



How common is tunnelled central venous catheter dysfunction, and what do we do about it?



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Aims

- We assessed current use of line thrombolytics within our regional outpatient haemodialysis unit, considering the use of Alteplase and other line locking agents.
- We designed a new protocol to direct clinical staff on how to select the most appropriate agent.

Introduction

Tunnelled central venous catheters (TCVC) are the most commonly used initial vascular access modality for chronic haemodialysis(1). They are vulnerable to complications such including infection, thrombosis and central venous stenosis. TCVC use is associated with increased morbidity and mortality risk, and higher hospitalisation rates (2). Thrombosis negatively impacts upon the quality of dialysis delivered which contributes in part to the increased mortality with this form of access. Varying methods have been trialled to counteract this complication with 'line locking' being the first line intervention used ahead of procedures such as line stripping. The most commonly used thrombolytic agent for TCVC-dysfunction are recombinant Tissue Plasminogen Activators (t-PA) although data surrounding the optimum management of poor flow rates varies (3).

Methods

We analysed all patients receiving haemodialysis via a TCVC in NHS Lanarkshire over one month between April and May 2020 (n=114). Frequency of use of standard line locks or thrombolytic agents was recorded, as were rates of referral for further investigation of line failure was recorded. Current literature regarding line thrombolytics and current protocols were reviewed to inform a new line thrombolysis protocol.

References

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- 2.The Renal Association, The Vascular Society, British Society of Interventional Radiology (2006) THE ORGANISATION AND DELIVERY OF THE VASCULAR ACCESS SERVICE FOR MAINTENANCE HAEMODIALYSIS PATIENTS, Report of a Joint Working Party: https://renal.org/wp-content/uploads/2017/06/Report_of_a_Joint_Working_Party_on_Vascular_Access_September_2006.pdf.
3. Kennard AL, Walters GD, Jiang SH, Talaulikar GS. Interventions for treating central venous haemodialysis catheter malfunction. Cochrane Database of Systematic Reviews 2017, Issue 10. Art. No.: CD011953. DOI: 10.1002/14651858.CD011953.pub2.

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Results

Sixty-six of 114 patients (58%) received thrombolytic line lock agents (Urokinase or Alteplase) rather than standard 'Taurolock' line lock (figure 1a). Urokinase was used in 48 patients (42%) and alteplase in 18 patients (16%) (figure 1c). Of this cohort of patients only 7 (10%) were referred to the vascular access team for further investigation and only 4 (6%) underwent line failure investigation – 3 (4%) chest x-rays and 1 (2%) lineogram (figure 1b)

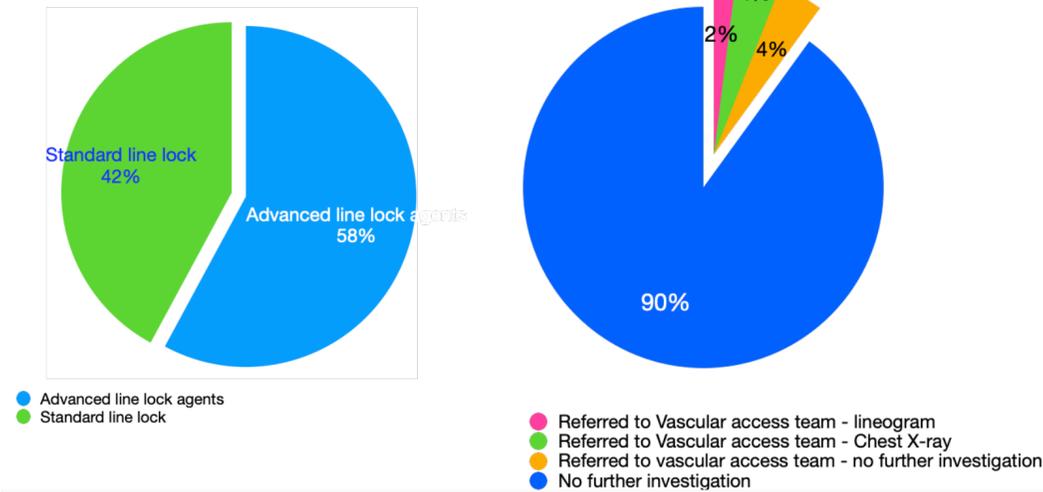


Figure 1. (a) Percentage of patients where standard and advanced line locks were used (b) Percentages of patients referred for further investigation of reduced flow rates (c) Table showing number and percentage of patients receiving each line locking agent post-dialysis (below)

