MACOVA 2020

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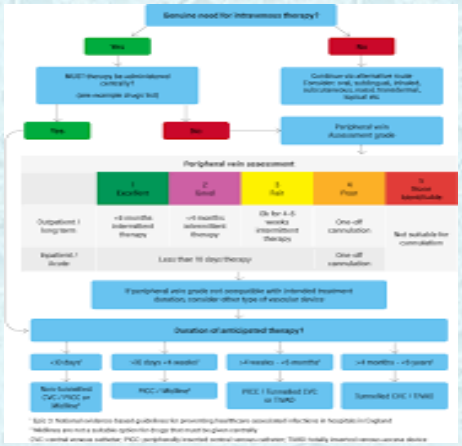
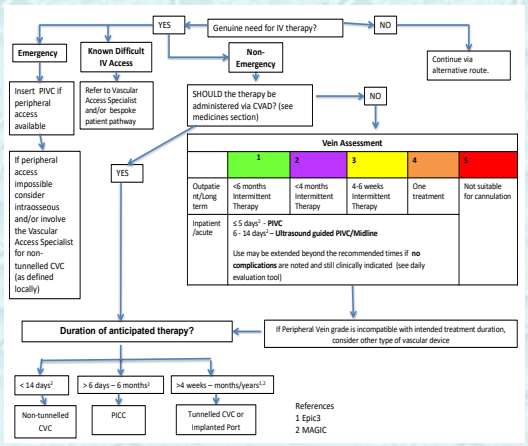
The UK VHP Framework 2020
Looking to the future





Dr Andrea Denton
Independent Nurse Consultant

Infection Prevention Society

Disclosure

AC Independent Nursing Consultants

- **The UK VHP Framework**
  - Infection Prevention Society(IPS) initiative working with NIVAS, RCN and Medusa Injectable Medicines Guide.
  - Adapted from US framework (Moureau et al, 2012).
  - Supported with an educational grant from Teleflex.
  - Teleflex continue to provide support for the project but there is no specific product/company promotion.

ips Infection Prevention Society

Drivers for the VHP Framework

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- Default to PIVC, often delegated to the least experienced staff & unclear escalation (Jackson et al 2013, BJN)
- Little consideration for the survival of the PIVC (Carr et al 2015)
- 19% failure rate for 1st attempt cannulation (van Loon et al 2019)
- Numerous cannulations into fragile veins (Oliver 2015, BJN)
- 35%-50% failure rate of PVC (Helm et al 2015, INS)
- Delayed treatments including analgesia, antibiotics and IV fluids

(Alexandrou 2014, BJN)

One Million Global (OMG) PIVC Study Findings

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- 71% PIVC placed by nurses (range 26% - 97%)
- Poorly placed PIVC in areas of flexion
- 10% painful/signs of phlebitis
- 10% signs of malfunction
  - Leaking
  - Dislodgement
  - Visible blood in the tubing

(Alexandrou et al 2018 J.Hosp.Med)

OMG Study Conclusion

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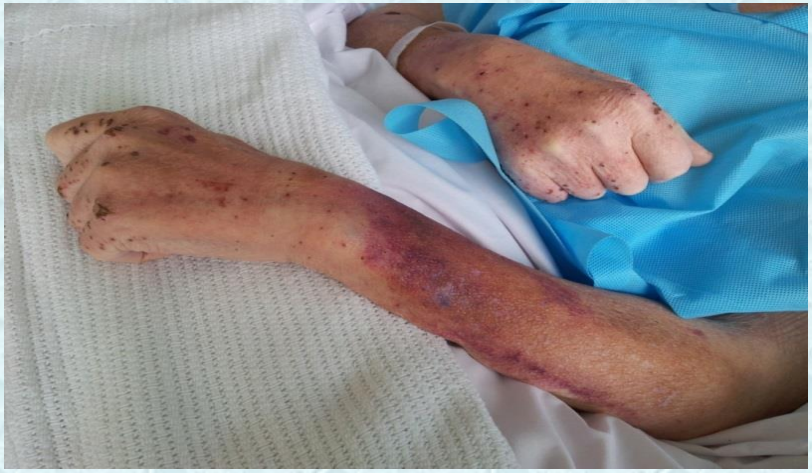
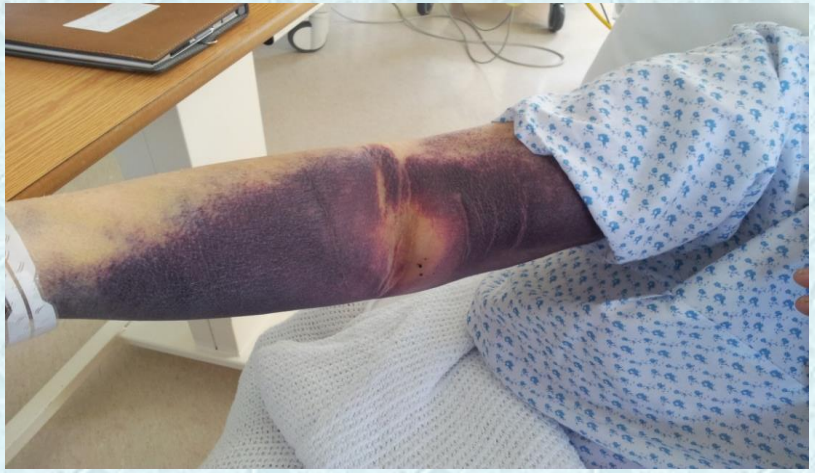
A stronger focus on insertion and management of PIVC, surveillance and **improved assessment and decision making**





Journal of Infection Prevention

Original Article

Development of the UK Vessel Health and Preservation (VHP) framework: a multi-organisational collaborative

Journal of Infection Prevention
2016, Vol. 17(2) 65–72
DOI: 10.1177/1757177415624752

jip.sagepub.com
SAGE

Carole Hallam[1], Valya Weston[2], Andrea Denton[3], Steve Hill[4], Andrew Bodenham[5], Helen Dunn[6] and Tim Jackson[1]

