

ESPEN Congress Prague 2007

Key papers in the field of nutrition
Pharmacist

S. Mühlebach

Key papers in the field of nutrition

Pharmacist

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Key paper selected

Clinical Nutrition (2007) 26, 141–144

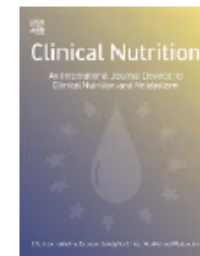


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ORIGINAL ARTICLE

Evaluation of 6 years use of sodium hydroxide solution to clear partially occluded central venous catheters

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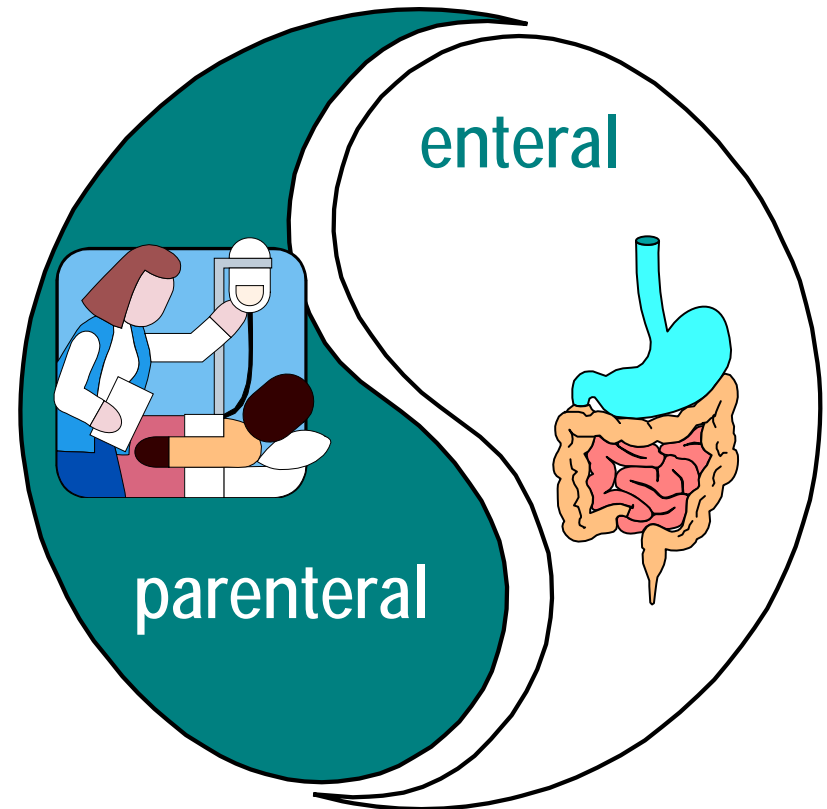
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Layout

- HPN: challenges and outcome factors

Parenteral Nutrition (PN): risk-benefit

- Effective when indicated
- Complications risks
 - **i.v. access**
 - Patients partly more fragile (neonates, critically ill)
 - Aseptic preparation (individualisation)
 - Complex pharmaceutical formulation (disperse system with physico-chemical **instabilities / incompatibilities**)
 - High costs compared to EN
- Multi-professional skills needed (pharmaceutical support)



HPN complications

Episodes per catheter year (95% confidence interval)

Catheter sepsis	0.34 (0.32-0.37)
Catheter occlusion	0.071 (0.059-0.083)
Central vein thrombosis	0.027 (0.02-0.034)
Fluid/electrolyte problems	0.12.- 0.61

Catheter occlusion 2nd most complication in HPN*

Factors on HPN outcome

Diagnosis	1yr survival \approx 90% M. Crohn, ischemic bowel, motility disorders 1yr survival \approx 20%: cancer
Remaining bowel	Permanent intestinal failure, if small bowel < 100cm (adult), < 50cm (child)
Age (at onset)	Survival: children > middle aged > geriatric
Experience supervisors	Mortality: early years program \ll later program
Opiate / sedative dependence	Dependent patients more hospital care, more sepsis

HPN: prevalence

US (1992)

HPN ~ 120 per 10⁶ inhabitants

Neoplasm 40% , M. Crohn 10%
mean duration 60 days (!)

