Standard versus perforated peripheral intravenous catheter (SURF): a pilot randomised controlled trial preliminary findings

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Purpose: To evaluate the effectiveness of perforated peripheral intravenous catheters (PIVCs) compared to standard PIVCs in reducing PIVC failure during injection for contrast enhanced computed tomography (CECT) scans.

Methods: A single centre, parallel-group, pilot randomised controlled trial (RCT) conducted between 30th March and 27th May 2020 at the Royal Brisbane and Women’s Hospital. Adult participants diagnosed with cancer were assigned to a non-perforated PIVC (standard care) or a PIVC with a novel perforated design (intervention) for the administration of intravenous contrast. There were two primary outcomes: (1) feasibility of an adequately powered RCT with pre-established criteria for eligibility, recruitment, protocol adherence and retention and (2) all cause PIVC failure. Secondary outcomes included: first insertion success, modes of PIVC failure, PIVC dwell time, contrast injection parameters (volume and injection rate), CECT image quality, radiographer satisfaction and adverse events, such as contrast reaction and extravasation, was also monitored.

Results: Feasibility outcomes were met, except for eligibility (≥80%) and recruitment (≥80%). In total, 166 participants were screened, 128 (77%) were eligible, and of these 101/128 (79%) were randomised; 50 to standard care and 51 to the intervention. There was no missing data. No patients withdrew from the study; however, the desired contrast injection rate was not achieved in 4/101 (4%) of participants; 2 from each group. One participant in the intervention received an extravasation injury. Radiographers were very happy (rated the quality 10/10 on a 0-10 Likert scale) with flow rate (42/50; 86% in the standard care and 45/51; 88% in the intervention) and the image quality (42/51; 86% in the standard care and 43/50; 84% in the intervention). The median PIVC dwell time was 37 minutes.

Conclusions: This pilot RCT suggests perforated PIVCs provide expected flow rate and similar image quality to non-perforated PIVCs. Feasibility of conducting an equivalence RCT was demonstrated.