


## PERIPHERAL VENIPUNCTURE

Andreas Kurtz,  
Group Product Manager Internal Medicine & Anesthesia,  
B. Braun Vet Care GmbH



**B. BRAUN**  
SAFER IS EXPERTISE

## IV CATHETER – IN A NEW PERSPECTIVE

**B. BRAUN**  
SAFER IS EXPERTISE

### Phlebitis

Most common complication in IV therapy.

**Definition:**

- Inflammation of the vein, that can cause a thrombosis (Thrombo-phlebitis).
- Symptoms: local warmth, pain on palpation, redness, swelling.

**Causes are**

- Chemical,
- Mechanical or
- Bacterial.


B. Braun Vet Care GmbH 3

**B. BRAUN**  
SAFER IS EXPERTISE

### Optimize and increase indwelling time

8 facts influence the indwelling time of a peripheral IV catheter (IVC):

1. Puncture site,
2. Sharpness of the needle,
3. Performance of catheter during venipuncture,
4. Correct catheter size,
5. Catheter material,
6. Care and maintenance of the IVC,
7. Hygiene,
8. Manipulations in the IV system.



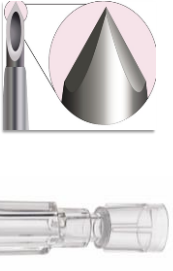
B. Braun Vet Care GmbH 4

**B BRAUN**  
SMART-ING EXPERTISE

## 2. Sharpness of needle bevel

The **super-sharp** back cut bevel offers different advantages:

- Wide choice of insertion angle, this helps to access difficult veins
- High puncture success with less forces

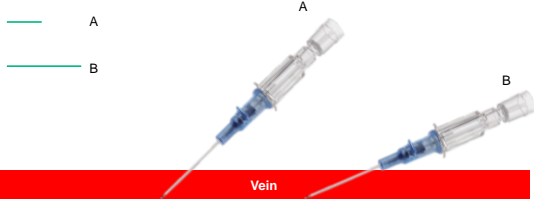


B. Braun Vet Care GmbH

**B BRAUN**  
SMART-ING EXPERTISE

## 2. Needle sharpness


The sharper the needle, the smaller is the angle for venipuncture. The smaller the angle, the longer is the way through the vein. The longer the way, the higher is a successful venipuncture rate.



B. Braun Vet Care GmbH

**B BRAUN**  
SMART-ING EXPERTISE

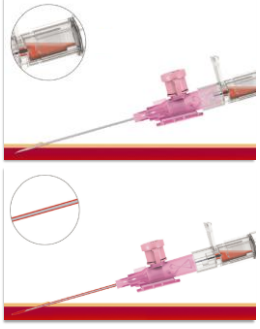
## 3. Performance of catheter during venipuncture



B. Braun Vet Care GmbH

**B BRAUN**  
SMART-ING EXPERTISE

## 3. Performance of catheter during venipuncture



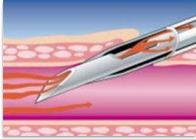
B. Braun Vet Care GmbH

**B. BRAUN**  
SMART-ING EXCELLENCE

### Notched Needle Flashback Technology

If a catheter has a notched needle, blood will fill the IV catheter after needle insertion.

- Result: loss of secondary flashback → No confirmation, that the IVC is placed correctly
- Maybe useful in small veins, which have a lower blood pressure



Source: www.bd.com, 2012-06-28

B. Braun Vet Care GmbH 9

**B. BRAUN**  
SMART-ING EXCELLENCE

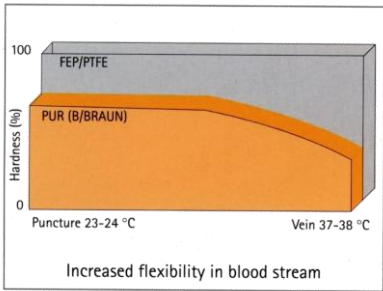
### 5. Catheter material



B. Braun Vet Care GmbH 10

**B. BRAUN**  
SMART-ING EXCELLENCE

### 5. Catheter material



Increased flexibility in blood stream

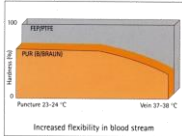
B. Braun Vet Care GmbH 11

**B. BRAUN**  
SMART-ING EXCELLENCE

### 5. Catheter material

Disadvantages FEP

- Higher risk for mechanical thrombophlebitis, due to the stiff tip of the catheter
- Less convenience for the patient, feels the catheter in the vein when placed in neighbourhood of a flexion point.