Abstract

Vascular access is an important part of many patient care management plans but has some unwanted risks. Previous work published by Moureau et al. (2012) inspired a working group led by the UK Infection Prevention Society (IPS) to produce

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UK VESSEL HEALTH AND PRESERVATION

INTRODUCTION

The evidence-based Vessel Health & Preservation (VHP) concept of vascular access management was introduced in the US. The essence of VHP is timely, intentional, proactive patient intervention for vascular access device selection during the first 24 hours of entry into the healthcare process (and re-evaluated thereafter), followed by placement of a clinically appropriate device within 48 hours. Once placed, the focus shifts to daily maintenance and care of the device using the central line bundle and daily assessment to determine the health of patient's blood vessels as well as continued necessity of the device (Moureau, *et al*, 2012).

This practical framework has been developed to support practitioners to undertake vessel assessment and make decisions regarding suitable devices for vascular access and administration of medication or fluids. This based on individual patient need and risk assessment. The framework is divided into relevant sections recognising the different stages of vascular assessment and therapy and is intended to be used either in its entirety or individual sections.

Preservation of vessels is required to minimise damage (thrombosis, stenosis and infection) and maintain the patency of the peripheral and central veins for as long as possible. This maintains good venous access for future treatments and minimises patient suffering. Further such actions have the potential to save significant staff and equipment costs to organisations providing vascular access and administration of medication or fluids.

This guidance relates to adult vascular access in acute or planned settings. It is not planned for use in emergency situations where other issues take priority and other routes of access may be appropriate e.g. intraosseous infusions.

GLOSSARY OF TERMS

CVC - Central venous catheter
IV - Intravenous route of access
Midline - Long venous catheter inserted into arm veins which does not extend centrally
PICC - Peripherally inserted central venous catheter
PN - Parenteral nutrition
TIVAD - Total implanted vascular access device (port)
Tunnelled CVC - central venous catheter which is tunnelled away from exit site and has anchoring cuff (e.g. Hickman type catheter).
VAD - Vascular access device
VHP - Vessel health and preservation
VIP - Visual Infusion Phlebitis Score (Jackson, 1997)

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START HERE

FIRST CONSIDERATION

IS IV THERAPY REQUIRED?

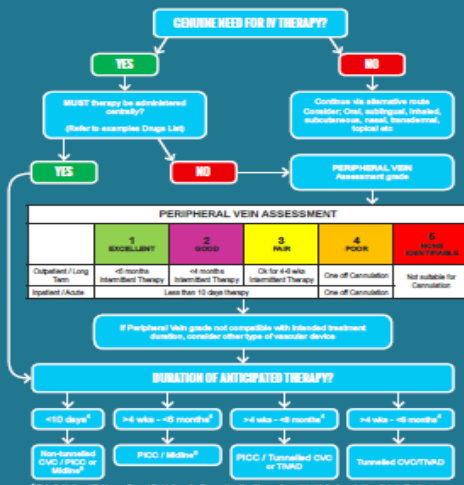
HAVE ALTERNATIVE ROUTES BEEN CONSIDERED AND EXCLUDED?

NO → CONTINUE TREATMENT VIA ALTERNATIVE ROUTE[1]

YES → SEE DECISION TOOL

[1] Alternative routes of therapy include: topical, sublingual, rectal, subcutaneous, transcutaneous, inhaled, nasal and others.

RIGHT LINE DECISION TOOL



* Epic 3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in Hospitals in England
* Midlines are not a suitable option for drugs that must be given centrally

SECONDARY QUESTIONS WHICH MAY REFINE LINE CHOICE IN INDIVIDUAL PATIENTS:

Patient preference / Lifestyle issues / Body Image

Known abnormalities of vascular anatomy which limit access site

Therapy specifics: eg Intermittent vs continuous sickness of patient, extreme duration of therapy (months-years) specific indications (eg bone marrow transplant)

Local availability of vascular competency

Need for long term dialysis with : AV fistula, avoid vein damage from PICC or Axillary / Subclavian catheters

Relevant PMH: coagulopathy, severe respiratory dysfunction and other contraindications to central access

Patient factors: cognitive function.

VESSEL ASSESSMENT

PERIPHERAL ACCESS ASSESSMENT

GRADE	VEIN QUALITY	DEFINITION IF VEIN QUALITY	INSERTION MANAGEMENT[2]
1	Excellent	4-5 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorised health care practitioner
2	Good	2-3 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorised health care practitioner
3	Fair	1-2 palpable/visible veins suitable to cannulate. (Veins maybe small, scarred or difficult to find and require heat packs to aid vasodilation)	Cannula may be inserted by trained/authorised health care practitioner but may require Infrared Viewer or Ultrasound
4	Poor	Veins not palpated/visible (requires ultrasound assistance or Infrared Viewer)	Cannula may be inserted by an experienced practitioner[3] in Cannulation. Use Infrared Viewer, Ultrasound, transillumination or other aids
5	None identifiable	No visible (naked eye or aids) or palpable veins.	Peripheral cannulation should not be performed

[2] The number of attempts for cannulation before escalation should be reflected in local policy
[3] To be determined locally

SUITABILITY OF DRUGS

Suitability of drugs for peripheral infusion is potentially complex and requires risk assessment for the individual drug and route of access with each treatment. In broad terms the safety of a drug infusion to prevent damage to the vessel will relate to factors like pH, osmolarity, viscosity, volume of dilution, speed of infusion, the size and fragility of the peripheral vein. General guidance should be available locally in all clinical settings. Examples include Injectable Medicines Guide (Medusa) http://medicines.wales.nhs.uk/Home.asp (Login and registration required).

