that ligation of a single pulmonary vein, either superior or inferior, may be accompanied by dilation of collateral veins to the azygous system, which may be compatible with life.⁴ This area requires further study, and conclusions should not be based on a single case.

In surgical emergencies, a transected main pulmonary artery does not preclude abrupt abortion of the intended surgical procedure. However, this should be used as a last resort. In elective cancer cases, a thorough inspection of all structures including artery, veins, and bronchus should be undertaken to ensure resectability before transection of any individual major structure.

*Raja M. Flores, MD
Chief of Thoracic Surgery
Mount Sinai School of Medicine
New York, NY*

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TO FENESTRATE OR NOT TO FENESTRATE

To the Editor:

In their recent article, Salazar and colleagues¹ have rightly addressed a pertinent topic. We agree that under usual circumstances a fenestration at the time of a total cavopulmonary connection should be avoided. Between June 2000 and June 2006, a total of 132 consecutive patients were treated at our institution without any fenestrations. At the time of total cavopulmonary connection, 93 patients (70%) were younger than 48 months. We continue to complete at a young

age and to avoid fenestrations. We have since opted for fenestration in only 2 patients, both of whom underwent single-lung palliation.

Salazar and colleagues¹ state that they opted for fenestration only in "highly selected patients." They mention patients with elevated pulmonary vascular resistance or transpulmonary gradient, significant atrioventricular regurgitation, and single-lung physiology. We would appreciate further guidance on their selection criteria, because we would like to know their cut-off for elevated pulmonary vascular resistance and why they deem patients with atrioventricular regurgitation to be candidates for fenestration. In addition, why should any intracardiac anatomy not be amenable to an extracardiac completion? In our view, the extracardiac completion does in fact help to overcome many complex morphologic obstacles and helps make it quite easy to reroute central venous blood flow to the pulmonary vascular bed.

Salazar and colleagues¹ might also elucidate their experience with fenestration patency. Ruiz and colleagues² have published an intriguing concept in which the lower atrial orifice toward the divided inferior vena cava is sutured in an end-to-side fashion to the leftward aspect of the punched conduit.

*Christian Schreiber, MD, PhD
Jürgen Hörer, MD, PhD
Rüdiger Lange, MD, PhD
Department of Cardiovascular*

*Surgery
German Heart Center Munich at the
Technical University
Munich, Germany*

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A RISK FACTOR FOR HYPERLACTATEMIA AFTER SURGICAL REPAIR OF SECUNDUM ATRIAL SEPTAL DEFECT IN CHILDREN: WHAT IS THE PROBLEM?

To the Editor:

We read with great interest the article by Abraham and colleagues.¹ They report their results of a retrospective study on the intraoperative risk factors for early postoperative hyperlactatemia in patients undergoing atrial septal defect repair. Multivariate logistic regression analysis showed that lower cardiopulmonary bypass (CPB) flow rate is an independent risk factor for early postoperative hyperlactatemia in children after atrial septal defect repair. It has instructive significance for the perfusionist to maintain higher mixed venous saturations and use vasodilators during CPB to improve overall tissue perfusion.

The study includes 68 patients with atrial septal defect, Risk Adjustment for Congenital Heart Surgery category I, who had good cardiac output in the postoperative period. This effectively avoids the influence of confounding factors on blood lactate, such as the CPB temperature, hemodilution, duration of CPB, cardiac function, drugs used perioperatively, liver and kidney function, and so forth. The design is a benefit for the study of the correlation simply between intraoperative factors and postoperative hyperlactatemia. However, several other factors that influence the blood lactate should be considered.

The subjects have atrial septal defect and are aged less than 21 years (range, 5–201 months). The age span is comparatively large because there is a big difference in the CPB prime and management between those aged 5 months and those aged 201 months. Generally, children aged less than 1 year would be primed with banked red blood cells and have comparatively more banked blood perioperatively. Banked blood itself, which

indicates lactate acidosis, will affect the blood lactate concentration, especially in very little infants.² This study has not analyzed the use of banked blood in 2 groups statistically. Therefore, is it more appropriate to limit the inclusion objects to a more narrow age span?

