Ethical and Legal Obligation to Avoid Long-Term Tunneled Catheter Access

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Despite recent national initiatives promoting the arteriovenous fistula as the initial, primary, and sole vascular access to be used by hemodialysis patients and recommending a decrease in the prevalence of tunneled cuffed catheters to less than 10%, the prevalence of tunneled cuffed catheters as hemodialysis access is increasing. This study describes the risks of tunneled cuffed catheters, explores the reasons why they remain prevalent, and presents the stance that nephrologists have an obligation to offer tunneled cuffed catheters only for temporary use and not as an acceptable alternative for long-term vascular access to patients for whom a properly functioning arteriovenous fistula or graft is possible. Recommendations for tunneled cuffed catheter use were based on dialysis clinical practice guidelines and the medical evidence regarding outcomes of use of arteriovenous fistulas and tunneled cuffed catheters. The authors found that compared with dialysis with arteriovenous fistulas, long-term dialysis with tunneled cuffed catheters is associated with (1) two to threefold increased risk of death, (2) a five to 10-fold increased risk of serious infection, (3) increased hospitalization, (4) a decreased likelihood of adequate dialysis, and (5) an increased number of vascular access procedures. To adequately inform patients about access options, nephrologists are ethically obligated to systematically explain to patients the harms of tunneled cuffed catheters. If catheters must be used to initiate dialysis, nephrologists should present catheters only as “temporary” measures and “unsafe for long-term use.”


N ative arteriovenous fistulas (AVFs) have the longest survival and the lowest infection and thrombosis rates, and thereby are recommended as the first choice of vascular access for hemodialysis whenever possible (1,2). In its goals for access placement set forth in 2000 and updated in 2006, the Kidney Disease Outcomes Quality Initiative (K/DOQI) recommends that primary AVFs should be constructed in at least 50% of all patients with end-stage renal disease (ESRD) who elect to receive hemodialysis, with the goal that ultimately 65% of prevalent patients should have native AVFs. K/DOQI further recommends that the use of tunneled-cuffed catheters (TCCs) be discouraged as long-term vascular access and that fewer than 10% of patients should be using them for permanent access (3). The Fistula First Initiative has promulgated similar recommendations (4).

Despite these recommendations, TCC use is rising. This growing use has been likened to a “catheter epidemic.” (5). In 2006, 82% of patients in the United States initiated dialysis via a catheter (6). The overall likelihood of TCC use was 35% greater in 2005 compared with 1996 (7).

This article describes the risks of TCCs in hemodialysis patients, explores the reasons why TCCs remain prevalent in the hemodialysis population, and tackles the ethical issues surrounding use of TCCs as long-term hemodialysis accesses. We hope to persuade nephrologists that strong counsel to patients against the long-term use of TCC is inherent to their ethical obligation to do no harm, and to provide a legal caution that, in most patients, TCC use is not the best form of access.

The Risks of TCCs

Since their development as an alternative to acute hemodialysis vascular access in the late 1900s, TCCs have generated controversy in the nephrology literature (8,9). TCCs are used as a bridge access device while awaiting maturation of an AVF in patients with severe comorbidities such as congestive heart failure and severe peripheral vascular disease, in the very elderly, in those with inadequate vascular anatomy, in those with limited life expectancy, and as a last resort in patients with multiple access failures (3). Originally hailed as a viable alternative to the arteriovenous graft (AVG), TCCs were presumed to have comparable infectious and thrombotic complication rates for patients needing long-term vascular access in whom creation of an AVF was not possible (10).

However, TCCs have been found to be associated with as much as a threefold increased mortality compared with AVFs (11,12). Sepsis-related death is 100 times greater in dialysis patients than in the general population, with infection-related...
death and all-cause mortality being highest in those with TCCs (6). Twenty-two percent of patients dialyzing through TCCs develop osteomyelitis, septic arthritis, and endocarditis and progress to death, regardless of whether the TCC is removed or exchanged (13,14). The cost of placing a TCC is approximately $13,000, and that of treating one TCC-related episode of bacteremia is as high as $45,000 (6). A several-fold increase in cardiovascular risk is also noted with TCCs (6).

