

Central Venous Catheter – Can We Do Without Radiographs?

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Steve Hill, Farha Hussain, Lisa Cooper, Hans-Ulrich Laasch

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Catheters
Can we do without
radiographs?

First European
Hospital Trial of the
ARROW® VPS®
G4™ Device

Performed at
The Christie
Europe's leading
Cancer Center

Intra-procedure
navigation is a clear
advantage over
landmark
techniques

Central Venous Catheter – Can we do without radiographs?



The Christie **NHS**
NHS Foundation Trust

Central venous catheter – can we do without radiographs?

Steve Hill, Farha Hussain, Lisa Cooper, Hans-Ulrich Laasch
The Procedure Team

Aim

The aim was to evaluate the findings of the trial comparing use of the Arrow VPS (Vascular Positioning System). The primary purpose of the study was to compare the Arrow VPS (Vascular Positioning System) to landmark technique for central venous catheter (CVC) placement. Secondary aims were to compare the Arrow VPS (Vascular Positioning System) to landmark technique for central venous catheter (CVC) placement. Secondary aims were to compare the Arrow VPS (Vascular Positioning System) to landmark technique for central venous catheter (CVC) placement.

The Christie

The Christie is one of Europe's leading cancer centres, treating more than 40,000 patients a year. The hospital is a provider of 1,000 beds. Christie Manchester, a Christie, but also a national specialist centre around 20% of patients are referred here from other parts of the country. As well as being a world-class cancer treatment, other services available at the trust include radiology, chemotherapy and highly specialised surgery for complex and rare cancers.

Procedure Team

At The Christie the Procedure Team consists of seven specialists of expertise in interventional interventional vascular access, including insertion of tunneled central venous catheters, peripherally inserted central venous catheters, totally implantable central venous devices, bone marrow biopsies and ablation procedures.

Background

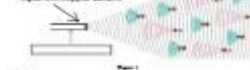
In the UK current practice is to use statistical methods with peak procedure time. Conventional techniques for central venous catheter (CVC) placement are based on anatomical landmarks. The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter. The procedure team at The Christie were keen to compare VPS technology to the landmark technique.

- It involves more efficient pathways
- Reduced patient length of stay
- Cost effective
- Reduced risk of infection and thrombosis
- Reduced risk of CVC placement
- Reducing risk of CVC placement
- Accuracy
- Interprofessional cooperation and teamwork

How it Works

The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter. The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter. The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter.

Ruler with Doppler sensor



ECG sensor

- The medical adhesive is attached to the patient's right chest (parasternal 2nd intercostal space) and the Arrow VPS (Vascular Positioning System) is placed on top of the ECG sensor.
- The Arrow VPS (Vascular Positioning System) is placed on top of the ECG sensor.
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Optical feedback link

The user clearly always displays color signals that the operator can see through the monitor.

	GREEN ARROW	The catheter is moving with the flow of the blood towards the heart.
	ORANGE CIRCLE	Catheter moving against the flow of blood, it needs to be pulled back and re-directed.
	YELLOW TRIANGLE	The catheter is possibly against the vessel wall, it needs to be pulled back and re-directed.
	BLUE SQUARE	The catheter tip has arrived with the lower SVC and the IVC.

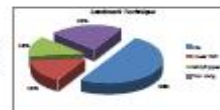
Methodology

- The study was a prospective, randomised, controlled trial comparing the Arrow VPS (Vascular Positioning System) to landmark technique for central venous catheter (CVC) placement.
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Results

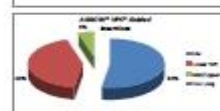
Landmark technique

Total number of cases	100 (n = 100)
Successful insertion	82% (n = 82)
Lower SVC	28% (n = 28)
Multiple PCC	22% (n = 22)
Training	22% (n = 22)

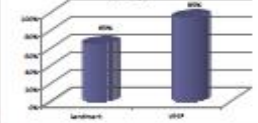


VPS Guided

Total number of cases	100 (n = 100)
Successful insertion	82% (n = 82)
Lower SVC	28% (n = 28)
Multiple PCC	22% (n = 22)
Training	22% (n = 22)



Accuracy



The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter. The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter.

