PICC, Port, PIV in oncology

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Disclosure

- CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

- Bard: Congress, Research, Consultant, Education

What are Medical or societal expectations in oncology? What do they want in cancer care…

- Good imaging modalities
- Good biology and good (molecular and genomic) anatomopathology
- Good chemiotherapy
- Good surgery and interventional radiology
- Good radiation therapy

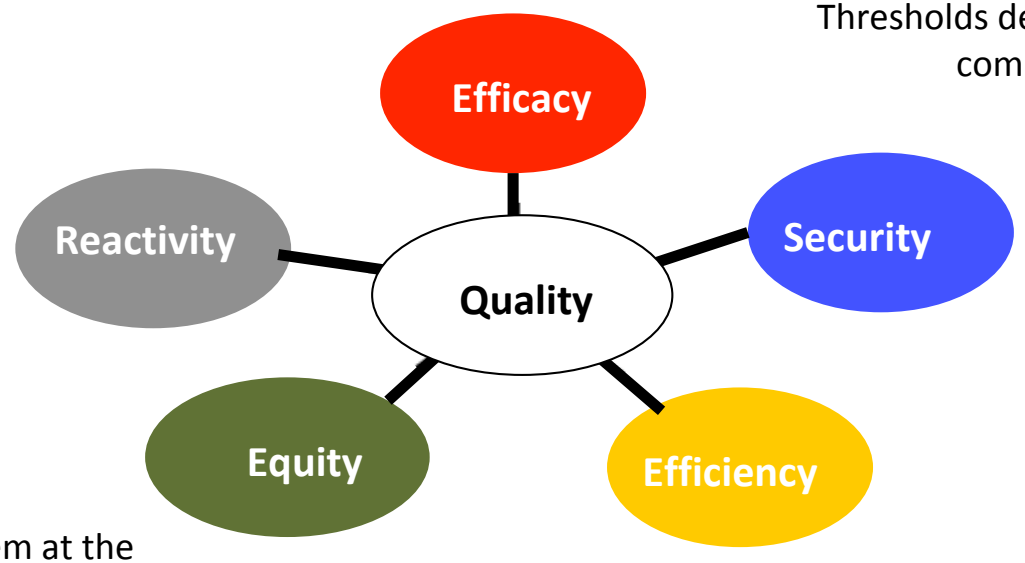
They want good quality

What is quality for Cancer treatment?

Relevance based on respect of **guidelines**

Prevention of **adverse events**. Thresholds definition for major complications

Ease of access to **good health services at the right time** .



sensitivity of the system at the **request of the patient**, respect for patient dignity, confidentiality, participation in choices…

Optimal use of available resources to achieve the best results.

And also:

- Timeliness
- Patient centeredness
- Continuity
- Satisfaction
- Technical competence

With cortesy of Pr M RIVOIRE

For the patient
What do they want?

1. Long-term survival
2. Quality of life
3. Good functional status

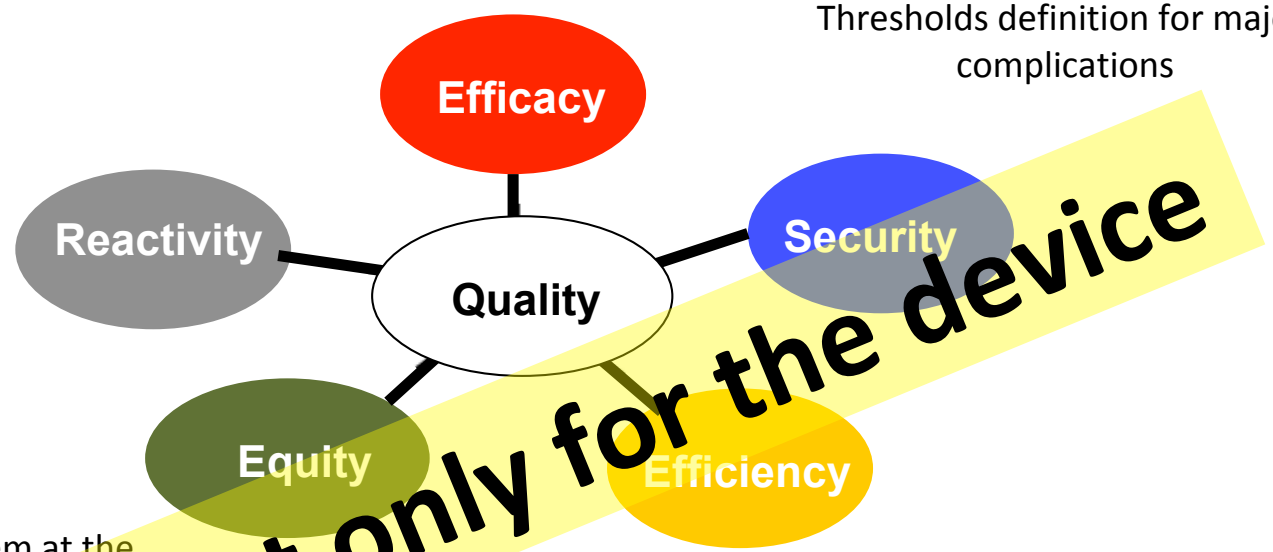
All of this needs a Good Central Venous Access Quality

What is quality for Central Venous access?

Relevance based on respect of **guidelines**

Prevention of **adverse events**. Thresholds definition for major complications

Ease of access to **good health services at the right time** .



sensitivity of the system at the **request of the patient**, respect for patient dignity, confidentiality, participation in choices…

Optimal use of available resources to achieve the best results.

And it is not only for the device

And also:

- Timeliness
- Patient centeredness
- Continuity
- Satisfaction
- Technical competence

With cortesy of Pr M RIVOIRE

What is quality for Central Venous access?

