

To compare the efficacy and safety of three commonly used techniques for implanting TIVAPs: the venous cutdown technique, the Seldinger technique, and the modified Seldinger technique. This review includes studies that use Doppler or real-time two-dimensional ultrasonography for locating the vein in the Seldinger technique” Hsu et al (2016).

Abstract:

BACKGROUND: Totally implantable venous access ports (TIVAPs) provide patients with a safe and permanent venous access, for instance in the administration of chemotherapy for oncology patients. There are several methods for TIVAP placement, and the optimal evidence-based method is unclear.

OBJECTIVES: To compare the efficacy and safety of three commonly used techniques for implanting TIVAPs: the venous cutdown technique, the Seldinger technique, and the modified Seldinger technique. This review includes studies that use Doppler or real-time two-dimensional ultrasonography for locating the vein in the Seldinger technique.

SEARCH METHODS: The Cochrane Vascular Trials Search Co-ordinator searched the Cochrane Vascular Specialised Register (last searched August 2015) and the Cochrane Central Register of Controlled Trials (CENTRAL) (2015, Issue 7), as well as clinical trials registers.

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SELECTION CRITERIA: We included randomised or quasi-randomised controlled clinical trials that randomly allocated people requiring TIVAP to the venous cutdown, Seldinger, or modified Seldinger technique. Two review authors independently assessed studies for inclusion eligibility, with a third review author checking excluded studies.

DATA COLLECTION AND ANALYSIS: Two review authors independently extracted data. We assessed all studies for risk of bias. We assessed heterogeneity using Chi² statistic and variance (I² statistic) methods. Dichotomous outcomes, summarised as odds ratio (OR) with 95% confidence interval (CI), were: primary implantation success, complications (in particular infection), pneumothorax, and catheter complications. We conducted separate analyses to assess the two access veins, subclavian and internal jugular (IJ) vein, in the Seldinger technique versus the venous cutdown technique. We used both intention-to-treat (ITT) and on-treatment analyses and pooled data using a fixed-effect model.

MAIN RESULTS: We included nine studies with a total of 1253 participants in the review. Five studies compared Seldinger technique (subclavian vein access) with venous cutdown technique (cephalic vein access). Two studies compared Seldinger (IJ vein) versus venous cutdown (cephalic vein). One study compared the modified Seldinger technique (cephalic vein) with the venous cutdown (cephalic vein), and one study compared the Seldinger (subclavian vein) versus the Seldinger (IJ vein) technique. Seldinger technique (subclavian or IJ vein access) versus venous cutdown (cephalic vein): We included seven trials with 1006 participants for analysis. Both ITT (OR 0.40; 95% CI 0.25 to 0.65) and on-treatment analysis (OR 0.59; 95% CI 0.36 to 0.98) showed that the Seldinger technique for implantation of TIVAP had a higher success rate compared with the venous cutdown technique. We found no difference between overall peri- and postoperative complication rates: ITT (OR 1.16; 95% CI 0.76 to 1.75) and on-treatment analysis (OR 0.93; 95% CI 0.62 to 1.40). In the Seldinger group, the majority of the trials reported use of the subclavian vein for venous access, with only a limited number of trials utilising the IJ vein for access. When individual complication rates of infection, pneumothorax, and catheter complications were analysed, the Seldinger technique (subclavian vein access) was associated with a higher rate of catheter complications compared to the venous cutdown technique: ITT (OR 6.77; 95% CI 2.31 to 19.79) and on-treatment analysis (OR 6.62; 95% CI 2.24 to 19.58). There was no difference in incidence of infections, pneumothorax, and other complications between the groups. Modified Seldinger technique (cephalic vein) versus venous cutdown (cephalic vein): We identified one trial with 164 participants. ITT analysis showed no difference in primary implantation success rate between the modified Seldinger technique (69/82, 84%) and the venous cutdown technique (66/82, 80%), $P = 0.686$. We observed no differences in the peri- or postoperative complication rates. Seldinger (subclavian vein access) versus Seldinger (IJ vein access): We identified one trial with 83 participants. The primary success rate was 84% (37/44) for Seldinger (subclavian vein) versus 74% (29/39) for the Seldinger (IJ vein). There was a higher overall complication rate in the subclavian group (48%) compared to the jugular group (23%), $P = 0.02$. However, when specific complications were compared individually, we found no differences between the groups. The overall quality of the trials

included in this review was moderate. The methods used for randomisation were inadequate in four of the nine included studies, but sensitivity analysis excluding these trials did not alter the outcome. The nature of the interventions, either venous cutdown or Seldinger techniques, meant that it was not feasible to blind the participant or personnel, therefore we judged this to be at low risk of bias. The majority of participants in the included trials were oncology patients at tertiary centres, and the outcomes were applicable to the typical clinical scenario. For all outcomes, when comparing venous cutdown and Seldinger technique, serious imprecision was evident by wide confidence intervals in the included trials. The quality of the overall evidence was therefore downgraded from high to moderate. Due to the limited number of included studies we were unable to assess publication bias.

AUTHORS' CONCLUSIONS: Moderate-quality evidence showed that the Seldinger technique has a higher primary implantation success rate compared with the venous cutdown technique. The majority of trials using the Seldinger technique used the subclavian vein for venous access, and only a few trials reported the use of the internal jugular vein for venous access. Moderate-quality evidence showed no difference in the overall complication rate between the Seldinger and venous cutdown techniques. However, when the Seldinger technique with subclavian vein access was compared with the venous cutdown group, there was a higher reported incidence of catheter complications. The rates of pneumothorax and infection did not differ between the Seldinger and venous cutdown group. We identified only one trial for each of the comparisons modified Seldinger technique (cephalic vein) versus venous cutdown (cephalic vein) and Seldinger (subclavian vein access) versus Seldinger (IJ vein access), thus a definitive conclusion cannot be drawn for these comparisons and further research is recommended.

Full Text

Reference:

Hsu, C.C., Kwan, G.N., Evans-Barns, H., Rophael, J.A. and van Driel, M.L. (2016) Venous cutdown versus the Seldinger technique for placement of totally implantable venous access ports. The Cochrane Database of Systematic Reviews. August 21st. 8:CD008942. .

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