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# Right choice of device, the role of the surgeon, complications with ports and PICCs

MaCoVa 15th januari 2020  
Dr. Boudewijn Moors

# Belgian situation

1. Ports → Surgeon
2. Central line → Anesthesiologist
3. PICCs → Surgeon, Anesthesiologist, Radiologist



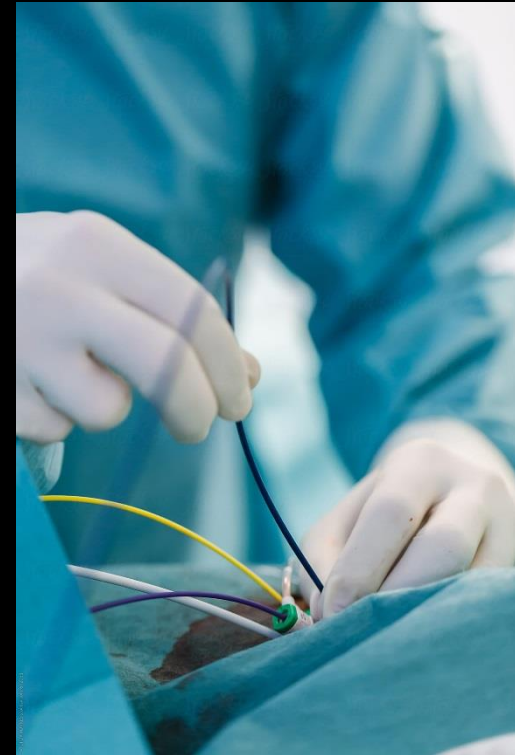
# Shift Central line → PICCs



# Two issues in long term IV access

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1. Complications
