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We would like to thank Dr Bonacchi for his comments. Firstly, retrocaval routing of the right internal mammary artery (RIMA) described by Pliam and Zapolanski in 1993 [1] is quite different from what we propose. Pliam indeed passes the RIMA retrocavally below the azygous vein and between the superior vena cava and the right pulmonary artery, the RIMA, then, lies on the roof of left atrium before passing into the transverse sinus. In our technique, the RIMA is passed behind the right subclavian vein and behind the right and left innominate veins well above the azygous vein. We believe that our technique offers a more direct pathway of the RIMA from its origin to the transverse sinus.

We did in fact miss Pliam’s paper during our search of the medical literature and despite important differences between our two techniques, we regret this lapse. Nevertheless, having tried Pliam’s technique, we strongly believe that our method allows a greater gain of length.

Secondly, we disagree with Dr Bonacchi’s comments on lambda grafting with a free end segment of the LIMA in conjunction with our technique, since the RIMA is almost entirely invisible in this routing and the free graft would be far too short to reach the right coronary artery as Bonacchi proposes [2].

On the other hand, we have indeed performed lambda grafting with the radial artery anastomosed on the distal segment of a retrocaval RIMA offering suitable configuration for grafting the right coronary artery and branches.

Finally, our paper was a ‘How-to-do-it’ with the primary objective of explaining a novel technique in its standard and basic form.

We do share Dr Bonacchi’s opinion that our proposed routing offers protection of the RIMA in redo surgery but this is not the principal advantage of the technique.

References


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Retrocaval route for the right internal mammary artery

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I read with interest the How-to-do-it article by Ramadan et al. [1], but I have two remarks. First, Pliam and Zapolanski described this technique in 1993 [2]. My second remark, however, concerns the last part of the final ‘conclusion’: “the RIMA (right internal mammary artery) is well hidden behind the vena cava which can be considered as an advantage in redo surgery by further avoiding RIMA damage”. I agree that the place and covering the IMA pedicle during the primary operation is essential to avoid damage to this graft during redo surgery [3]. A lot of surgeons reject the ante-aortic route to cross the midline with a right IMA graft, and the reason is possible damage to this graft during resternotomy for reoperation (RECABG). However, damage may also occur during the dissection of the IMA-graft, necessary for manipulation of the heart, and eventually clamping the IMA-graft. If a RIMA is crossing the midline, it is important to have a good access to the proximal part of the RIMA-graft, because by reopening the chest by sternotomy, it is this part that needs more length. By spreading the two sternum parts, the distance between the ostium of the right IMA in the subclavian artery and the midline is increasing. Therefore, meticulous dissection of this part of the right IMA is important to avoid damage to this pedicle. Above all, if we have an IMA-graft passing through the transverse sinus, to a circumflex coronary artery, and we have to reach the lateral side of the heart during RECABG, the dissection of this IMA can give us a lot of problems. Even the part of this IMA-graft under the aorta must be dissected free, to avoid damage during aortic cross-clamping.

Besides the fundamental discussion is it opportune to cross the midline with an IMA-graft? In my personal opinion, the ante-aortic route is a safe and the most practical way to bring a right IMA to the left heart side. The pedicle must, however, always be covered by pericardium or thymic fat, to avoid direct adherence with the internal sternal table. Use of the retrocaval route allows additional length to the RIMA, and the placement of the IMA-graft through the transverse sinus avoids lesions during resternotomy as stated by the authors [1]. However, IMAs placed in this way are more difficult to handle during RECABG. With the increasing number of RECABG, with patent IMA-grafts [4], not only placement and covering of IMA grafts are necessary to avoid damage during RECABG, but also the
possibility to manipulate these grafts during RECABG becomes important.

In conclusion, the retrocaval route to bring the right IMA to the left heart side is useful in a selected number of patients.

References


Reply to the Letter to the Editor

Reply to Noyez

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We thank Dr Noyez for expressing his ideas on redo surgery after retrocaval routing of the right internal mammary artery (RIMA). Retrocaval routing of the RIMA described by Pliam and Zapolanski in 1993 is quite different from what we propose. Pliam indeed passes the RIMA retrocavally below the azygous vein and between the superior vena cava and the right pulmonary artery, the RIMA, then, lies on the roof of left atrium before passing into the transverse sinus. In our technique, the RIMA is passed behind the right subclavian vein and behind the right and left innominate veins well above the azygous vein. We believe that our technique offers a more direct pathway of the RIMA from its origin to the transverse sinus with a greater gain of length.

With regard to the position of the RIMA and the risk of injury during redo surgery, we think it is important to emphasize that this is not the goal of our technique. Retrocaval passage of the RIMA is indicated to achieve a gain in length when a marginal artery lies too distally for standard passage through the transverse sinus. Regardless, we prefer to pass the right mammary artery behind the heart which as Dr Noyez clearly notes offers protection from injury at the time of resternotomy. In our opinion, retrocaval passage of the RIMA is safe in redo surgery and in our experience with retro-aortic RIMAs, no particular problems related to the RIMA were encountered with sternal retraction when adequate dissection of the heart from the inner sternal table was performed. The question of controlling the proximal part of the right mammary artery could indeed be problematic with retrocaval passage. Freeing the RIMA does not seem indispensable for aortic cross-clamping and since we achieve cardiac arrest with continuous warm blood retrograde cardioplegia, it is often enough to increase cardioplegia flow rate and/or potassium concentration to maintain a motionless field. Thus, when dissection is difficult, the RIMA can simply be left undisturbed.