Guidelines suggest peripheral cannulae and midlines are unsuitable for the following:

- Continuous vesicant chemotherapy
- Parenteral nutrition exceeding 1/2 per cent dextrose and/or 5 per cent protein
- Solutions and/or medications with pH less than 5 or greater than 9
- Solutions and/or medications with osmolarity greater than 600mOsm/l

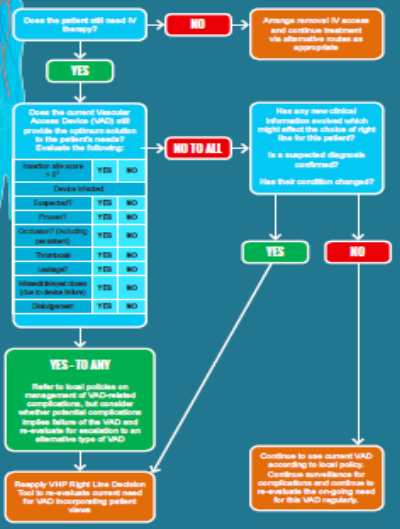
(Royal College of Nursing Standards of Infusion therapy 2010)

EXAMPLE OF A DRUGS LIST

DEFINITELY CENTRAL	CONSIDER CENTRAL
Amiodarone (except emergency in cardiac arrest)	Vancomycin (especially when more than just a few days)
Some cancer chemotherapy drugs	Labetalol
Dobutamine	Aciclovir
Dopamine	Caffeine
Epinephrine (Adrenaline) infusion (except bolus dose in cardiac arrest)	GTN
Norepinephrine (Noradrenaline)	Co-trimoxazole
Potassium >40mmol/litre	Dantrolene
PN (unless only for first 1-2 days of therapy)	Phenoxybenzamine
Dopexamine	Foscarnet
Glucose >15%	Nitroprusside
Nimodipine	Phenytoin
Sodium Bicarbonate 4.2% or 8.4%	Gancyclovir
Sodium Chloride 1.8% +	Pentamidine

RE-EVALUATION OF ACCESS DEVICE

Daily assessment is required to ensure the device is appropriate, preserving vessel health and comfort for the patient. The assessment should consider any complications and whether the device is still required. In addition, observation of the vascular access device insertion site should be performed each shift.



* Use local insertion site score - eg VIP Score for peripheral cannula

Sponsored by Teleflex

Specialists in Infection Prevention, Education and Training

Results from the Logic Outcome Evaluation of those using VHP

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- Better patient experience
- Improved device selection
- Ongoing assessment of device
- Improved knowledge
- Junior doctors making device choice earlier/timelier referral
- More successful placement
- Decrease in multiple cannulations

What Happened Next…..?

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- VHP framework originally developed in 2015
- Subsequent Review of evidence for each section
- Updated *'VHP framework 2020'* now near completion
- Better understanding of implementation
- Feedback from small scale studies and experts
- Rationale to be included in changes
- Potential to develop a VHP App

Peripheral Vein Assessment (original)

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Peripheral Vein Assessment			
Grade	**Vein quality**	**Definition of vein quality**	**Insertion management**
1	Excellent	4-5 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorised practitioners
2	Good	2-3 palpable/visible veins suitable to cannulate	Cannula may be inserted by trained/authorised practitioners
3	Fair	1-2 palpable/visible veins suitable to cannulate. (Veins may be small, scarred or difficult to find and require heat packs to aid vasodilation)	Cannula may be inserted by trained/authorised practitioners but infrared viewer or ultrasound may be required to help locate the vein
4	Poor	Veins not palpated/visible (requires ultrasound assistance or infrared viewer)	Cannula may be inserted by practitioners experienced in cannulation (to be determined locally)
5	None identifiable	No visible (naked eye or aids) or palpable veins	Peripheral cannulation should not be performed

Note: the number of cannulation attempts permitted before escalation should be reflected in local policy

Since 2015:

- On going work at the Christie Hospital to validate
- Used in an RCT Marsh et al. Trials (2018) 19:564
- Considered the Difficult IV Access studies

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A Clinical Predictive Scale to Identify Difficult Intravenous Access in Adult Patients Based on Clinical Observations

Fredericus H. J. van Loon, MSc, Lisette A. P. M. Puijn, RN, Saskia Houterman, PhD, and Arthur R. A. Bouwman, MD

Medicine • Volume 95, Number 16, April 2016

Risk Factor	Definition	Additive Risk Score
Palpable appearance	Is it impossible to identify the target vein by palpating the upper extremity?	1
History of difficult intravenous access	Was it difficult to insert a peripheral intravenous catheter in the past?	1
Visual appearance	Is it impossible to identify the target vein by visualizing the upper extremity?	1
Unplanned indication for surgery	Is the patient at an emergency indication for surgery?	1
Diameter of the vein ≤ 2 millimeters	Does the target vein have a diameter of at most 2 millimeters?	1

The A-DIVA scale is represented as an additive scoring system to calculate the predicted risk for an individual patient; the scores for existing risk factors are added to give an approximate estimation of a difficult intravenous access. Scores are added after answering a question with "yes."
$R^2 = 2.142$ (Hosmer–Lemeshow), $P = 0.71$.

Peripheral Vein Assessment 2020

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Suitable Vein Definition;
Visible and compressible, 3mm or larger (van Loon et al 2019)

Grade	Number of suitable veins	Insertion Management*
1	4-5 veins	Insertion by trained health care practitioner (HCP)
2	2-3 veins	Insertion by trained HCP
3	1-2 veins	Insertion by trained HCP
4	No palpable visible veins	Ultrasound guided cannulation, by trained HCP, one off cannulation
5	No suitable veins with ultrasound	Refer for alternative vascular access device**

Known Difficult IV access patient must be referred to an IV specialist and will require an individualised pathway

***The number of attempts for cannulation before escalation should be reflected in local policy**

****Referral process to be determined locally**

Device Selection Algorithm

(original)