Incidence: 10-20/10⁶/yr

Europe (1997)

HPN ~ 1-13 per 10⁶ inhabitants

Neoplasm 40%
Crohn's disease 20%

Incidence: 1-3/10⁶/yr

N.N., JPEN 2002;26(1 Suppl):1;
A. Van Gossum et al. Clin.Nutrition 1999;18:135
J.W. Puntis, Nutrition 1998;14:809

The Netherland

HPN ~ 5.1 per 10⁶ inhabitants
(≈ 100 totally; two centers)

Short bowel	50%
Motility disorders	30%
(malignancy > 6 m survival estimate ≈ 10%)	
Others	15%

Duration 0.5-336 months (mean 38)
(1970-2004 n=290 patients)

C.F. Jonkers-Schuitema, H.P. Sauerwein
Clin.Nutrition 2005;24:526

Layout

- HPN: challenges and outcome factors
- Study details

Catheter occlusion: patient's profile

Table 1 Patient characteristics.

Characteristics	N	%
<i>Gender</i>		
Male	14	27
Female	31	69
<i>Age at initiation HPN</i>		
< 40 years	12	27
40–60 years	29	64
> 60 years	4	9
<i>Diagnosis</i>		
Mesenteric thrombosis	19	42
Sclerosis of peritoneum	4	9
Crohn's disease	3	7
Radiation enteritis	1	2
Motility disorder	14	31
<i>Reason home parenteral nutrition</i>		
Short bowel	27	60
Malabsorption	6	14
Motility disorder	5	11
Mechanical obstruction	2	4
Other	5	11
<i>Type of catheter</i>		
Port-a-cath [®]	33	74
Pass-port [®]	1	2
Central venous catheter	11	24

Exclusion from evaluation:

Age < 18 y at start HPN

HPN ≤ 3 months

Retrospective information on catheter occlusions

Evaluation over 6 years
(1997-2003)

