

# Improving AV Fistula and Graft Cannulation Practice

MAGIC: A National KQuIP Project

Katie Fielding,

MAGIC Lead and Co-Chair BRS VA

Senior Clinical Educator –Haemodialysis, RDU – Derby

Chair, Measurement & Understanding Workstream, KQuIP

# KQUIP: KIDNEY QUALITY IMPROVEMENT PARTNERSHIP

Paul Cockwell,  
Co – Lead, KQuIP  
Consultant Nephrologist, Birmingham QEH  
Professor, University of Birmingham  
Clinical Vice President, Renal Association

# CHALLENGES OF CANNULATION PRACTICE

# Discussion

- 1) What is good about your cannulation practice?
- 2) What would you like to improve in cannulation practice?
- 3) What do you think is the consequence of poor cannulation practice?

# CANNULATION BEST PRACTICE

# BRS VA and VASBI Cannulation Recommendations

Being released later this year

A good needling technique will:

Incorporates:

- Buttonhole, rope ladder and area puncture cannulation
- AV grafts and fistulae
- Paeds and adults
- Existing BH recommendations

- Minimise damage to the AV fistula / graft during needling
- Minimise complications from needling
- Minimise pain and anxiety related to needling

# How to Cannulate Well

- How to insert the needle well
  - Gentle and considered insertion
  - Sure of direction and depth
  - Balance of empathy and necessity
- Technical aspects
  - Needle gauge
  - Needle direction and depth
- Procedural aspects
  - Infection control
  - Taping

# Pre-Cannulation Assessment

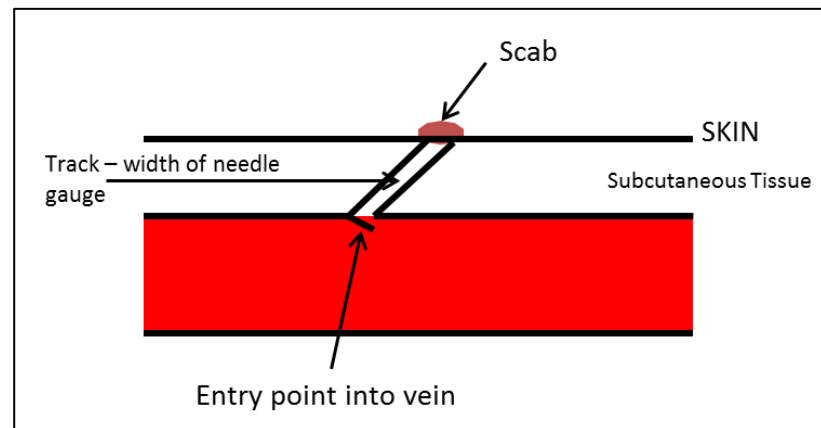
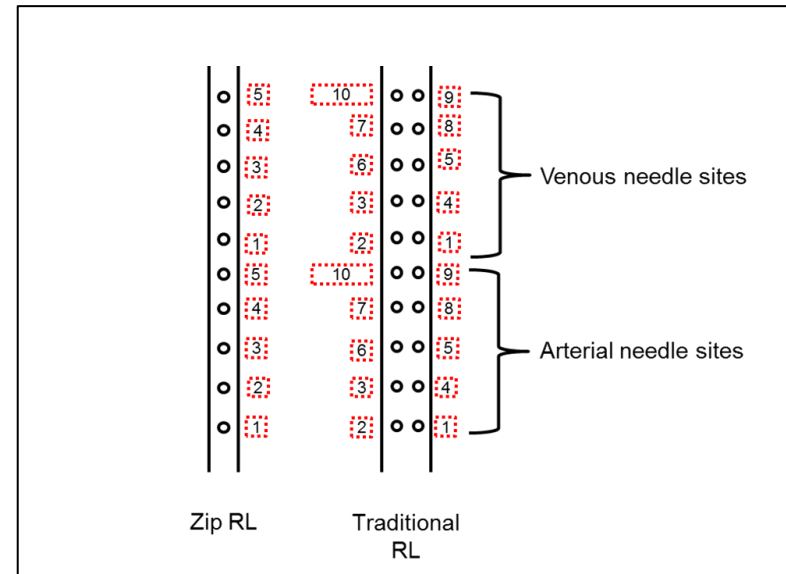
Arteriovenous Fistula/Graft (AVF/AVG) Pre-Cannulation Assessment Tool		
Signs and symptoms	Score	Actions
<ul style="list-style-type: none"> <li>No scabs larger than the needle sites</li> <li>No pain or new swelling</li> <li>No <del>nocrocod</del> areas</li> <li>No aneurysms</li> <li>No erythema</li> <li>Normal bruit / thrill</li> <li>No hardness over AVF/AVG</li> </ul>	0	<p>No action required</p> <p>Safe to needle</p>
<ul style="list-style-type: none"> <li>No pain or new swelling</li> <li>No <del>nocrocod</del> areas</li> <li>No scabs larger than the needle sites</li> <li>No erythema</li> <li>Normal bruit / thrill</li> <li>No hardness over AVF/AVG</li> </ul> <p>Aneurysms present and stable</p> <ul style="list-style-type: none"> <li>Not increasing in size</li> <li>Skin not shiny or thin over aneurysms</li> </ul>	1	<p>Monitor</p> <p>Consider photograph AVF/AVG for reference</p> <p>Document aneurysm size, by measuring arm diameter at aneurysm and position</p> <p>Safe to cannulate</p>
<ul style="list-style-type: none"> <li>No discoloured areas</li> <li>No scabs larger than needle sites anywhere on fistula</li> </ul> <p>Any of the following:</p> <ul style="list-style-type: none"> <li>Pain or discomfort to any area on the AVF/AVG</li> <li>Aneurysms increasing in size or pulsating</li> <li>New aneurysms</li> <li>Thin and shiny skin around AVF</li> <li>Whistling bruit on auscultation</li> <li>Non cannulation segments hard on palpation</li> <li>Bleeding around needle site during dialysis</li> <li>Extended post dialysis bleeding &gt;20minutes</li> <li>Erythema &gt;2cm anywhere on the fistula</li> </ul>	2	<p>Refer to Vascular Access Team</p> <p>Previous actions <u>add</u></p> <p>Patient information given on actions and escalation if fistula bleeds at home</p> <p>Review individual's antiplatelet and anticoagulation prescription</p> <p>Consider enabling erythema</p> <p>Lift arm above head, to assess whether aneurysms drain</p>
<p>Any of previous signs <u>add</u> any of the following:</p> <ul style="list-style-type: none"> <li>Pain / swelling to AVF/AVG</li> <li>Nocrocod areas on AVF/AVG</li> <li>Patient reports skin bleed at home</li> <li>Scabs at needle sites or elsewhere &gt;3cm</li> <li>Absent or changed thrill on palpation</li> <li>Absent bruit on auscultation</li> <li>Cannulation segments hard on palpation</li> <li>Coating (pus) from red/infamed areas</li> <li>Erythema increased in size</li> </ul>	3	<p>Do not needle</p> <p>Urgently refer to Renal / Vascular Team</p> <p>Keep patient in department</p> <p>Previous actions <u>add</u></p> <p>Swab pus / erythema</p> <p>Take blood cultures if erythema or pus present</p> <p>Take U&amp;Es</p>