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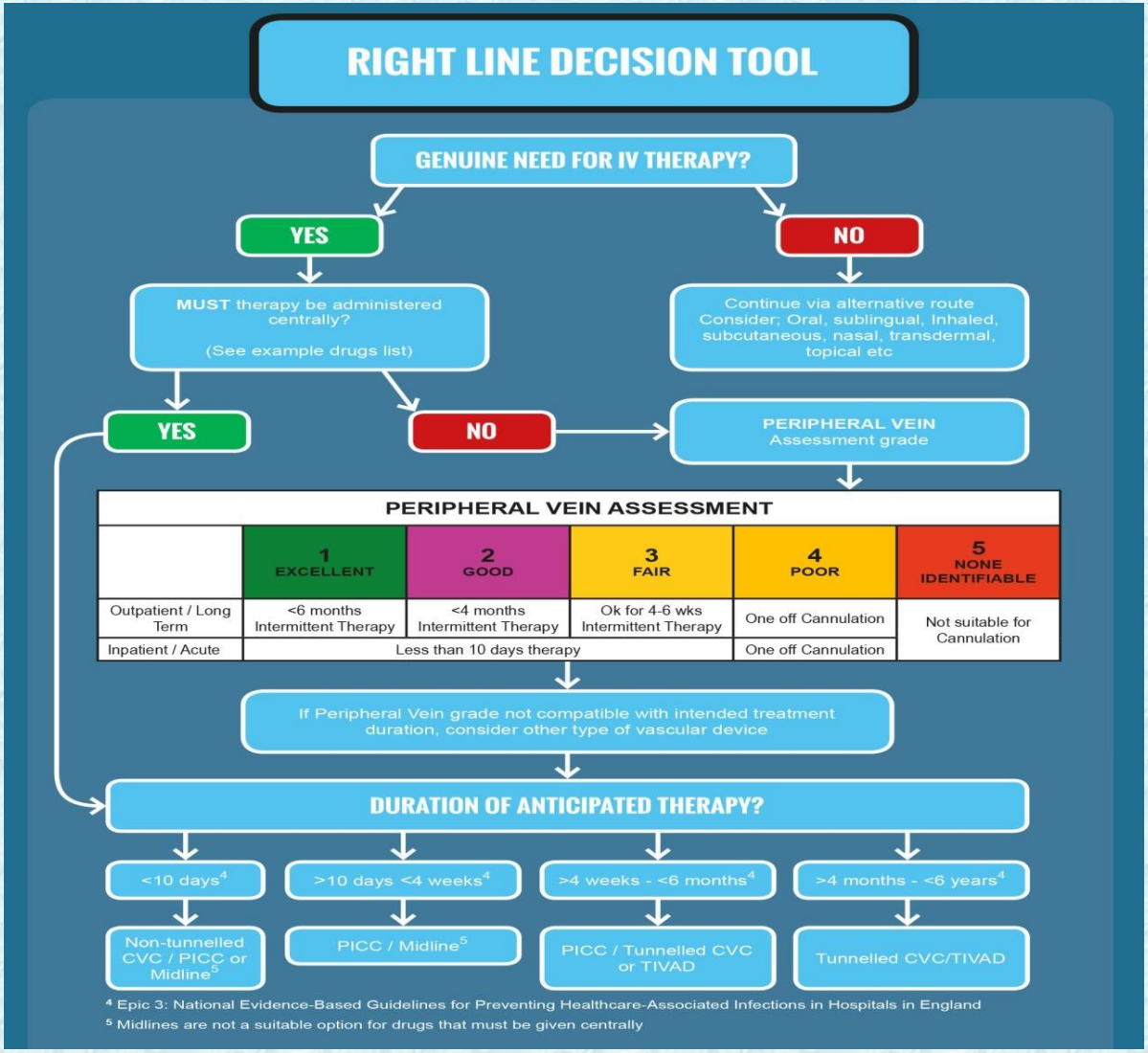

Comparing Epic3 with MAGIC

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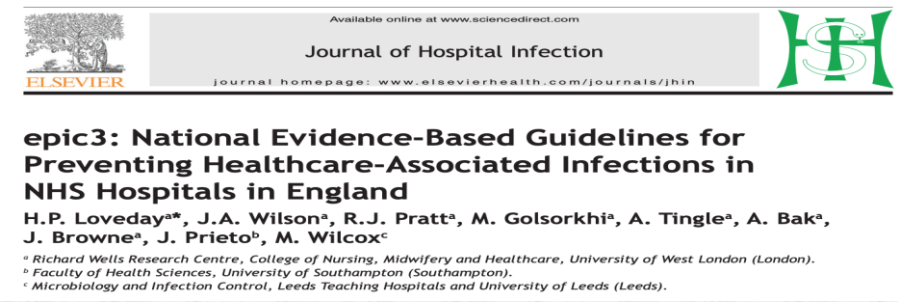


Available online at www.sciencedirect.com

Journal of Hospital Infection

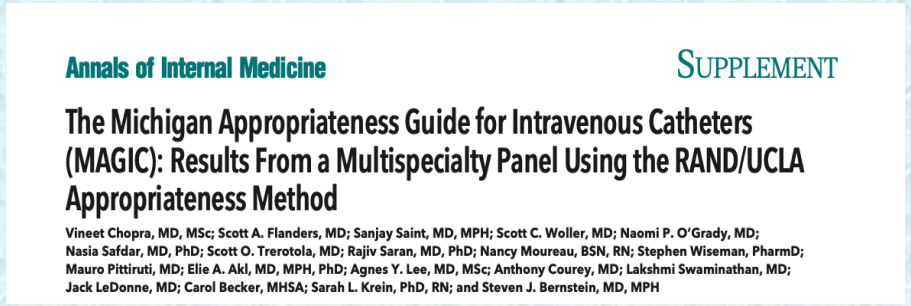
journal homepage: www.elsevierhealth.com/journals/jhin

ELSEVIER

epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

H.P. Loveday[a*], J.A. Wilson[a], R.J. Pratt[a], M. Golsorkhi[a], A. Tingle[a], A. Bak[a], J. Browne[a], J. Prieto[b], M. Wilcox[c]

[a] Richard Wells Research Centre, College of Nursing, Midwifery and Healthcare, University of West London (London).
[b] Faculty of Health Sciences, University of Southampton (Southampton).
[c] Microbiology and Infection Control, Leeds Teaching Hospitals and University of Leeds (Leeds).



