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Yet Another CVP Artifact

To the Editor:—Having read, with interest, the report of Salmonpera,¹ I would like to call attention to another potentially important artifact in the measurement of right atrial pressure (RAP) using a 7.5 Fr. pulmonary artery catheter (VIP®, Edwards Laboratories) having two closely spaced orifices approximately 30 cm proximal to the balloon tip. During the course of an otherwise uneventful anesthetic for a coronary artery bypass procedure, I noted an abrupt increase in RAP without other hemodynamic alteration. The RAP was measured using a correctly zeroed and calibrated transducer from the right atrial lumen of a 7.5 Fr. pulmonary artery catheter inserted via an 8 Fr. catheter introducer previously placed into the right internal jugular vein. At the time of the step change in RAP there was no infusion into the side arm of the catheter introducer. However, simultaneous with observed RAP change, an infusion into the VIP® port of the pul-

monary artery catheter had been started. Subsequent observations revealed that the RAP changed repeatedly in synchrony with the onset of infusion into the VIP® port (figure 1) and was increased in proportion to the height of the infusion container above the VIP® port. The pulmonary artery catheter had reached a satisfactory "wedge" position with the catheter tip 45 cm from the hub of the side arm.

Since the initial observation, this artifact has been noted in 10 additional patients (all with catheter insertion of less than 48 cm), producing an RAP increment of 11.4 ± 3.5 mmHg (SD).

Following this clinical observation, three commonly used catheter introducer sheaths were examined *in vitro*. The range in length of the three (distal tip to proximal end of side arm hub) was 18.0 cm to 20.3 cm. I believe this RAP artifact is due to pressurization of fluid inside the relatively tight-fitting sheath by the VIP® infusion, thereby increasing the pressure measured at the right atrial port. It is important, therefore, to recognize the relationship between the right atrial port, the VIP® port, and the length of the introducer sheath when using a VIP® or other similar catheter. In order to avoid this artifact, a length of catheter equal to 30 cm plus the length of the sheath must be inserted. However, this length, 48.0 cm for the shortest sheath tested, may be excessive, since frequently a satisfactory "wedge" position is obtained with insertion of the catheter to less than 45 cm. An infusion into the VIP® port begun before starting RAP measurement and continued without interruption could cause an unrecognized artifactual elevation of RAP of a clinically serious magnitude; treatment of this artifact could result in needless complications.

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REFERENCE

1. Salmonpera M: An erroneous CVP with the triple-lumen catheter in a short patient. *ANESTHESIOLOGY* 57:423, 1982

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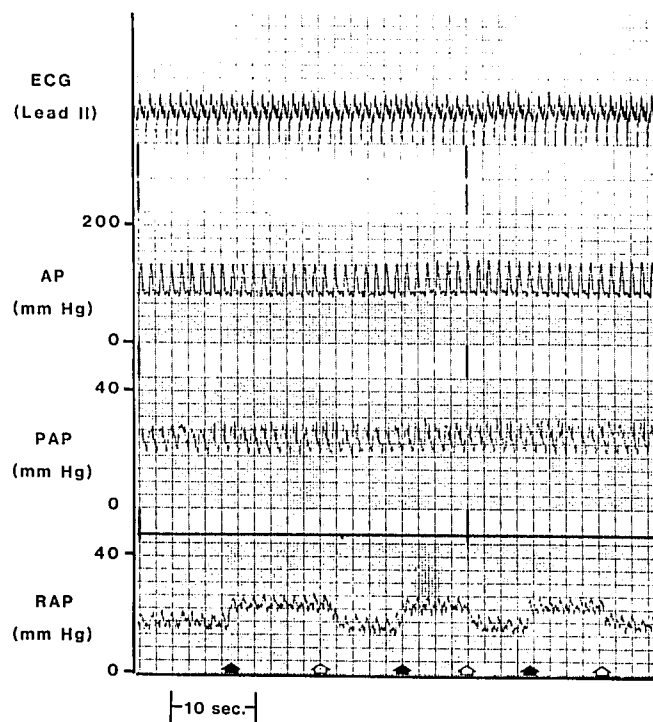


FIG. 1. Right atrial pressure is increased at the onset of the VIP® port infusion (solid arrow) and returns to the preinfusion level when the infusion is stopped (open arrow).