[illegible]



# Cannulation Techniques

- **Rope Ladder**
  - Move up the vessel in a systematic manner
  - Use as much length of the vessel as possible
    - At least 5cm per site
- **Area Puncture**
  - Shorter length than rope ladder
- **Buttonhole**
  - Cannulate in exactly the same site each time



# Choosing your Cannulation Techniques

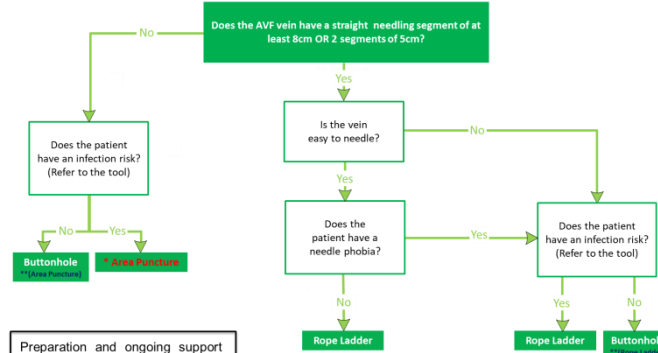
- With patients
- Length of cannulation segment
- Infection risk
  - Screening tool (Swain et al, 2017)
- Needle phobia
- Ease of cannulation



## NEEDLING DECISION MAKING MODEL

This tool has been developed to help haemodialysis nurses and patients decide which needling technique is best for each individual arteriovenous fistula (AVF). However, this assessment will be unique and individual to each patient, so you will still need to apply clinical judgement. You may diverge from the decision making aid, so consider how your clinical expertise can justify this divergence. In particular, patient's who self needle their AVF may prefer to use buttonhole needling technique, although this will still be related to personal consideration.

Arteriovenous grafts (AVG) are not included in this model. AVG always have a long, straight needling segment, so should automatically undergo rope ladder needling.



Preparation and ongoing support for AVF needling is recommended in all age groups. Coping techniques such as relaxation, distraction and play therapy should be considered.

\* BRS and VASBI do **not** recommend area puncture. If this assessment results in area puncture, please refer to the 'Area Puncture Action Chart.'