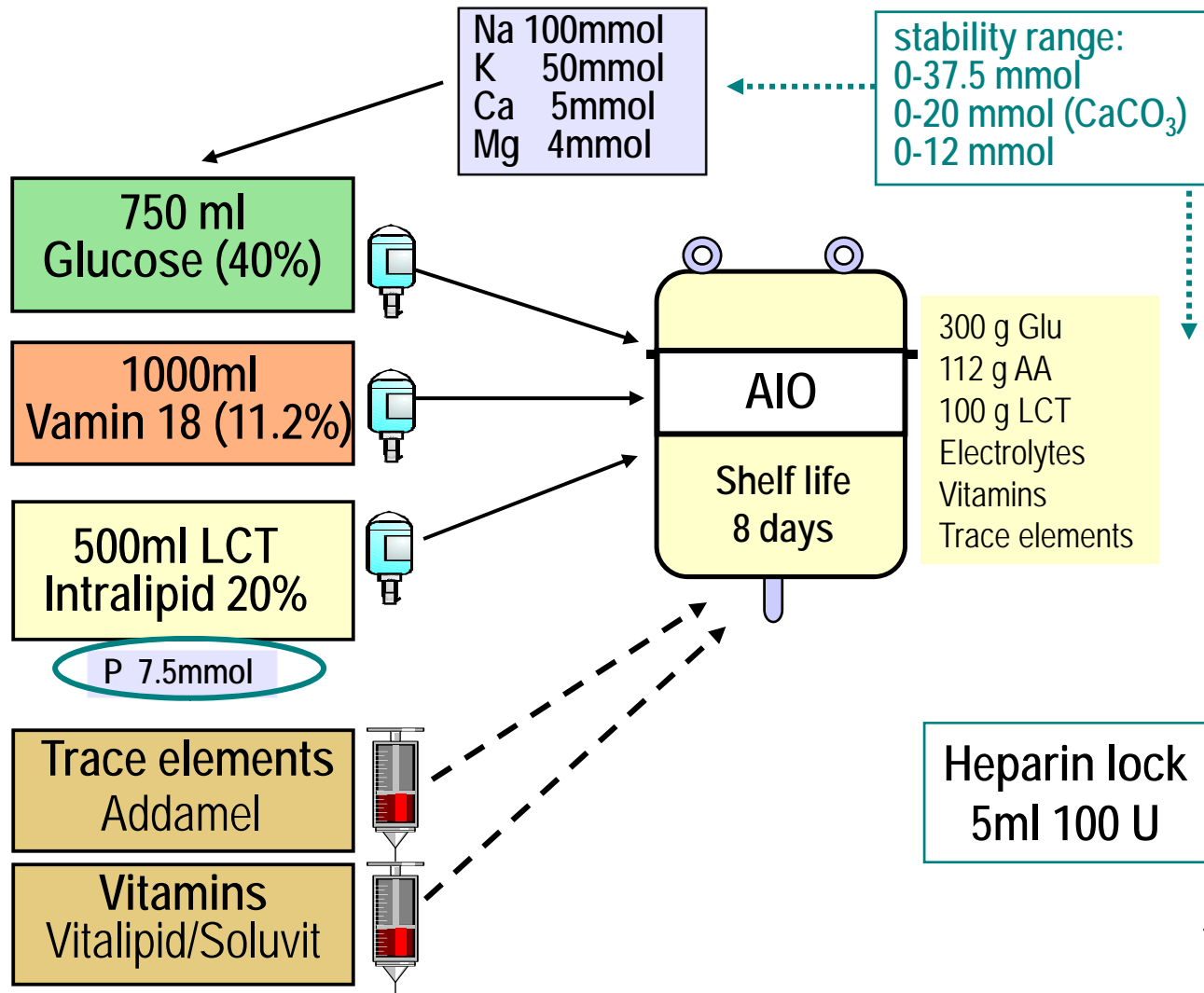
n = 45 patients

17 patients died

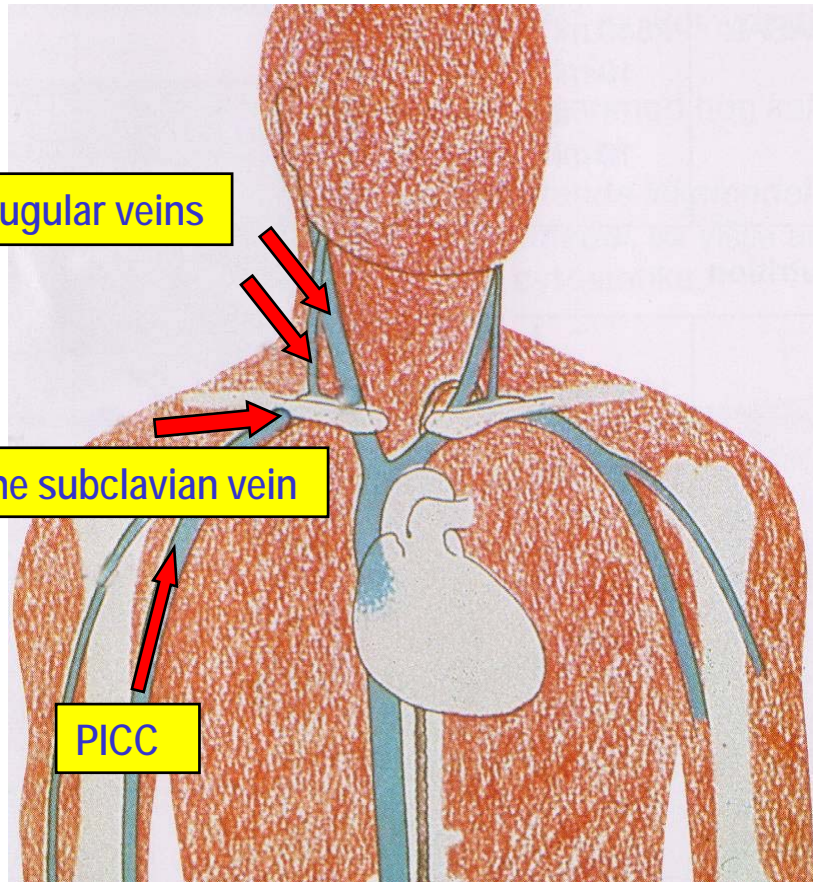
12 patients stopped HPN

PN: pharmacy-compounded (standard) AiO admixture

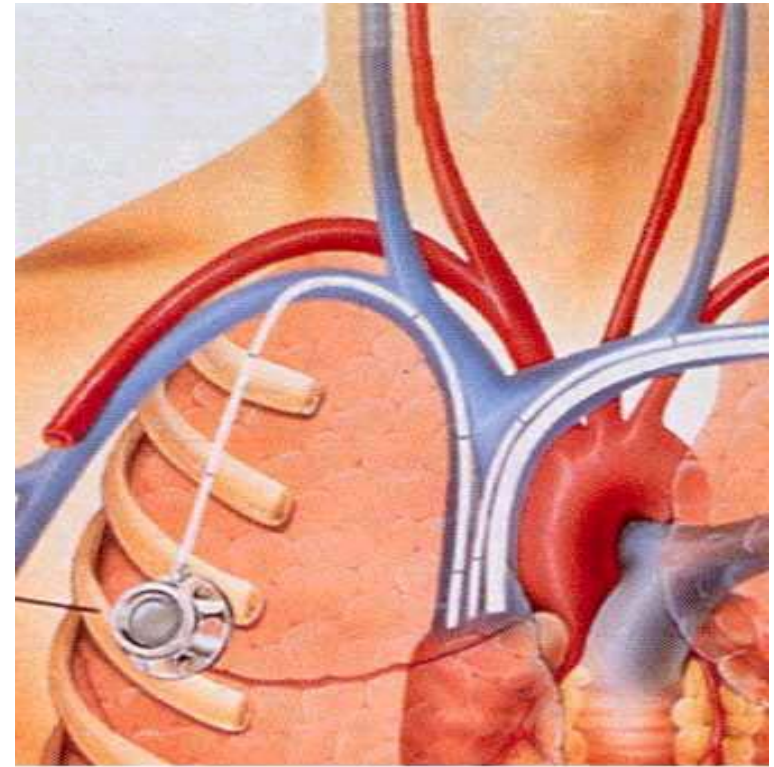
Nutrients



Central venous catheters:



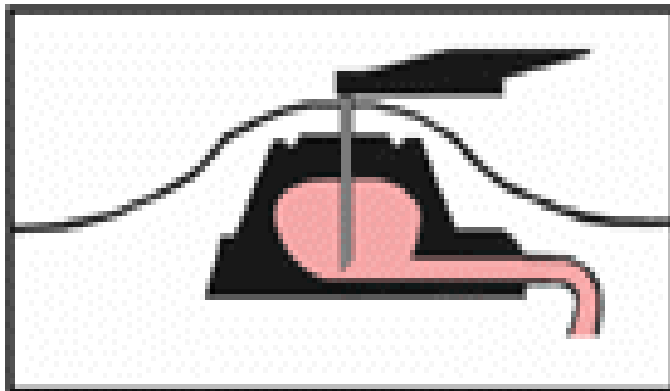
Landmarks for central vein catheterization



Subcutaneous port

Partial occlusion: NaOH treatment

Partial occlusion:
spontaneous flow 25 -59 drops/min
(100 ml 0.9% NaCl)



Catheter evaluated for mechanical occlusion and malposition.

Perfused
10 ml 0.1M NaOH (sterile, pyrogen-free)
rate of 1 ml/h for 10 h
followed by a 2-h lock

Rinsing 0.9% NaCl at the same speed for 3 h
quick flush of 20 ml of 0.9% NaCl

All external connections renewed
500 ml 0.9% NaCl given.

Flow rate measured
if still below 60 drops/min, procedure repeated
(max two extra procedures).

Layout

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- Results

Results

- 130 occlusions (1 occlusion: 221 FD)
in 28 catheters (1-19 per patient)
- 95 (73%) treated with NaOH
- **78% (73/95) effectively cleared ($P < 0.05$; χ^2 test)**
- 22% (22/95) failed