Observations

- 2 catheters were excluded from the data. 2 due to lack of measurable P waves and 2 due to technical difficulties during the procedure.
- The rate of successful insertion using the Arrow VPS (Vascular Positioning System) was 82%.
- The Arrow VPS (Vascular Positioning System) is a novel technology that uses Doppler ultrasound to guide the placement of the catheter.
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Conclusion

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References

1. Hill S, Hussain F, Cooper L, Laasch H-U. (2014) Central venous catheter placement using the Arrow VPS (Vascular Positioning System) compared to landmark technique: a randomised controlled trial. *BMJ Open*, 8(12), e007888.
2. Hill S, Hussain F, Cooper L, Laasch H-U. (2014) Central venous catheter placement using the Arrow VPS (Vascular Positioning System) compared to landmark technique: a randomised controlled trial. *BMJ Open*, 8(12), e007888.
3. Hill S, Hussain F, Cooper L, Laasch H-U. (2014) Central venous catheter placement using the Arrow VPS (Vascular Positioning System) compared to landmark technique: a randomised controlled trial. *BMJ Open*, 8(12), e007888.

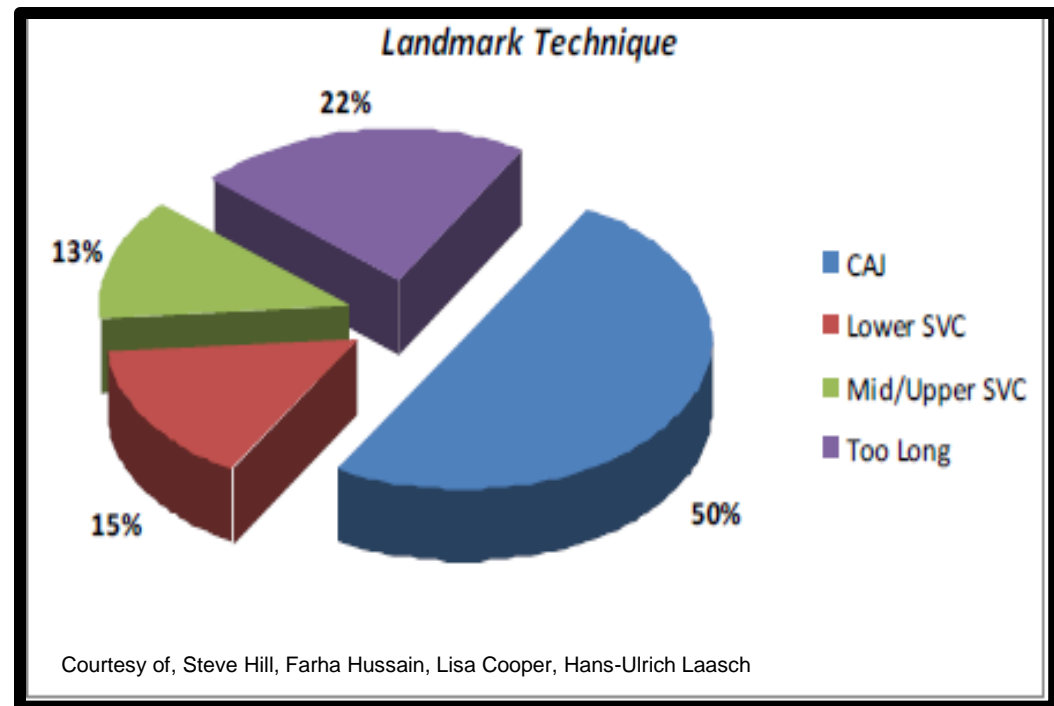


Figure 1. Arrow VPS (Vascular Positioning System) device.

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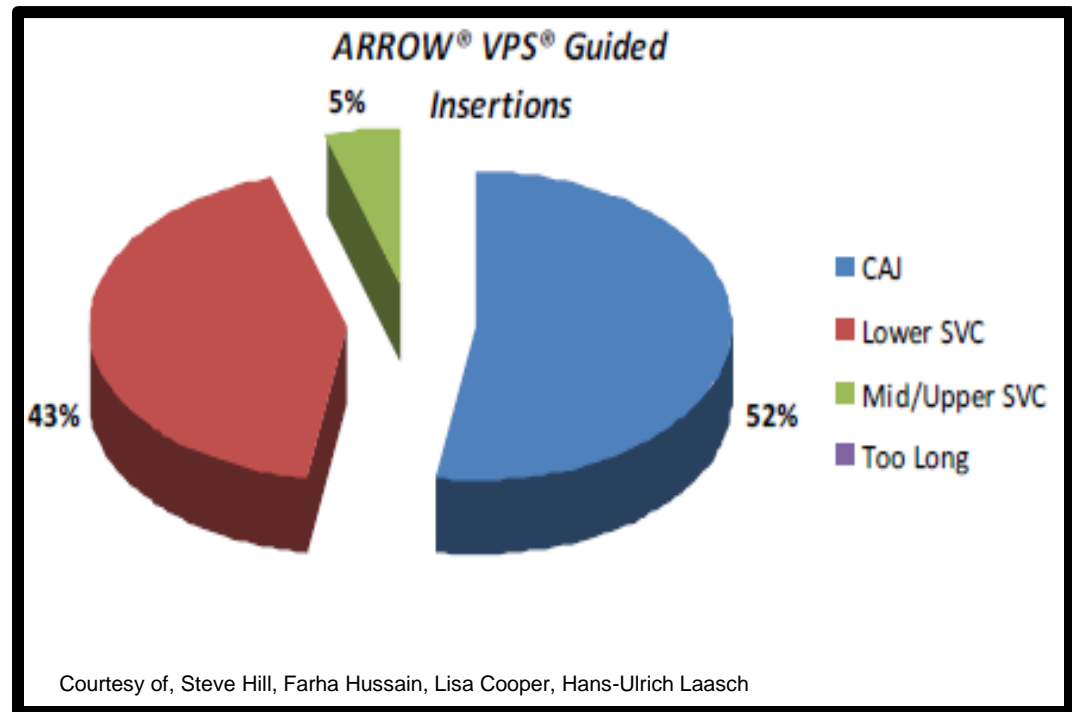
Landmark technique