\*\* If your unit does not use buttonhole, then you will need defer to the technique in brackets in the relevant box.

Infection Risk Screening Tool		
Criteria present:	(Please tick)	
Metallic Heart Valve	Yes	No
Pacemaker		
Previous MSSA/MRSA bacteraemia		
Previous endocarditis		
Significant structural valvular heart disease		
MSSA / MRSA positive		
Mupirocin resistant MSSA		
Skin disorders causing itching or skin breakdown around cannulation sites		
Poor adherence to hygiene protocols		
Clinical Judgement/Other Considerations:		
On the basis of the above, this patient is / is not (delete as applicable) suitable for using buttonhole needling technique.		

# How to Avoid Area Puncture

- Avoid if possible
- Educate patients
- Educate staff
- Needling plan
- Maybe a necessary evil
  - Monitor for complications



## AREA PUNCTURE ACTION CHART

This tool has been developed to summarise the potential actions to take when area puncture needling has been implemented on an AVF or AVG. This summarises the actions recommended in the BRS / VASBI Clinical Practice Recommendations for Needling of Arteriovenous Fistulae and Grafts.

Identify area puncture is in use on one or both cannulation sites  
Needling sites on same segment of vein and cover less than 8cm on same segment  
OR  
Needling sites are on separate segments and one site covers less than 5cm



Complications associated with area puncture include:

- Increased aneurysm development, with / without associated tortuosity
- Increased development of stenosis and related AVF thrombosis
- Reduced skin integrity, leading to increased risk of life-threatening bleed

Can rope ladder or buttonhole technique be used?  
(Use AVF Needling Decision Making Model for AVF)

No

Yes

Explain to patient alternative needling techniques.  
Include the risks of area puncture and advantages of buttonhole or rope ladder.  
Does the patient agree to rope ladder or buttonhole technique?

No

Yes

Explore reasons for refusal  
Is this due to pain or anxiety?

No

Yes

- Consider use of distraction / play therapy to improve needling experience
- Educate patient about signs of complications related to area puncture
- Review needling options with patient, following an agreed time

Does the patient agree to rope ladder or buttonhole technique?

No

Yes

Area Puncture

- Refer to vascular team to explore alternatives
- Increase surveillance for complications related to area puncture
- Educate patient about signs of complications related to area puncture
- Review options with patient, following an agreed time
- Document risk assessment and rationale for use of area puncture

Rope Ladder or Buttonhole

- Educate staff about use of rope ladder / buttonhole
- Document cannulation plan for future cannulations
- Consider use of distraction or play therapy to improve cannulation experience

# Managing Anxiety related to Cannulation

- Used paediatric expertise
- Requires attention in adult setting
  - Tendency to ignore
- Requires further research
- Desensitisation
  - Handling the needle
  - Using the needle
- Music
- Breathing control
- Control of procedure
- Time
- Calm environment

# Patient Involvement

- Involve patient's in their VA care
  - Adult participants
  - Not telling what to do
- Involvement is more than setting up their pack and self-cannulation
- Include in all decisions
  - Starts pre-dialysis
- View needling and VA care as a partnership
- Encourage self needling
- Support required to self-needle

# Other Sections

- How to do Buttonhole well
  - Track development
  - Disinfection prior to cannulation
  - Use of mupirocin on needle sites
- Summary of rope ladder procedure
- Use of nurse-led US assessment
- Cannulating new AVF / G

# MANAGING ACCESS BY GENERATING IMPROVEMENTS IN CANNULATION (MAGIC)

# MAGIC

- Quality Improvement project
- Designed by BRS VA and VASBI nurses
- KQuIP supporting the implementation
  - Regional implementation
- Implementation of Cannulation Recommendations

**Aim: To improve prevalent AVF/G rates:**

- Improve cannulation to preserve AVF/G function
- Make AVF/G more attractive through better patient experience
- Develop structures to support further VA QI

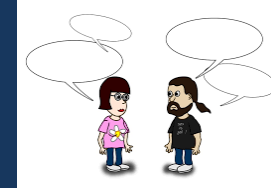


# Elements of MAGIC

## Leadership

Needling  
Champion -  
Nurse

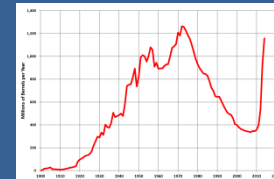
Nephrologist



## Measurement

Monthly clinical  
outcomes  
Run Charts

Measure impact  
Guide future QI



## Materials



Elearning based on  
Recommendations

Awareness materials for  
patients

# Leadership

- Nurse lead and nephrologist lead
  - Developed through KQuIP training
- Work together
  - Meet monthly
- Lead MAGIC locally
- Regional MAGIC network
  - Meet 3 monthly
- Continue doing QI following MAGIC