Poor quality of life, reduced dialysis adequacy, and central venous stenosis that may preclude subsequent AVF creation have also been noted as consequences of TCC use (6). Compounding these problems is a primary TCC failure rate of 52% to 91% per year (5).

**Why Is There an Increase in the Number of TCC Placements?**

A perceived difficulty in creating AVFs has contributed to the preferential use of TCCs (15). However, creation of AVFs in most patients—probably more than 75%—has been shown to be an attainable goal (16–18). Yet boosting the prevalence of AVFs will require both increased predialysis placement of AVFs and concerted efforts to salvage immature or dysfunctional AVFs with radiologic or surgical interventions (19). The changing demographics of incident ESRD patients caused by the rising rates of diabetes along with the increase in patients older than 75 yr has led to a patient population with enough comorbidities to make TCC an easier alternative for initiation of dialysis. Female sex, obesity, peripheral vascular disease, age older than 65 yr, and preference of the dialysis unit are all independently associated with increased use of TCCs (6).

In addition to patient demographics, lack of a coordinated effort on the part of healthcare professionals constitutes a major reason for the increased prevalence of TCCs as hemodialysis vascular accesses. Late referral to a nephrologist often results in the need for urgent dialysis, necessitating TCC placement (20). Patients with a timely referral to a nephrologist and subsequently to a vascular surgeon still may not have a functioning AVF, as result of either a delay in procedure scheduling or failure of the fistula to mature (6). Allon et al. showed that fistula creation could be increased from 33% to 69% in new dialysis patients using a multidisciplinary approach aided by an access coordinator (21).

**Are Patient Choices Contributing to TCC Use?**

Few studies address patient preferences that affect the type of permanent access they use. In one study that explicitly did so, the researchers found that significantly more patients using an AVF would recommend it to a friend (77%) than patients using a TCC (62%), and that significantly fewer patients using an AVF (11%) wanted to switch to another access than patients using a TCC (32%). However, significantly more patients using a TCC (97%) considered their access easy to use than patients using an AVF (86%). A minority of patients (12% to 22%) dialyzing through an AVF were at least moderately bothered by pain, bleeding, bruising, and/or appearance. Older patients were more likely to report more symptoms with catheters than younger patients (22). As many as 9% of patients offered an AVF consistently refused surgery, and hesitancy to undergo access surgery in the face of failed prior accesses also deters patients from having a fistula created or revised (23).

The likelihood of converting to a more permanent form of access decreases with increasing duration of catheter use. The Clinical Performance Measures Project reported that 67% of patients who initiated dialysis with a catheter remained catheter-dependent at 90 d (23). This, coupled with the finding that fistula failure was noted to be greater in patients who were already dialyzing through TCCs (24), underscores the importance of adequate education of patients with regard to vascular access before the initiation of dialysis and follow-through to ensure that fistula placement and maturation have occurred.

Nephrologists’ attitudes and perception of vascular access, however, are even less well researched. The Quality Initiative report of 2001 noted the failure of nephrologists to act as Vascular Access Team Coordinators as the topmost barrier to creation of AVFs. After educational meetings, nephrologists were more likely to attempt AVF creation in the elderly, diabetics, obese, and those with failed prior accesses (25).

**Should We Respect Patient Choice to Defer an AV Fistula?**

Placement of vascular access is a matter of informed consent. On the basis of medical evidence, patients should be informed of the following about long-term dialysis with TCCs compared with AVFs: (1) their risk of death is increased two- to threefold; (2) their risk of serious infection is increased five- to 10-fold; (3) their risk of experiencing a painful complication from infection (osteomyelitis, septic arthritis, endocarditis, or epidural abscess) that may require major surgery and be difficult or impossible to cure is significantly increased; (4) their risk of needing access replacement is higher for TCCs because TCCs are not intended for permanent use; (5) their risk of being sicker because of inadequate dialysis through a TCC is higher; (6) their risk of spending more time in the hospital is higher because of TCC complications; and (7) their risk of death in the first year of dialysis is significantly increased with TCC use. Nephrologists need to be aware of the strength and implications of these data before discussing dialysis access with their patients, and they need to develop the conviction that TCCs are not a safe long-term vascular access option for their patients who are good candidates for an AVF or AVG and that they should not be presented as such. If, for reasons beyond nephrologists’ control, a TCC is required for the initiation of dialysis, patients and families should be informed that TCCs are temporary and unsafe for long-term use in patients who are candidates for a properly functioning AVF or AVG.