2. Right choice of device



# Complications

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1. Surgery related
2. User related
3. Unexpected events



# Complications

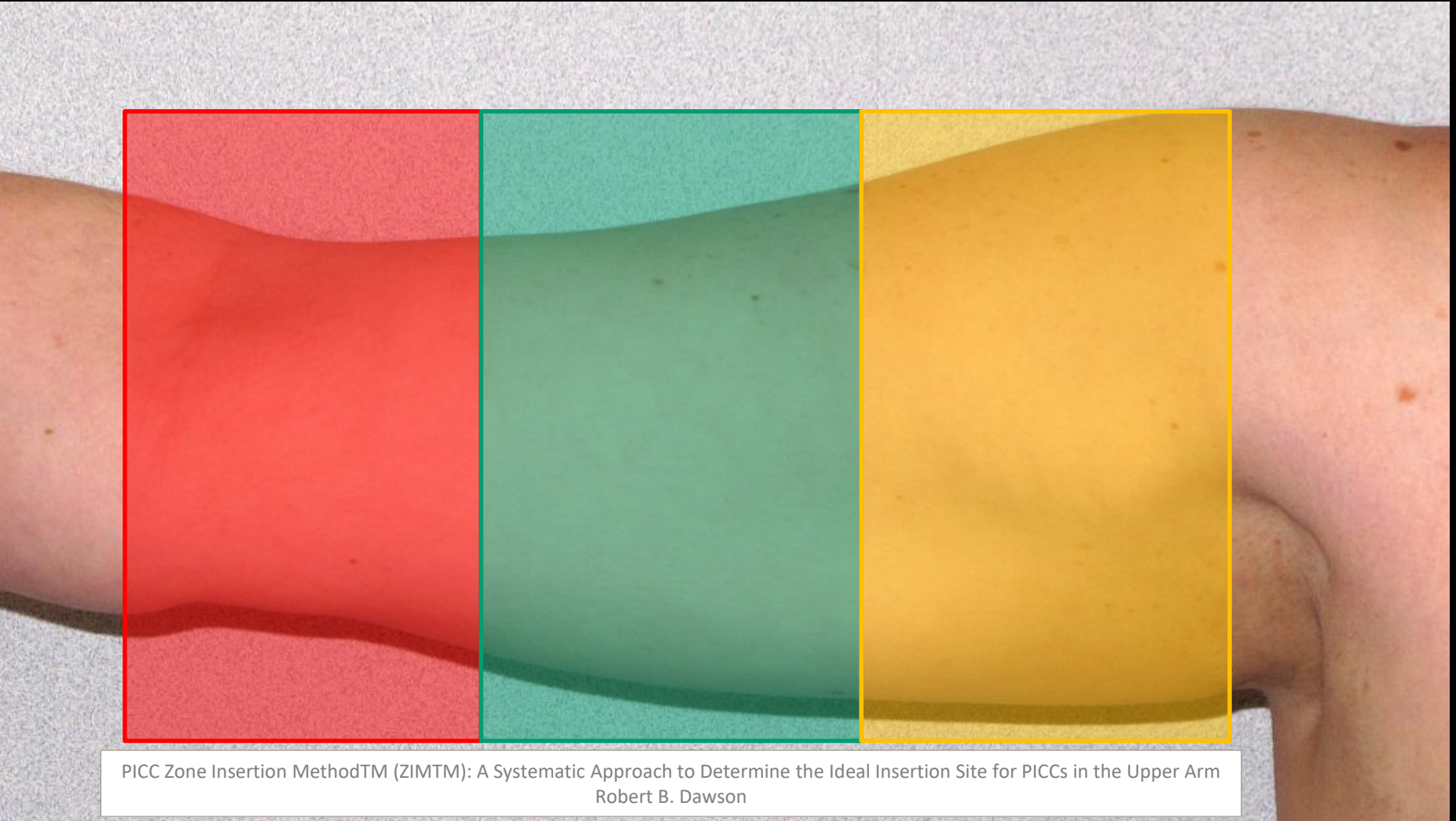
	Ports	PICCs
Surgery related	Infection Pneumo/hemothorax Bleeding	Infection Puncture site bleeding
User related	Infection Occlusion/malfunction Damaging	Infection Occlusion/malfunction Damaging
Unexpected events	Deep vein thrombosis	Deep vein thrombosis Thrombophlebitis Accidental removal

