

# Left Atrial Vent Device

By

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## ABSTRACT

A right angle sump catheter device for use in venting the left side of the heart through the left atrium during operations using cardiopulmonary bypass has been described. Design features were based upon aspiration of the most dependent portion of the left atrium. It has proven useful in rendering a dry operating field.

Aspiration of blood returning to the left side of the heart during cardiopulmonary bypass from bronchial or aorto-pulmonary collateral circulation is necessary in many open intracardiac operations. Traditionally, this blood has been removed through a catheter inserted through the apex of the left ventricle. This method has generally been satisfactory, but problems associated with catheter position in trabeculae of the left ventricle, control of suction, damage to the ventricular myocardium, and risk of hemorrhage have led to use of the left atrium as the venting site of choice in most instances. A vent catheter inserted into the left atrium offers major safety and convenience factors, as well as placing the aspiration catheter at the most dependent point in the heart. A right angle sump device has been designed and used in over 500 open intracardiac procedures. It has proven to be very effective and essentially problem free in removing blood from the left atrium.

## METHOD

The device is constructed of stainless steel. The configuration is basically right angle with multiple perforations from the tip to and including the angle portion. Three lengths are available (Figure 1) for use in babies and children, adults with normal sized left ventricle, and patients with enlarged left atrium and ventricle. The length of the unperforated portion is provided for ease of insertion and positioning. The external diameter is 1/4 inch, and the device joins directly to 1/8 inch Tygon tubing and is generally adequate for removal of the volume of blood returning to the left atrium. The small size and pliability of this tubing is especially convenient. A threaded internal aspirating tube is joined to the device and sealed by a rubber "O" ring. As shown in Figure 2, the internal tube places the point of maximum suction near the perforations in the angle of the cannula. It also simplifies cleaning of the device.

A purse-string stitch is placed in the left atrium at the junction of the right superior pulmonary vein. The vent device is inserted through a stab incision within

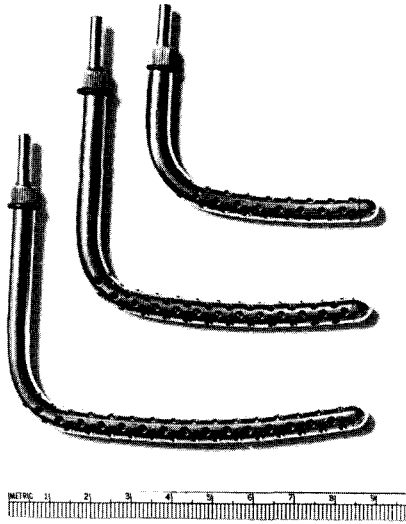


Fig. 1

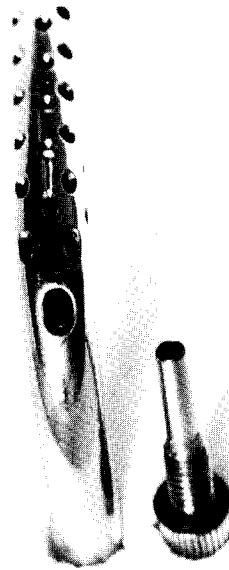


Fig. 2

Figure 1: Right angle sump catheter for use in venting the left side of heart through the left atrium. Perforations are placed from the tip into the angle. Three sizes are shown for use in children, adults with normal left ventricle, and patients with enlarged left atrium and ventricle.

Figure 2: Threaded internal aspirating tube shown on left places the point of maximum suction near perforations in the angle of the device.

the purse string. The right angle shape of the device and its rigid properties make it a simple maneuver to guide the tip across the left atrium and through the mitral valve into the left ventricle. A tourniquet tightened on the purse string holds the position of the device even during displacement or retraction of the heart.

#### COMMENT

The unique design characteristics of this left atrial sump catheter are the right angle shape, the location of the perforations, and the position of the tip of the internal aspiration tube. When placed through the mitral annulus, the right angle shape of the catheter places the angle deep on the posterior wall of the left atrium, the most dependent position in the heart with the patient in the supine position. Utilizing perforations into the angle of the catheter and the tip of the aspiration tube near the angle, optimal removal of blood is insured. Little, if any, blood entering the left atrium through the pulmonary veins will reach the left ventricle. The device maintains mitral valve incompetence so that any blood entering the left ventricle through Thebesian circulation may readily return to the aspiration point in the left atrium through the valve or through the multiple perforations in the device.

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