Data extracted from the United States Renal Data System Dialysis Morbidity and Mortality study indicated that patients who were more informed and had more proactive nephrologists were more likely to have AVFs placed (26). Failure to adequately inform patients about the benefits and risks of TCCs is confounded by the belief that it is necessary to respect patient choices. Although this may be true with limited exceptions, patients cannot make truly autonomous decisions if they are not adequately informed. Many dialysis patients who choose a
TCC long-term may not have been systematically and emphatically informed of the above risks associated with TCC use.

The principle of autonomy, which allows patients to refuse any procedure or choose among different beneficial procedures, does not allow them to demand treatments in which the harms significantly outweigh the benefits (27). The moral basis of the physician–patient relationship is the obligation of the physician to attempt to benefit the patient. Actions that do not contribute to this end because the harms substantially outweigh the benefits are not morally required (28). To assert that physicians should not have the discretion to refrain from patient-requested treatments in which the harms outweigh the benefits is to deny the medical profession the authority to interpret and apply its own defining values embodied in the Hippocratic oath. Such a position denies the nephrologist the authority to refuse to agree to the insertion of TCC for long-term use in patients who, despite knowing its antecedent risks, choose to defer the creation of a feasible AV access and confounds the physician's moral imperative, making him or her instead complicit in the patient's self-destructive choice.

Furthermore, avoiding use of a TCC when a properly functioning AVF or AVG is feasible is a matter of maintaining professionalism, particularly physician integrity. Recent research indicates the extent to which physician integrity is being challenged. In one study of the public's views on medical care for trauma, the majority of respondents (72%) said that physicians should do what patients want even if the physicians do not think it is medically indicated (29). In a study of physicians' attitudes toward professional norms and the extent to which their practices conform to these norms, 36% of physicians admitted they would agree to order an expensive imaging study requested by the patient even although they knew it was unnecessary (30). Years ago, health economist Lester Thurow wrote that reform of the increasingly expensive United States health care system would require that physicians learn to say "no" to avoid practicing "bad medicine" (31). He included in his definition of bad medicine treatments that hurt patients (long-term dialysis with a TCC has a greatly increased risk of harm) and treatments whose costs are not justified by the benefits gained, as is true for TCCs. He said physicians could determine that a treatment is bad medicine when there is medical evidence on the cost effectiveness of alternative medical techniques, as exists in abundance for TCCs. As such, when a properly functioning AVF or AVG is feasible, physicians have the prerogative to desist in allowing the use of TCCs as long-term vascular access. A nephrologist's refusal to allow long-term TCC use must necessarily be preceded by appropriate patient and family education about the benefits and burdens of AVFs, AVGs, and TCCs. In response to the request of a patient who has initiated dialysis with a TCC, "Can't I just continue to dialyze through the catheter? It seems to be working fine," the nephrologist has several options (see Figure 1). The case in Box 1 demonstrates how the application of the options presented in the figure can result in a patient who wants to use a TCC long-term agreeing to receive an AVF.

**Figure 1.** Nephrologists' possible responses to a patient's request to use a tunneled cuffed catheter for long-term dialysis access. TCC, tunneled cuffed catheter; AVF, arteriovenous fistula.