# Role of the surgeon





# Role of the surgeon

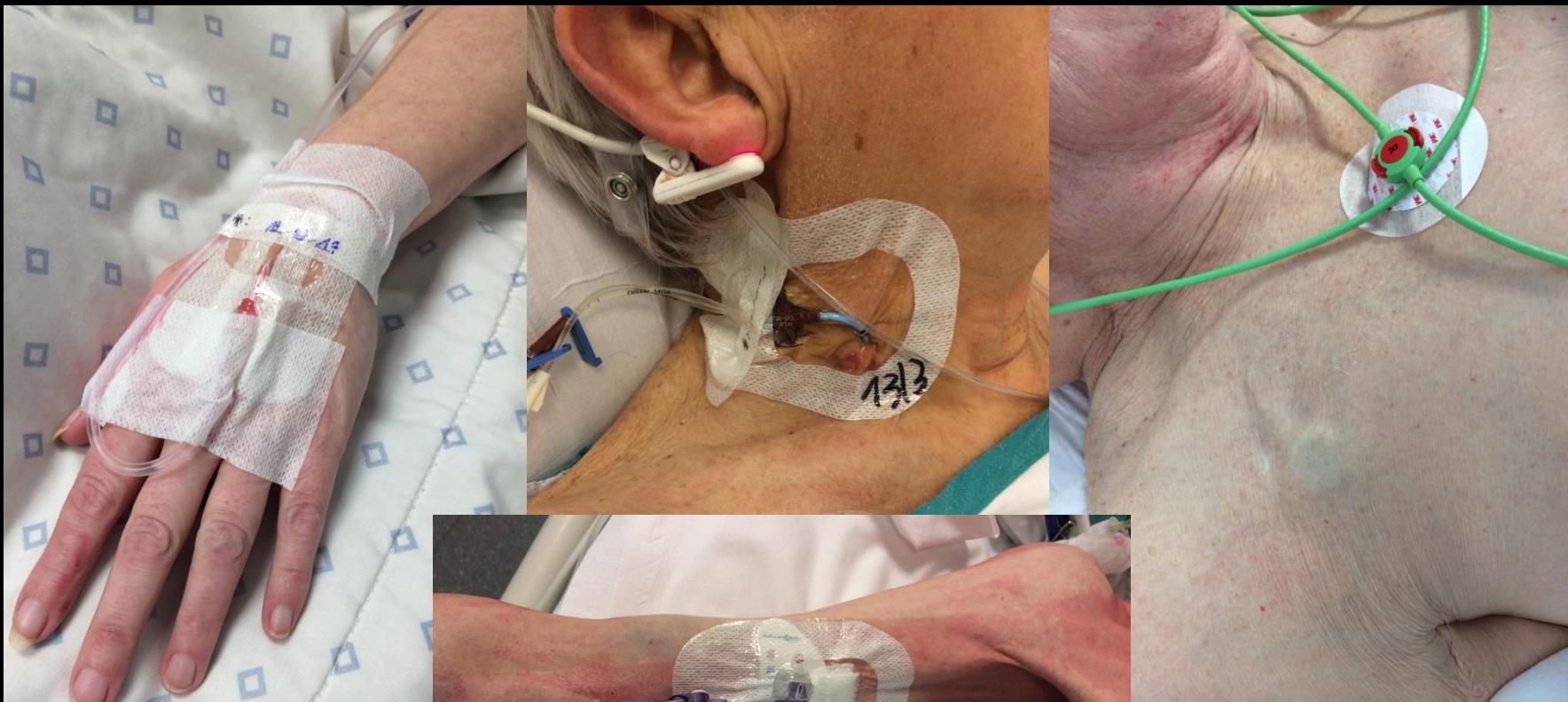


PICC Zone Insertion Method™ (ZIMTM): A Systematic Approach to Determine the Ideal Insertion Site for PICCs in the Upper Arm  
Robert B. Dawson

# Role of the surgeon



# Right choice of device



MPHS VASCULAR ACCESS DEVICE  
SELECTION ALGORITHM

# Vascular Access Device

considerations | as prescribed by physician

This chart is for informational purposes only and is not intended to replace current standards of Care or institutional protocols.

## Beslisboom veneuze toegang

### Infusate characteris

- > Length of
- > Number of
- > Flow rate
- > Need for
- > Patient pre to cope/c
- > Will patie on therap

### Duration of therap

- Doel veneuze
- Infusoploss

### Vascular integrity

- > Risk for insertion complicat
- > Risk for po insertion complicat
- > Potential for change in therap
- > Current or potential activit level of patient

### Diagnostics/ Procedures

### CKD, Dialysis, ESF

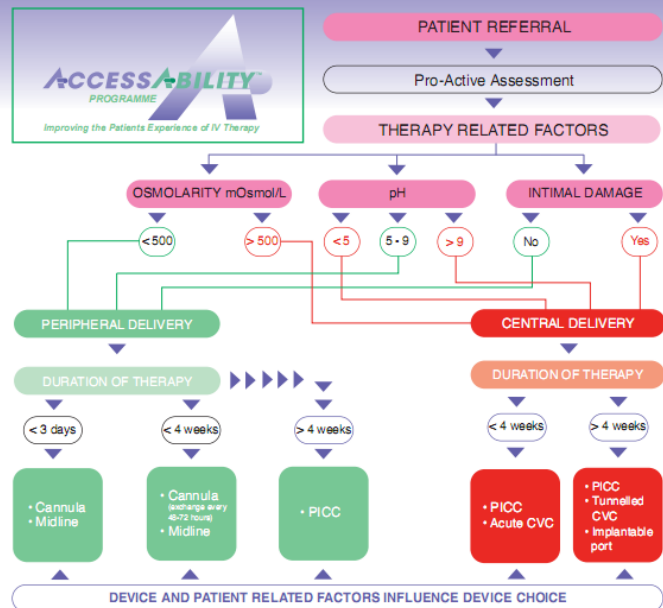


Short Peripheral IV.

