

Safety in HD

Editorial Comment

Improving patient safety in haemodialysis

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Abstract

Thomas Inman (1820–76) wrote ‘Practice two things in your dealings with disease: either help or do not harm the patient’, echoing writings from the Hippocratic school. The challenge of practicing safely with the avoidance of complications or harm is perhaps only heightened in the context of modern medical settings such as the haemodialysis unit where complex interventions and treatment are routine. The current issue of CKJ reports two studies aimed at improving the care of haemodialysis patients targeting early use of arteriovenous grafts as access for haemodialysis and the implementation of a dialysis checklist to ensure the prescribed dialysis treatment is delivered. The further challenge of ensuring that such evidence-based tools are used appropriately and consistently falls to all members of the clinical team.

Keywords: arteriovenous graft; checklist; haemodialysis; patient safety

Medical care for patients receiving haemodialysis is complex and technology dependent, it is recognized however that providing safe patient care in this setting is to be achieved as much by focussing upon challenges common to all healthcare settings such as effective communication, staff training, a safe environment and avoidance of falls, infection control and avoidance of medication errors as by attention to chronic kidney disease (CKD) or dialysis-specific patient safety factors [1, 2]. In addition, it is just as important to ensure that routine processes of care are performed correctly and competently each and every time as it is to identify and attempt to prevent the occurrence/recurrence of avoidable harms. The use of guidelines, protocols, check lists and care bundles are strategies employed to promote the consistent delivery of excellent care, these must be fit for the purpose and used appropriately and effectively if they are to achieve their purpose. Such strategies, even when based on robust evidence, must be supported by individual and organizational appreciation of worth and efficacy based on constructive communication and performance feedback to ensure adoption and longer term adherence [3].

This edition of CKJ contains two articles that address diverse aspects of patient safety in haemodialysis. The first study by Al Shakarchi *et al.* [4] is a systematic review that tackles the question of when a newly placed arteriovenous graft (AVG) can first be cannulated as access for haemodialysis. Vascular access is a critical issue for haemodialysis patients and relatively simple seeming decisions about the

placement and use of haemodialysis access can have profound implications on patient outcomes.

The decision to cannulate a newly placed AVG often requires striking a balance between minimizing the use of central venous catheters for haemodialysis access, and avoiding potential damage and early failure of the graft through premature cannulation. There is a compelling case for avoiding the use of central venous catheters as access for haemodialysis wherever possible, since catheters are associated with increased risks of infection and mortality [5]. On the other hand, premature cannulation of an immature graft can cause morbidity, reduced patency and failure of the graft. Like Odysseus sailing between Scylla and Charybdis, decision-making in haemodialysis vascular access often requires careful navigation of many potential sources of risk.

Current international guidelines on the use of AVGs suggest that a maturation period of 2–3 weeks should be allowed prior to first cannulation. However, the authors found little evidence to support this recommendation, neither for traditional Polytetrafluoroethylene (PTFE) grafts nor a variety of new generation grafts that have been designed to allow early cannulation. Early cannulation (e.g. within 72 h) was generally found to be equivalent to usual practice in complication rates and long-term patency, both for PTFE and new generation grafts.

One of the striking findings of the review was the paucity of good quality studies on this topic, particularly of randomized clinical trials. Overall the number of patients

included in the 11 studies included in the review was small and the studies were largely case series and observational cohorts, with only one randomized study comparing different types of graft. The absence of randomized data means that it is hard to determine if the favourable profile of early cannulation in these studies was simply the result of selection bias. Randomizing suitable patients to different cannulation times would seem to be a relatively straightforward task and would provide the data required to guide meaningful clinical decision-making in this area. In the meantime, the current literature suggests that early cannulation of newly placed AVGs can be safely carried out in selected patients.

Haemodialysis is a technically complex procedure with many potential sources of error and harm to patients. Carrying out haemodialysis safely requires many steps, from setting up the dialyser and other equipment, providing the correct treatment type and dose, accessing the blood stream by needling an arteriovenous fistula or opening a central line, connecting dialysis lines and monitoring the patient for complications and haemodynamic stability. All of this has to be carried out consistently and accurately in the busy setting of the haemodialysis unit, with high patient turnover and amidst many potential sources of distraction for the dialysis unit staff.

One of the solutions that has been adopted in other high-risk settings where accurate completion of technical tasks is required is the use of the checklist. Checklists have, for example, been widely used in the airline industry for many years, and have more recently been adopted into healthcare. Probably the best known example of a healthcare checklist is the WHO Surgical Checklist, which has been used in a wide array of surgical settings as part of efforts to improve patient safety in the operating theatre. Some of the components of the surgical checklist might seem surprisingly basic and indeed too obvious to check—such as having all the members of the team to introduce themselves by name and ensuring the correct patient identification. Nonetheless, one of the lessons of checklists is that even the obvious can get overlooked and there is evidence that use of the surgical checklist improves safety and reduces mortality [6].

