

Patency of tunnelled central venous catheters for haemodialysis access: a systematic review and meta-analysis

Dr Sarah Blakey¹, Dr Anamika Adwaney¹, Dr Damien Ashby¹

¹Imperial College NHS Healthcare Trust, London, United Kingdom

Introduction

Arteriovenous fistulae (AVF) are widely regarded as the optimum vascular access in haemodialysis patients; however, tunnelled dialysis catheters (TDC) are often advocated as an alternative for older more comorbid patients, and those in whom native vascular access creation is unfeasible, with clinicians increasingly recognising the importance of patient choice. Little is known about the expected patency of TDCs, yet this information may be valuable in informing shared decision making between physicians and haemodialysis patients.

Methods

We performed a literature search using Pubmed, EMBASE and Cochrane Library, through inception to January 2020. We identified studies featuring adult patients, in which TDC patency in conventional upper body sites was reported as a primary or secondary endpoint. Where individual studies compared two or more patient groups (for instance, different TDC designs or insertion techniques), the patency for each group was considered as a separate cohort. We assumed an exponential model to calculate an equivalent 12-month patency for each cohort regardless of the duration of observation.

Results

After quality assessment, 98 studies, comprising cohorts of 8 to 812 patients, were included in our analysis. Many of the studies identified were intended to review or compare TDC designs, insertion techniques or lock solutions, but some of the cohorts were taken from studies comparing outcomes of different modalities of vascular access within a population.

In total, 12,636 TDC insertions were performed in 139 patient cohorts between 1984 and 2019. TDC patency was reported at between one and 60 months (median 6 months), with outcomes beyond 12 months reported for only 26 (19%) cohorts. TDC patency varied considerably between studies, with the equivalent 12-month patency ranging between 0% and 99.3% (weighted mean 52.0%). Some of the variation was geographic, with studies from USA typically reporting shorter patencies, and twin catheters, such as Tesiocaths, appeared more durable than single catheter designs (equivalent 12-month patency 70.7 vs 47.6%), but most of the variation is unexplained, presumably representing clinical practice variation.

Using a weighted exponential model of TDC survival, estimated secondary patency proportion was 67.5% at 12 months, 45% at 24 months, 29.5% at 36 months and 19.5% at 48 months (Figure 1).

Discussion

Our systematic review demonstrates marked variation in TDC patency between study cohorts. There is no clear explanation for the variability in TDC outcomes; however, it may be that differences in clinical practice are implicated, given similarities in patient demographics and TDC-related factors between cohorts. Based on patencies commonly achieved with over half still patent at 1 year, TDC access may be optimal and appropriately favoured in a number of clinical settings.