Annals of Internal Medicine

SUPPLEMENT

The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results From a Multispecialty Panel Using the RAND/UCLA Appropriateness Method

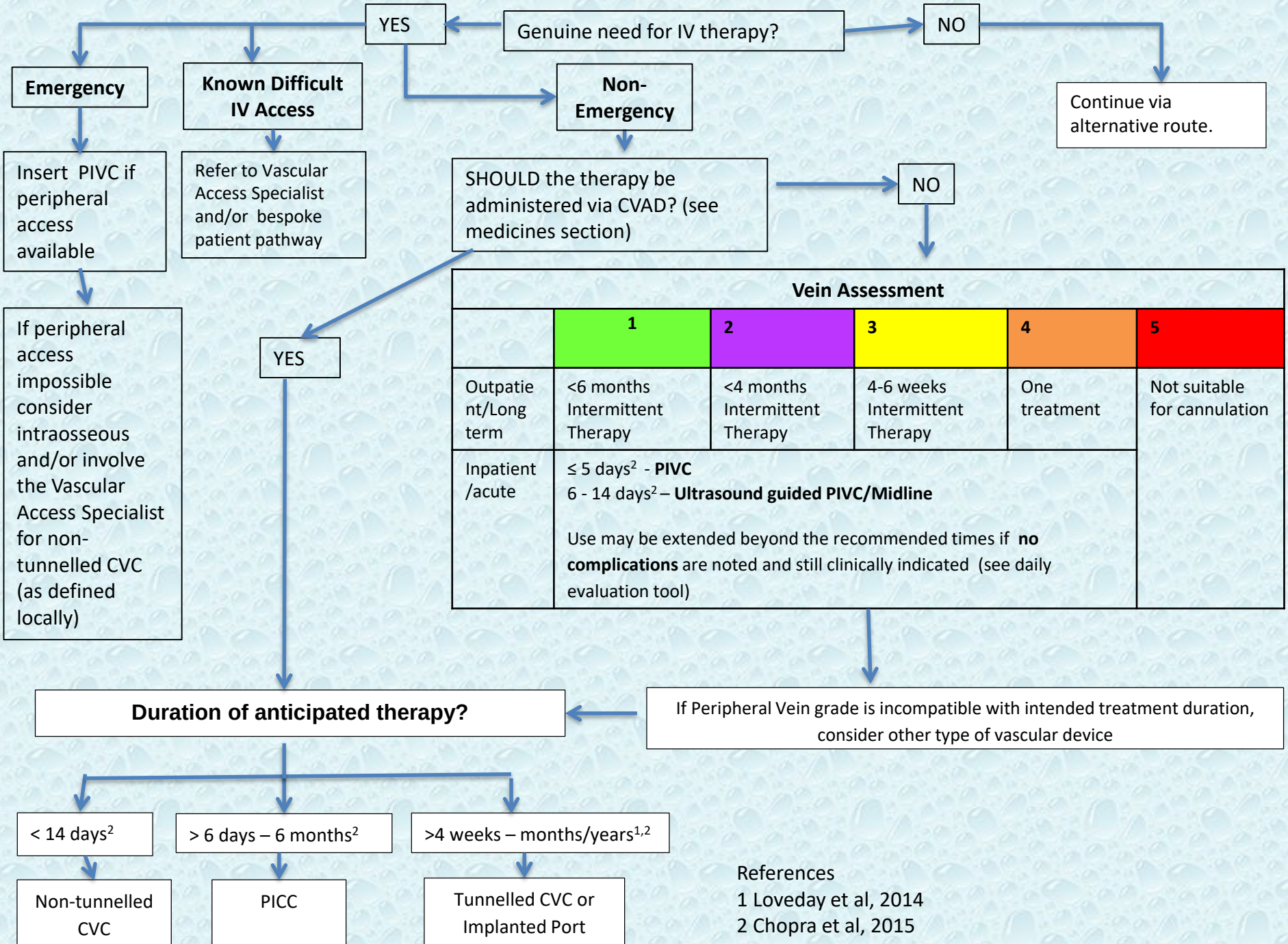
Vineet Chopra, MD, MSc; Scott A. Flanders, MD; Sanjay Saint, MD, MPH; Scott C. Woller, MD; Naomi P. O'Grady, MD; Nasia Safdar, MD, PhD; Scott O. Trerotola, MD; Rajiv Saran, MD, PhD; Nancy Moureau, BSN, RN; Stephen Wiseman, PharmD; Mauro Pittiruti, MD; Elie A. Akl, MD, MPH, PhD; Agnes Y. Lee, MD, MSc; Anthony Courey, MD; Lakshmi Swaminathan, MD; Jack LeDonne, MD; Carol Becker, MHSA; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

Epic3 2014 (adapted from O'Grady 2011)

- **PIVC** up to 7 – 10 days
- **Midline** 1 – 4 weeks
- **PICC** 4 weeks – 6 months
- **NT CVC** up to 7 – 10 days
- **Tunnelled CVC** months/years
- **TIVAD** months/years

MAGIC 2015

- **PIVC** up to 5 days
- **US guided PIVC** 6 to 14 days
- **Midline** up to 14 days
- **PICC** > 6 days
- **NT CVC** up to 14 days
- **Tunnelled CVC** > 15 days +
- **TIVAD** > 30 days +



References
1 Loveday et al, 2014
2 Chopra et al, 2015

Suitability of Medicines 2020

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The most important principle to use when assessing suitability for an infusion to be administered via a peripheral cannula, is that **ALL** intravenous medicines potentially pose a threat to vessel health.