Increased flexibility in blood stream

B. Braun Vet Care GmbH 12

**5. Catheter material**

**Advantages PUR**

- Reduced risk for mechanical thrombophlebitis, due to the softness of the catheter in the warm blood
- Longer indwelling performance
- Better kink-resistance

The VasoVet and IntroVet IV catheters are made of Polyurethane.

B. Braun Vet Care GmbH 13

**What else is in there?**  
**Bevel Indicator**

- In IntroVet and IntroVet-W only
- Ensures, that needle-bevel is always in the correct position
- Necessary for successful venipuncture

AESCULAP | B. Braun VetCare

**6. Care and maintenance of the IVC**

B. Braun Vet Care GmbH 15


**6. Care and maintenance of the IVC**

Saline flush? Extension line?  
Back-check-valve?  
Stylet? Nothing special, close with a cap?  
Heparin flush?

B. Braun Vet Care GmbH 16

**B. BRAUN**  
SMART-ING EXPERTISE

### Caresite – Luer Access Device




B. Braun Vet Care GmbH 17

**B. BRAUN**  
SMART-ING EXPERTISE

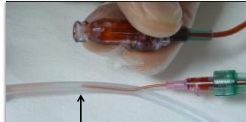
### Caresite – Positive displacement volume

Moment of disconnection



Flush solution

After disconnection



Catheter tip

B. Braun Vet Care GmbH 18

**B. BRAUN**  
SMART-ING EXPERTISE

### Caresite – Positive displacement volume

Robert- Koch- Institute Germany:

...immediately after placing the IVC, a sterile extension set should be connected. This should allow an aseptic flushing and blockade of the IVC. The line should be closed with a swabbable, desinfectable valve. ...like Caresite®.

Quelle: Bundesgesundheitsamt 2017. 40307-015. DOI: 10.1007/978-3-7081-2488-9. Online published: 16. Januar 2017. © Springer-Verlag Berlin Heidelberg 2017.


B. Braun Vet Care GmbH 19

**B. BRAUN**  
SMART-ING EXPERTISE

### 8. Manipulations in the IV system

Why is a manipulation needed?


- Change IV fluid,
- Give medication,
- Air in line,
- ...
- 



B. Braun Vet Care GmbH 20


**B. BRAUN**  
SMART-ING EXPERIENCE

## IV sets with "Air Stop" membrane



Special IV sets have an „Air Stop“ membrane in their drip chamber.

- Hydrophilic membrane → air can't pass through, when the filter is wet.
- E.g., available in B. Braun **Intrafix® SafeSet**.



B. Braun Vet Care GmbH 21

**B. BRAUN**  
SMART-ING EXPERIENCE


## Summary: How to prevent phlebitis?

- Aseptic conditions during venipuncture, drug admixture, infusion preparation and manipulations at the IV system.
- Reduce manipulations in the IV system to a minimum.
- Maintain hygienic conditions at the venipuncture site, e.g. aseptic changes of dressing every 24 hrs.; remove coagulated blood at the venipuncture site, ...
- Change IV site every 72 hrs.

- Choose biggest possible vein and smallest possible IV catheter (acc. to therapy needs) for IV access.
- **No** standard catheter size acc. to patients bodyweight.
- Use IV catheter with PUR capillary.
- Avoid flexion areas for IV access.

B. Braun Vet Care GmbH 22

**B. BRAUN**  
SMART-ING EXPERIENCE




QUESTIONS ?  
EXPERIENCE THE PRODUCTS...