Second, crystal solutions would be used in the extracorporeal circulation. The crystal solutions in use now include Ringer's lactate and Ringer's acetate. Lactate has 2 isoforms: L-lactate and D-lactate. L-lactate is the products of anaerobic glycolysis in humans and has been used as a marker of cellular hypoxia and tissue malperfusion.³ It would be converted to sodium bicarbonate by tricarboxylic acid cycle. However, D-lactate is mostly exogenous from Ringer's lactate solution. Its clearance is much slower than L-lactate, mainly depending on the liver function.³ Massive exogenous D-lactate Ringer's solution infusion would cause iatrogenic hyperlactacidemia in those infants with immature liver function. This phenomenon would not occur when Ringer's acetate is used in CPB. However, this study has not mentioned the kinds and dosage of the crystal solution.

Ronghua Zhou, MD
Jin Liu, MD, PhD
Department of Anesthesiology
West China Hospital
Sichuan University
Chengdu, Sichuan, China

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COMMENT ON EDITORIAL BY LAPEYRE AND COLLEAGUES To the Editor:

The editorial by Lapeyre and colleagues,¹ "Prosthetic heart valves: Difficult to make something simple," emphasizes the need for more durable tissue valves for patients younger than 65 years, especially juveniles and young adults in emerging countries. To address that need, our group has worked on the concept of a non-immunogenic autologous tissue valve for the last 25 years. The initial clinical application was a stent-mounted valve made in the operating room at the time of valve replacement.² More recently, a totally stentless aortic valve made with disposable instruments at the time of valve replacement has been developed and used clinically.³ Follow-up of the first 11 patients implanted with the stentless autologous pericardial valve in a prospective pilot study from February 2003 to May 2005 at the Harefield Hospital by Dreyfus can be seen, before publication, on the webcast of the 2010 American Association for Thoracic Surgery annual meeting in Toronto.⁴ The first patient in the series was a 42-year-old man with a heavily calcified bicuspid aortic valve, a gradient of 131 mm Hg, and an ascending aortic aneurysm. He has normal valve function with no evidence of calcification 7.2 years post-aortic valve reconstruction. The last patient in the series was a 22-year-old woman with congenital aortic stenosis and a calcified bicuspid aortic valve with a gradient of 71 mm Hg. She has normal valve function with no evidence of calcification 5 years after aortic outflow enlargement and aortic valve reconstruction. These results suggest that lightly tanned autologous pericardium may be a suitable biomaterial for fabricating a more durable tissue heart valve for younger patients. The use of autologous tissue and disposable instruments for the valve reconstruction

has the potential for being a cost-effective solution to the need for a tissue heart valve in emerging countries.

It is largely forgotten that the first tissue heart valves were made of autologous tissue, by Åke Senning in the early 1960s. He did freehand reconstruction of aortic valves with the patient's own fascia lata. Senning explained presciently why he used autologous tissue: "Having worked with organ transplantation, I felt the allografts or homografts would be slowly destroyed by immunologic factors. In the same year, I began replacing the aortic valve with autogenous fascia lata, which was taken sterile at the time of operation, eliminating the problems of sterilization, preservation, immunologic reactions, and thromboembolism."⁵ He used untreated autologous fascia lata, and although 18 of 90 patients survived 12 to 20 years with their reconstructed aortic valves, 13 with "no or minimal dysfunction," most of the valves became insufficient because of thickening and shrinkage of the tissue. Others, notably Björk⁶ and Edwards,⁷ confirmed poor results with untreated fascia lata and pericardium, and the use of autologous tissue fell out of favor. On revisiting the concept, we discovered serendipitously that a brief immersion of autologous pericardium in dilute buffered glutaraldehyde solution, light tanning,² eliminated the thickening and shrinkage that had been observed by Senning, Björk, and Edwards. The tissue had a healthy, pristine appearance after valve implantation for 5 months in juvenile sheep, a known severe test for calcific degeneration. Love⁸ summarized the early history of autologous tissue heart valves in a monograph on the subject.

The valve industry has shown little interest in an autologous tissue heart valve that might prove to be more durable and cost a fraction of currently available bioprostheses.