Abstract

PURPOSE: To determine risk factors associated with mechanical complications of central venous catheterization (CVC).

METHODS: The Beth Israel Institutional Review Board approved this study. We analyzed a database of 499 consecutive CVC attempts by Department of Medicine residents, cardiology and critical care fellows, and critical care attendings from October 1, 2003 through March 31, 2004 in a large urban teaching hospital. These procedures were performed in the Medical ICU, Coronary Care Unit or Respiratory Care Unit. The database included: (1) patient characteristics (age, gender, body mass index, level of consciousness, and whether the procedure was emergent or elective); (2) procedure characteristics (site of insertion, time of procedure, number of attempts, unit location); (3) operator characteristics (postgraduate year of training of person performing procedure and supervisor); and (4) mechanical complications. The correlation between each variable and complication was explored (Pearson’s R).

RESULTS: 312 (63%) attempts were uneventful. Complications included: failure to place the CVC (133), arterial puncture (20), improper position (18), pneumothorax (7 in 347 subclavian and internal jugular attempts, 6 of whom had a chest tube placed), hematoma (5), hemothorax requiring chest tube (2) and asystolic cardiac arrest of unknown etiology (1). Of all the variables assessed, only the site of insertion correlated with the development of a mechanical complication: the risk of developing any complication was significantly higher with the subclavian approach (44%, p<0.001) than either the internal jugular (33%) or femoral approaches (30%). All of the potentially life-threatening complications (pneumothorax, hemothorax, and death) occurred with subclavian CVC.

CONCLUSION: The subclavian approach to CVC insertion is associated with the highest rate of mechanical complications, predominantly due to failure to place the line. Complications were not related to patient characteristics or experience of the operator in this study.

CLINICAL IMPLICATIONS: Subclavian CVC is preferred because of a low infection rate, but carries the highest mechanical complication rate in our institution. Methods to reduce risk (vascular probes, training on animals or patient simulators) should be investigated and utilized further.
DISCLOSURE: L.A. Eisen, None.
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