See you at our booth,  
Aisle 200 **cp**medical

© by Andreas Kuntz

B. Braun Vet Care GmbH  
Am Aesculap Platz 1  
78532 Tuttlingen  
Germany  
0049 171 835 2868  
[cp@braunvetcare.com](mailto:cp@braunvetcare.com)

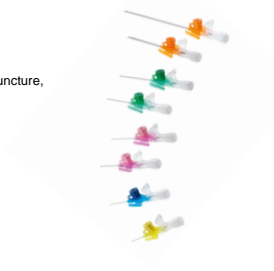


**B. BRAUN**  
SMART-ING EXCELLENCE

## Optimize and increase indwelling time

8 facts influence the indwelling time of a peripheral IV catheter (IVC):


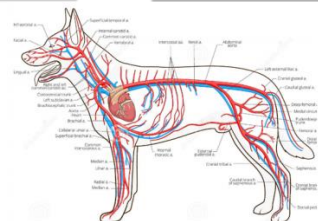
1. Puncture site,
2. Sharpness of the needle,
3. Performance of catheter during venipuncture,
4. Correct catheter size,
5. Catheter material,
6. Care and maintenance of the IVC,
7. Hygiene,
8. Manipulations in the IV system.



B. Braun Vet Care GmbH 25

**B. BRAUN**  
SMART-ING EXCELLENCE

## 1. Puncture site

B. Braun Vet Care GmbH 26

**B. BRAUN**  
SMART-ING EXCELLENCE

## 1. Puncture site

In general:

- The vessel shall accommodate the gauge and length of the catheter required for prescribed therapy.
- Site selection for IVC shall include:
  - Condition of the vessel at the insertion site and proximal to its
  - History of previous venipunctures and access devices
  - Type and duration of infusion therapy

B. Braun Vet Care GmbH 27

**B. BRAUN**  
SMART-ING EXCELLENCE

## 1. Puncture site

### Areas to avoid


- The areas to avoid are:
  - Areas of flexion
  - Areas of pain on palpation
  - Veins that are compromised (e.g. infiltrated, phlebotic, sclerosed or corded)
  - Areas of planned procedures
  - On or near infection, phlebitis area
  - Small superficial veins
  - Area of haematoma
  - Edematous area
  - Area of previous venipuncture

Source: Journal of Infusion Nursing Standards of Practice Vol.34 Jan/2011

B. Braun Vet Care GmbH 28

**B BRAUN**  
SMART-ING EXPERTISE


4. Choose the correct catheter size



B. Braun Vet Care GmbH 29

**B BRAUN**  
SMART-ING EXPERTISE

4. Choose the correct catheter size




- Catheter size in „Gauge“.
- G-size gives an information about diameter and length.
- The bigger the number, the smaller is the catheter.
- Diameter and length are responsible for the resistance / flow rate.
- Gauge coding as colour and number on the package.

B. Braun Vet Care GmbH 30

**B BRAUN**  
SMART-ING EXPERTISE

What is the consequence, if the IVC is too big in diameter?

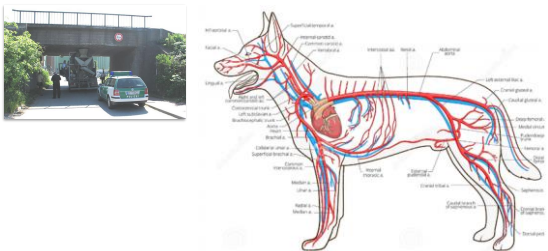


Source: 30.07.2013, <http://blau.kit.harvesta.de/stalbund.de/2009/07/03/ivc-fahrt-sich-unter-bruecke-azp/>

B. Braun Vet Care GmbH 31

**B BRAUN**  
SMART-ING EXPERTISE

4. Choose the correct catheter size



B. Braun Vet Care GmbH 32



## 4. Choose the correct catheter size

- Why is the IVC needed? Required flowrate, blood withdrawn, ...
- Choose catheter diameter acc. to vein situation of patient.
- Check vein, when tourniquet is open!
- No standardisation acc. to patient, e.g. dogs >15kg G18, dogs <15kg G20, etc.
- Choose the smallest possible IVC and the biggest (in diameter) possible vein.

## 4. Choose the correct catheter size

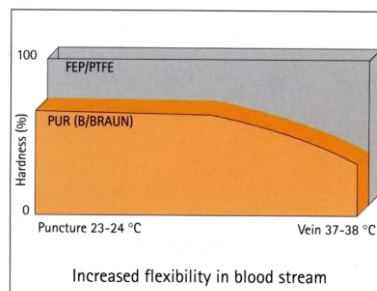
G14	340ml/min
G16	215ml/min
G17	128ml/min
G18	100ml/min
G20	60ml/min
G22	35ml/min
G24	22ml/min

Flowrates of IVCs under gravity administration.  
With pressure infusion higher flowrates are possible.