Katheterkeu

DRUG	pH	Osmolarity (mOsm/L)	Comment
ACETILCYSTENE	7	NA	
ADENOSINE (adenosine)	6.3-7.3	NA	
ALTEPLASE (tPA)	7.3	315	
AMINOPIRYLINE	6.8-8.0	327	
AMOXICILLIN/CO-AMOXICILAV	6.8-8.8	NA	
AMPHOTERICIN B (Fungizone)	6.5-8.5	NA	
ATENOLOL	6.5-8.5	339	
BENZYLPENICILLIN	6.5-7.5	237-265	
BUMETANIDE	6.8-7.8	493	
CARBOPLATIN	6.8-7.0	94	
CEFTAZIDIME	6.0-7.5	319	
CEFTAZIDIME	6.0-8.0	Isotonic	
CEFTAZIDIME	6.0-6.7	NA	
CEFTIOXIME	6.0-8.5	339	
CICLOPORIN	6.0-7.0	NA	
CIDOFOVIR	7.2	241-392	
CLINDAMYCIN	6.8-7.0	269-355	
CEFTAZIDIME	7.0-8.5	238-268	
DIGOXIN	6.8-7.2	NA	
ERYTHROMYDIN	6.5-7.5	NA	
FLUCLOXACILLIN	6.0-7.0	NA	
FLUCYTOSINE	7.0-7.5	339	
FOLIC ACID (Calcium Leuvelin)	6.5-8.5	NA	
FRUSEMIDE	6.0-8.3	287-291	
GABAPENTRON	6.0-7.0	NA	
HEPARIN SODIUM	6.0-6.0	270-292	
HERCEPTIN (Trastuzumab)	6.4-6.6	NA	
HYDROCORTISONE	7.8-8.5	533	
IFOSFAMIDE	4.5-8.5	NA	
ILOPROST	7.8-8.8	287-291	
IMPENEM	6.8-7.5	NA	
INBULIN	7.7-8.0	Isotonic	
LIPUSOLAL DOXORUBICIN (Liposol)	6.5-8.5	NA	
LORAZEPAM	No hydrogen ions	NA	
MEROPENEM (Meropenem)	7.3-8.3	NA	
MESNA	6.5-8.5	NA	
METHOTREXATE	6.5	Isotonic	
METHYLPREDNISOLONE	7.0-8.0	NA	
METRONIDAZOLE	6.0-7.0	310	
PAMDRONATE DISODIUM	6.3-8.5	NA	
PIPERACILLIN	6.8-7.5	NA	
RALITREXED (Trepstar)	6.0-7.0	NA	
RANTHIONE	6.7-7.3	284	
RIFAMPICIN	7.8-8.8	NA	
RITUXIMAB (MabThera)	6.5-8.5	NA	
SANDOLOXIBLEN	6.8-8.8	NA	
STREPTOKINASE	6.8-7.5	NA	
TEICOPLANIN	7.5	NA	
TRIMETHOPRIM	6	244	
VITAMIN K (phytonadione)	6.8-8.3	NA	
ZOSINEX (Zosyn)	6.8	NA	