- Total Number of Cases ($n = 46$)
- Cavo-Atrial Junction 50% ($n = 23$)
- Lower 1/3 SVC 15% ($n = 7$)
- Mid/Upper SVC 13% ($n = 6$)
- Too Long 22% ($n = 10$)



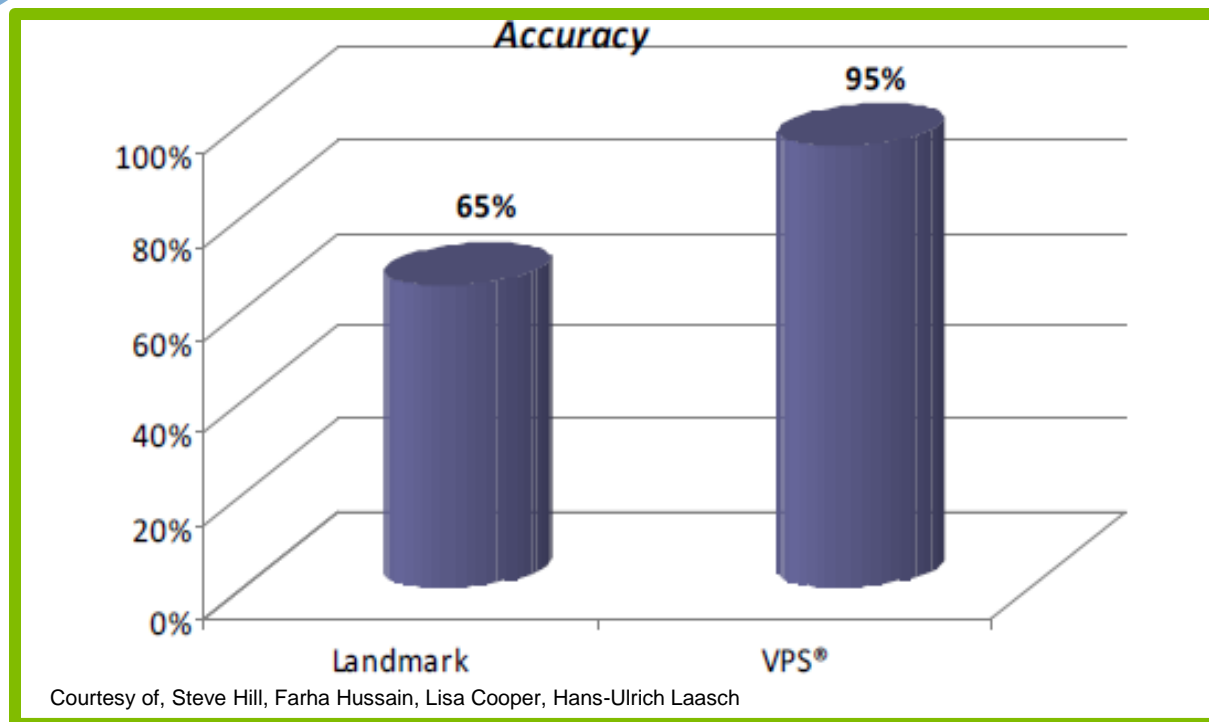
Central Venous Catheter – Can we do without radiographs?