## 5. Catheter material



## 5. Catheter material



**B. BRAUN**  
SAFETY AND EXPERTISE

### 5. Catheter material

Disadvantages FEP

- Higher risk for mechanical thrombophlebitis, due to the stiff tip of the catheter
- Less convenience for the patient, feels the catheter in the vein when placed in neighbourhood of a flexion point.

Easier to handle in production, less know-how needed → low quality products often in FEP only.

Increased flexibility in blood stream

B. Braun Vet Care GmbH 37

**B. BRAUN**  
SAFETY AND EXPERTISE

### 5. Catheter material

Advantages PUR

- Reduced risk for mechanical thrombophlebitis, due to the softness of the catheter in the warm blood
- Longer indwelling performance
- Better kink-resistance

The VasoVet and IntroVet IV catheter are made of Polyurethane.

Increased flexibility in blood stream

B. Braun Vet Care GmbH 38

**B. BRAUN**  
SAFETY AND EXPERTISE

### 6. Care and maintenance of the IVC

B. Braun Vet Care GmbH 39

**B. BRAUN**  
SAFETY AND EXPERTISE

### 6. Care and maintenance of the IVC

Saline flush?      Extension line?

Back-check-valve?


Stylet?      Nothing special, close with a cap?

Heparin flush?

B. Braun Vet Care GmbH 40

**B. BRAUN**  
SMART-ING EXPERTISE

### Caresite – Luer Access Device

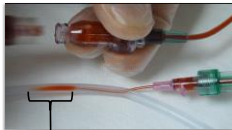


B. Braun Vet Care GmbH 41

**B. BRAUN**  
SMART-ING EXPERTISE

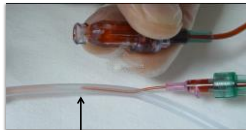
### Caresite – Positive displacement volume

Moment of disconnection



Flush solution

After disconnection



Catheter tip

B. Braun Vet Care GmbH 42

**B. BRAUN**  
SMART-ING EXPERTISE

### Caresite – Positive displacement volume

Recommendation from Robert- Koch- Institute (RKI), Germany:


...immediately after placing the IVC, a sterile extension set should be connected. This should allow an aseptic flushing and blockade of the IVC. The line should be closed with a swabbable, disinfectable valve.\* ...like Caresite®.

Quelle: Bundesgesundheitsbl 2017 | 60:207-215. DOI 10.1007/s00127-016-2488-9. Online published: 16. Januar 2017. © Springer-Verlag Berlin Heidelberg 2017.

FYI:  
„RKI“ is the German „CDC“

**B. BRAUN**  
SMART-ING EXPERTISE

### 7. Hygiene in the entire process



Which hygienic conditions helps to use an IVC longer and helps to prevent complications?

B. Braun Vet Care GmbH 44

## 7. Hygiene in the entire process



B. Braun Vet Care GmbH

## 7. Hygiene in the entire process



B. Braun Vet Care GmbH

46

## 8. Manipulations in the IV system

Why is a manipulation needed?

