

Cardioprotective effects of ischemic preconditioning*To the Editor:*

We read with interest the article by Abd-Elfattah and Wechsler in the August issue of the Journal.¹ They cite their experimental data to explain the validity of the intermittent aortic crossclamp technique as a means of myocardial preservation, and they suggest that multiple brief crossclampings interspersed with periods of resumption of coronary blood flow tend to protect against subsequent ventricular dysfunction. We wish here to share our clinical observations in this regard.

In our practice of coronary artery bypass grafting of about 30 years, we have been using exclusively the method of intermittent ischemic fibrillatory arrest for up to 30 minutes, followed by unclamping of the aorta and additional perfusion of pump blood through the completed or partially completed distal vein graft anastomosis for 5 minutes. Inasmuch as a substantial proportion of our patients have diffuse coronary artery disease, and several of them require extensive endarterectomies, our total aortic crossclamp times for distal anastomoses vary greatly. In an analysis of our data some years back, we found that patients having a longer than usual total crossclamp time for the very first graft were more likely to die as a result of the operation. We also noted that patients who had shorter crossclamp times in the beginning of the operation, rather than later, did better (in terms of ease of separation from bypass, need for inotropic agents and intraaortic balloon pump support, intensive care unit stay, and operative mortality) than those patients who had longer clamp times at the start. Even though we were not then aware of the postischemic protective effects of preconditioning, it appears now that by doing grafts with shorter ischemic times first, we had been inadvertently practising ischemic preconditioning in patients in the better outcome group.

Most available literature (albeit mainly from animal laboratories) on ischemic preconditioning of the myocardium suggests that the beneficial effects of this phenomenon are best observed when the initial aortic crossclamp period is brief.²⁻⁴ However, owing to the diffuse nature of

coronary disease in our patients, it is sometimes not possible to do any graft in a relatively short time. To address this, we now make conscious efforts to precondition the heart *before* bypass grafting is begun. Soon after the start of bypass, the aorta is clamped and fibrillation is induced for 3 minutes. The clamp is then released and the heart allowed to beat for 5 minutes. This process is repeated once more, and the actual operation then proceeds in the usual fashion. This deliberate attempt at preconditioning seems innocuous and does not add significantly to the overall ischemic time. We are still in the midst of studying these patients, but our preliminary results appear promising so far. We will have to wait for more clinical evidence of advantages of ischemic preconditioning to appear, but it seems likely that it will be used more frequently in the practice of bypass grafting in the future.

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[A reply was requested from Dr. Wechsler, and he declined to respond.]