diameter of the cannula is the key factor in generating the pressure drop, rather than the shape of the tip. In addition, relative to axillary artery cannulation, a larger size of cannula can be used for innominate artery cannulation, which may decrease blood damage, especially during periods of high flow rate.

The main comment of Ji and colleagues is that during antegrade cerebral perfusion (ACP), when the innominate artery is used as the cannulation site, blood flow distribution may depend on the resistance of 2 arteries, the right axillary artery and the right common carotid artery. Thus any decrease or increase in the resistance of the right axillary artery could result in malperfusion of the brain. Compared with direct axillary artery cannulation technique, the perfusion pressure for the common carotid artery can be monitored by direct right radical artery cannulation. Therefore, ACP can be adjusted by flow rate combined with perfusion pressure. Usually a flow rate of 8 to 10 mL · kg⁻¹ · min⁻¹ is used for ACP, while the perfusion pressure may be maintained between 40 and 50 mm Hg. When the perfusion pressure is too low, the flow rate can be increased to avoid underperfusion to the brain. When the perfusion pressure is too high, such as higher than 70 mm Hg, the flow rate can be decreased. We therefore believe that this technique may be better than ACP with a fixed flow rate. Our clinical results have also confirmed that ACP with innominate artery cannulation is an acceptable brain protective method during arch surgery.¹ We also do agree that transcranial Doppler ultrasonography combined with near-infrared spectroscopy is a more accurate means of monitoring brain perfusion state.

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Reference

1. Shi E, Gu T, Yu L, Xiu Z, Zhang Z, Wang C, et al. Repair of Stanford type A aortic dissection with ascending aorta and hemiarch replacement combined with stent-graft elephant trunk technique by using innominate cannulation. *J Thorac Cardiovasc Surg*. 30 Mar 2011 [Epub ahead of print].

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DABIGATRAN ETEXILATE IN MECHANICAL VALVE THROMBOPROPHYLAXIS

To the Editor:

I read with interest the recently published study of McKellar and colleagues regarding the effectiveness of dabigatran etexilate for thromboprophylaxis of mechanical heart valves.¹ In this animal study, McKellar and colleagues¹ used a model of heterotopic aortic valve replacement in which, as described previously, the valve within the modified valved conduit remains open continuously throughout the cardiac cycle.² Surprisingly, this very important information regarding the valve function after this extra-anatomic valved conduit placement is missing from their recent study as a possible major limitation.¹

Historically, successful aortic valve replacement is considered the implantation of a mechanical or tissue valve in the aortic position with the prosthetic valve leaflets remaining open only during systole and closed during diastole. I believe that this historic definition of successful aortic valve replacement has never been challenged and certainly has never changed, so I have the following questions: (1) Did the authors make a modification in their model leading to a periodic, synchronous to cardiac cycle opening and closing of the mechanical valve? (2) If no modification to their previously published model has been made, how can they translate their findings into clinical aortic valve replacement practice in light of the extra-anatomic position of the mechanical prosthetic valve and the fact that this valve function is completely different from that considered clinically successful?

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References

1. McKellar SH, Abel S, Camp CL, Suri RM, Erath MH, Schaff HV. Effectiveness of dabigatran etexilate for thromboprophylaxis of mechanical heart valves. *J Thorac Cardiovasc Surg*. 2011; 141:1410-6.
2. McKellar SH, Thompson JL, Schaff HV. A model of heterotopic aortic valve replacement for studying thromboembolism prophylaxis in mechanical valve prostheses. *J Surg Res*. 2007; 141:1-6.

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Reply to the Editor:

We appreciate Argiriou's comments. The heterotopic porcine model described in our study is useful for screening antithrombotic therapy for mechanical valves.¹⁻³ The procedure is less costly in terms of time and equipment than heterotopic valve replacement, and mortality among experimental animals is relatively low. Rapid, robust thrombus formation is important in the swine model because of somatic growth and the considerable expense of housing animals for long periods. It is true that the tilting discs of the bileaflet valves do not open and close normally; however, we actually consider this an advantage of the model in that lack of leaflet washing might actually be expected to increase thrombogenicity of the valve. Indeed, we previously compared thrombus formation on mechanical valve prostheses in the heterotopic aortic and orthotopic mitral positions, and at 30 days, thrombus formation was greater on the heterotopically placed valves.⁴ Thus any therapies that reduce or eliminate thrombus formation in this heterotopic model should be effective in an orthotopic model.

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References

1. McKellar SH, Abel S, Camp CL, Suri RM, Ereth MH, Schaff HV. Effectiveness of dabigatran etexilate for thromboprophylaxis of mechanical heart valves. *J Thorac Cardiovasc Surg.* 2011;141:1410-6.
2. Thompson JL, Hamner CE, Potter DD, Lewin M, Sundt TM, Schaff HV. Melagatran for thromboprophylaxis after mechanical valve implantation: results in a heterotopic porcine model. *J Thorac Cardiovasc Surg.* 2007;134:359-65.
3. McKellar SH, Thompson JL 3rd, Garcia-Rinaldi RF, Macdonald RJ, Sundt TM 3rd, Schaff HV. Short- and long-term efficacy of aspirin and clopidogrel for thromboprophylaxis of mechanical heart valve: an in vivo study in swine. *J Thorac Cardiovasc Surg.* 2008;136:908-14.
4. McKellar SH, Thompson JL, Schaff HV. A model of heterotopic aortic valve replacement for studying thromboembolism prophylaxis in mechanical valve prostheses. *J Surg Res.* 2007;141:1-6.

doi:10.1016/j.jtcvs.2011.09.001