In broad terms the safety of a medicine infusion to prevent damage to the vessel will relate to factors such as:
pH
osmolarity
viscosity
volume of dilution
speed of infusion
size and fragility of the peripheral vein

A central vascular access device (CVAD) should be the preferred device to administer infusions of vesicant chemotherapy and parenteral nutrition.

For some infusions, use of a CVAD is the preferred or essential route, for example, vasoconstrictor medicines (e.g. adrenaline and noradrenaline).

Many medicines administered by IV injection have a high osmolarity. Diluting the injection with sodium chloride 0.9% or glucose 5% before administration will reduce the osmolarity. Seek further information from the Injectable Medicine Guide (Medusa)

Note: The use of a CVAD is specified for some medicines in the Summary of Medicine Product Characteristics (SmPC). Where this is the case the recommendation should be followed.

See the Injectable Medicines Guide website (Medusa) for more information http://medusa.wales.nhs.uk/Home.asp

Daily Evaluation

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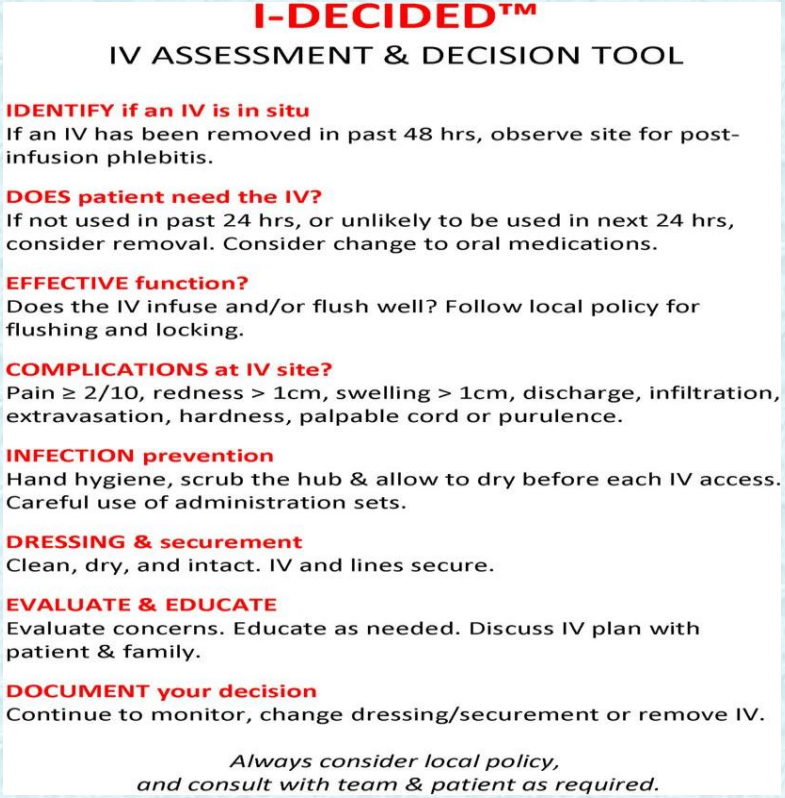
- Evaluation still important component
- I-DECIDED IV Assessment and decision tool (Ray-Barruel et al, 2018)
  - 'has the device been used in last 24 hours'?
  - 'Pain ≥ 2/10'?



I-DECIDED™

IV ASSESSMENT & DECISION TOOL

IDENTIFY if an IV is in situ
If an IV has been removed in past 48 hrs, observe site for post-infusion phlebitis.

DOES patient need the IV?
If not used in past 24 hrs, or unlikely to be used in next 24 hrs, consider removal. Consider change to oral medications.

EFFECTIVE function?
Does the IV infuse and/or flush well? Follow local policy for flushing and locking.

COMPLICATIONS at IV site?
Pain ≥ 2/10, redness > 1cm, swelling > 1cm, discharge, infiltration, extravasation, hardness, palpable cord or purulence.

INFECTION prevention
Hand hygiene, scrub the hub & allow to dry before each IV access. Careful use of administration sets.

DRESSING & securement
Clean, dry, and intact. IV and lines secure.

EVALUATE & EDUCATE
Evaluate concerns. Educate as needed. Discuss IV plan with patient & family.

DOCUMENT your decision
Continue to monitor, change dressing/securement or remove IV.

Always consider local policy,
and consult with team & patient as required.

