

# Letters to the Editor

March 1, 1977

Dear Editor:

Mr. Stephen Peterson's suggestion, as reported in "Left Atrial Femoral Bypass Set Up for Descending Aortic Aneurysm Using the Cardiomy Reservoir," Vol. VIII, No. 4, 194, to use a cardiomy reservoir instead of an oxygenator for left atrial-femoral bypass is interesting. However, the use of a roller pump to remove blood from the left atrium rather than open left atrial drainage is hazardous. The negative pressure created by the author's depicted method of closed bypass has been shown to cause spinal cord damage in humans and other neurological manifestations<sup>1-2</sup> and has caused coronary air embolism in dogs.<sup>3</sup> The negative pressure of the roller pump in the closed bypass system can suck air into the left atrium around the catheter. Since the left heart is beating during these procedures, the chance of systematic air embolism is high. Moreover, the use of an open left atrial drainage yields consistently larger and more reliable volumes of flow than the closed system.<sup>3</sup>

The author's use of a hardshell reservoir instead of an oxygenator and his suggested circuit would be safer if the roller pump between the left atrium and the reservoir were eliminated and gravity drainage used. However, the reservoir must be vented to atmosphere rather than allowed to be pressurized, especially if a cardiomy sucker is used.

Lastly, I'm sure most perfusionists prefer the convenience and simplicity of a one pump system compared to a two pump system.

1. DeBakey, M.D., D. A. Cooley, E. J. Crawford, and G. C. Morris. Aneurysms of the Thoracic Aorta. *J. Thor. Surg.* 36: 393, 1958.
2. Harris, E. J., J. E. Connolly, and D. I. Bruns. Surgical Management of Dissecting Aneurysm: The Use of Simplified Bypass. *Calif. Med.* 91: 127, 1959.
3. Snyder, D. D., G. R. Williams, and G. S. Campbell. Open Versus Closed Left Atrial Drainage During Cross Clamping of the Thoracic Aorta. *J. Thor. Card. Surg.* 39: 634, 1960.

Sincerely,

Joseph P. Mandl  
Director  
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The Ohio State University  
Columbus, Ohio

March 24, 1977

Dear Editor:

Mr. Mandl mentioned that pumping the blood from the left atrium rather than left atrial gravity drainage is hazardous. My technique of pumping out of the left atrium with a beating heart has complications, but I saw more complications trying to regulate the drainage with an occluder or with a closed system.

I do like the two pump system for several reasons which I would like to explain briefly.

By using a pump on the blood coming from the left atrium the flow can be quickly regulated by the pump speed. By regulating the blood flow out of the atrium the arterial pressure can be adjusted. If the arterial pressure is too low the pump on the left atrial line can be slowed down. If the pressure is too high, this pump can be speeded up. When there is increased filling pressure to the left ventricle there is increased cardiac output.

During bypass a pressure of 80-100 mmhg should be adequate for the head and arms and a flow of 1.0 liters x M<sup>2</sup> BSA seems to be adequate for below the aneurysm. This balance using two pump is possible and we have not experienced post operative cerebral, kidney or spinal cord damage. Additional volume will usually be needed to maintain the flows needed for adequate perfusion.

Excessive negative suction on the left atrium can be avoided if a left atrial pressure is monitored. We also use a 3/8 PVC thin wall tube from the left atrium and through the pump head with a reducer connector for the attachment to the cardiotomy. The 3/8 PVC thin wall tube will collapse whenever there is excessive negative suction. Even if gravity drainage is used it does not eliminate the possibility of air to be drawn into the left atrium.

The cardiotomy suction functions as an auto transfuser during and post bypass before neutralization. This technique of reusing the blood is helpful when there are dramatic blood losses.

Because of the extra-corporeal system there is some heat loss from the blood. When cold fluids were added we did have problems with hypothermia. We solved this problem by pre-warming the fluids before administration.

At the University of Iowa during the past 3 years we have used the technique of Left Atrial Femoral Bypass as explained in The Journal of Extra-Corporeal Technology, Volume VIII, No. 4, Page 194.

We experienced about 10 perfusions of this type and seemed to have good results. I know we would have had problems without the use of this system on a couple occasions because of massive bleeding. Yes, an oxygenator would work as well, but is not needed for this type of bypass.

I hope this letter answers Mr. Mandl's comments and I hope other perfusionists comment to the editor also. We will all benefit from your comments.

Sincerely,

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