Device
Team
Organization

Device
Team
Organization

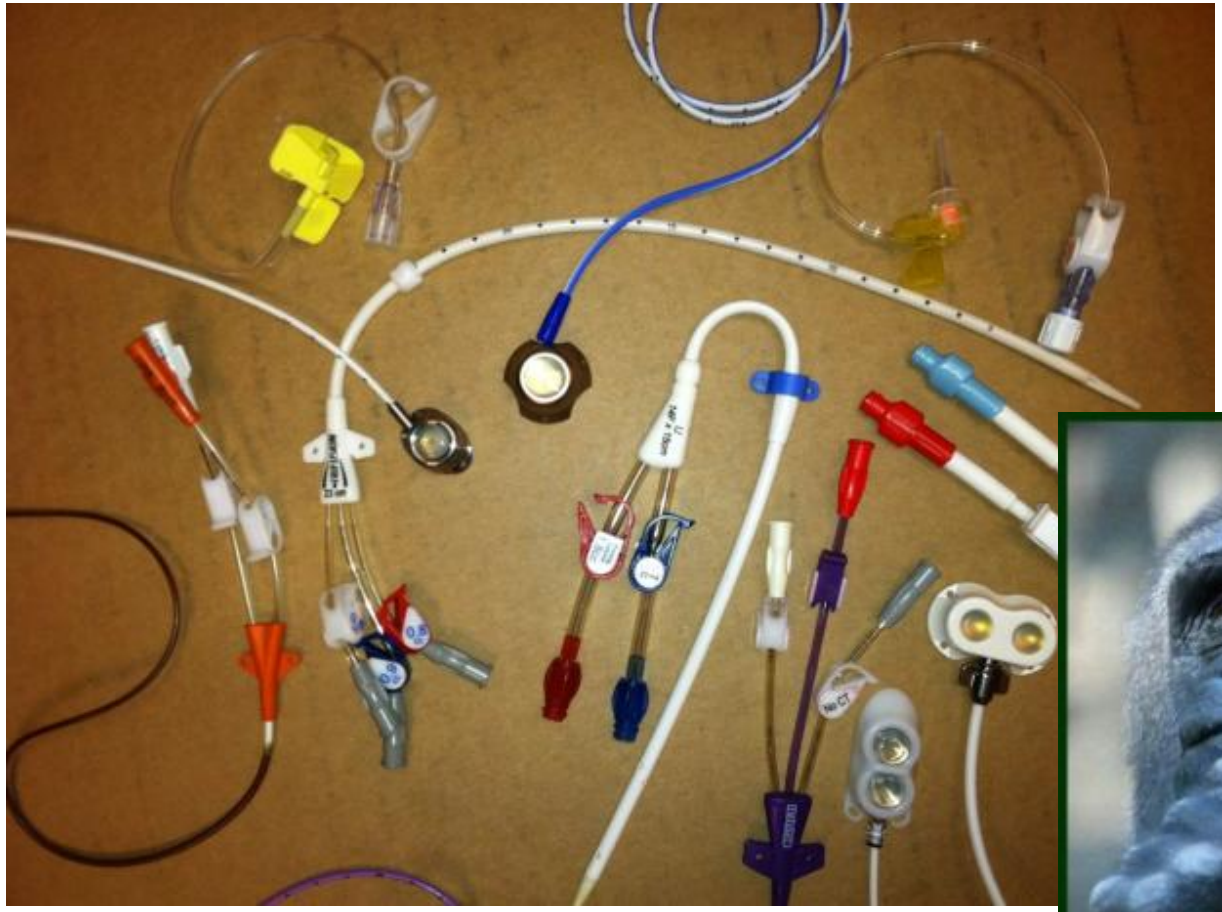
Device
Team
Organization

Device
Team
Organization

Device
Team
Organization

With cortesy of Pr M RIVOIRE

Many available devices…



CVC Type, Insertion Site, Placement

Recommendation #1.1: There is insufficient evidence to recommend one type of CVC routinely for all patients with cancer: the choice of catheter should be influenced by the expected duration of use, chemotherapy regimens, and patient ability to provide care; the minimum number of lumens essential for the management of the patient is recommended; these issues should be discussed with the patient.

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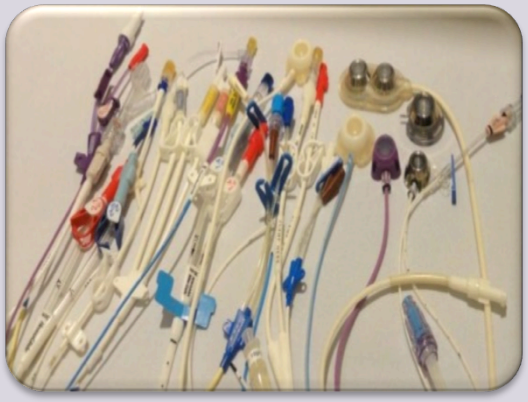
Factors influencing VAD selection



Therapy

- Type of treatment
- Duration of therapy
- characterics

Device

- Potential of complications
- Ressources available for device care
- Technical staff expertise
- Costs

Patient

- Hospital status
- Preferences and lifestyle
- Co-morbidity
- Vascular integrity
- Self care ability

