

Update from the British Renal Society

In this article, Matt Bottomley and Karen Jenkins outline the Kidney Patient Safety Committee recommendations for the removal of temporary femoral haemodialysis catheters

■ patient safety ■ staff competencies ■ patient information ■ risk factors

The use of temporary haemodialysis catheters to provide short-term renal replacement therapy in renal and intensive care settings is widespread. The removal of these catheters presents a risk to patient safety, particularly the risk of bleeding post-removal. Despite this, there are no national guidelines or standardised recommendations for the removal of femoral catheters specific to people with kidney disease. The recent death of an inpatient, ascribed to haemorrhage from the site of a removed femoral catheter, has highlighted the need for such recommendations.

While guidance is available from sources, such as the London Health Science Centre (<https://www.lhsc.on.ca/critical-care-trauma-centre/removal-of-central-venous-catheters-jugular-subclavian-femoral>), it is generic, and does not take into consideration the specific needs of people with kidney disease undergoing renal replacement therapy. Removal of these catheters represents a potential risk, particularly when sited within the femoral vessels, where complications may be hidden beneath dressings, patient clothing and bed linen. Haemorrhage following catheter removal is a well-recognised, albeit rare, complication. This was initially highlighted by a previous

National Patient Safety Agency (NPSA) alert arising from a serious incident relating to out-of-hours femoral catheter removal in 2010 (NHS, 2019).

A review of the case by the coroner recognised a lack of guidance at a national level regarding the removal of catheters, and a 'Preventing Further Deaths' report was issued to the Secretary of State for Health and the respective Presidents of the Renal Association, British Renal Society and Intensive Care Society under Regulation 28 of the Coroners (Investigation) Regulations 2013. Such a report is issued when the coroner has grounds to believe that there is a risk of further deaths in similar circumstances and obligated the respective parties 'to review the policies and protocols in relation to the removal of central venous catheters and to consider the issue of national guidelines relating to the removal of catheters'.

In response to the Regulation 28 (Preventing Further Deaths) coroner's report, a working group representing the Kidney Patient Safety Committee and the Intensive Care Society developed common recommendations to support local guidelines regarding the removal of temporary femoral catheters. This article provides details of the background, rationale and key recommendations for practice in response to the Regulation 28 report. The guidance provides recommendations for the preparation for and removal of temporary femoral catheters and post-procedure observations and is available from: <https://renal.org/clinical/ra-brs-patient-safety>.

Key concerns and learning

The case referred to the coroner was an older patient with multiple comorbidities

and severe acute kidney injury requiring haemodialysis. At the time of femoral catheter removal, the patient was confused and being nursed in a side room with a closed door, due to infection control concerns. The patient was receiving thromboprophylaxis in the form of low-dose low-molecular-weight heparin. The catheter was removed during daylight hours and initial haemostasis was achieved after pressure was applied to the removal site for 15 minutes. The patient was partially sat up to enable them to eat, then left unattended for approximately half an hour. Upon subsequent review by an allied health professional, the patient was found in bed, having exsanguinated a significant volume of blood, with no cardiac output. Cardiopulmonary resuscitation was unsuccessful.

The coroner raised concerns at the inquest that the local guideline was incompletely adhered to, and did not provide guidance regarding ongoing visual observation after initial haemostasis was achieved. Furthermore, it was identified that, while local guidelines existed, there were no national recommendations or guidelines regarding removal of femoral catheters.

An initial NPSA alert identified 45 incidents relating to elective femoral catheter removal leading to two deaths (NHS, 2019). A review of incidents reported to the National Reporting and Learning System (NRLS) in the last three years identified a further five episodes of late bleeding following femoral catheter removal. Of these, two resulted in greater than 1 litre estimated blood loss and two were associated with death of the patient.

The working group identified a number of further learning points and concerns

Matt J Bottomley

Specialist Registrar and Clinical Lecturer in Renal Medicine, Oxford Kidney Unit, Churchill Hospital, Oxford

Karen Jenkins

Consultant Nurse, Kent Kidney Care Centre, Kent & Canterbury Hospital, Canterbury, BRS Vice President Clinical Practice

Email: matt.bottomley@ouh.nhs.uk

from this case, which influenced the final recommendations for practice (Table 1).

During the process of developing the recommendations, the patient safety committee gathered information from UK renal units to ascertain a consensus on UK practice, in the absence of clinical trials to inform best-practice. The aim of these recommendations is to provide common ground for local protocols to reduce the risk of future harm arising from femoral catheter removal.

Key recommendations

The working group reviewed the local catheter removal protocols in use at a number of renal and intensive care units across the UK and those available internationally. There was significant variation in local guidelines, particularly with respect to the duration of bedrest and the frequency of observations and level of supervision following the procedure.

Supervision

Removal of a femoral catheter should be considered a semi-elective procedure, and as such, should take place when there is an adequate level of staffing trained in catheter removal, to ensure safe levels of supervision. Similarly, the patient's ability to understand and follow instructions given by the supervising staff should be taken into account. If there are concerns about this, delaying catheter removal should be considered, provided it is allowed by clinical circumstances. Patients should be counselled about the risks of catheter removal and written information provided.