Gillian Ray-Barruel et al. BMJ Open 2018

Daily Evaluation 2020

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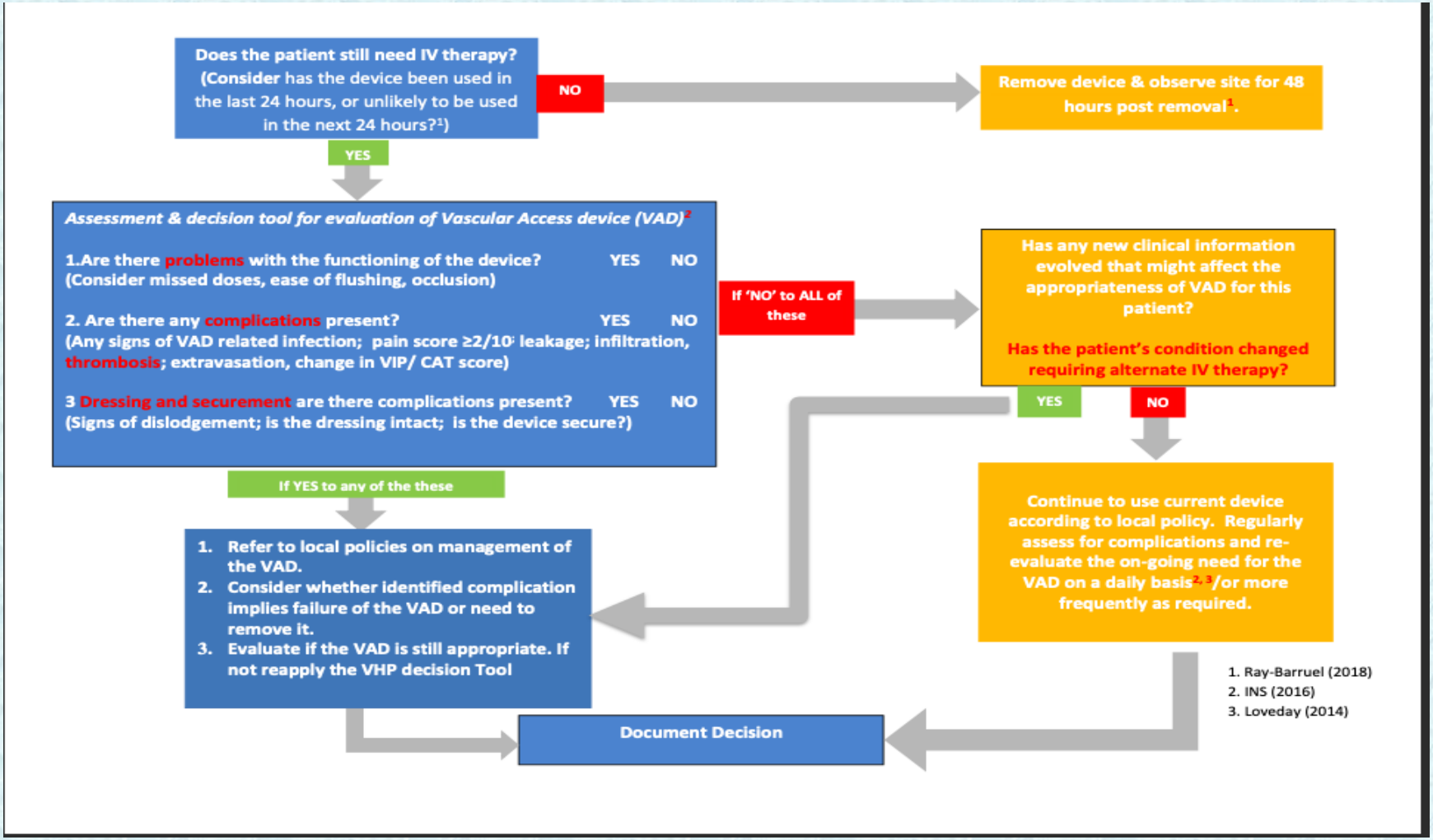

Summary

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- The VHP framework is being used by many
- Most cited JIP article in last 3 years
- Revised Poster and pocket guides expected late spring
  - QR code with further information and rationale for changes
- Ongoing requirements
  - evaluate impact on outcome
  - Understanding the barriers to implementation

UK VESSEL HEALTH AND PRESERVATION 2020

INTRODUCTION

The UK evidence-based Vessel Health & Preservation (VHP) concept of vascular access device (VAD) management was originally adapted and developed (Hallam et al. 2016) from the US model (Moureau et al. 2012). This revised UK VHP framework is based on published evidence and guidelines.

Evaluation studies of the original VHP Framework to date have included the uptake of the VHP Framework (Burnett et al. 2018) and a small-scale pilot study exploring the impact of using the framework on the insertion and management of VADs (Weston et al, 2017).

The framework has been developed to facilitate a complex adaptive systems approach to VAD insertion and management and is intended for adult vascular access in acute or planned settings. Whilst the principles of VHP should be incorporated into any emergency situation, it is recognised that other issues may take priority in these situations and dependent on the condition of the patient and availability vascular access expertise therefore other immediate routes of access may be more appropriate e.g. intraosseous access.

The evidence for each of the sections with references and signposting to further information can be accessed via the Quick Response (QR) code.

GLOSSARY OF TERMS

CVAD – Central vascular access device
CVC – Central venous catheter
Midline - Long venous catheter inserted into arm veins which does not extend centrally
IV - Intravenous route of access
PICC – Peripherally inserted central venous catheter
PIVC – Peripheral intravenous catheter
Tunnelled CVC - central venous catheter which is tunnelled away from exit site and has anchoring cuff
VAD - Vascular access device
VIP - Visual Infusion Phlebitis Score
VHP - Vessel health and preservation

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RIGHT LINE DECISION TOOL

GENUINE NEED FOR IV THERAPY?

- **NO** → Continue via alternative route
- **YES** →
  - Emergency → Insert PIVC if peripheral access available → If peripheral access is impossible consider intraosseous and/or involve the Vascular Access Specialist (as defined locally) for non-tunelled CVC
  - Known difficult IV Access → Refer to Vascular Access Specialist and/or bespoke patient pathway
  - Non-Emergency → SHOULD the therapy be administered via CVAD? (see medicines section)
    - **YES** → DURATION OF ANTICIPATED THERAPY?
    - **NO** → PERIPHERAL VEIN ASSESSMENT

PERIPHERAL VEIN ASSESSMENT

	1 Excellent	2 Good	3 Fair	4 Poor	5 None Identifiable
Outpatient/ Long term	<8 months Intermittent Therapy	<4 months Intermittent Therapy	4-6 weeks Intermittent Therapy	One treatment	Not suitable for cannulation
Inpatient/ Acute	<5 days[2] - PIVC 6-14 days[2] - Ultrasound guided PIVC/Midline Use may be extended beyond the recommended time if no complications are noted and still clinically indicated (see daily evaluation tool)				

[1]Chopra et al (2015)
[2]Loveday et al (2014)

If Peripheral Vein grade not compatible with intended treatment duration, consider other type of vascular device → DURATION OF ANTICIPATED THERAPY?

DURATION OF ANTICIPATED THERAPY?