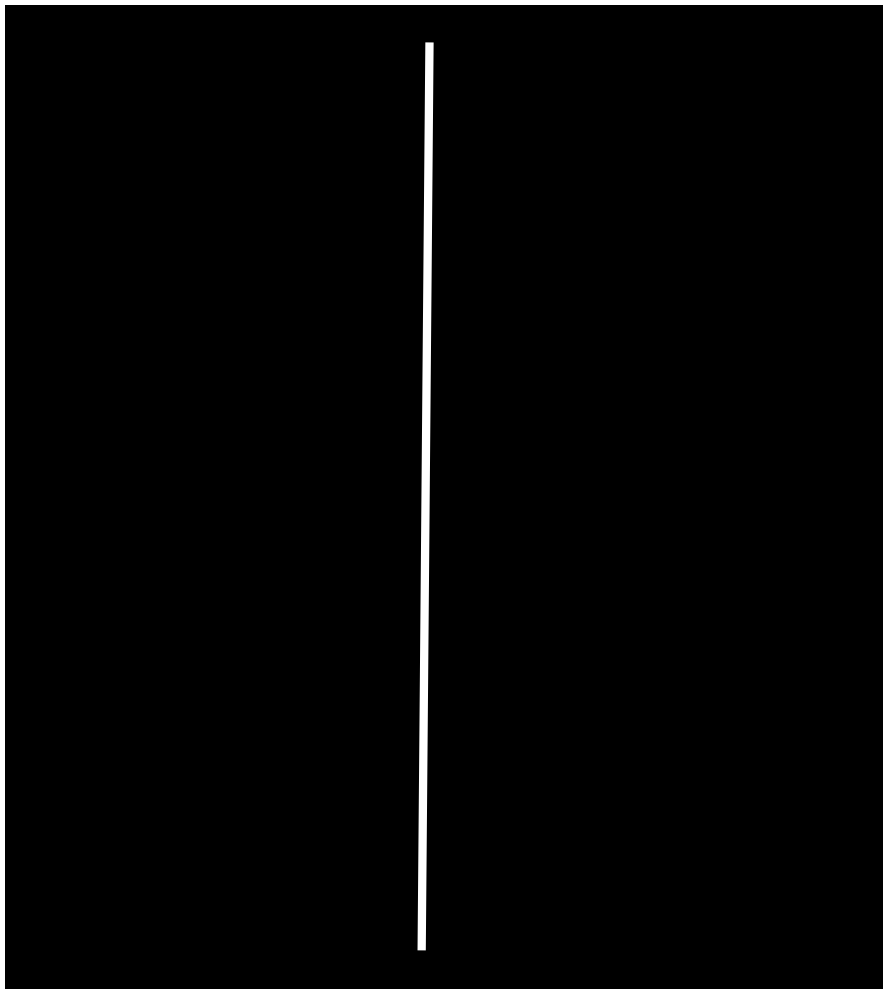
Therapy

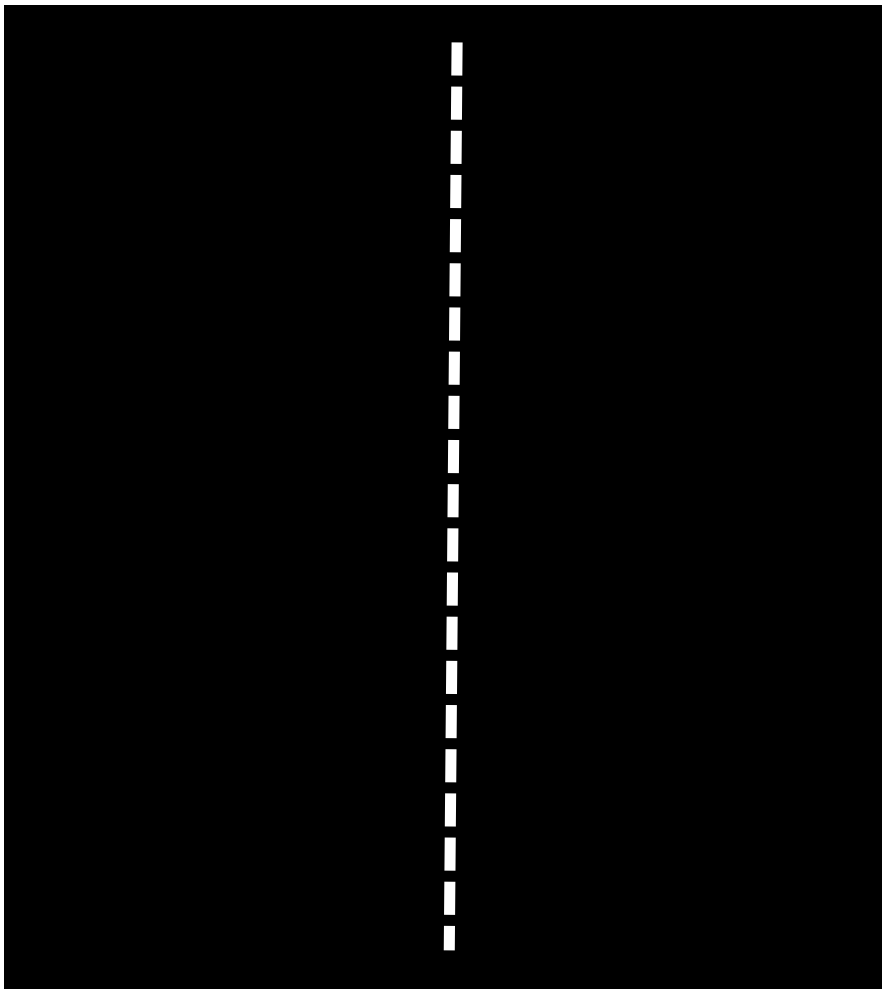
Irritant? Vesicant?

Peripheral catheter or Midline

Cis-diaminedichloroplatine CDDP
Gemcitabine
Carboplatine
Paclitaclel
Docetaxel
Bleomycine
Methotrexate
Trastuzumab
Eribuline
Cetuximab
Rituximab
Topotécan
Pemetrexed