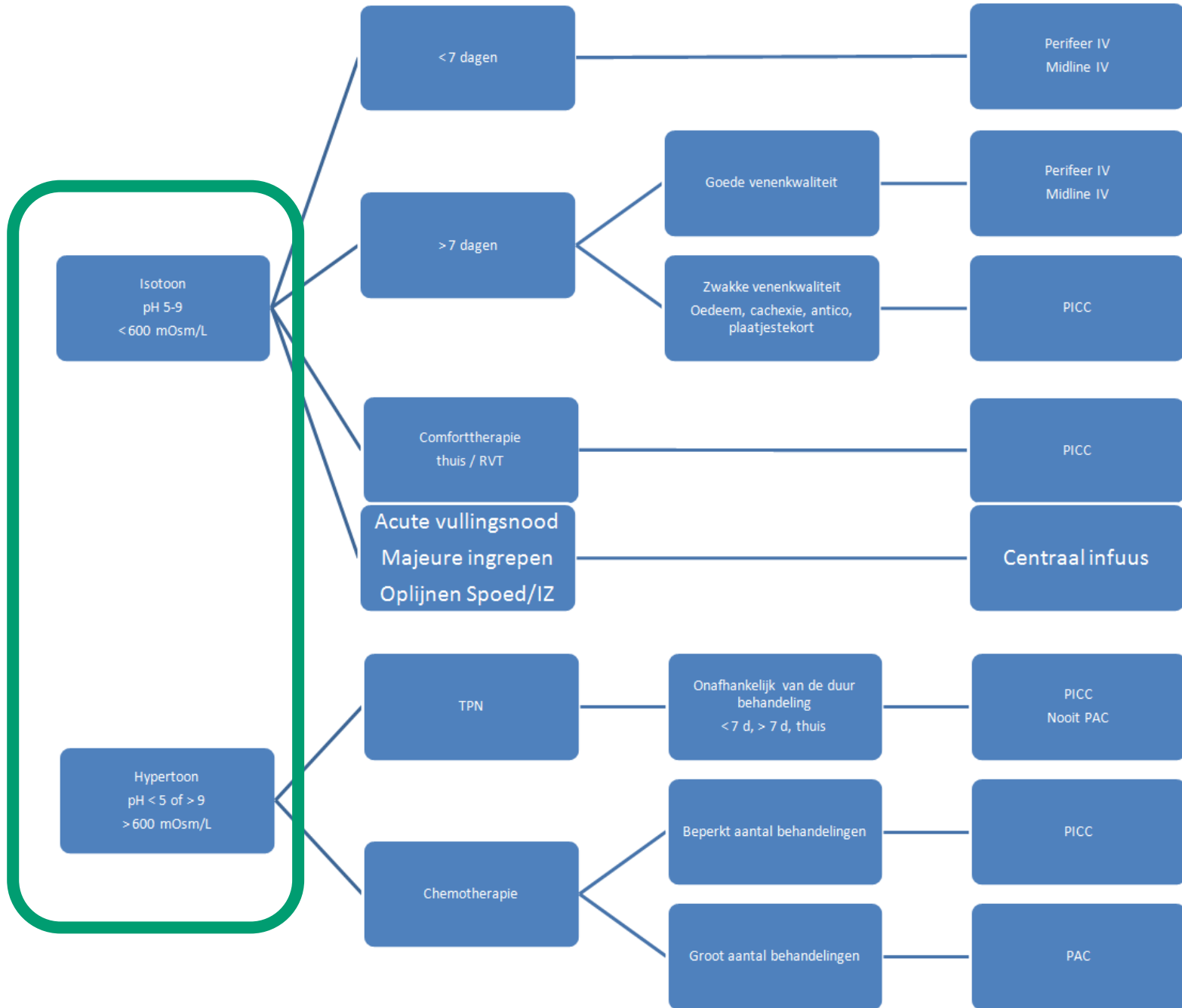
NA = Not Available  
Bovides of pH and Osmolarity Information  
\* Trade Edition © (ISBN: 4-88204-004)  
\* LUCIN Book of Intravenous Drugs 2004 (ISBN: 0-832-0327-8)  
\* Mosby: Intravenous Medications: A Handbook for Nurses and Allied Health Care Professionals, 2003 3rd Edition (ISBN: 0-323-0288-7)  
\* British National Formulary 47 (March 2010) (ISBN: 0-85384-884-4)  
\* Individual Manufacturers



