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CAT 1
Dec 2014 - Block 6

Association Between Arterial Catheter Use and Hospital Mortality in Intensive Care Units: JAMA Intern Med. 2014;174(11):1746-1754. doi:10.1001/jamainternmed.2014.3297
Published online September 8, 2014.

Background:
While seemingly becoming less frequent in today's practice (as compared to those antidotes of 'the good ol' days by experienced attendings) arterial catheterization (AC) in critical patients in ICU settings are used frequently (36% of patients). While benefits include facilitated phlebotomy, HD monitoring there are significant adverse risks including limb ischemia, pseudoaneursyms, and catheter infections, as well as costs. Given the lack of objective evidence at present (per this researcher) the observational study was designed to evaluate for potential increased mortality associated with use of arterial catheterization in ICU patients.

Methods:
The researchers performed an observational propensity score matching analysis of medical ICU patients (no surgery within the 7 days before ICU admission) who arrived in the ICU from any location other than the OR/PACU and who required mechanical ventilation at any point during their ICU stay. Data was taken from participants of a voluntary, paid clinical review service in which certified data collectors on-site. Secondary cohorts included low/middle/high levels of Mortality Probability, patients admitted to mixed med-surg ICUs, pts requiring vasopressors, septic pts, pts who underwent surgery within the 7 days prior to ICU admission (with >24hrs arterial line in the ICU post-op).

Results:
The 60,975 patients were matched into 13,603 pairs (AC vs no AC). Using propensity matching there was no association demonstrated between AC use and in-hospital mortality. Secondary cohort analysis did not demonstrate an association with exception of those pts requiring vasopressors, in whom pts with AC use had increased odds of death (OR, 1.08; 95% CI, 1.02-1.14; P = .008). Secondary outcomes including vasopressor use, duration of ventilation, ICU stay were all increased in pts with AC use.

Conclusion:
Based on the reviewed data in this analysis there is no association between Arterial Catheterization use and in-hospital mortality (primary objective, benefit or harm).

Limitations:
Observational studies are limited by selection and confounding bias. Furthermore, the use of a commercial data collection service requiring payment from participating hospitals generates an significant selection bias, severely limiting the generalization of this data to lower-volume centers where providers may have less experience with AC insertion/maintainability.

Discussion:
Given the current limited evidence for/against AC catheter use, this is a good place to start. While there are significant limitations using this type of observational data collection, it did provide a sufficiently large sample size for initial analysis which will be helpful in designing future studies. Furthermore, the lack of benefit (in addition to harms) of AC use as evaluated in this study necessitates that we spend the time/effort/resources to identify in which populations AC use would be more helpful to limit the less-clinical harms including hospital resource use/payer cost for these devices.