Regimens chemotherapy





Duration of chemotherapy

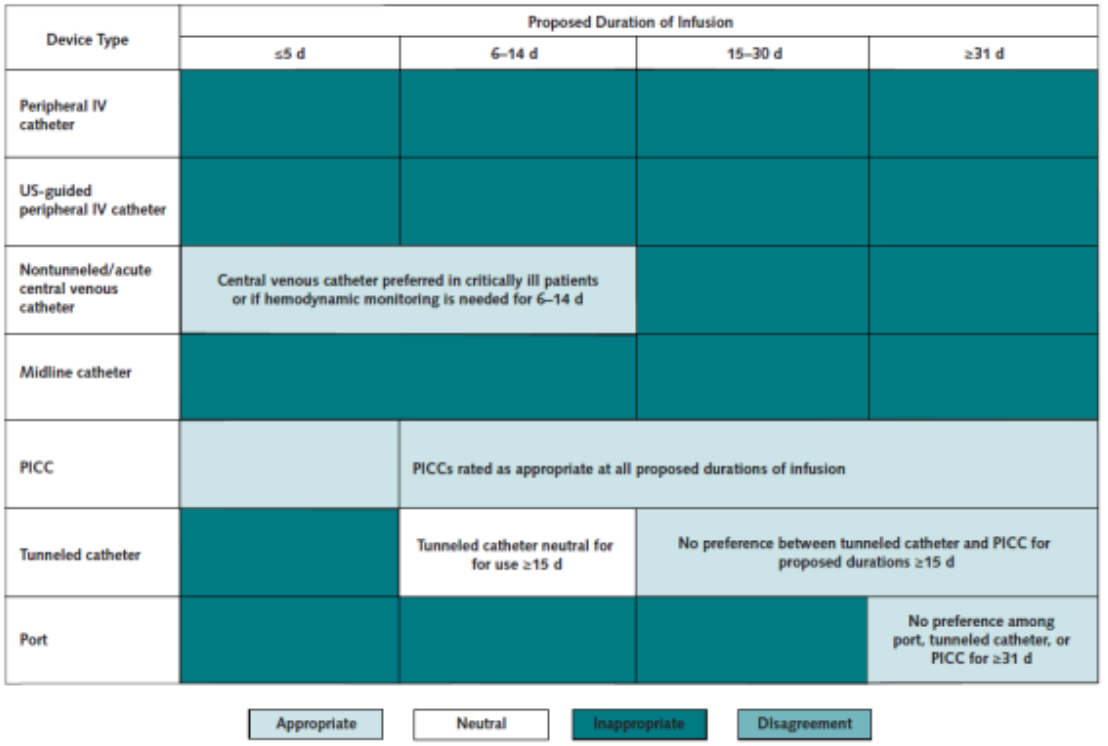
Annals of Internal Medicine SUPPLEMENT

The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results From a Multispecialty Panel Using the RAND/UCLA Appropriateness Method

Annals of Internal Medicine • Vol. 163 No. 6 (Supplement) • 15 September 2015

Vineet Chopra, MD, MSc; Scott A. Flanders, MD; Sanjay Saint, MD, MPH; Scott C. Woller, MD; Naomi P. O'Grady, MD; Nasia Safdar, MD, PhD; Scott O. Trerotola, MD; Rajiv Saran, MD, PhD; Nancy Moureau, BSN, RN; Stephen Wiseman, PharmD; Mauro Pittiruti, MD; Elie A. Akl, MD, MPH, PhD; Agnes Y. Lee, MD, MSc; Anthony Courey, MD; Lakshmi Swaminathan, MD; Jack LeDonne, MD; Carol Becker, MHSA; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

Figure 4. Venous access device recommendations for infusion of non-peripherally compatible infusates.



IV = intravenous; PICC = peripherally inserted central catheter; US = ultrasonography.

Devices

- Port device
- PICC line
- Tunneled CVC

- Midline
- PVC

Devices
Potential of complications

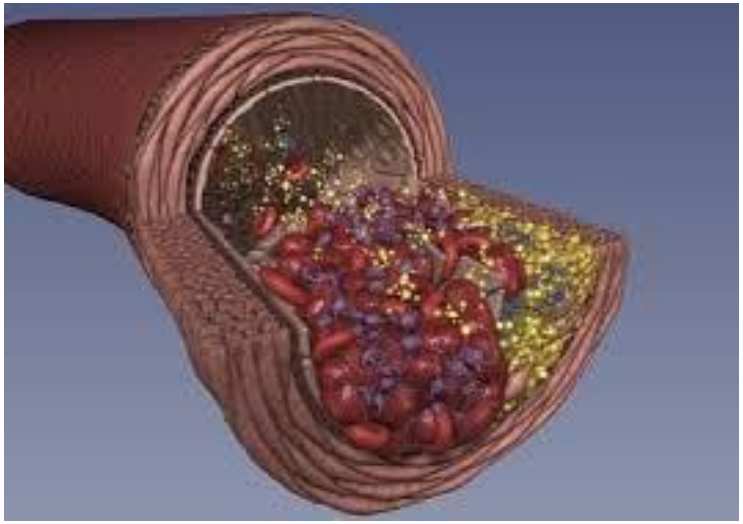
Background

- High frequency of CVA complications
- In oncology CVA complications have great impact on cancer treatment

Potential of complications

- Infections

- Thombosis



Peripherally Inserted Central Catheters (PICCs) in Cancer Patients Under Chemotherapy: A Prospective Study on the Incidence of Complications and Overall Failures

SERGIO BERTOGLIO, MD,[1,2]* BEATRICE FACCINI, RN,[3] LUCA LALLI, ScD,[4] FERDINANDO CAFIERO, PMD,[2] AND PAOLO BRUZZI, MD[4]

Journal of Surgical Oncology 2016;113:708–714

TABLE II. Frequency of Complications and Removal of 291 Observed PICCs

	Total complications		Removal	
Type of complications	n	%	n	%
PICC-UEDVT	34	11.7	12	4.1
PICC-CLABSI	6	2.1	5	1.7
Exit site infection	14	4.8	9	3.1
Dislodgement/inadvertent removal	11	3.8	11	3.8
Occlusion	7	2.4	7	2.4
Total	72	24.7	44	15.1

UEDVT, upper extremity deep venous thrombosis; CLABSI, catheter line bloodstream infection.
Multiple complications in the same subject were counted only once.

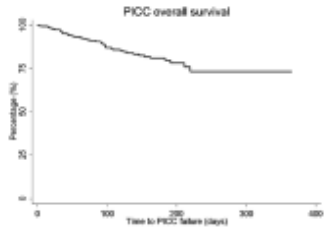


TABLE IV. Multivariate Analyses for PICCs Failure; Variables Not Significantly Associated With the Risk of Failure Were Excluded From the Model

Variable	Patients (n)	Failures (n)	Hazard ratio	95% Confidence interval	*P*-Value
Previous DVT					
No	267	36	ref		
Yes	24	8	2,953	1,33–6,53	0,008
Catheter size					
5F	218	37	ref		
4F	73	7	0,439	0,19–1,00	0,05
Type of CT					
Other	158	17	ref		
EC/taxane/carboplatin	112	21	0,951	0,46–1,97	0,04
5FU/oxaliplatin/bevacizumab	21	6	3,112	1,17–8,26	
Reason for PICC implant					
CT + palliative treatments	63	5	ref		
CT	153	33	3,653	1,29–10,34	0,003
CT + TPN	75	6	0,841	0,24–2,85	

CT, chemotherapy; F, French; DVT, deep venous thrombosis; GI, gastrointestinal; EC, epirubicin and cyclophosphamide; 5FU, 5-fluorouracil; TPN, total parenteral nutrition.