The study by Marcelli *et al.* [7] describes the use of a dialysis checklist in a dialysis facility in Portugal. The checklist included 15 items encompassing pre-session safety checks, session initiation checks and post-session quality checks. The checklist was used consistently over an 18-month period and completion of the items was generally high. One of the promising aspects of the implementation was that completion was maintained even in the setting of staff turnover. The checklist ensured that the prescribed needles and dialyser were employed and correct dialysis duration delivered but did not include checks of needle placement, correct line securement and absence of line kinking during treatment therefore perhaps missing potential safety opportunities such as reduction of needle dislodgement—the absence (or not) of dislodgement was noted under the heading of post session quality check.

The study was not designed to test the effectiveness of the checklist in improving safety, patient outcomes nor patient experience with the exception of patient waiting time prior to initiation of dialysis. However, it demonstrated that use of a checklist is feasible in routine care settings. It is important to note that the dialysis checklist employed in this study was quite different in character from the WHO surgical checklist. Many of the items on the WHO surgical checklist relate to non-technical aspects of

care such as team working and communication; in contrast the dialysis checklist included only technical items. The dialysis checklist may therefore not help to reduce the incidence of some important and common causes of patient harm. There is evidence that it is not technical errors in dialysis but non-technical errors in communication, prescribing and in the recognition and management of common medical problems such as hyperkalaemia that result in the most severe harm to dialysis patients [2]. Further iterations of the checklist should therefore consider inclusion of these non-technical aspects of care.

Many items from the dialysis checklist were also generated automatically from device monitors and electronic records rather than being physically checked by a person. This might make the checklist less effective as a patient safety intervention: one of the reasons why checklists are thought to improve safety is that they modify behaviour—it is the act of completing the checklist that is important, not using the checklist as a means of data collection or assurance. Checklists are a complex intervention and how they are implemented and used can be highly variable and affected by the context in which they are used [8]. This work to develop checklists in dialysis units is therefore promising but will require further development and evaluation of effectiveness in improving quality and patient safety.

Medical harm has received increasing attention since the publication of the landmark report into patient safety by the Institute of Medicine, “To Err is Human” [9]. This estimated that at least 44 000 people were dying in the USA each year as a result of medical error, mainly from errors in the administration of medications, surgical injuries, falls and pressure ulcers. There is now a wide body of literature describing the extent and nature of adverse events in healthcare. Errors in healthcare are of many different types, and include errors of both commission (an incorrect action such as wrong site surgery) and omission (failure to act such as failing to detect physiological deterioration).

Studies across countries and healthcare settings are fairly consistent in reporting a prevalence of adverse events in hospital inpatients of 5–15% [10–12]. Despite an increasing focus on patient safety, the prevalence of adverse events does not appear to be decreasing [13, 14]. Most errors are minor, resulting in no or mild and temporary injury to patients almost certainly great numbers of errors result in no harm—near miss events. A retrospective population-based study of patients in Scotland dying whilst in receipt of renal replacement therapy (RRT) describes that in the great majority of deaths there were no areas of concern in the care of the patient before death but that 3.5% of deaths might have been avoidable through better care [2]. The areas of concern largely fell into five main categories: recognition and management of hyperkalaemia, safe prescribing, out of hours care, the prevention and management of infection and haemodialysis vascular access. These factors were both organizational and human in nature, and no deaths were considered to be directly attributable to the failure or misuse of RRT-related medical devices. These findings suggest that errors are not a common cause of avoidable mortality in the RRT population and that efforts to improve the safety of RRT should focus not just on the technical aspects of RRT, but also consider the many other potential sources of harm in this complex group of patients. This is consistent with studies of adverse safety events in the pre-dialysis CKD population, where the most frequent causes of harm are infection, falls, electrolyte/metabolic disturbance and

medication errors. Patients with CKD are at increased risk of a whole range of adverse events compared with the general hospital population, not just those directly related to CKD itself [15, 16].

It is only through thoughtful examination of healthcare practice by all constituent team members, through continued awareness of the potential for sources of harm to inadvertently slip into practice and the vigorous and universal adoption of tools—good communication, robust guidelines, protocols, checklists and care bundles to name just a few—that we might hope to reduce potential sources of harm to patients under our care.

Conflict of interest

None declared.

(See related articles by Marcelli *et al.* Implementation of a quality and safety checklist for haemodialysis sessions. *Clin Kidney J* (2015) 8: 265–270 and by Al Shakarchi and Inston. Timing of cannulation of arteriovenous grafts: are we too cautious? *Clin Kidney J* (2015) 8: 290–292.)

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