Different tip designs (step, split, and symmetrical) have been developed to ameliorate the catheter-related problems. The aim of the study was to compare the efficacy and safety of split-tip, step-tip, and symmetrical-tip HD catheters” Ling metal (2019).

Abstract:

OBJECTIVE: Patients with end-stage renal disease need vascular access to ensure sufficient blood flow during hemodialysis (HD). Patients who are poor candidates for arteriovenous access creation require long-term catheter placement. Problems such as dialysate recirculation, thrombosis, catheter-related infections, and malfunction can occur with HD catheters. Different tip designs (step, split, and symmetrical) have been developed to ameliorate the catheter-related problems. The aim of the study was to compare the efficacy and safety of split-tip, step-tip, and symmetrical-tip HD catheters.

METHODS: The PubMed, Embase, Cochrane Library, and Scopus databases and the ClinicalTrials.gov registry were searched for studies published before November 2017. Studies comparing the clinical and rheologic outcomes of step-, split-, or symmetrical-tip catheters in patients undergoing HD were included in this meta-analysis. We conducted meta-analyses using random-effects models. The primary outcomes were catheter survival time and incidence of functioning catheters. The secondary outcomes were delivered blood flow rate, blood recirculation rate, and incidence of catheter-related complications.
RESULTS: Seven randomized controlled trials and one retrospective study with a total of 988 patients were included. No significant differences were observed in the delivered blood flow rate (weighted mean difference, -5.37 mL/min; 95% confidence interval [CI], -23.75 to 13.02), incidence of catheter-related infections (risk ratio [RR], 1.18; 95% CI, 0.63-2.22), or incidence of catheter-related thrombosis (RR, 1.29; 95% CI, 0.64-2.59) between step-tip catheters and advanced (both split-tip and symmetrical-tip) catheters. Moreover, a meta-analysis of the incidence of functioning catheters at 1 month, 6 months, and 12 months revealed that the outcome of step-tip catheter use was better than that of split-tip catheter use, but with a significant difference only at 6 months (RR, 1.22; 95% CI, 1.02-1.46).

CONCLUSIONS: None of the catheter types exhibited unique features that can enhance their suitability for application. Hence, catheters can be selected by also considering different factors, including costs, ease of procedures, expertise of the clinician, and education and preference of the patient.

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