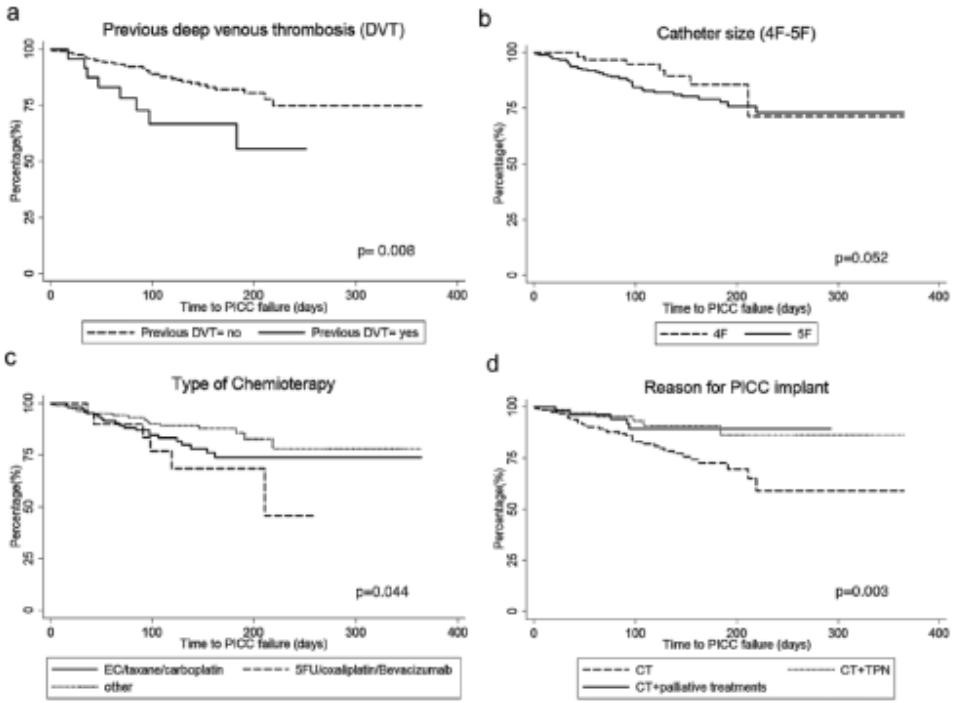


Fig. 2. Kaplan–Meier PICC survival estimates for risk factors statistically significant for failure: previous DVT (a), Catheter size (F, French) (b), type of chemotherapy (E, epirubicin; C, cyclophosphamide) (c), and reason for PICC implant (CT, Chemotherapy; TPN, total parenteral nutrition) (d). Catheter size variable was borderline significant ($P = 0.052$).

Catheter-Related Complications in Cancer Patients on Home Parenteral Nutrition: A Prospective Study of Over 51,000 Catheter Days

Paolo Cotogni, MD[1, 2]; Mauro Pittiruti, MD[3]; Cristina Barbero, MD[1]; Taira Monge, RD[1, 2]; Augusta Palmo, MD[2]; and Daniela Boggio Bertinet, MD[2]

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Table 2. Characteristics of Venous Access Devices (VADs)

	Medium-term VADs		Long-term VADs		
	PICC	Hohn	Tunneled	Port	Total
No. (%) of VADs	65 (22)	107 (37)	45 (16)	72 (25)	289 (100)
Duration, d, median (range)	158[a] (15-657)	73 (7-368)	125[b] (9-663)	254[c] (38-731)	120 (7-731)
Duration >90 d, No. (%)	40 (62)	40 (37)	30 (67)	67 (93)	177 (61)
Total catheter-days	11,504	10,364	7835	21,605	51,308
HPN-days	8413	7710	5150	8834	30,107

Catheter-Related Complications in Cancer Patients on Home Parenteral Nutrition: A Prospective Study of Over 51,000 Catheter Days

Paolo Cotogni.

Table 3. Infectious Complications

	Medium-term VADs		Long-term VADs		
	PICC	Hohn	Tunneled	Port	Total
No. of VADs	65	107	45	72	289
Local infection, No.	2	2	2	3	9
No./1000 catheter-days	0.17	0.19	0.26	0.14	0.17
No./1000 HPN-days	0.24	0.26	0.39	0.34	0.30
CRBSI, No.	0[a]	9	5	4[b,c]	18
No./1000 catheter-days	0	0.87	0.64	0.19	0.35
No./1000 HPN-days	0	1.17	0.97	0.45	0.60
Risk factors for CRBSI, *P* value					
Use during HPN	—	<.001	<.001	<.001	

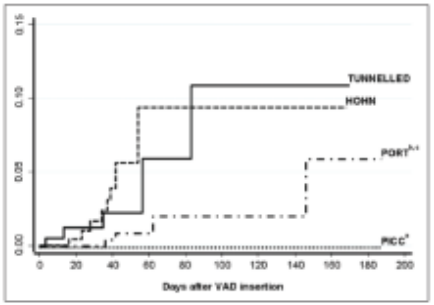

Figure 1. Probability of a catheter-related bloodstream infection after insertion of different types of a central venous access device (VAD). PICC, peripherally inserted central catheter.
[a] $P < .001$ vs Hohn and tunneled.
[b] $P < .002$ vs Hohn.
[c] $P < .04$ vs tunneled.

Catheter-Related Complications in Cancer Patients on Home Parenteral Nutrition: A Prospective Study of Over 51,000 Catheter Days

Paolo Cotogni.

Table 5. Noninfectious Complications

	Medium-term VADs		Long-term VADs		
	PICC	Hohn	Tunneled	Port	Total
No. of VADs	65	107	45	72	289
Venous thrombosis, No. (%)	0	3 (2.8)	0	0[a]	3 (1)
Mechanical complications					
Catheter dislocation, No. (%)	5[a] (7.7)	16 (15)	4[b] (8.9)	—	25 (8.6)
Rupture of external tract, No. (%)	2 (3.1)	0	2 (4.4)	—	4 (1.4)
Lumen occlusion, No. (%)	2 (3.1)	3 (2.8)	0	7 (9.7)	12 (4.1)
Total	9[b] (13.9)	19 (17.8)	6 (13.3)	7[c] (9.7)	41 (14.1)
No./1000 catheter-days	0.78	1.83	0.77	0.32	0.80
No./1000 HPN-days	1.07	2.46	1.16	0.79	1.36
Risk factors for thrombosis, *P* value					
Use during HPN	<.01	<.01	<.01	<.01	
No ultrasound guidance	—	<.001	—	—	
Left side insertion	—	<.001	—	—	
Risk factors for dislocation, *P* value					
Use during HPN	<.01	<.01	<.01	<.01	
Suture	—	<.001	NS	—	
Cuff <2 cm from exit site	—	—	<.01	—	

HPN, home parenteral nutrition; NS, not significant; PICC, peripherally inserted central catheter; VAD, venous access device; —, not applicable.
[a] $P < .01$ vs Hohn.
[b] $P < .05$ vs Hohn.
[c] $P < .001$ vs Hohn.

