

Abstract

Original Article

Modified Insertion Techniques Decreases the Risk of Tip Malposition in Peripherally Inserted Central Catheters: A Systematic Review and Meta-Analysis

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Abstract

Objectives: Traditional insertion technique of peripherally inserted central catheter (PICC) is associated with an increased risk of tip malposition. Several studies indicate that modified insertion technique may address this issue. However, a definitive conclusion was not obtained. A systematic review and meta-analysis was therefore performed to evaluate the effects of modified insertion technique versus traditional insertion technique in PICC.

Methods: PubMed, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), China Biomedical Database (CBM), Wanfang and China National Knowledge Infrastructure (CNKI) were searched to identify potential randomized controlled trials that compared modified with traditional insertion technique for PICC from inception through April, 2016. All statistical analyses were conducted by using Reviewer Manager (RevMan) 5.3. We also applied the GRADE method to grade the level of evidence.

Results: We included eventually 8 RCTs, comprising 1482 participants. The meta-analysis suggested that modified insertion techniques decreased the rate of malposition (8 RCTs, n = 1482, risk ratio [RR] 0.16, 95% confidence intervals [CIs] 0.10 to 0.26, moderate quality of evidence), shortened insertion time (2 RCTs, n = 388, mean difference [MD] -3.45, 95% CI -3.86 to -3.03, low quality of evidence), and improved the comfort level of participants (2 RCTs, n = 388, MD -1.61, 95% CI - 1.82 to -1.39, low quality of evidence).

Conclusions: Modified insertion technique is benefit for decreasing the rate of malposition, shortening insertion time, and improving the comfort level in PICC.

Keywords: Peripherally inserted central catheter; modified insertion techniques; malposition; systematic review; meta-analysis