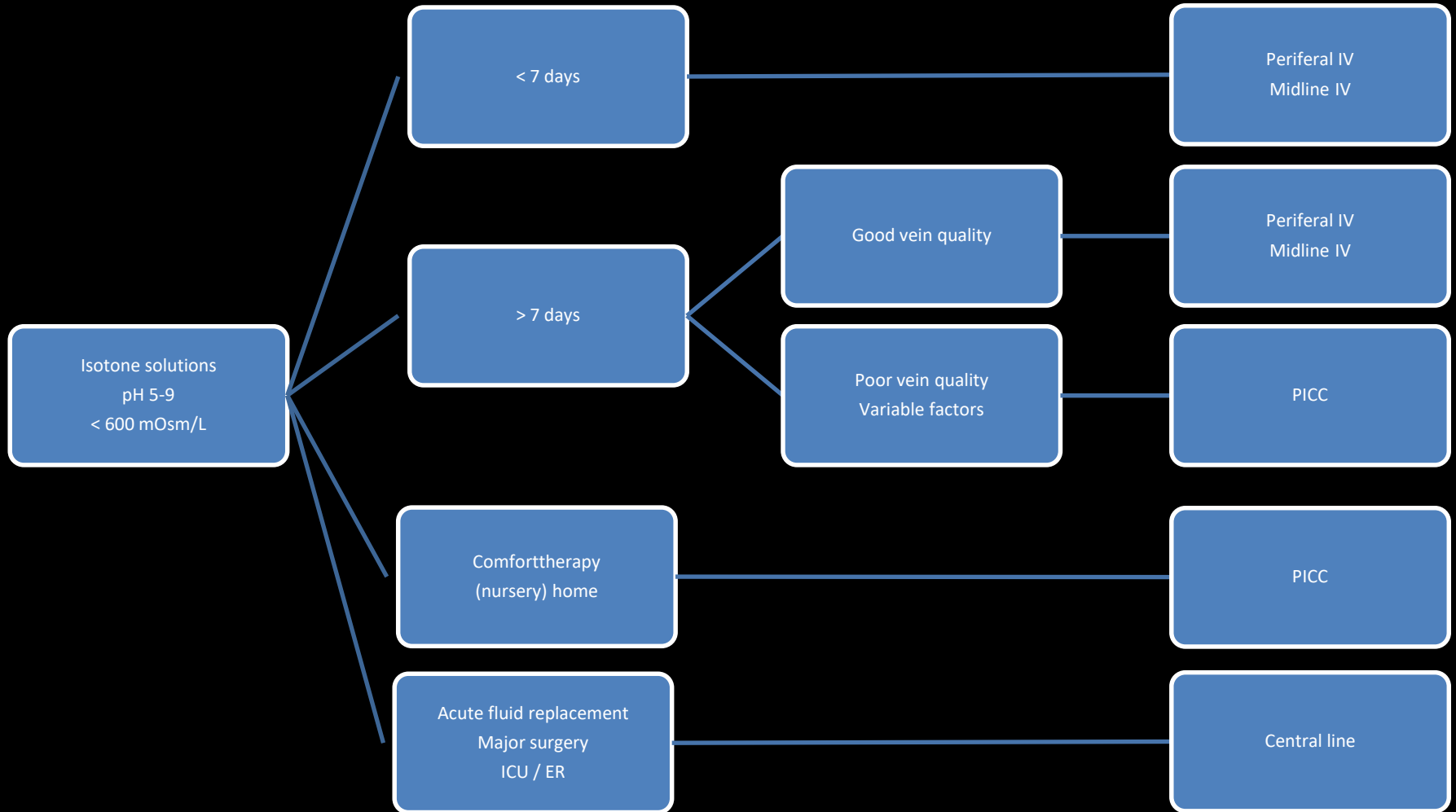
DRUG	pH	Osmolarity (mOsm/L)	Comment
ACICLOVIR	10.5-11.8	319	
ADOLPHOS	6.3-6.4	3170	
ADRENALINE	2.5-5.0	273	
ALBAMACIN	3.8-5.9	913	
AMIODARONE	3.0-4.4	NA	
AMPHOTERICIN (AmBisome)	6.0-6.0	NA	Known phlebotropic
AMPICILLIN	6.0-10.0	820	
AMBACRINE	3.5-4.5	NA	Veicant
ASBOBIC ACID	6.0-6.7	>2000	
ATROPINE	3.0-6.5	NA	
BLOSUMICIN	4.5-6.0	86	
CALCIUM CHLORIDE 10%	6.5-7.0	1780	
CALCIUM GLUCONATE	6.0-6.5	880	Veicant
CHLORPHENIRAMINE	4.0-6.2	NA	
CIPROFLOXACIN	3.3-3.9	NA	
CISPLATIN	3.7-6.0	285	
CLARITRAMYDIN	6.0-6.6	NA	Known phlebotropic