Conclusions and Recommendations

TCVC dysfunction is common, and thrombolytic drugs are commonly administered to assist their patency. In spite of this it is uncommon for TCVC dysfunction to be formally investigated.

We used our findings to develop a simple protocol to facilitate investigation of dysfunctional TCVCs and streamline thrombolytic use (figure 2)

Monklands Dialysis Unit - Protocol for TCVC thrombolysis

Alteplase Dwell Prescription

Dialysis Unit: _____ Name: _____
Allergy status: NKDA Yes CHI: _____

Date	Drug	Dose	Route	Start time	Given time	Prescribed
Please refer to vascular access team						

- ### Dialysis checklist
- Regular Tauro-hep on dialysis kardex
 - PRN tauro-urokinase on dialysis kardex
 - Does the patient take any anticoagulant medication? (e.g. aspirin, clopidogrel, warfarin, heparin, tinzaparin)
 Yes No If 'Yes': _____
 - Has patient been consented for alteplase use:
 Yes No

- ### Contraindications to Alteplase
- Relative** (discuss with medical staff)
Left heart thrombus, endocarditis, catheter related sepsis, haemorrhagic retinopathy
- Absolute**
Active bleeding, recent trauma or surgery, severe uncontrolled hypertension, recent haemorrhagic stroke

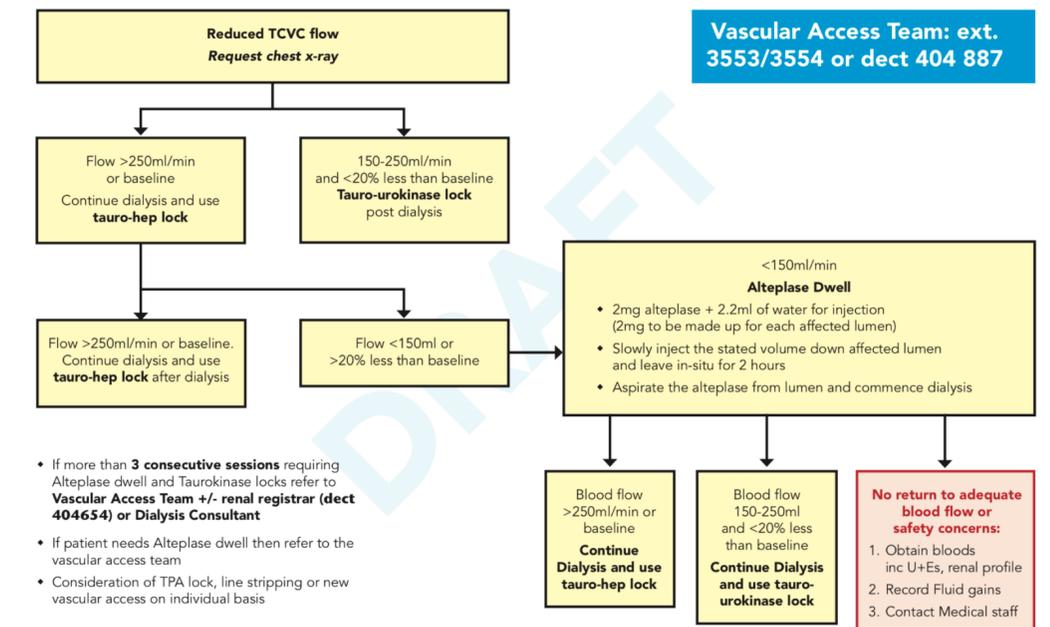


Figure 2. The thrombolysis protocol created by the group for use in patients with dysfunction of TCVC whilst receiving haemodialysis