

Anticoagulation and dialysis access practice in home haemodialysis in the UK

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Abstract

Anticoagulation is an important component of haemodialysis treatment in all settings. The therapeutic options available for anticoagulation of home haemodialysis are similar to those for haemodialysis in other settings. However, dialysis sessions with a wide range of treatment durations are undertaken at home, which can require different approaches to anticoagulation. Conference delegates were asked about the types of anticoagulation used in home dialysis and about surveillance strategies for monitoring vascular access, and the results are presented and discussed.

Keywords: anticoagulation; haemodialysis; heparin; vascular access

Anticoagulation has always been an essential component of the haemodialysis procedure to prevent clotting of blood in the extracorporeal circuit [1]. Initial attempts at 'dialysis' used hirudin extracted from leeches but since human dialysis has been undertaken, the mainstay of treatment has been heparin.

The current guidelines for anticoagulation used in home haemodialysis are based on those used in standard in-centre treatment. These include the guidelines published by the British Renal Association and by the Kidney Disease Outcomes Quality Initiative (K/DOQI). Specific recommendations are made about the use of either fractionated (low molecular weight) or unfractionated heparin during haemodialysis to reduce the risk of clotting in the extracorporeal circuit [2]. Recommendations are also made for patients with an increased risk of bleeding, alternative agents for use in patients with sensitivity to heparins and for the use of locking solutions to maintain catheter patency. These guidelines are suitable for patients dialysing in either unit or home settings.

Despite there being much data regarding anticoagulation during haemodialysis, little of this is specifically in the home setting. This is especially true of recent times when patients on home haemodialysis have made up a small proportion of the overall dialysis population. The little specific data that does exist has been focussed on safety issues. In reporting 6 years experience of home haemodialysis up to 1970, Blagg *et al.* [3] identified many diffi-

culties experienced by patients related to anticoagulation and identified that maintaining stable anticoagulation was a key requirement to successful treatment. Among recommendations for future improvements was the development of heparin-free devices. In comparing intermittent heparin to continuous warfarin for maintenance of arteriovenous shunts, Diggers *et al.* [4] found an unacceptably high complication rate with warfarin compared to a low rate of one complication per 40 patient-years with heparin.

There are no reports suggesting that anticoagulation practice on home haemodialysis should differ from haemodialysis in other settings. Until recently, the use of unfractionated heparin infused continuously throughout the haemodialysis session was almost universal. This has a predictable response with few patients experiencing adverse reactions [5]. Low-molecular-weight heparins have become more widely used in recent years for both unit and home haemodialysis. A single intravenous dose can be administered at the commencement of the session covering up to 5 h dialysis treatment [6, 7]. One advantage of low-molecular-weight heparin is that the syringe port is kept free for other uses, including infusion of intravenous iron.

A specific indication for continuous heparin infusion is long hours and nocturnal haemodialysis. In dialysis sessions lasting for >5 to 6 h, the anticoagulant effect wears off towards the end of the treatment time increasing the risk of clotting in the dialysis circuit. Repeating the dose of a low-molecular-weight heparin is often impractical, particularly for nocturnal dialysis patients. The most frequent practice in this setting is to use unfractionated heparin.

Only isolated reports exist of patients with sensitivities to heparin receiving home haemodialysis [8]. In these cases, the difficulties and alternative treatment options are similar to conventional haemodialysis.

In order to obtain information about current anticoagulation practice in patients undertaking home haemodialysis in the UK, a survey of delegates was carried out during the conference by completion of a questionnaire. Responses were obtained from delegates representing 31 of the 63 UK renal units, and 28 of these reported having patients receiving home haemodialysis. Patients treated by these units received a number of different schedules including conventional three times weekly dialysis, short daily intermittent long hours and daily nocturnal haemodialysis. The results are summarized in

Table 1. Types of heparin used in different home haemodialysis regimes^a

	Units responding	Type of heparin used		
		Unfractionated heparin	Low-molecular-weight heparin	Both
Conventional HD	26	12	9	5
Short daily HD	19	6	9	4
Long hours/nocturnal HD	13	10	1	2

^aHD, haemodialysis.**Table 2.** Units permitting home HD patients with grafts and lines^a

	Yes	No
Do you allow home HD patients with grafts?	18	10
Do you use different anticoagulation for grafts?	2	16
Do you allow home HD patients with lines?	22	6
Do you use different anticoagulation for lines?	1	21

^aHD, haemodialysis.

Table 1 and show considerable variations in practice between units and also some variation for patients within individual units.

The survey also asked questions regarding vascular access practice, including types of access allowed for home dialysis, use of catheter locks and surveillance for fistula and graft patency (Table 2). While native arteriovenous fistulas were the preferred form of access for all units, most units would allow patients with tunnelled catheters to undertake home haemodialysis. All units having patients using tunnelled catheters reported that these patients followed the standard unit practice. This was split evenly between locking with heparin alone ($n = 12$ units) and the use of citrate-based locks (citrate $n = 7$, Taurolock $n = 5$), with a single unit using a heparin/antibiotic lock.

Although the majority of units reported having patients with grafts, there was some concern about these being suitable for long-term access. Surveillance for access patency was divided between the use of the ultrasound-based techniques (Transonic $n = 12$, ultrasound $n = 2$) and by clinical checks alone ($n = 13$).

In summary, there are similar indications for anticoagulation and access use between in-centre and home haemodialysis, and this is reflected in current practice among UK units with use of both unfractionated and low-molecular-weight heparins in common usage. The only place where a specific advantage exists is in long hours treatment where unfractionated heparin is recommended. It still holds true that the development of haemodialysis equipment that does not require systemic anticoagulation would be of great potential benefit for this group of patients.

Conflict of interest statement. None declared.

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