This should provide guidance on what to do in the event of bleeding from the exit site if the patient is at home. A patient information leaflet is available from <https://renal.org/clinical/ra-brs-patient-safety/> and available to be adapted for local healthcare settings.

Coagulothrapy

It is essential that all patients have basic coagulation and platelet parameters checked prior to the procedure. They should not be receiving high-level ('therapeutic') anticoagulation at time of removal. Consideration should be given to the impact of low-level heparin, often used for thromboprophylaxis, upon clotting

Table 1. Learning points and recommendations for practice

Learning points or concern	Recommendation
Prior to removal of catheter	
Consent and patient information	<ul style="list-style-type: none"> ■ Consider patient's ability to follow instructions ■ Inform and counsel appropriately regarding the procedure and subsequent risks ■ Provide both verbal and written information
Appropriate timing of catheter removal	<ul style="list-style-type: none"> ■ Staffing levels enable appropriate levels of supervision post-procedure
Possibility of coagulopathy (both natural and iatrogenic)	<ul style="list-style-type: none"> ■ Basic coagulation studies and platelet count should be available and reviewed prior to catheter removal ■ Consider level of bleeding risk in all cases ■ Confirm absence of high-level anticoagulation and consider impact of heparin use on coagulation status
Training and competency of staff	<ul style="list-style-type: none"> ■ Procedure should only be carried out by an appropriately trained and competent healthcare professional
During catheter removal	
Positioning of patient during and after removal	<ul style="list-style-type: none"> ■ Lay supine during and after procedure
Duration of pressure to removal site	<ul style="list-style-type: none"> ■ A defined minimum period of time should be specified in local protocols. We suggest five minutes beyond haemostasis
Following catheter removal	
Frequency of observations following removal	<ul style="list-style-type: none"> ■ Local protocols should specify frequency and recording of observations
Duration of bedrest	<ul style="list-style-type: none"> ■ Suggest at least two hours supine bedrest
Use of appropriate dressing over removal site	<ul style="list-style-type: none"> ■ Local protocols should clearly identify the appropriate dressing to be used
Documentation	<ul style="list-style-type: none"> ■ Comprehensive documentation should be provided, incorporating: timing of catheter removal, duration of pressure to removal site, dressing applied and subsequent frequency of observations
Bleeding	<ul style="list-style-type: none"> ■ In event of significant bleeding, local policies should provide guidance (which is likely to entail activation of local major haemorrhage protocol)
Hospital discharge	<ul style="list-style-type: none"> ■ Timing of hospital discharge should take into account recent removal of catheter ■ Written information should be provided about how to manage an exit site bleed at home

parameters which may not be quantifiable in laboratory testing. It may be appropriate to temporarily withhold this at time of catheter removal. Bleeding risk should be assessed in all cases; patients at increased risk of bleeding would include those who are confused or lack capacity, those who are receiving anticoagulation or antiplatelet therapy, those who may be unable to lay flat (for example, due to back pain or chest

disease) and those with severe uraemia (which may cause an unquantifiable uraemic coagulopathy).

Positioning of the patient

Patients should lie supine for the catheter removal, and remain so for at least two hours afterwards. Pressure should be applied to the removal site for a locally specified period of time in order

to stop bleeding and reduce the risk of air embolus; we would recommend five minutes beyond haemostasis as a minimum. A dressing is then applied to the site and checked at regularly agreed intervals prior to discharge.

Post-removal monitoring

Following haemostasis, patients should be monitored for a minimum of two hours. The frequency of observations should be specified locally. Staff need to be aware that the rate of blood loss from a central vein could exceed 200 mL/minute and a period of direct observation may be appropriate, particularly in patients who are unable to call for assistance.

Documentation should comprehensively record the details of the catheter removal, timing of the procedure, duration of pressure applied to the site, duration and frequency of observations after the procedure. The decision to discharge patients should take into account the time of catheter removal and

stability of observations.

Ongoing safety reporting and the role of the Kidney Patient Safety Committee

The development of these recommendations provides a standardised set of considerations when reviewing local guidelines. It highlights aspects specific to an individual patient that should be taken into account when considering the timing and level of supervision around the removal of a temporary femoral catheter.

In the absence of evidence to guide protocols in this area, the greatest opportunity for learning, both at a local and a national level, comes from reviewing incidents and 'near misses'. The Kidney Patient Safety Committee are a multidisciplinary team, comprising medical, nursing, allied health and technical professionals, along with patient representation, who work closely with NHS Improvement and the Medicines and Healthcare Regulatory Agency (MHRA) to

identify significant incidents and risks, to minimise avoidable harm to patients with kidney disease. The Kidney Patient Safety Committee strongly encourages the ongoing reporting of patient safety events through local incident reporting processes, in order to promote timely dissemination of lessons learned and to identify safety risks that may still be present in other units. The Patient Safety Committee can be contacted directly at patientsafety@renal.org, and safety concerns can be reported directly to the committee through the Patient Safety webpages on the Renal Association website and British Renal Society (www.renal.org or www.britishrenal.org). **JKC**

References

NHS. Haemorrhage following removal of femoral catheters: signal 2019. <https://webarchive.nationalarchives.gov.uk/20171030124259/http://www.nrls.npsa.nhs.uk/resources/?entryid45=83805&p=5> (accessed 12 July 2019)



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