- <14 days[1] → Non tunnelled CVC
- >6 days - 6 months[1] → PICC
- >4 weeks - months/years[1,4] → Tunnelled CVC or implanted Port

SECONDARY QUESTIONS WHICH MAY REFINE LINE CHOICE IN INDIVIDUAL PATIENTS:

- Patient preference: lifestyle issues and/or body image.
- Known abnormalities of vascular anatomy which limit access site.
- Therapy specifics: e.g. intermittent vs continuous sickness of patient, extreme duration of therapy (months-years) specific indications (e.g. bone marrow transplant).
- Local availability of vascular competency.
- Need for long term dialysis with: AV fistula, avoid vein damage from PICC or Axillary/Subclavian catheters.
- Relevant past medical history: coagulopathy, severe respiratory dysfunction and other contra-indications to central access.
- Patient factors: e.g. cognitive function.

PERIPHERAL VEIN ASSESSMENT

Suitable Vein Definition: Visible and compressible, 3mm or larger[1]

Grade	Number of suitable veins	Insertion Management[3]
1	4-5 Veins	Insertion by trained healthcare practicioner (HCP)
2	2-3 Veins	Insertion by trained healthcare practicioner (HCP)
3	1-2 Veins	Insertion by trained healthcare practicioner (HCP)
4	No palpable visible veins	Ultrasound guided cannulation, by trained HCP, one of cannulation
5	No suitable veins with ultrasound	Refer for alternative vascular access device[4]

[illegible]

[2]van Loon et al (2019)
[3]The number of attempts for cannulation before escalation should be reflected in local policy
[4]Referral process to be determined locally

SUITABILITY OF MEDICINES

The most important principle to use when assessing suitability for an infusion to be administered via a peripheral intravenous catheter (PIVC) is that **ALL** intravenous medicines potentially pose a threat to vessel health.

In broad terms the safety of a medicine infusion to prevent damage to the vessel will relate to factors such as:

- pH
- osmolarity
- viscosity
- volume of dilution
- speed of infusion
- size and fragility of the peripheral vein

A central vascular access device (CVAD) should be the preferred device to administer infusions of vesicant chemotherapy and parenteral nutrition.

For some infusions, use of a CVAD is the preferred or essential route, for example, vasoconstrictor medicines (e.g. adrenaline and noradrenaline).

Many medicines administered by IV injection have a high osmolarity. Diluting the injection with sodium chloride 0.9% or glucose 5% before administration will reduce the osmolarity; information should be sought from the Injectable Medicines Guide website (Medusa).

Note: The use of a CVAD is specified for some medicines in the Summary of Medicine Product Characteristics (SmPC). Where this is the case the recommendation should be followed.

See the Medusa website for more information http://medusa.wales.nhs.uk/Home.asp

DAILY EVALUATION

Does the patient still need IV therapy?
(Consider has the device been used in the last 24 hours, or unlikely to be used in the next 24 hours)[3]

- **NO** → Remove the device and observe site for 48 hours post removal[3]
- **YES** →

Assessment & decision tool for evaluation of Vascular Access device (VAD)[1,2]

1. Are there problems with the functioning of the device? (Consider missed doses, ease of flushing, occlusion)
2. Are there any complications present? (Any signs of VAD related infection; pain score ≥2/10[1]; leakage; infiltration; thrombosis; extravasation; change in VIP score)
3. Dressing and securement are there complications present? (Signs of dislodgement; is the dressing intact, is the device secure?)

If 'YES' to any of these →

1. Refer to local policies on management of the VAD.
2. Consider whether identified complication implies failure of the VAD or need to remove it.
3. Evaluate if the VAD is still appropriate. If not reapply the VHP Decision Tool

If 'NO' to all of these → Has any new clinical information evolved that might affect the appropriateness of VAD for this patient? Has the patient's condition changed requiring alternate IV therapy?

- Yes → (back to steps 1–3 above)
- No → Continue to use current device according to local policy. Regularly assess for complications and re-evaluate the on-going need for the VAD on a daily basis[2,3] or more frequently as required.

→ Document Decision

[1]Ray-Baurrel et al (2018)
[2]Loveday et al (2014)
[3]RCN (2016)

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BJA

British Journal of Anaesthesia, 122 (6): 734–741 (2019)

doi: 10.1016/j.bja.2019.01.038
Advance Access Publication Date: 17 April 2019
Clinical Practice

Clinical impact of peripherally inserted central catheters *vs* implanted port catheters in patients with cancer: an open-label, randomised, two-centre trial

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Abstract

Background: Centrally inserted totally implanted vascular access ports (PORTs) and peripherally inserted central catheters (PICCs) are widely used for the administration of chemotherapy. Our aim was to study the incidence of catheter-related deep venous thrombosis in patients with cancer receiving chemotherapy through either a PICC or a PORT.
Methods: Adults with non-haematological cancer (mainly breast and colorectal) from two Swedish oncology centres were included and followed for up to 1 yr. Patients were randomly assigned to receive a single-lumen PICC or PORT. The primary end point was the occurrence of a clinically significant catheter-related deep venous thrombosis, and the secondary end point was a composite of adverse events related to the catheter: insertion complication, thrombosis, occlusion, infection, and mechanical problems.
Results: The trial recruited 399 participants (PICC, n=201; PORT, n=198) between March 2013 and February 2017. The PICCs were associated with 16 (8%) deep venous thromboses compared with two (1%) in the PORT group (HR=10.2; 95% confidence interval, 2.3–44.6; P=0.002). The overall incidence of composite adverse events was higher for patients with a PICC compared with those with a PORT (HR=2.7; 95% confidence interval, 1.6–4.6; P<0.001).
Conclusions: PICCs are associated with higher risk for catheter-related deep venous thrombosis and other adverse events when compared with PORTs. This increased risk should be considered when choosing a vascular access device for chemotherapy, especially in patients with solid malignancy.
Clinical trial registration: NCT01971021.

Keywords: central venous catheter; central venous catheter thrombosis; peripherally inserted central catheter line insertion; vascular access devices

Editorial decision date: 31 January 2018; **Accepted:** 31 January 2019

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Thank you for listening

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