Ann Thorac Surg. 2005 Oct;80(4):1479-83.

Non-invasive cardiac output determination by two-dimensional independent Doppler during and after cardiac surgery.

Knobloch K, Lichtenberg A, Winterhalter M, Rossner D, Pichlmaier M, Phillips R.

Author information

Abstract

PURPOSE:

This study was to compare noninvasive measurement of cardiac output (CO) using a novel Doppler technique with invasive CO measurements in the postcardiac surgical intensive care unit.

DESCRIPTION:

Thirty-six patients (67.2 +/- 10 years, New York Heart Association functional class 3.1 +/- 0.3) undergoing coronary revascularization were prospectively examined postoperatively. One hundred eighty paired CO and stroke volume measurements were compared from the noninvasive USCOM device (Sydney, Australia) and the invasive Swan-Ganz catheter at varying COs. Eighteen measurements were performed intraoperatively by direct insonation of the right ventricular outflow tract.

EVALUATION:

Mean noninvasive and invasive CO values were 5.15 +/- 1.98 L/min and 4.92 +/- 2.0 L/min, respectively ($r = 0.870$; $p < 0.01$). The mean difference between methods was -0.23 +/- 1.01 L/min greater than a range of CO values from 2.5 to 9.9 L/min. Mean central venous saturation percentage was 72 +/- 9%, correlating with both noninvasive and invasive CO ($r = 0.474$ and 0.606, respectively, $p < 0.01$). Intraoperatively, both direct and invasive CO were identical.

CONCLUSIONS:

Using the ultrasonic cardiac output monitoring (USCOM) device it is possible to determine noninvasive beat-to-beat CO in postcardiac surgery patients without the possible complications associated with invasive right heart catheterization. The USCOM CO and stroke volume showed a very good agreement with invasive Swan-Ganz measures and correlated with central venous saturation percentage.