

P171

## P171 -A Systematic Review of Randomised Control Trials Comparing Cannulation Techniques for Arteriovenous Access for Haemodialysis

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**Background:** Needling is an essential procedure to perform haemodialysis with arteriovenous (AV) access. However, repetitive needling for haemodialysis can cause damage that leads to access failure, is associated with complications and affects patients' experiences of haemodialysis. Different needling techniques exist to minimise these problems, but uncertainty remains as to which is best, driving variations in practice. We therefore performed a systematic review of randomised control trials (RCT) that compare needling techniques for AV access for haemodialysis.

**Methods:** A protocol was developed using PRISMA-P guidance and registered on PROSPERO (CRD42018094656). A current haemodialysis patient was included as a reviewer, to gain a patient's perspective. MEDLINE, CINAHL, PubMed, EMBASE, BNI, LILACS, Cochrane database and clinical trials registers were searched. Eligibility criteria were set using a PICO question. Screening of articles, assessment of quality and data extraction were performed by two authors and differences adjudicated by the guarantor. The data extraction form was based on templates from 'Centre for Reviews and Dissemination' and 'Joanna Briggs Institute' (JBI), but also included data extraction on cannulation procedures. Assessment of quality was performed using the 'JBI Checklist for Randomised Controlled Trials'. Primary outcomes of interest were patency, infection, pain and anxiety related to cannulation.

**Results:** The literature search identified 241 records, of which 36 were selected for full text review. Ten records describing five RCTs met the inclusion criteria. Four potential records were identified at title and abstract screening but could not be sourced. The five included RCTs all compared buttonhole cannulation to either rope ladder or usual practice. A meta-analysis was deemed inappropriate due to variation in study design.

Patency was measured in three RCTs, of which one reported better patency with buttonhole (100% survival at 12 months v. 86% for usual practice,  $p=0.0005$ ). Bacteraemia rates were reported in two RCTs, with one RCT reporting a higher rate with buttonhole (1 at 8 weeks v. 0 for standard needling,  $p=1.0$ ; 9 for buttonhole at unspecified time period  $>12$  months v. 0 for standard needling,  $p=0.003$ ) and one RCT reporting a higher rate with usual practice (2 at 12 months v. 0 in buttonhole). All RCTs assessed pain, but none anxiety. Whilst RCTs made claims about differences in pain, the reported differences did not appear clinically meaningful. Methodological limitations were identified, including poor description of the intervention and comparator (e.g. unclear as to whether the comparator was actually rope ladder); no measure of fidelity of cannulation techniques; differing sample baseline characteristics; and use of varying outcomes, some poorly defined.

**Conclusions:** Currently published RCTs of needling techniques for AV access have methodological weaknesses, leading to varied results that do not allow definitive conclusions to be drawn. A definitive RCT is therefore required, with consideration of cannulation as a complex intervention. Future research should include: detailed descriptions of the intervention and comparator; process evaluation to measure fidelity of cannulation; and selection of appropriate outcome measures, including more comprehensive evaluation of patients' experiences of cannulation. A feasibility study is also recommended to ensure a definitive RCT is possible.