DRUG	pH	Osmolarity (mOsm/L)	Comment
CO-TRIMOXAZOLE	10	841-833	
CYCLOZINE	3.3-3.7	NA	
CYCLOPHOSPHAMIDE	4.0-6.0	172-219	
DILTIAZEM	4.0-6.0	160	
DACARBASINE	3.0-4.0	109	Veicant
DAUNORUBICIN	3.8-4.8	280	Veicant
DIAMORPHINE	3.8-4.5	NA	
DIASEMULS	6	349	Risk of extravasation
DIASEPAM	6.2-6.9	7775	Risk of extravasation
DOBUTAMINE HCL	3.5-5.5	273	
DOXAPRINE HCL	3.5-5.0	275	
DOXORUBICIN (Amesinon)	3.8-4.5	280	
EPHEDRIN	3.0-4.0	NA	Veicant
ETOPOSIDE	3.0-4.0	>3000	Infant
FLUOROURACIL	4.0-4.0	NA	
FLUCONAZOLE (in Normal extrol)	4.0-6.0	330-318	
FLUCONAZOLE (in 5% Glucose)	5.5-6.5	330-318	

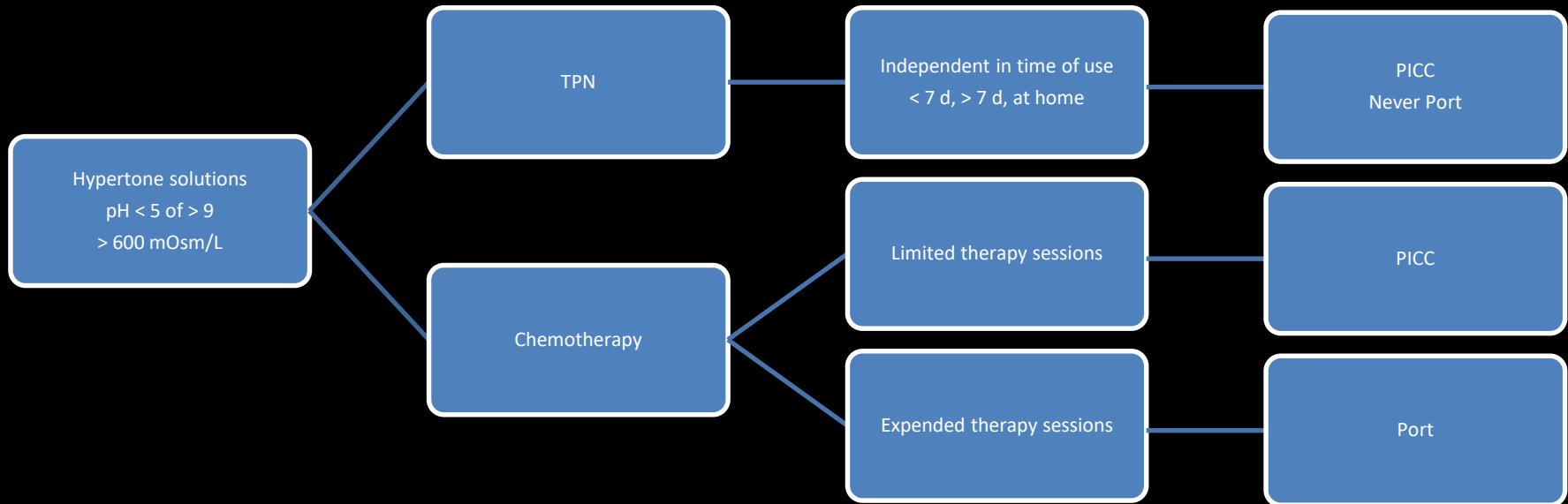
DRUG	pH	Osmolarity (mOsm/L)	Comment
FLURAZEPIL	4	NA	
FLUOROURACIL (FU)	5.2	890	Seicant
FOLIC ACID	6.0-11.0	188	
FOCARNET	7.4	271	Known phlebotropic
GANCICLOVIR	11	320	
GEMOTABINE	2.7-3.3	NA	Infant
GEBRANTON	3.0-5.5	200-230	
GLUCAGON	2.5-3.0	NA	
GLUCOSE 10%	3.5-6.8	535	
GLUCOSE 20%	3.5-6.8	1110	
GLUCOSE 50%	3.5-6.8	2175	
GTM (Nitrogel) in 5% Glucose	3.8-5.0	304	
GTM (Nitrogel) in 5% NaCl	3.8-5.0	612	
GTM (Nitrogel)	3.0-5.5	274	
HYDROALAZINE	3.5-4.2	NA	
IRINOTECAN	3.0-4.0	NA	
IRON-DEXTRANS (Venerol)	10.5-11.1	1270	
ISOPRENALINE	2.5-3.5	277-289	
KABIVEN S79 (79%)	6.6	650	
KASIVEN S98.11.4 (98%)	6.6	1230	
LASBETOL	3.0-4.0	387	
LIOTHYRONINE	6.5-11.5	NA	
LIPUSOLAL DOXORUBICIN (Liposol)	6.5	NA	Veicant
MAGNESIUM SULPHATE	3.5-6.5	4080	
MANNITOL 10%	4.8	272	
