

Cite this article as: Suma H. How Did I Came Up With the Idea of Using the Right Gastroepiploic Artery for Coronary Artery Bypass Grafting. Eur J Cardiothorac Surg 2026; doi:10.1093/ejcts/e2ag180.

How Did I Came Up With the Idea of Using the Right Gastroepiploic Artery for Coronary Artery Bypass Grafting

Received: May 19, 2026; Accepted: May 20, 2026

In 1984, while I was a cardiovascular surgical fellow at LDS Hospital of the University of Utah, it was widely recognized that saphenous vein grafts used for CABG had a high rate of occlusion after 10 years, whereas internal thoracic artery grafts showed excellent long-term patency, and that this difference had a major impact on late survival.

The following year, after returning to Osaka Medical College and being appointed chief of coronary artery surgery, I began working on the aggressive use of the internal thoracic artery—which was still rare in Japan at the time—and on the search for a second arterial conduit. One day, I recalled the many lessons I had learned about gastrectomy from Dr Hiroshi Akiyama, a master of oesophageal surgery, when I was a surgical resident at Toranomon Hospital. I immediately borrowed 100 randomly selected coeliac angiograms from the radiology department and investigated the course, calibre, and length variations of the right gastroepiploic artery (RGEA). Next, I went to the anatomy laboratory and measured the distance from the pylorus of the stomach to each coronary artery. Finally, I visited the pathology laboratory and asked for an assessment of the degree of atherosclerosis in the RGEAs harvested from resected stomach specimens. Based on these findings, I became convinced that the RGEA was an appropriate arterial graft for CABG.

I presented this work at a university research meeting and, after obtaining the approval of Professor Atsuro Takeuchi, waited for a patient in whom this unknown conduit would be needed.

Six months later, I was granted permission to use it in a redo operation for a patient whose saphenous veins had all been used in the initial surgery. The patient was a small woman, 54 years old, but the RGEA was larger than the left internal thoracic artery and provided greater blood flow, so I grafted the RGEA to the LAD and the ITA to the circumflex artery. The patient was discharged without complications. It was June 1986, and I was 36 years old.

In 1987, I published these basic investigations and the successful surgical case in the *Annals of Thoracic Surgery*.¹ To my surprise, at around the same time, Dr John Pym of Canada published a clinical report on the RGEA in the *Journal of Thoracic and Cardiovascular Surgery*.²

In 1990, at the First RGEA Workshop in Lisbon, hosted by Dr Jose Roquette, I met Dr Pym and Dr Bruce Lytle of

the Cleveland Clinic, and a friendship and relationship of mutual trust began. On that occasion, I asked Dr Pym how he had come up with the idea of using this graft. He told me that he had learned that, at the hospital where he worked, Dr Arthur Vineberg had once used the RGEA in the procedure he had devised in which the internal thoracic artery was implanted into the myocardium, and that this led him to think of trying a direct anastomosis. It is extremely interesting that the same procedure was conceived independently at roughly the same time in the East and the West (Figure 1).

The following year, at a meeting in Brussels organized by Dr Robert Dion, I performed the first live demonstration of RGEA grafting, which helped many cardiac surgeons understand this procedure. In 1992, in Los Angeles, I presented the 5-year results of our experience with 200 patients at the AATS meeting and enjoyed discussions with Dr Lytle and Dr Noel Mills,³ but unfortunately, the last day was thrown into panic because of the riots.

In the following years, our group continued extensive investigation of the RGEA and found that its flow capacity was sufficient for ischaemic myocardium, and that no gastric ischaemia occurred after takedown of the artery. The production of prostacyclin and the response to various vasoactive agents were different in the saphenous vein, the internal thoracic artery, and the RGEA. Histologically, the internal thoracic artery contains many elastic fibres, while the RGEA has many smooth muscle cells in the media, which makes the RGEA more prone to spasm. Pathologically, the degree of atherosclerosis is a little higher in the RGEA than in the internal thoracic artery, but is far less common than in the coronary artery.

