LETTER TO THE EDITOR

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Left ventricular volume reduction and reshape – 'Re-STICHING' the field

We read with interest the study by Klein *et al.*[1] exploring the effect of a less invasive device in inducing left ventricular reconstruction in failing hearts post-myocardial infarction. Left ventricular remodelling following an anterior myocardial infarction has detrimental effects to the efficacy of the left ventricle. This stems not only from the Laplace law but in addition from the impaired blood flow kinetics within the remodelled left ventricle. The concept of surgical volume reduction of the dilated left ventricle is to exclude the infarcted myocardial tissue, reshape and increase the efficacy of the left ventricle.[2] This strategy faces two major challenges.

First, the final end-diastolic volume should be reduced enough in order to allow the Laplace low to take place effectively. However, the final volume should not be that small, otherwise restrictive phenomena will occur, stroke volume will be reduced, left ventricular filling pressures will rise and re-dilatation of the left ventricle might occur. In those cases, any potential benefit from volume reduction therapies will be eliminated.[3,4] In order to avoid the left ventricular excessive volume reduction during the procedure, surgeons are trying to keep the final left ventricular remaining volume close to 60 mL/m^2 using the 'balloon sizing' technique. However, even if it is true that a final volume at that level is sufficient for the normally working heart, we still do not know whether this is also true for an impaired left ventricle that has undergone remodelling.

The second challenge for left ventricular reconstruction surgeries is the restoration of a more conical shape of the left ventricle. Studies have shown that a conical shape results in better outcomes since this shape improves blood flow hydrodynamics. In the STICH trial, left ventricular geometry worsened after left ventricular reconstruction surgery and the left ventricle became more spherical.[5] Only those patients that obtained a conical left ventricular shape demonstrated improved outcomes.

Left ventricular reconstruction surgery is not a one size fits all patients, and a more individualized approach should be implemented. Klein *et al.*[1] in a less invasive approach attempted to reduce the volume of the infarcted left ventricle, excluding the non-functioning scarred myocardium. There was a significant reduction in left ventricular volumes and a significant increase in left ventricular ejection fraction. A total of 46 out of 86 participants were characterized as 'responders' since they revealed improvement in the 6-min walk test and in their quality of life.

To the direction of a more individualized approach for ventricular volume reduction and reshaping therapies, it would be very helpful if authors could provide also parameters of the shape of the left ventricle before and following the application of the device (apical conicity index, left ventricular sphericity index). The device proposed by Klein *et al.*[1] has the advantage of requiring no cardiopulmonary bypass. In that way, haemodynamic parameters obtained by a Swan–Ganz catheter at the time of the deployment of the device could provide important prognostic information on the short- and long-term adaptation of the left ventricle to the newly acquired volume and shape in a real time way.

Again, we find the study of Klein *et al.*[1] a very important step for a more quantitative and personalized application of left ventricular reshaping and volume reduction therapies.

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