# Measurement

- Core measurement strategy
  - Flexible local additions
- Monthly local audit
  - Collected by needling champion
- Life QI
  - Run charts / Trends
- Compare
  - Before / after
  - Regionally

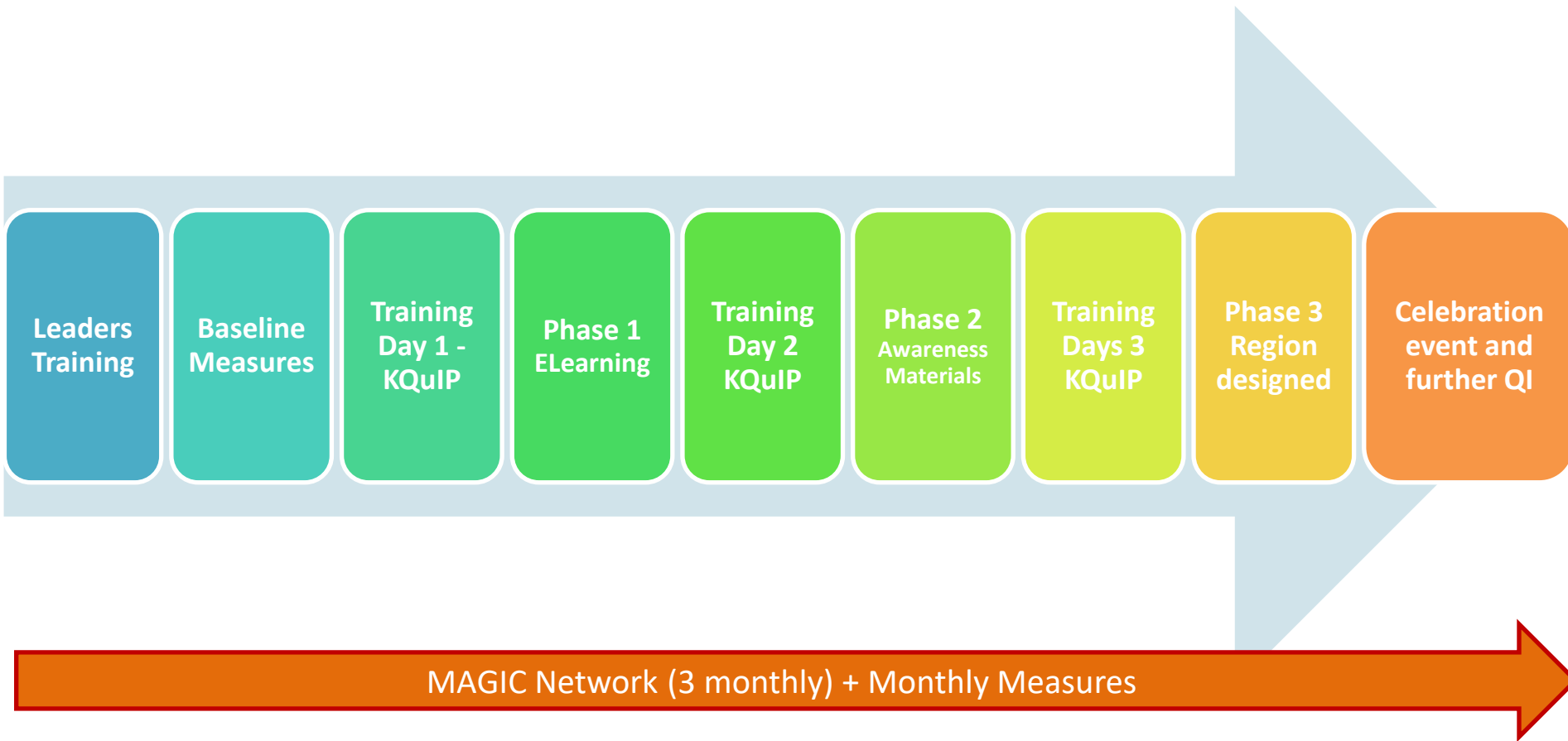
## Sample of Patients

- Needling technique
- Missed cannulation
- Patient experience of cannulation
  - PREM needling question

## Whole Unit

- No. AVFs used for HD
- No. of AVFs lost
- No. new AVFs used
- Infection

# Implementing MAGIC





Website - [www.thinkkidneys.nhs.uk/kquip/magic/](http://www.thinkkidneys.nhs.uk/kquip/magic/)

Facebook - [www.facebook.com/groups/1918050308446120/](https://www.facebook.com/groups/1918050308446120/)

Twitter - [twitter.com/HaemodialysisVA](https://twitter.com/HaemodialysisVA)