- Procedure repeated 1-6 time (mean 2.6)
- **Use extension:** 32 catheters (7-1592 d; mean 328)
66% (21/32) used for > 3 months
- 11 catheters had to be replaced

Slow i.v. administration of 0.1 m NaOH not hazardous
(catheter degeneration, lab abnormalities, blood pressure, pulse)

Risk factors for occlusion

Table 2 Influence of fat component of the TPN formulation in occluding catheters.

Fat in TPN	Feeding days	Occlusions	Incidence/feeding days
Yes	21,575	129	1 at 167
No	7126	1	1 at 7126

P < 0.05
 RR = 43

Table 3 Influence of calcium of the TPN formulation in occluding catheters.

Calcium (mmol)	Feeding days	Occlusions	Incidence/feeding days
<5	2553	3	1 at 851
5–10	13290	55	1 at 242
> 10	12858	72	1 at 179

RR = 4

Layout

- HPN: challenges and outcome factors
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- Results
- Discussion and conclusions

Catheter occlusion

- Removal often needed
 - Causes:
 - thrombus formation (fibrinolytics: Urokinase[®])
 - lipid deposition
 - drug precipitation
- Ethanol / HCl disappointing results**
NaOH (acts on fibrin and lipids)
highly effective

Occlusion incidence ?