Totally implantable venous access port systems and risk factors for complications: A one-year prospective study in a cancer centre

F. Narducci [a,*], M. Jean-Laurent [b], L. Boulanger [a], S. El Bédoui [a], Y. Mallet [a], J.L. Houpeau [a], A. Hamdani [a], N. Penel [a], C. Fournier [a]

[a] *Centre Régional de Lutte Contre le Cancer Oscar Lambret, 3 rue Frédéric Combemale, BP 307, 59020 Lille Cedex, France*
[b] *Maison de la Femme, de la Mère et de l'Enfant, CHU de Fort de France, BP 632, 97261 Fort de France Cedex, Martinique*

Table 1
Complications during TIVAPS use.

Complication	No. of patients N = 815
External complications	*111*
Inflammation	28
Local haematoma	26
Local skin disorders	23
Pain	19
Port exteriorisation	15
Internal complications	*97*
Documented infection	44
Extravasation	15
Mechanical problems	13
Port obstruction	11
Venous thrombotic syndrome	7
Catheter migration	7
Complications prompting premature TIVAPS removal	*55*
Documented infections related to TIVAPS	19
Port expulsion	14
Catheter migration	6
Venous thrombotic syndrome	5
Mechanical problems	3
Skin disorders	2
Pain syndrome	2
Extravasation	2
Infection not related to TIVAPS	1
Inflammatory syndrome	1

13,6%

11,9%

6,7%

Infectious Complications

Table 3
Summary of Catheter Complications by Device Type

Complication	PICC*	Tunneled Central Catheter*	Chest Port*	Midline*	Nontunneled Central Catheter*	*P* Value‡	Total*
Infection							
Systemic	117 (0.11)	262 (0.34)	108 (0.16)	14 (0.09)	40 (0.22)	<.01	541 (0.19)
Local	258 (0.25)	272 (0.36)	100 (0.14)	34 (0.21)	64 (0.35)	<.01	728 (0.26)

Note.—* Number of complications (event rate per 1000 catheter days). † Other types of catheter dysfunction were not analyzed (NA). ‡ Comparison of rates for each complication among the different types of devices using χ^2 test.

Central Venous Catheters in Home Infusion Care: Outcomes Analysis in 50,470 Patients

Nancy Moureau, BSN, CRNI,[1] Susan Poole, MS, CRNI, CNSN,[1] Margie A. Murdock, RN, MSN,[1] Sarah M. Gray, PhD, and Charles P. Semba, MD[1]

J Vasc Interv Radiol 2002; 13:1009–1016

Thrombotic Complications

Table 4
Catheter Dysfunction: Reported Causes

Event	PICC	Tunneled Central Catheter	Chest Port	Midline	Nontunneled Central Catheter	Total Events
Thrombosis	411 (29)	43 (20)	43 (28)	136 (29)	14 (17)	647 (28)
Infiltration/extravasation	25 (2)	7 (3)	13 (9)	39 (8)	1 (1)	85 (4)
Inability to maintain access	24 (2)	3 (1)	3 (2)	2 (1)	5 (6)	37 (1)
Catheter breakage/damage	381 (27)	67 (30)	16 (10)	89 (19)	12 (14)	565 (24)
Catheter pulled/fell out	259 (18)	63 (29)	15 (10)	115 (24)	34 (40)	486 (21)
Other/unknown	313 (22)	38 (17)	62 (41)	87 (19)	19 (22)	519 (22)
Total	1413 (100)	221 (100)	152 (100)	468 (100)	85 (100)	2339 (100)

Note.—Numbers in parentheses are percentages.

Central Venous Catheters in Home Infusion Care: Outcomes Analysis in 50,470 Patients

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Own datas

Except large multicenter studies properly conducted, these studies represent only the states of singular place, leading a local practice to a particular moment; they can only show the objectives towards which we should aim.

General practice:

- indications
- materials
- Maintenance (fixation, dressings, flushing, hygiene)
- Experience


We need datas…
In our own hospitals…

Ressources available for devices' implantation and care. Technical staff expertise

