre, single-blind, randomized controlled trial considered 64 patients undergoing CABG, and assessed the rates of surgical site infection as one its secondary endpoints. We were able to show that NPWT following saphenous vein graft harvesting is safe, well-tolerated, and its utility improves the post-operative recovery time, with a prolonged impact on mobility at six weeks.

With the advent and exponential growth of the newer minimally invasive techniques, a lot of excitement has been generated for incorporating such newer approaches in cardiac surgery. Many studies are investigating the safety of these approaches, and a variety of groups are aiming to demonstrate the superiority these innovations can confer in optimal patient care. These methods will undoubtedly shape the future landscape of cardiac surgery as a profession, but as is the case for any intervention, every procedure should be considered in the context of what is most beneficial to the patient. To ensure a technology or technique has a lasting and meaningful impact, this consideration should be driven by evidence based practices which have been targeted for the precise individualized application of medicine.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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(English Language Editor: Jeremy Dean Chapnick, AME Publishing Company)

Cite this article as: Fatehi Hassanabad A, Fedak PW. Precision and targeted therapy in cardiac surgery. J Thorac Dis 2018;10(Suppl 33):S3986-S3988. doi: 10.21037/jtd.2018.09.90