Incidence rate:
4.5 /1000 feeding days

Literature
Incidence rate:
0.65-3.17 /1000 FD
(background information?)

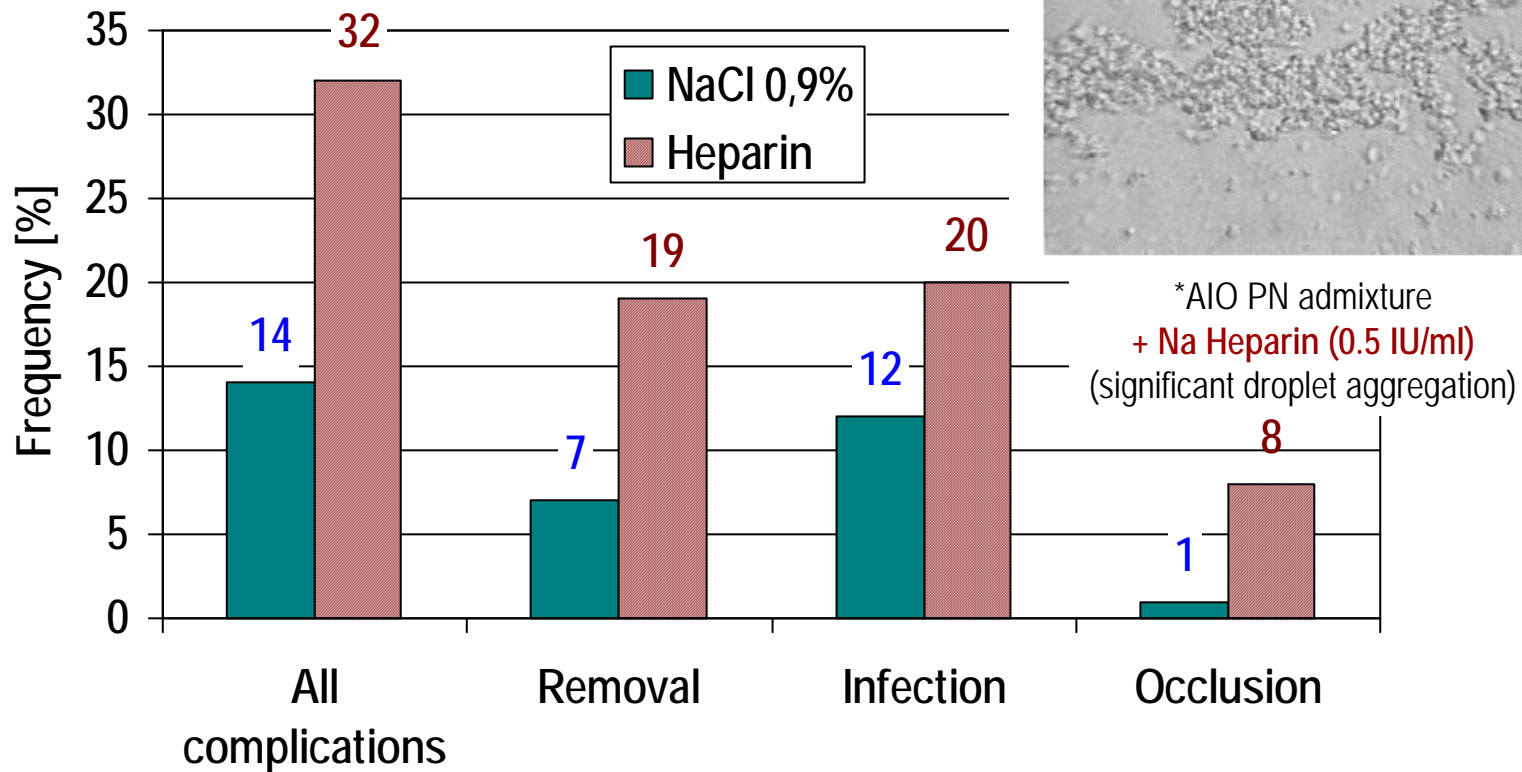
Conclusion

We conclude that perfusion of a partial occluded central venous catheter (defined as 25–60 drops/min) used for parenteral nutrition with 0.1 M NaOH is safe and gives a significant long-term improvement in catheter care, by preventing total occlusion and operative removal.