Costs

Placement

Port a cath more expensive

Care

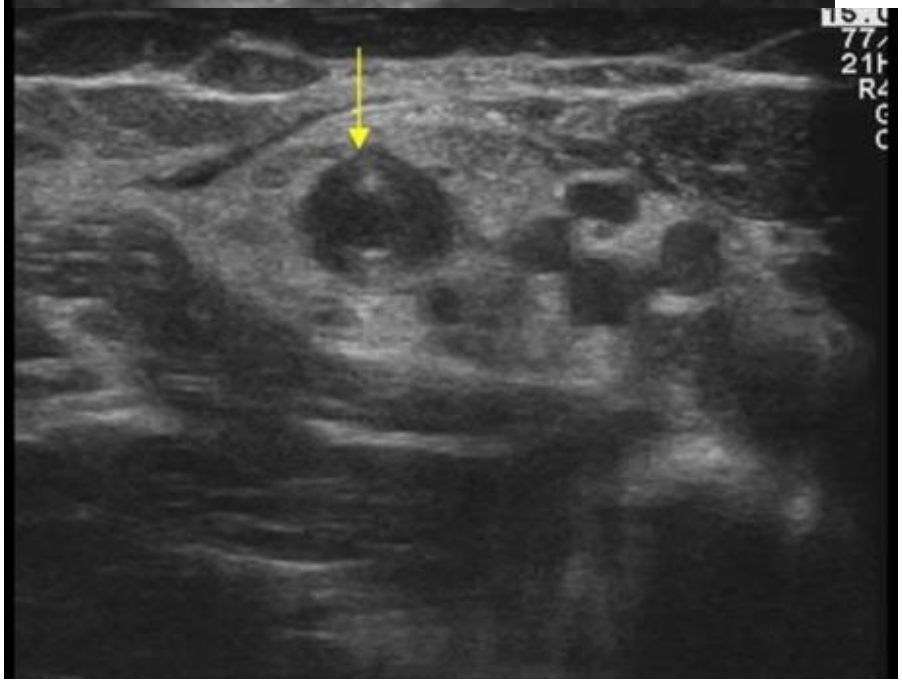
Lines with external hub: more expensive

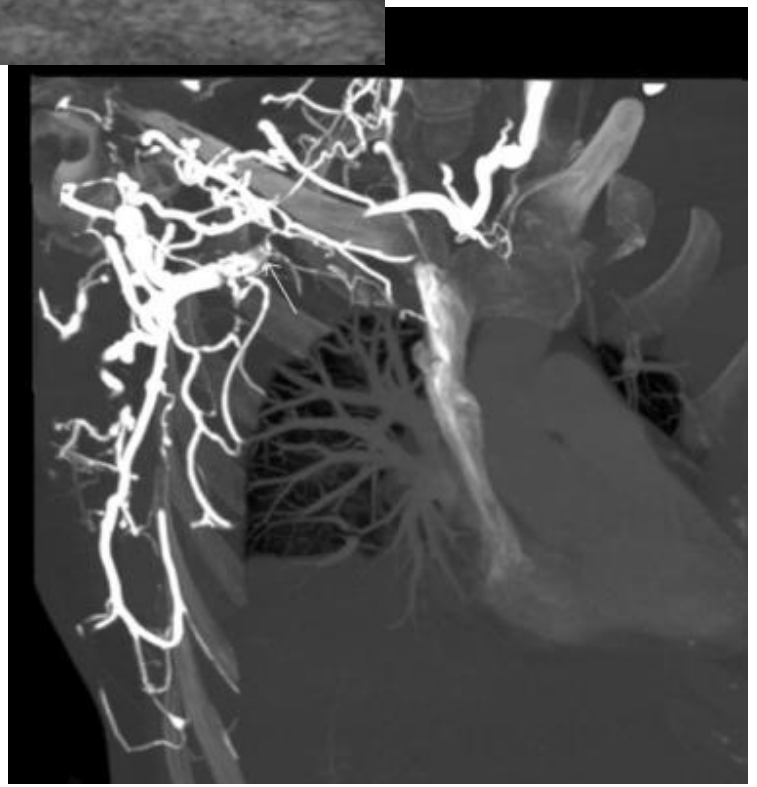
Patient: Preference and way of life

All, we are patient, Doctor!

Undissociated with the co-morbidity

undissociated its pathology…





Hospital status

In the real life…

- Patients and physicians want:

Inspired from Pr S BERTOGLIO

What we know?

• TIVAD

- Good performing device
- Totally implantable
- Invasive/Expensive insertion
- Invasive withdrawal
- Residual skin scar
- No Maintenance
- Few Physical limitations
  - Swim and bath
- Low infection rates
- Low DVT rates
- Few Mechanical complications
- Low rates but serious/extravasation

• PICC

Inspired from Pr S BERTOGLIO

What we know?

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Inspired from Pr S BERTOGLIO

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- **No Maintenance**
- Few Physical limitations
  - Swim and bath
- **Low infection rates**
- **Low DVT rates**
- **Few Mechanical complications**
- **Low rates but serious/ extravasation**

PICC

- Good performing device
- Partially implantable
- Easy and low cost insertion
- Easy withdrawal
- No skin scar
- Weekly maintenance
- More Physical limitations
  - No swim, No bath except special equipments
- Low infection rates
- Somehow higher DVT rates
- Somehow higher mechanical complications
- No extravasation

Inspired from Pr S BERTOGLIO

What we know?

TIVAD

- Good performing device
- Totally implantable
- Invasive/Expensive insertion
- **Invasive withdrawal**
- **Residual skin scar**
- **No Maintenance**
- Few Physical limitations
  - Swim and bath
- **Low infection rates**
- **Low DVT rates**
- **Few Mechanical complications**
- **Low rates but serious/ extravasation**

PICC

- Good performing device
- Partially implantable
- Easy and low cost insertion
- Easy withdrawal
- **No skin scar**
- **Weekly maintenance**
- More Physical limitations
  - No swim, No bath except special equipments
- Low infection rates
- **Somehow higher DVT rates**
- **Somehow higher mechanical complications**
- **No extravasation**

