and only for patients presenting with a coagulopathy as confirmed by rotational thromboelastometric analysis. Ideally, the lowest dose capable of correcting the coagulopathy should be given, avoiding a hypercoagulable state and thus thromboembolic events. Adopting this protocol avoids placing patients with a surgical cause of bleeding at an unjustified risk of thromboembolism and reserves rFVIIa for those who truly need it.

In conclusion, rFVIIa represents a treatment with its own specific indications, and we should not consider it as an alternative to reexploration in cardiac surgery. Indeed, the two are "horses for courses."

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doi:10.1016/j.jtcvs.2011.08.028

Reply to the Editor:

We appreciate Tarzia and colleagues' letter regarding our article.¹ They take exception to comparing reexploration with pharmacologic management using recombinant activated factor VII (rFVIIa) in the intensive care unit because the source of bleeding is not known. They also elucidate a well-thought out algorithm for the management of postoperative bleeding.

Our initial experience with rFVIIa was in the operating room, where we found it to be highly effective at controlling intraoperative bleeding and to reduce the incidence of packing and delayed closure for hemostasis.² We developed criteria for correction of coagulopathy (including platelet count, prothrombin time, partial thromboplastin time, and fibrinogen levels), acid-base status, temperature, and ionized calcium levels before the administration of rFVIIa. We found that patients who continued to bleed despite correction of these variables responded quickly to rFVIIa.

All intensive care unit patients in our current study had undergone similar evaluations in the operating room and were considered not to have surgical bleeding. Unfortunately, the source of significant bleeding in the intensive care unit is always unknown, and this is the clinical conundrum our study attempted to address. In this study, we found 1 case of surgical bleeding out of the 12 patients who received rFVIIa. This is substantially lower than the 50% quoted by Tarzia and colleagues. This emphasizes the importance of having a well-thought out algorithm for the management of bleeding. Ours begins by defining significant bleeding as 3 mL/kg/h for 2 or more consecutive hours. Correction of the previously mentioned variables is accomplished as early as possible. Hemothorax and pericardial tamponade are considered indications for reoperation. Finally, the attending surgeon's index of suspicion for surgical bleeding is the final determinant of therapy. As we had

previously observed in the operating room, bleeding intensive care unit patients with corrected coagulation factors, temperature, ionized calcium, and acidosis quickly responded to rFVIIa. This suggests that we are not capable of measuring a clinically significant coagulation deficiency. Perhaps rotational thromboelastometry will be able to shed light on these difficult patients. Rotational thromboelastometry was only recently approved by the Food and Drug Administration in 2010 (after our study period), and furthermore only 2 of the 4 reagents described by Tarzia and colleagues, INTEM and HEPTM, have been approved.

We anxiously await new tools for the diagnosis and treatment of postoperative coagulopathic bleeding. It is important that they be incorporated into a well-designed and well-thought out algorithm for the treatment of postoperative bleeding.

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doi:10.1016/j.jtcvs.2011.08.027

CANNULATION SITES AND TYPES FOR ANTEGRADE CEREBRAL PERFUSION DURING ARCH SURGERY To the Editor:

We read with great interest the recent published paper by Shi and

colleagues.¹ They introduced a case series with the use of innominate cannulation during repair of Stanford type A aortic dissection with ascending aorta and hemiarch replacement combined with stent-graft elephant trunk. We congratulate them for their excellent clinical results and also would like to discuss a few questions regarding cannulation during antegrade cerebral perfusion (ACP).

The combined use of ACP with hypothermic circulatory arrest (HCA) is widely accepted as a routine means of protecting the brain during complex aortic arch reconstruction; however, the risks of brain complications related to HCA and extensive ACP times also remain a substantial burden in aortic arch construction. Moreover, technical issues relating to the use of ACP during HCA, such as cannulation sites and types for ACP, unilateral perfusion or bilateral perfusion, and the flow rate and blood pressure used to selectively perfuse the brain, are still uncertain. ACP has become recognized as an important mode for arch replacement and can be performed in several different ways: unilateral cerebral perfusion through the right axillary artery or the right brachial artery, or the innominate artery. It is well documented that unilateral cerebral perfusion through the right axillary artery by direct cannulation has been successfully used in a majority of heart centers.² In a previous letter published elsewhere,³ we discussed the benefits and risks with Xu, whose group used a side vascular graft to perfuse the innominate artery in conjunction with the use of HCA during aortic arch surgery. Shi and colleagues¹ also summarized benefits with cannulation at the innominate artery site relative to right axillary artery cannulation: (1) No additional incision is needed. (2) The same technique and same size of cannula are used as in ascending aortic cannulation. (3) Cerebral perfusion pressure can be monitored continuously with a right arterial line.

Relative to Xu's method, cannulation at the innominate artery has more limitations. First, cannulation at the innominate artery avoids the additional incision, but you may have another cannula in your surgical field. Although the innominate artery is larger than the right axillary artery, it is shorter; moreover, you have to choose a cannula with a curved tip, because the tip of the cannula should be adjusted in direction at least twice during the procedure. Adjustment of the direction of the cannula may cause damage to the artery.⁴ A cannula with a curved tip generates greater pressure drops and may cause more blood damage. Moreover, as we mentioned in our previous letter,³ we still think that there is a potential risk when the innominate artery is used to perfuse the brain. When the innominate artery is used, blood flow distribution may depend on the resistance of the right axillary artery and the left common carotid artery. Our concern is that if the resistance of the right axillary artery decreases or increases, this may result in malperfusion to the brain. Although this has not been widely recognized in the study of ACP flow during HCA, both overperfusion and underperfusion have been shown to be detrimental to the brain. In our previous research, when the ACP (unilateral cerebral perfusion through the right axillary artery by direct cannulation) flow was lower than 10 mL/kg, transcranial Doppler ultrasonography could not detect the signal of blood flow in the middle cerebral artery.⁵ We think that no matter which way is used during aortic arch surgery, it is most important that we know whether the brain is at a suitable ratio of blood flow and oxygen consumption. To achieve this purpose, the best way to monitor the brain status is by combining transcranial Doppler ultrasonography with near-infrared spectroscopy during this procedure, not relying on pressure alone.

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doi:10.1016/j.jtcvs.2011.07.064

Reply to the Editor:

We thank Ji and colleagues for their insightful comments on the technique of innominate artery cannulation during surgery to correct Stanford type A aortic dissection as described in our recently published article.¹

Although one more cannula is in the surgical field when the innominate artery cannulation technique is used, we do not think that this cannula will add any difficulty to the operation. Gentle adjustment of the direction of the cannula by an experienced surgeon will do no damage to the artery. In Ji and colleagues' opinion, a cannula with a curved tip may generate higher pressure drop and cause more blood damage. In contrast, we think that the