#IVTEAM #Intravenous literature: van de Wetering, M.D., van Woensel, J.B. and Lawrie, T.A. (2013) Prophylactic antibiotics for preventing Gram positive infections associated with long-term central venous catheters in oncology patients. The Cochrane Database of Systematic Reviews. November 23th. 11:CD003295. .

Abstract:

BACKGROUND: This is an updated version of the review which was first published in the Cochrane Database of Systematic Reviews in 2006. Long-term central venous catheters (CVCs), including tunnelled CVCs (TCVCs) and totally implanted devices or ports (TIDs), are increasingly used when treating oncology patients. Despite international guidelines on sterile insertion and appropriate CVC maintenance and use, infection remains a common complication. These infections are mainly caused by Gram positive bacteria. Antimicrobial prevention strategies aimed at these micro-organisms could potentially decrease the majority of CVC infections. The aim of this review was to evaluate the efficacy of antibiotics in the prevention of Gram positive infections in long-term CVCs.

OBJECTIVES: To determine the efficacy of administering antibiotics prior to the insertion of long-term CVCs, or flushing or locking long-term CVCs with a combined antibiotic and heparin solution, or both, to prevent Gram positive catheter-related infections in adults and children receiving treatment for cancer.

SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials

(CENTRAL) (to June 2013) and the MEDLINE and EMBASE databases (1966 to 2013).

SELECTION CRITERIA: Randomised controlled trials (RCTs) comparing prophylactic antibiotics given prior to long-term CVC insertion with no antibiotics, RCTs comparing a combined antibiotic and heparin solution with a heparin-only solution to flush or lock newly inserted long-term CVCs, and RCTs comparing a combination of these interventions in adults and children receiving treatment for cancer.

DATA COLLECTION AND ANALYSIS: Two authors independently selected studies, classified them and extracted data on to a pre-designed data collection form. We pooled data using the RevMan software version 5.2 and used random-effects (RE) model methods for meta-analyses.

MAIN RESULTS: We included 11 trials with a total of 828 oncology patients (adults and children). We assessed most included studies to be at a low or unclear risk of bias. Five trials compared the use of antibiotics (vancomycin, teicoplanin or ceftazidime) given before the insertion of the long-term CVC with no antibiotics, and six trials compared antibiotics (vancomycin, amikacin or taurolidine) and heparin with a heparin-only solution for flushing or locking the long-term CVC after use. Administering an antibiotic prior to insertion of the CVC did not significantly reduce Gram positive catheter-related sepsis (CRS) (five trials, 360 adults; risk ratio (RR) 0.72, 95% confidence interval (CI) 0.33 to 1.58; I^2 = 5 2%; P = 0.41).Flushing and locking long-term CVCs with a combined antibiotic and heparin solution significantly reduced the risk of Gram positive catheter-related sepsis compared with a heparin-only solution (468 participants, mostly children; RR 0.47, 95% CI 0.28 to 0.80; I^2 = 0%; P = 0.005). For a baseline infection rate of 15%, this reduction translated into a number needed to treat (NNT) of 12 (95% CI 9 to 33) to prevent one catheter-related infection. We considered this evidence to be of a moderate quality.

AUTHORS' CONCLUSIONS: There was no benefit to administering antibiotics before the insertion of long-term CVCs to prevent Gram positive catheter-related infections. Flushing or locking long-term CVCs with a combined antibiotic and heparin solution appeared to reduce Gram positive catheter-related sepsis experienced in people at risk of neutropenia through chemotherapy or disease. Due to insufficient data it was not clear whether this applied equally to TCVCs and totally implanted devices (TIDs), or equally to adults and children. The

use of a combined antibiotic and heparin solution may increase microbial antibiotic resistance, therefore it should be reserved for high risk people or where baseline CVC infection rates are high (> 15%). Further research is needed to identify high risk groups most likely to benefit.