Review: A pulmonary artery catheter does not reduce mortality or hospital days in critically ill patients

Shah MR, Hasselblad V, Stevenson LW, et al. **Impact of the pulmonary artery catheter in critically ill patients: meta-analysis of randomized clinical trials.** JAMA. 2005;294:1664-70.

Clinical impact ratings: Hospitalists ★★★★☆☆ Critical Care ★★★★★★☆

QUESTION

In critically ill patients, does a pulmonary artery catheter (PAC) reduce all-cause mortality or hospital days?

METHODS

Data sources: MEDLINE (1985 to 2005), the Cochrane Central Register of Controlled Trials (1988 to 2005), the National Institutes of Health Clinical Trials Web site, the U.S. Food and Drug Administration Web site, and references of retrieved articles.

Study selection and assessment: Randomized controlled trials (RCTs) that compared PAC with no PAC and assessed death, days in hospital, or days in the intensive care unit. Studies that combined randomized and nonrandomized groups in outcomes, did not specify groups as PAC or no PAC, or did not use conventional PAC were excluded. Study quality was assessed for allocation generation, allocation concealment, and intention-to-treat analysis.

Outcomes: All-cause mortality during hospitalization and number of hospital days.

MAIN RESULTS

13 RCTs (*n* = 5051) met the selection criteria. Meta-analysis using a random-effects model showed that the PAC and no-PAC groups did not differ for all-cause mortality during hospitalization (Table) or for number of hospital days (11 RCTs) (mean difference 0.11 d, 95% CI −0.51 to 0.74). Patients in the PAC group had a higher rate of vasodilator (odds ratio [OR] 2.35, CI 1.75 to 3.15) and inotrope use (OR 1.58, CI 1.19 to 2.12).

CONCLUSION

In critically ill patients, a pulmonary artery catheter does not reduce all-cause mortality during hospitalization or days in hospital.

Pulmonary artery catheter (PAC) vs no PAC in critically ill patients during hospitalization*

Outcome	Number of trials (*n*)	Weighted event rates		RRI (95% CI)	NNH
		PAC	No PAC		
All-cause mortality	13 (5026)	33%	33%	2% (−4 to 9)	Not significant

*Abbreviations defined in Glossary; weighted event rates, RRI, NNH, and CI calculated from data in article.

COMMENTARY

Within the past 3 years, 4 large RCTs comparing PAC with no PAC have been published (1-4). These trials failed to show a benefit of the PAC in a broad range of patients for whom the use of PAC is frequently considered, including high-risk surgical patients (1), patients with shock and the acute respiratory distress syndrome (2), general intensive care unit patients (3), and those with decompensated heart failure (4). These trials (all included in the review by Shah and colleagues) have appropriately dampened enthusiasm for routine use of the PAC in these patient populations.

While the results of the meta-analysis by Shah and colleagues are sobering, they do not completely preclude the possibility that the PAC can favorably affect clinical outcomes in a focused group of high-risk patients. 2 studies in this review showed a survival benefit with the PAC in older patients with hip fracture (5), and a favorable trend in a small study of patients having peripheral vascular surgery (6). Furthermore, the PAC may prove effective when its use is tightly linked to specific hemodynamic management strategies. Of interest in this regard is the Fluids and Catheter Treatment Trial (FACTT) in patients with the acute respiratory distress syndrome (7). In FACTT, 1000 patients were randomized in a factorial design to a PAC or central venous catheter and a liberal or conservative fluid treatment strategy. The treatment strategies specified the use of fluids, diuretics, vasopressors, and inotropes, based on hemodynamic data obtained from each of the catheters. The results of this trial will be available later this year.

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