Layout

- HPN: challenges and outcome factors
- Study details
- Results
- Discussion and conclusions
- Remarks on occlusion incidence

CVC rinsing and catheter complications

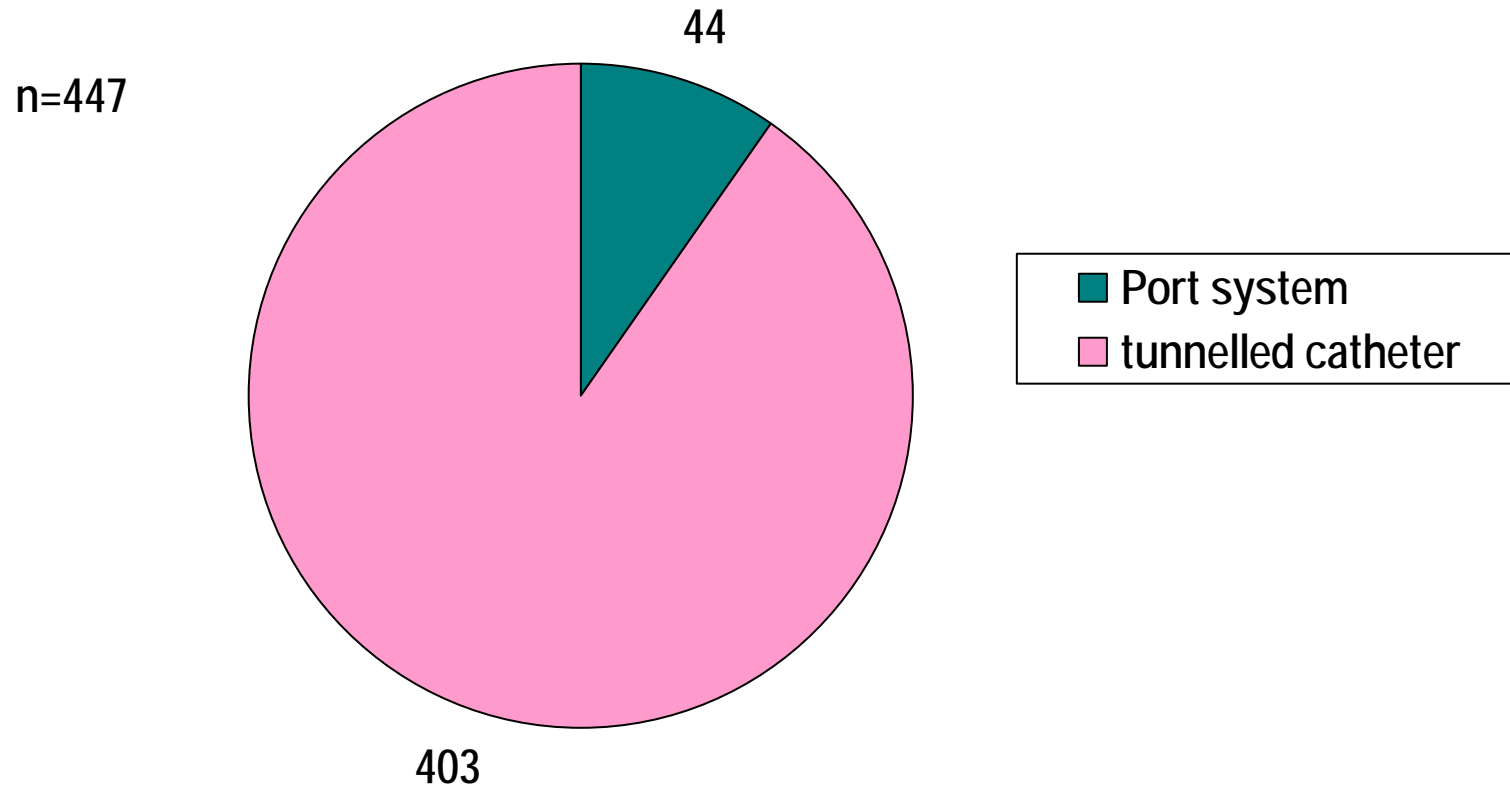


Clin Nutr 2002;21:475 (slide offered by PD Dr. Thul, Charité)

*Thesis C. Gräflin www.unibas.ch/diss/2004/DissB_6720.htm

Heparin for prolonging i.v. catheter use in neonates CD Syst Rev 2005;(4):CD002774 22

Type of catheters



Complication and type of catheter

