Antibiotic-impregnated central venous catheters significantly reduced the risk of bloodstream infections compared with standard and heparin central venous catheters" Gilbert et al (2016).

Abstract:

BACKGROUND: Impregnated central venous catheters are recommended for adults to reduce bloodstream infections but not for children because there is not enough evidence to prove they are effective. We aimed to assess the effectiveness of any type of impregnation (antibiotic or heparin) compared with standard central venous catheters to prevent bloodstream infections in children needing intensive care.

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METHODS: We did a randomised controlled trial of children admitted to 14 English paediatric intensive care units. Children younger than 16 years were eligible if they were admitted or being prepared for admission to a participating paediatric intensive care unit and were expected to need a central venous catheter for 3 or more days. Children were randomly assigned (1:1:1) to receive a central venous catheter impregnated with antibiotics, a central venous catheter impregnated with heparin, or a standard central venous catheter with computer generated randomisation in blocks of three and six, stratified by method of

consent, site, and envelope storage location within the site. The clinician responsible for inserting the central venous catheter was not masked to allocation, but allocation was concealed from patients, their parents, and the paediatric intensive care unit personnel responsible for their care. The primary outcome was time to first bloodstream infection between 48 h after randomisation and 48 h after central venous catheter removal with impregnated (antibiotic or heparin) versus standard central venous catheters, assessed in the intention-to-treat population. Safety analyses compared central venous catheter-related adverse events in the subset of children for whom central venous catheter insertion was attempted (per-protocol population). This trial is registered with ISRCTN number, ISRCTN34884569.

FINDINGS: Between Nov 25, 2010, and Nov 30, 2012, 1485 children were recruited to this study. We randomly assigned 502 children to receive standard central venous catheters, 486 to receive antibiotic-impregnated catheters, and 497 to receive heparin-impregnated catheters. Bloodstream infection occurred in 18 (4%) of those in the standard catheters group, 7 (1%) in the antibiotic-impregnated group, and 17 (3%) assigned to heparin-impregnated catheters. Primary analyses showed no effect of impregnated (antibiotic or heparin) catheters compared with standard central venous catheters (hazard ratio [HR] for time to first bloodstream infection 0·71, 95% CI 0·37-1·34). Secondary analyses showed that antibiotic central venous catheters were better than standard central venous catheters (HR 0·43, 0·20-0·96) and heparin central venous catheters (HR 0·42, 0·19-0·93), but heparin did not differ from standard central venous catheters (HR 1·04, 0·53-2·03). Clinically important and statistically significant absolute risk differences were identified only for antibiotic-impregnated catheters versus standard catheters (-2·15%, 95% CI -4·09 to -0·20; number needed to treat 47, 95% CI 25-500) and antibiotic-impregnated catheters versus heparin-impregnated catheters (-1·98%, -3·90 to -0·06, NNT 51, 26-1667). Nine children (2%) in the standard central venous catheter group, 14 (3%) in the antibiotic-impregnated group, and 8 (2%) in the heparin-impregnated group had catheter-related adverse events. 45 (8%) in the standard group, 35 (8%) antibiotic-impregnated group, and 29 (6%) in the heparin-impregnated group died during the study.

INTERPRETATION: Antibiotic-impregnated central venous catheters significantly reduced the risk of bloodstream infections compared with standard and heparin central venous catheters. Widespread use of antibiotic-impregnated central venous catheters could help prevent

bloodstream infections in paediatric intensive care units.

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Reference:

Gilbert, R.E., Mok, Q., Dwan, K., Harron, K., Moitt, T., Millar, M., Ramnarayan, P., Tibby, S.M., Hughes, D. and Gamble, C. (2016) Impregnated central venous catheters for prevention of bloodstream infection in children (the CATCH trial): a randomised controlled trial. Lancet. March 3rd. .

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