Author has nothing to disclose with regard to commercial support.

ability of the kidneys to remove lactate is increased by acidosis.[2]

The prognostic impact of hyperlactatemia on mortality has been documented in a postcardiotomy setting, even if there is no cutoff value of lactate that is associated with worse outcome or that can guide resuscitation or hemodynamic management. Lactate clearance has been reported to be more reliable on clinical grounds than absolute value of lactate for risk stratification in refractory postcardiotomy cardiogenic shock.[3,4] It has been published that lactate behaviors, particularly lactate clearance after ECMO support, are highly associated with in-hospital mortality in postcardiotomy patients.[3] In addition, early lactate level reduction has also been seen to be predictive of successful weaning from ECMO.

Through the dynamic behavior of blood lactate with serial measurements, it is possible to estimate the effectiveness of ECMO therapy in restoring circulation and adequate tissue perfusion. If there is no reduction in high lactate levels despite ECMO support, further mechanical circulatory support or application of limb perfusion techniques should be considered.

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NEW TRENDS IN CARDIAC SURGERY: TOWARD A LESS-INVASIVE SURGICAL PROCEDURE

To the Editor:

We read with interest the article by Quan and colleagues.[1] The authors report on a 41-year-old man with advanced cardiomyopathy complicated with cardiogenic shock that was successfully treated. The article highlights 2 aspects: (1) the concomitant execution of venoarterial extracorporeal membrane oxygenation implantation and a transvenous atrial septostomy; and (2) in a delayed surgical procedure, the insertion of a left ventricular assist device (LVAD) (HeartWare HVAD, Medtronic, Minneapolis, Minn) using minimal access surgery (left median type upper ministernotomy and a left anterior minithoracotomy) in association with a percutaneous atrial septal closure with a 15-mm Amplatzer (Abbott, St Paul, Minn) septal occluder. A percutaneous transvenous technique with both atrial septostomy and the later closure of the created septal defect is a good alternative and uses less-invasive surgery. The implantation of an LVAD by means of minimally invasive cardiac surgery (MICS) is an attractive, innovative, and less-aggressive surgical procedure. Cardiac surgeons need to be informed of new, reliable, and efficient surgical modern modalities of treatment. Cardiac surgery continues to evolve and develop. New trends in cardiac surgery favor a less-invasive surgical intervention. MICS with the incorporation of new technology, such as advanced thoracoscopic systems, minimally invasive extracorporeal circulation equipment, modern and more reliable surgical instruments, image-guided surgical procedure instrumentation, and robotic-guided surgery, has been increasingly introduced into current surgical practice and will continue to expand. At present, a significant number of patients undergoing extracorporeal membrane oxygenation therapy need a subsequent LVAD implantation. In the future, the number of potential patients requiring cardiopulmonary mechanical assistance is expected to increase. LVAD implantation using a MICS access has been associated with good outcomes. In a retrospective 1-year outcome evaluation on 32 patients with Interagency Registry for Mechanically Assisted Circulatory Support 1, Wert and colleagues[2] demonstrated higher survival in the group of patients undergoing MICS (69.7% survival, 14 patients) versus the group of patients undergoing full sternotomy (50% survival, 18 patients). Anastasiadis and colleages[3] reported that minimally invasive extracorporeal circulation in cardiac surgery is related with less morbidity and a lower mortality in the coronary surgery group of patients. According to Dieberg and associates,[4] MICS is as safe as conventional cardiac surgery. In a systematic review in robotic cardiac surgery (28 studies, 5993 patients), Doulamis and associates[5] showed good results with a mean 30-day mortality of 0.7% to 0.9% and a late mortality of 0.8% to 1% with a mean follow-up period of 40.1 months.

MICS provides a better cosmetic result, smaller scars, less postoperative pain, less bleeding, fewer surgical wound infections, reduced hospital stay (intensive care unit and ward), and a faster postsurgical recovery. MICS is a work in progress. It requires specific training and skills, and the surgeon has to maintain an active surgical practice and

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updated information. The article by Quan and colleagues[1] is a novel, interesting, and valuable contribution to this field.

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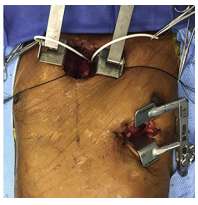

MINIMALLY INVASIVE DURABLE MECHANICAL CIRCULATORY SUPPORT: DON'T HIT THEM WHILE THEY'RE DOWN

Authors have nothing to disclose with regard to commercial support.

Reply to the Editor:

In response to our recent case report on a patient who underwent percutaneous atrial septal closure concomitantly with left-ventricular assist device (LVAD) implantation via an upper hemisternotomy and left anterior minithoracotomy approach, Abad and colleagues[1] wrote on trends toward less-invasive procedures in cardiac surgery. It has already been demonstrated in many other areas of surgery that patients undergoing minimally invasive approaches often have equivalent or improved outcomes, particularly in terms of postoperative length of stay and recovery.[2] Although multifactorial, some of these benefits may be attributable to a reduced physiologic hit. Specifically, a less-invasive approach may cause less physiologic stress and minimize the resultant inflammatory and cytokine response.[3] This may be of particular benefit in patients who are at higher preoperative risk, such as those in cardiogenic shock.

In the realm of mechanical circulatory support, the institution of percutaneous extracorporeal membrane oxygenation and percutaneous temporary ventricular assist device (VAD) placement have allowed for an expedient and relatively facile approach to support patients in cardiogenic shock and aid in multisystem recovery. It is not uncommon for these patients to go on to require a durable VAD, either as destination therapy or as a bridge to heart transplantation. Our preferred approach for LVAD implantation has become the upper hemisternotomy and left anterior minithoracotomy (data forthcoming). We have found that this approach leads to improved patient outcomes, particularly in patients of higher acuity. This observation is in line with data reported by Wert and colleagues[4] in Interagency Registry for Mechanically Assisted Circulatory Support 1 patients. Bejko and colleagues[5] demonstrated that patients undergoing a minimally invasive approach for VAD implantation had a faster postoperative recovery in terms of the duration of mechanical ventilation, inotropic support, length of stay, and time to mobilization. A number of different minimally invasive approaches to LVAD are possible and have been summarized by Makdisi and Wang.[6] The use of minimally invasive approaches in concert with transcatheter procedures to address concomitant issues, such as an atrial septal occluder in our patient to close an atrial septostomy, or a transapical aortic valve implantation in a patient with moderate aortic insufficiency as described by Schaefer and colleagues,[7] can minimize the physiologic hit for these already critically ill patients.

By minimizing the hit, minimally invasive approaches in cardiac surgery, and in particular in mechanical circulatory support, may offer a more tolerable operation and result in improved outcomes in the most critically ill patients.

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