- Change IV fluid,
- Give medication,
- Air in line,
- ...
- 

B. Braun Vet Care GmbH

47

## IV sets with "Air Stop" membrane

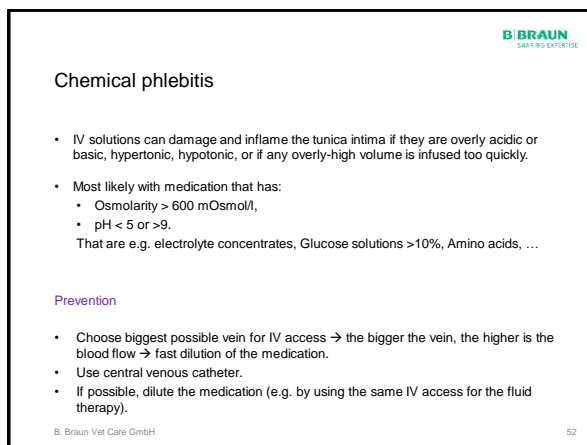
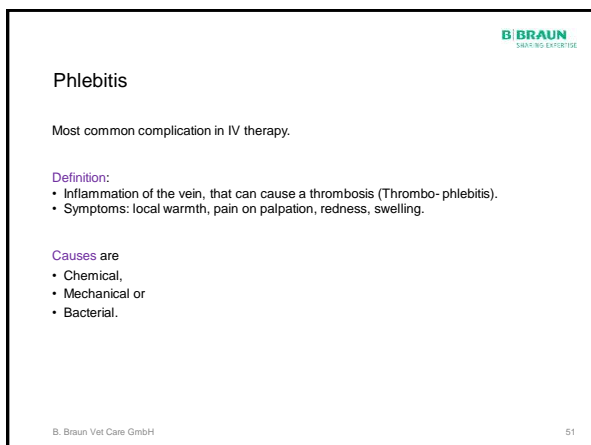
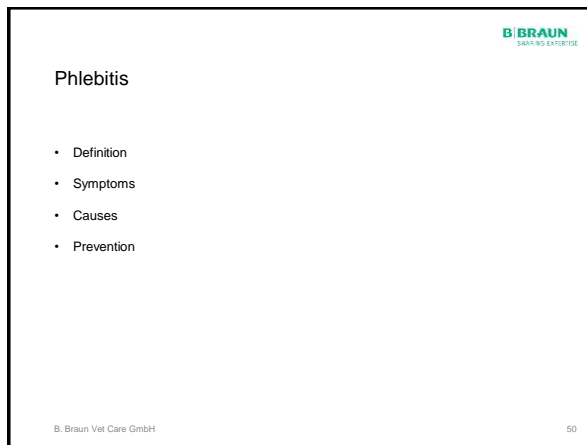
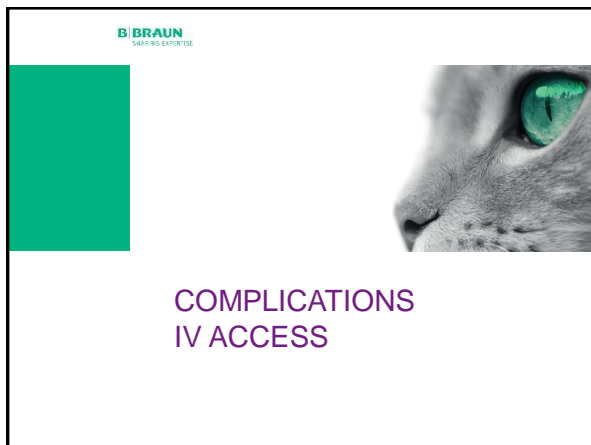


Special IV sets has an „Air Stop“ membrane in their drip chamber.

- Hydrophilic membrane → air can't pass through, when the filter is wet.
- E.g. available in B. Braun Intrafix® SafeSet.

B. Braun Vet Care GmbH

48



### Mechanical phlebitis

- This phlebitis results when the catheter tip repeatedly scrapes the tunica intima during patient movement.
- Caused by the IV catheter:
  - FEP catheter material,
  - Catheter too big in diameter or vein too small in diameter,
  - Catheter placed near by a flexion point,
  - Weak fixation of IV catheter.

#### Prevention

- Choose biggest possible vein and smallest possible IV catheter for IV access.
- **No** standard catheter size acc. to patients bodyweight.
- Use IV catheter with PUR capillary.
- Avoid flexion areas for IV access.
- Fix the catheter in a way, that it can not move in and out by itself.
- Many attempts and manipulations, when placing the IV catheter.

### Bacterial phlebitis

- Caused by an infection at the puncture site, of the IV catheter or a contamination of the given medication .

#### Prevention

- Aseptic conditions during venipuncture, drug admixture, infusion preparation and manipulations at the IV system.
- Reduce manipulations in the IV system to a minimum.
- Maintain hygienic conditions at the venipuncture site, e.g. aseptic changes of dressing every 24 hrs., remove coagulated blood at the venipuncture site, ...
- Change IV site every 72 hrs.

