

## **The Potential Role of Adventitial-Derived Nitric Oxide (NO) for Improving Both Arterial and Venous Grafts in Coronary Artery Bypass Surgery.**

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**Objectives:** To study the distribution and protein expression of endothelial nitric oxide synthase (eNOS) and NOS activity in the internal mammary artery (IMA), radial artery (RA) and saphenous vein (SV) segments both skeletonised and with pedicle.

**Methods:** After Ethics Committee approval and patients' informed consent samples of SV, RA and IMA were obtained from patients undergoing CABG. The samples were either skeletonized or harvested with surrounding tissue. Immunohistochemistry (n =10) and Western blots (n=4) were performed to evaluate the distribution and protein expression for eNOS in the various preparations and NOS activity was assessed by the citrulline assay (n=6).

**Results:** Western blots show a significant reduction of eNOS protein for SV and IMA grafts when skeletonized ( $p<0.05$ ). NOS activity was also significantly reduced in skeletonized IMA grafts. Immunohistochemistry revealed the distribution of eNOS in the different preparations. There was strong eNOS immunostaining of the endothelial cells lining the lumen of all vessels studied as well as with the medial and adventitial vasa vasorum. In addition, staining was also associated with vascular smooth muscle cells (VSMCs). Immunostaining was reduced in those vessels where the external pedicle/cushion had been removed.

**Discussion:** Nitric oxide (NO), synthesised by eNOS, has a dilatory effect on blood vessels and inhibits platelet aggregation and adhesion, migration of smooth muscle cells and adhesion of inflammatory cells. NOS has been shown to contribute to an improved patency rate of vein grafts harvested with surrounding tissue where a significantly higher amount of eNOS is present than in skeletonized vein grafts. It is known that skeletonising the RA causes damage to the graft that highly compromises its patency. Skeletonising the IMA has become more popular since it can be lengthened and used for grafting more coronary arteries. Skeletonising also reduces the damage to the chest wall resulting in reduced postoperative bleeding and fewer problems with wound healing.

No prospective randomised trial exists showing if there is any difference in patency between the two techniques of harvesting the IMA. We have shown that skeletonising SV and RA grafts reduces eNOS suggesting that this may compromise the patency of these grafts. This investigation shows that skeletonising the IMA results in an even greater reduction of the amount and activity of eNOS compared to non-skeletonized grafts which could be a factor jeopardising the patency of the skeletonised IMA.