MELPHALAN	7	NA	
METOCLOPRAMIDE	4.5-8.4	385	
MIDAZOLAM HCL	3	355	
MITOMYDIN	6.0-8.0	9	Veicant
MITOXANTHONE	3.0-4.5	270	Known phlebotropic
MORPHINE SULPHATE	2.5-6.0	285	
NALOXONE HCL	3.0-4.0	351	
NORADRENALINE	3.0-4.0	NA	
OCRETIDE	3.9-4.5	379	
OPLOXACIN	4.0-5.0	280-304	
OMEPRAZOLE (in 5% Glucose)	6.9-9.5	NA	
OMEPRAZOLE (in 5% NaCl)	9.3-10.3	300	
ONABENTRON HCL	3.4-5.4	275	
OXALIPLATIN (Eloxatin)	4.8-5.2	NA	Known phlebotropic
OXYTOON	3.0-4.0	24	
PHENOBARBITONE SODIUM	6.0-10	335	
PHENYTOIN	12	912-936	
POTASSIUM CHLORIDE	4.0-8.0	4000	
PROPOFOL	4.5-5.5	Isotonic	
PROSTACYCLIN (Epoprostenol)	10.5	NA	
SALBUTAMOL	3.5	NA	
SODIUM BICARBONATE 8.4%	7.0-8.5	2008	
SODIUM FUSIDATE (Fuside Acid)	7.4-7.8	NA	Risk of extravasation
TAXOL (Paclitaxel)	4.5-6.8	NA	
TAXOTER (Docetaxel)	3.0-4.0	NA	Known phlebotropic
VANCOMYCIN	3.5-5.5	391	Veicant
VIGAM	4.8-5.0	400	
VINDICRISTINE	3.0-5.0	378	
VINDICRISTINE	3.5-5.5	810	Veicant
VINDORELINE	3.5	NA	Veicant
VITAMIN B 6 C (Phlebotan)	4.8	NA	



# Right choice of device



# Right choice of device



# Role of the surgeon

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## Variable factors

1. Anticoagulation → PICC
2. Thrombocytopenia → PICC
3. Pacemaker, defibrillator,  
previous surgery breast/shoulder, radiotherapy?
4. Deep vein thrombosis upper limb?



# Role of the surgeon

Management and reduction complications  
Right choice of device

