The Editor,

Swan-Ganz catheter is an important hemodynamic tool for perioperative monitoring in cardiac surgery. The balloon tip catheter is floated into the pulmonary artery (PA) by observing changes in pressure waveform from the right atrium, right ventricle to PA. In certain conditions such as severe tricuspid regurgitation and right-sided dilated chambers, it may become difficult to advance the catheter requiring multiple attempts. Transesophageal echocardiography (TEE) can be a great aid in such situations to guide the placement of PA catheter. This has been very well corroborated by a prospective and proof of concept study where PA catheters were placed by transesophageal echocardiographic guidance.[1] PA catheter can be advanced from the superior vena cava through the tricuspid valve under the guidance of a midesophageal modified bicaval view [Figure 1]. The pulmonary artery catheter (PAC) can then be floated and maneuvered through the right ventricle and right ventricular (RV) outflow tract under TEE visualization in the midesophageal RV inflow–outflow view [Figure 2] and then into PA entry can be seen in midesophageal ascending aortic short axis view [Figure 3].

Successful placement of PAC through flow direction and pressure waveform transduction method was observed in 45% of the cases in the above study. Manipulation of the catheter was needed in 45% of the cases under TEE guidance to avoid the right atrial appendage and direct it to the tricuspid valve. In 15% of cases, TEE revealed coiling of the catheter in the right atrium and so it had to be removed and reinserted. Manipulation of the catheter under TEE guidance was required in the right ventricle to enter the outflow tract in 5% of cases. Overall TEE came to rescue in 65% of cases. Sometimes, its possible that RV filling is less postinduction of anesthesia due to vasodilation. TEE can reveal so small RV outflow tract in such hypovolemic patient or in patients with hypertrophied RV outflow tract that PAC balloon may not pass through it. Half deflated balloon can aid in smooth passage of PAC.[3] TEE-guided PAC insertion can be accomplished with the help of two clinicians/operators (1TEE and 1 PAC). Apart from the views described, other views such as upper esophageal aortic arch short-axis views, transgastric RV inflow–outflow as well as 3D TEE can very well assist in the procedure. TEE is a feasible adjunctive method to conventional pressure waveform placement of PA catheters in potentially difficult patients [Table 1].

Cardiac output can be derived from Swan-Ganz catheter by using thermodilution principle.[2] Factors affecting the delivery of an amount of warm or cold blood reaching the thermistor will influence the exactness of the technique, for
example, intracardiac shunt, severe tricuspid regurgitation. Similarly, factors affecting the transit time of blood reaching thermistor from the filament will also decide the accuracy of cardiac output measurement from thermodilution. For example, distal bent or loop of Swan-Ganz catheter can bring thermistor tip close to the thermal filament thereby reducing the transit time for warm or cold blood to reach thermistor. This leads to overestimation of the cardiac output value. TEE can be useful in precluding the distal bent of the catheter so that accurate hemodynamic parameters can be derived. PA catheter insertion under TEE guidance can result in expedited PAC insertion while avoiding complication.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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