

Central venous line for injection with powerinjector



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Your experience?

Do you ever use central venous catheters
for injection of cm with powerinjector?

Do you have local guidelines for "off-label
use" CVC-Powerinjection of cm?

Do you know who is responsible in case of
adverse event?

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Risks & benefit

Weigh up the risks and benefits between

- 1-the (modest) risk of CVC damage and
- 2-the risk of failing to obtain a diagnostic quality scan (with the associated detriment to clinical decision-making regarding patient management)



The use of central venous catheters for intravenous contrast injection for CT examinations.

Plumb, Br J Radiol 2011

”...summarises the available evidence for the safe and effective use of these devices...”

”The use of CV lines for power injection of CM is feasible and safe as long as certain precautions are taken. The 1% adverse events... lead to no patient harm and only require catheter replacement to rectify.



”Following a strict safety protocol there were no complications associated with power injections of contrast material containing 400mg iodine/ml with preset flow rates up to 5ml/s ...”

”104 examinations with 16G lumen of the Arrow central venous catheters were evaluated”



Responsibility

- Manufacturerer: if CVC is used as CE-approved
- Deptm of Rad: if ”off label use” is in line with local Guideline.
- Dr/nurse: personal responsibility for any other ”off label use”!

Why CVC for cm with powerinjector?

When CVC is present in:

- children
- ICU-patients
- - peripheral access is difficult

17 y.o. girl with cancer

Traumatized by long hospital stay. Recurrent abdominal pain, CT-abd



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When is the powerinjector needed?

CTA

- Pulmonary embolism
- Dissection of aorta
- Aneurysm intracranially or elsewhere

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Local test Uppsala

Can CVC handle the pressure in vitro?

Xenetix / Omnipaque 350 mg Iodine/ml

Room temperature (25° C)

60 ml/injection

Powerinjector Medrad IPX1

Max pressure: 325 PSI

Injection rate: 2-4-6-8-10 ml/s

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Test setup

- Powerinjector
- Standars lines from injector
- CVC
- Paper around CVC
- Tip of CVC in bottle



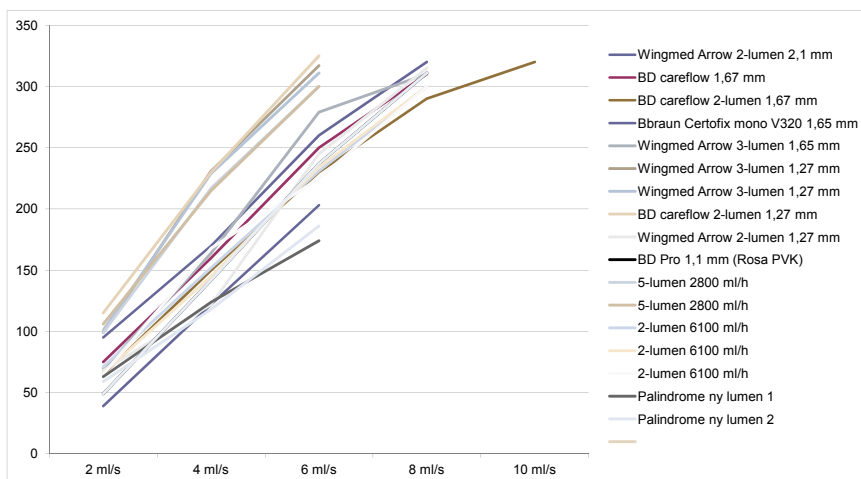
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CVC tested straight and bent



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Results Pressure vs speed of flow



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Results

Test with speed of flow ≤ 6 ml/s

- One type of CVC ruptured repeatedly
 - (Bard Hickman/Baroviak)
- All other tested CVC - no sign of ruptur
- Pressure in Powerinjector < 325 psi



Recommendations

- Use CVC tested by manufacturer for use with powerinjector!!!
 - Write local guidelines for "off label use"
 - Test the CVC's used at your hospital
 - Use relevant tests from other institutions
 - Information to CT-staff and referring units

Guidelines Uppsala for "off label use" (CVC-powerinjector)

Off-label use may be done with the following CVC's:

- Arrow 3-lumen (Wingmed)
- Arrow 2-lumen (Wingmed)
- Bbraun Certofix mono V320
- BD careflow 7Fr 2-lumen

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Guidelines Uppsala for "off label use" (CVC-powerinjector)

Precautions:

- Speed of injection ≤ 6 ml/s
- CVC not older than 2 weeks
- Injection and aspiration through CVC can be done without resistance
- Correct position of CVC verified recently
- Temperature of cm $\geq 30^{\circ}$ C

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Conclusion

Approved CVC exist, use them if possible

- Is it safe when following guidelines?
 - Our testing - YES
 - Others testing - YES
 - If you abide guidelines!
- When is bending the rule advantageous for the patient?
 - Any CT with cm affecting patient care
 - CTA
 - Adverse effects are rare and seldom serious

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Look where it ruptures!



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