### Case Illustration: An Effective Response to a Patient's Request to Dialyze Long-term with a Tunneled Cuffed Catheter

A 75 year-old woman started dialysis for ESRD secondary to hypertensive nephrosclerosis with a TCC. She had refused an AVF in predialysis clinic visits because her cardiologist told her that her heart was too weak to withstand one. Two years ago she had a myocardial infarction transiently complicated by congestive heart failure. Recently, she has been without cardiac symptoms. In repeated discussions with the patient about dialysis access, the nephrologist realized that she would not agree to an AVF unless her cardiologist told her it would not harm her. The nephrologist began a dialogue with the cardiologist, which resulted in the patient undergoing a repeat cardiac evaluation. To the surprise of the cardiologist, but not the nephrologist, the patient's cardiac function was significantly better than the cardiologist thought. The cardiologist agreed that it would be safe for the patient to have an AVF placed and informed the patient. The patient then agreed to an AVF insertion. Six months after starting dialysis the patient is now dialyzing with an AVF, and the TCC has been removed.

This case illustrates the importance of learning the reason for the patient's refusal of an AVF insertion and addressing the concerns behind the reason. The nephrologist temporarily yielded to the patient's request to use a TCC but remained persistent in his efforts to convince the patient (and her cardiologist!) that dialysis with an AVF would be in her best interest. The nephrologist's persistence paid off, and the patient is dialyzing with a better access!
such use potentially exposes nephrologists to legal liability. The standard of care has been defined as the degree of knowledge, skill, and care that would be exercised by a competent practitioner under the same or similar circumstances (32). Although clinical practice guidelines such as the K/DOQI recommendations do not define the standard of care, they do help to establish what the standard of care should be in a particular case. K/DOQI recommends severely restricted use of TCCs as long-term vascular accesses. When a dialysis patient using a TCC as a long-term vascular access who was a good candidate for an AVF dies of a predictable complication of TCC use and the patient’s family sues the nephrologist for negligence in using a TCC, the burden of proof will rest on the nephrologist to show that he or she adequately informed the patient of all of the risks of TCCs, including the one from which the patient died, and that the patient chose, nonetheless, to continue to use the TCC. To anticipate just such circumstances, nephrologists may want to require informed refusal and give patients who are suitable candidates for a properly functioning AVF or AVG but who choose to dialyze long-term through a TCC a printed statement of all of the complications of long-term TCC use, including the nephrologist’s strong recommendation against such use. The patient could be asked to read the statement, acknowledge its content, and sign at the bottom that he or she still chooses to receive dialysis via a TCC.

To advance the care of hemodialysis patients, research is needed to clarify those factors that most influence patients’ decisions about dialysis access and, more specifically, identify reasons behind patients’ choice of TCCs as long-term access, as well as effective strategies for persuading patients to convert from a TCC to an AVF. Attitudes of nephrologists and other dialysis personnel toward vascular access options greatly influence patients’ attitudes and thus, along with attitudes of patients who have converted from a TCC to an AVF, also constitute an area of needed study. Patients’ understanding of the benefits and risks of TCCs and AVFs as dialysis access could be assessed before and after a variety of educational interventions by differing dialysis clinicians to see whether one type of communication is more effective than another at improving patient knowledge and achieving consent for AVF placement. Finally, patients who start dialysis with an AVF could be evaluated for characteristics (in addition to earlier referral) that distinguish them from patients who start with a TCC.

There is also a need for better criteria to identify patients whose vascular anatomy is not likely to support a functional AVF. Dember et al., in a study of 877 patients who had AVFs created, found that 60% failed to mature sufficiently to be used for dialysis (33). This study underscores the need to better understand the pathophysiology of fistula maturation and failure and the contributions of vascular anatomy, vascular function, and surgical technique to the maturation of AVFs.

In summary, as nephrologists we are well aware of the significant harms of TCCs, and our clinical experiences repeatedly remind us that AVFs are the best choice of access for hemodialysis patients for whom placement of a properly functioning AVF is possible. To optimize AVF use, nephrologists must exercise leadership, consider assembly of a multidisciplinary vascular access team, and establish processes for tracking patient vascular access outcomes from the initial referral to long-term use and complications (5,21). With the knowledge that AVFs are promoted by all authorities as the veritable “standard of care” for hemodialysis access, we are obligated as physicians who have taken the Hippocratic oath to uphold our vow to “do no harm” and refuse to place TCCs, except as a temporary measure or a last resort.

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Disclosures
None.

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