- **ARROW® VPS® G4™ Device Guided**
- Total number of cases ($n = 63$)
- Cavo-Atrial Junction 52% ($n = 33$)
- Lower 1/3 SVC 43% ($n = 27$)
- Mid/Upper SVC 5% ($n = 3$)
- Too long 0%



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Landmark versus
ARROW® G4™
Device guidance
shows 30%
improvement in
accuracy



Central Venous Catheter – Can we do without radiographs?

Conclusions

VPS® Technology had clear advantage over landmark technique

No manipulation of catheters required after placement

Reduces radiation exposure

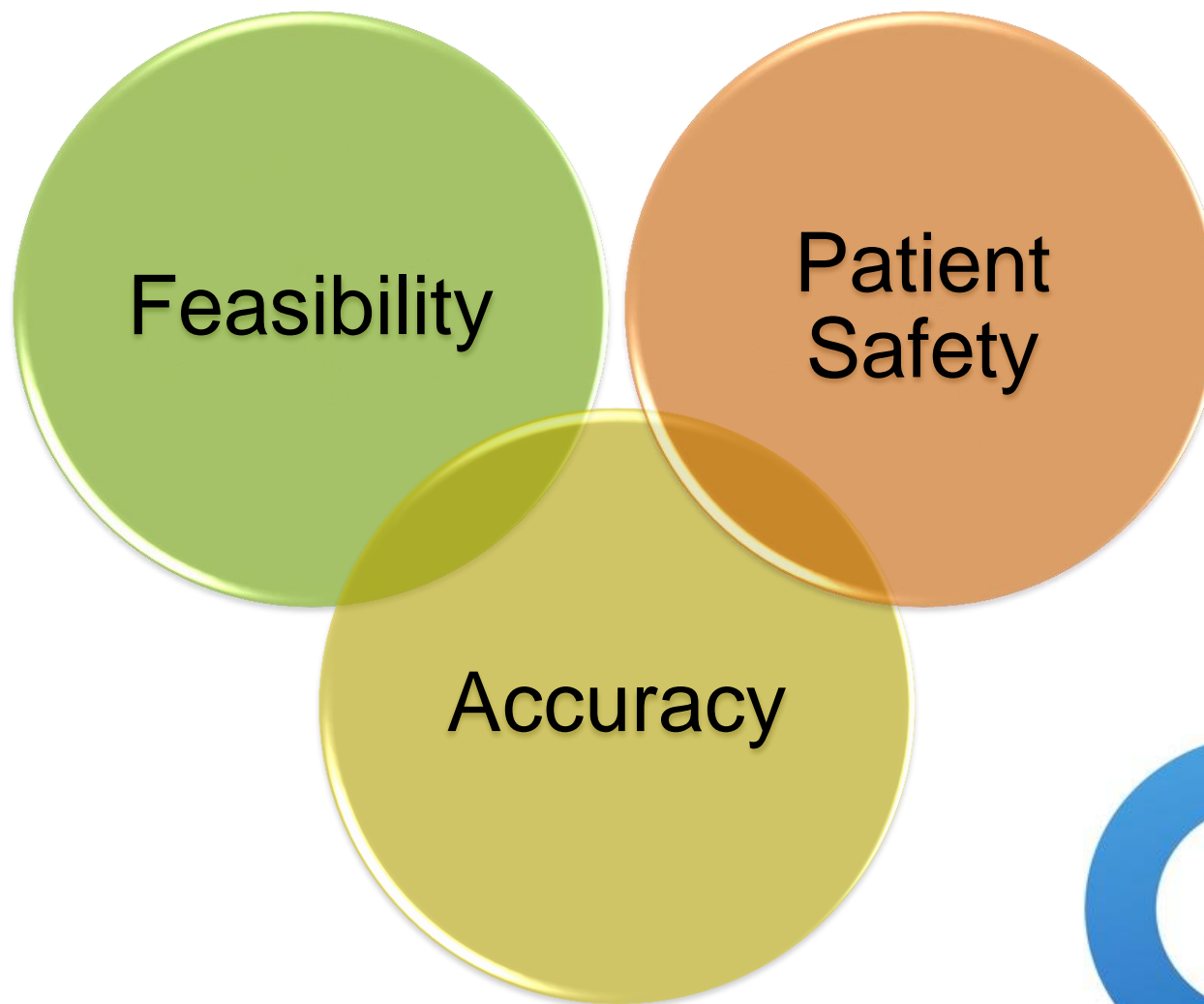
Increases safety of secondary complications due to repositioning

Good workflow with team

VPS® Technology safe and reliable

Easy to incorporate with minimal learning curve

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TM

ARROW[®]
NEVER SETTLE™

Thank You

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