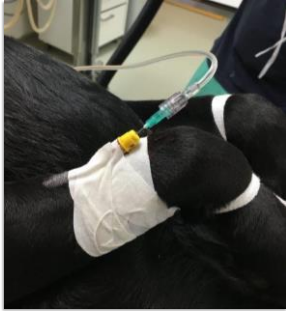
### Phlebitis score

IV Site appears healthy	0	No sign of phlebitis OBSERVE CATHETER
One of the signs is evident: • Slight pain near IV site or • Slight redness near IV site	1	Possibly first signs of phlebitis OBSERVE CATHETER
Two of the signs are evident: • Pain at IV site • Redness • Swelling	2	Early stage of phlebitis RESITE CATHETER
All of the following signs are evident: • Pain along path of catheter • Redness around site • Swelling	3	Medium stage of phlebitis RESITE CATHETER CONSIDER TREATMENT
All of the following signs are evident and extensive: • Pain along path of catheter • Redness around site • Swelling • Palpable venous cord	4	Advantage stage of phlebitis or the start of thrombophlebitis RESITE CATHETER CONSIDER TREATMENT
All of the following signs are evident and extensive: • Pain along path of catheter • Redness around site • Swelling • Palpable venous cord • Pyrexia	5	Advantage stage of thrombophlebitis RESITE CATHETER INITIATE TREATMENT

### Other complications

Complication	Recommendation
<b>Infiltration:</b> When a non-vesicant medication/ solution leaks into the subcutaneous tissue instead of the vein	<ul style="list-style-type: none"> <li>• Stop infusion at once</li> <li>• Remove catheter immediately</li> <li>• Assess extend and volume of infused solution</li> <li>• Treat according to local policy</li> <li>• Document in patient's notes</li> </ul>
<b>Extravasation:</b> When a vesicant medication/ solution leaks into the subcutaneous tissue instead of the vein	<ul style="list-style-type: none"> <li>• Stop infusion at once</li> <li>• Leave catheter in-situ</li> <li>• If possible, withdraw the drug</li> <li>• If possible, elevate limb to reduce oedema</li> <li>• Advise patient to exercise joints</li> <li>• Subsequent management depends on the drug involved and the degree of damage</li> <li>• Treat according to local policy</li> <li>• Document in patient's notes</li> </ul>
<b>Haematoma:</b> When blood has leaked from a vein/artery into the surrounding tissue	<ul style="list-style-type: none"> <li>• Remove the device immediately</li> <li>• Apply pressure until bleeding stops</li> <li>• If appropriate, elevate limb</li> <li>• Apply ice pack if necessary</li> <li>• Do not reapply tourniquet to affected limb</li> <li>• Document in patient's notes</li> </ul>

Problems in process



Problems in process




Problems in process



Problems in process




**B. BRAUN**  
SMART-ING EXPERTISE



**B. BRAUN  
CATHETER FAMILY**


**B. BRAUN**  
SMART-ING EXPERTISE

### Dedicated Vet IV Catheter




**VasoVet®**

- PUR capillary
- Double flashback
- Injection port
- Stabilisation platform with fixation wings
- G 24 - 18 & G 14



**IntroVet®**

- PUR capillary
- Double flashback
- G24 - 14




**IntroVet® - W**

- PUR capillary
- Double flashback
- Fixation wings
- G24 - 14

B. Braun Vet Care GmbH 62

**B. BRAUN**  
SMART-ING EXPERTISE



**B. BRAUN  
SAFETY CATHETER  
FAMILY**

**B. BRAUN**  
SMART-ING EXPERTISE

### (Human) Safety IV catheter




- Automatically attaches to and shields the needle bevel
- Minimizes needle stick injuries
- Increased comfort
- No unnecessary or additional procedures to activate the safety mechanism
- Safety mechanism cannot be bypassed or inadvertently activated
- Encourages best practice

B. Braun Vet Care GmbH 64




**B. BRAUN**  
SMARTING EXPERTISE

(Human) Safety IV catheter



**Vasofix® Safety**

- Safety clip
- PUR or FEP capillary
- Double flashback
- Injection port
- Stabilisation platform with fixation wings
- G 24 - G14




**Introcan® Safety & Introcan® W Safety**

- Safety clip
- PUR or FEP capillary
- Double flashback
- With and without fixation wings
- G 24 - G14

B. Braun Vet Care GmbH 65


**B. BRAUN**  
SMARTING EXPERTISE

(Human) Safety IV catheter



**Introcan® Safety 3 – 3rd generation of safety IV catheter**

- Safety clip
- Multiple access septum – prevents blood from leaking out
- PUR capillary
- Double flashback
- Stabilisation platform incl. fixation wings
- G 24 – G14



B. Braun Vet Care GmbH 66