Through these extensive investigations, we made many interesting discoveries. One of the great joys of my life as a physician-scientist has been that this work progressed from the development of a new surgical technique to advances in the science of understanding the unique characteristics of human tissues.

In 1995, I was appointed Professor of Cardiac Surgery at the Catholic University in Rome. Dr Mario Gaudino was a brilliant young member of the staff, and he understood very deeply what I had done in coronary artery surgery. My Italian life was fruitful supported by Dr Antonio Calafiore, exchanging ideas for complex arterial grafting in CABG. One day, I received a request from Dr Vincent

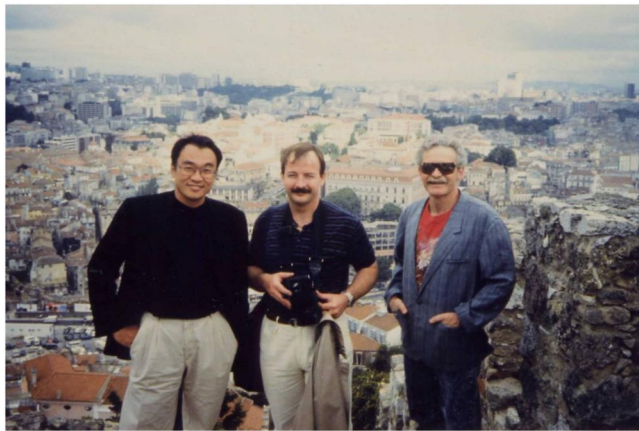


Figure 1. Dr John Pym (middle) and Dr Bruce Lytle (right) with me at Lisbon in 1990.

Dor of Monte Carlo to demonstrate RGEA surgery at his hospital, and I traveled there. Dr Dor was very impressed, and soon afterward, he introduced the skeletonized RGEA graft, a technique which is widely used in Japan today. The RGEA is still used in Japan in nearly 1000 cases annually.

In the approximately 20 years since I started using this unique conduit, we have accumulated a large number of operative cases and published the results in a series of papers.^{4,5}

Throughout my more than 50 years as a physician, I have felt deep gratitude for having been a cardiac surgeon. This is not only because I was able to save so many lives, but also because I experienced both the hardships and the joys of creating new surgical techniques, and

through that journey, I was able to build friendships with many wonderful and deeply respected cardiac surgeons around the world.

Conflicts of interest

The author has no conflicts of interest to declare.

Hisayoshi Suma*

Department of cardiology, Medock Healthcare Clinic, Shinagawa, Tokyo 141-0021, Japan

*Corresponding author. Department of cardiology, Medock Healthcare Clinic, 3-11-18 Kamiosaki, Shinagawa, Tokyo 141-0021, Japan (sumaheart@ezweb.ne.jp).

References

- [1] Suma H, Fukumoto H, Takeuchi A. Coronary artery bypass grafting by utilizing in situ right gastroepiploic artery: basic study and clinical application. *Ann Thorac Surg*. 1987;44:394-397.
- [2] Pym J, Brown PM, Charrette EJP, Parker JO, West R. Gastroepiploic coronary anastomosis: a viable alternative bypass graft. *J Thorac Cardiovasc Surg*. 1987;94:256-259.
- [3] Suma H, Wanibuchi Y, Terada Y, Fukuda S, Takayama T, Furuta S. The right gastroepiploic artery graft: clinical and angiographic midterm results in 200 patients. *J Thorac Cardiovasc Surg*. 1993;105:615-622; discussion 623.
- [4] Suma H, Amano A, Horii T, Kigawa I, Fukuda S, Wanibuchi Y. Gastroepiploic artery graft in 400 patients. *Eur J Cardiothorac Surg*. 1996;10:6-10; discussion 11.
- [5] Suma, Hisayoshi, Tanabe, Hiroaki, Takahashi, Akihito, Horii, Taiko, Isomura, Tadashi, Hirose, Hitoshi, Amano, Atsushi,. Twenty years experience with the gastroepiploic artery graft for CABG. *Circulation* 2007;116:1188-91.