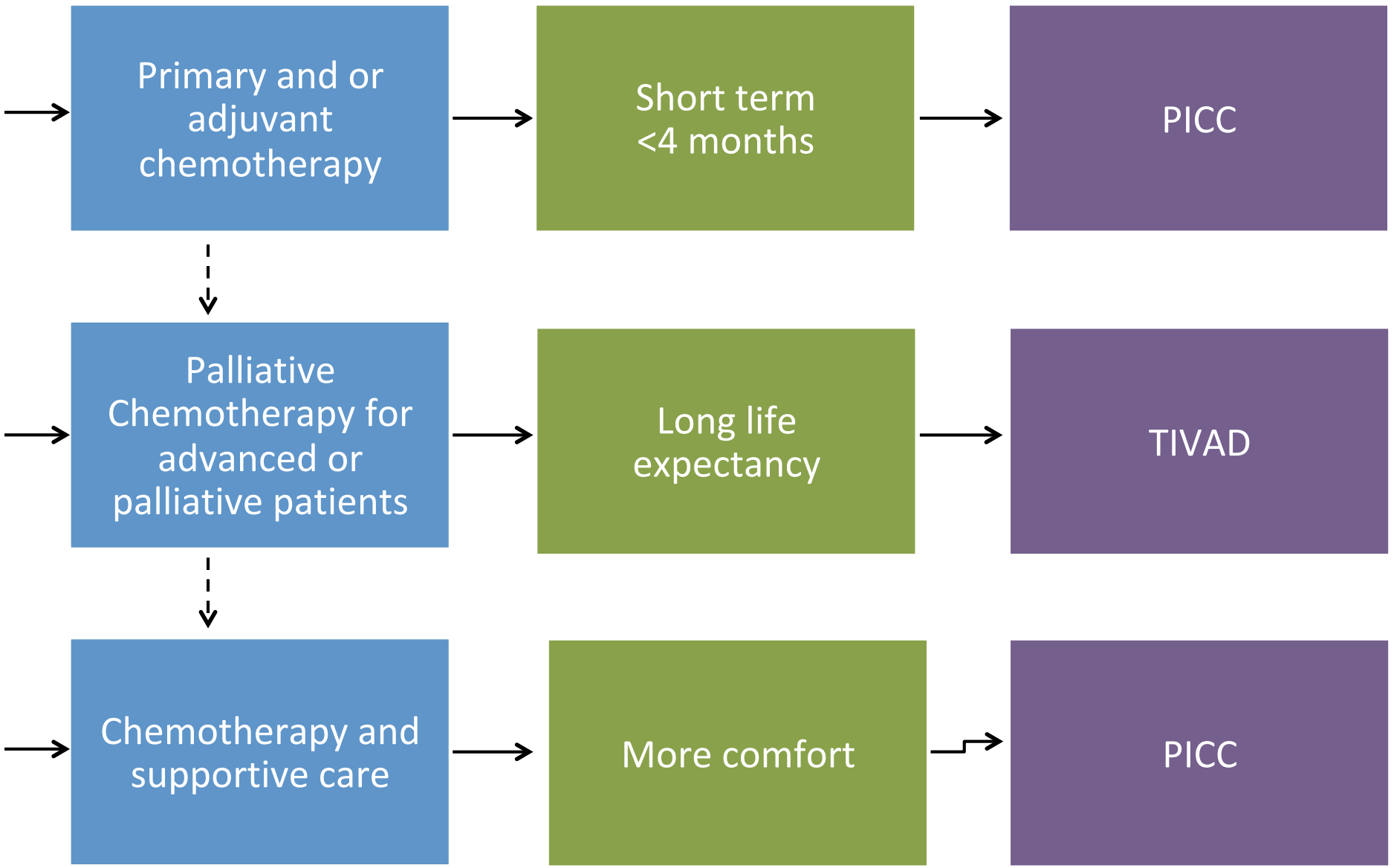
Difficult and daily questions

- **Which performing and safe central vascular device for primary or adjuvant CT of solid tumours ?**

For breast cancer ?

For testicle cancer ?

…


Primary and or adjuvant chemotherapy
Short term <4 months
PICC
Palliative Chemotherapy for advanced or palliative patients
Long life expectancy
TIVAD
Chemotherapy and supportive care
More comfort
PICC

Which vascular access for cancer patients ?

Primary and or adjuvant chemotherapy

Palliative Chemotherapy for advanced or palliative, metastatic patients

Chemotherapy and supportive care

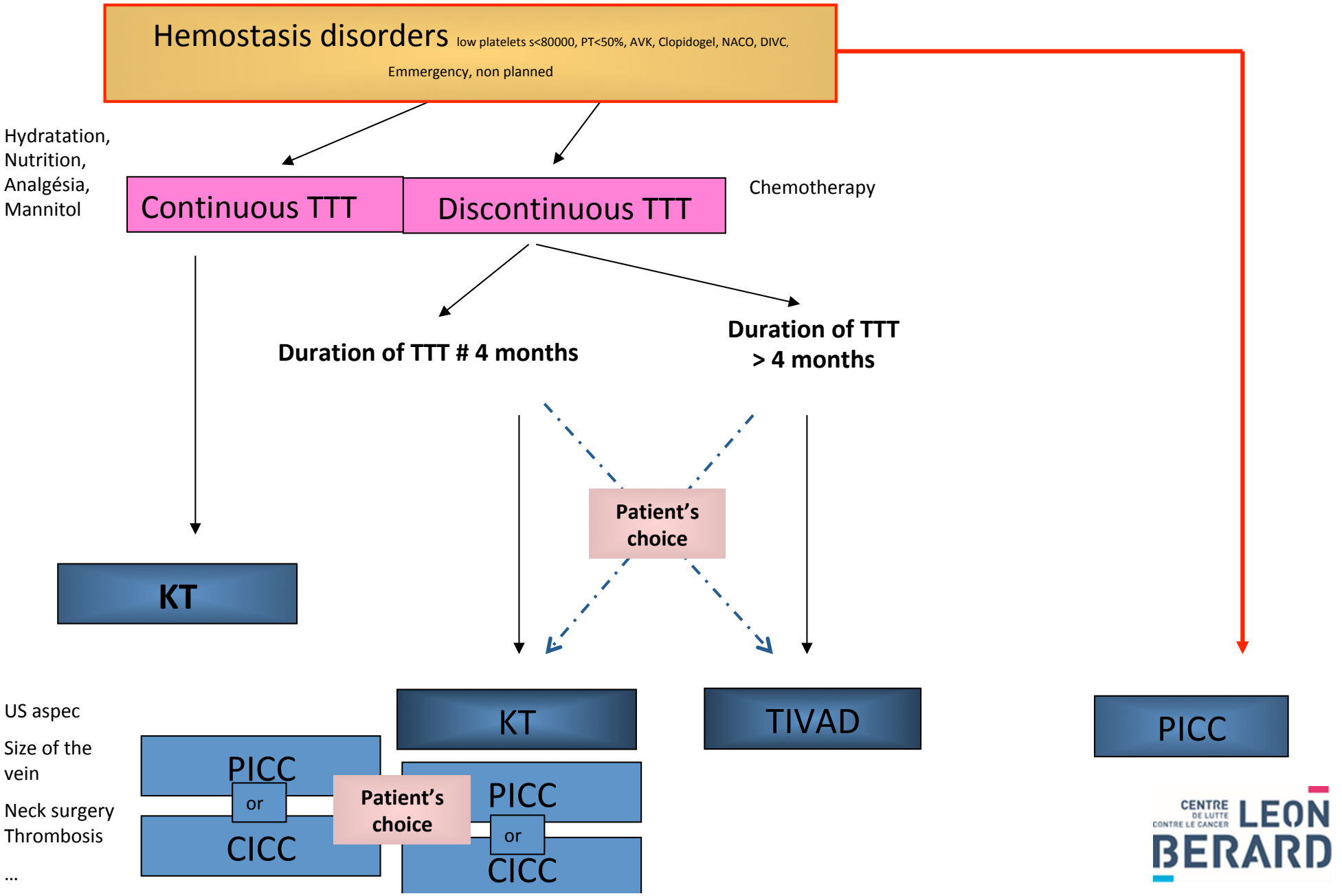
Depend of the step, the evolutivity, the expected duration, the regimen…

MULTI DISCIPLINARY

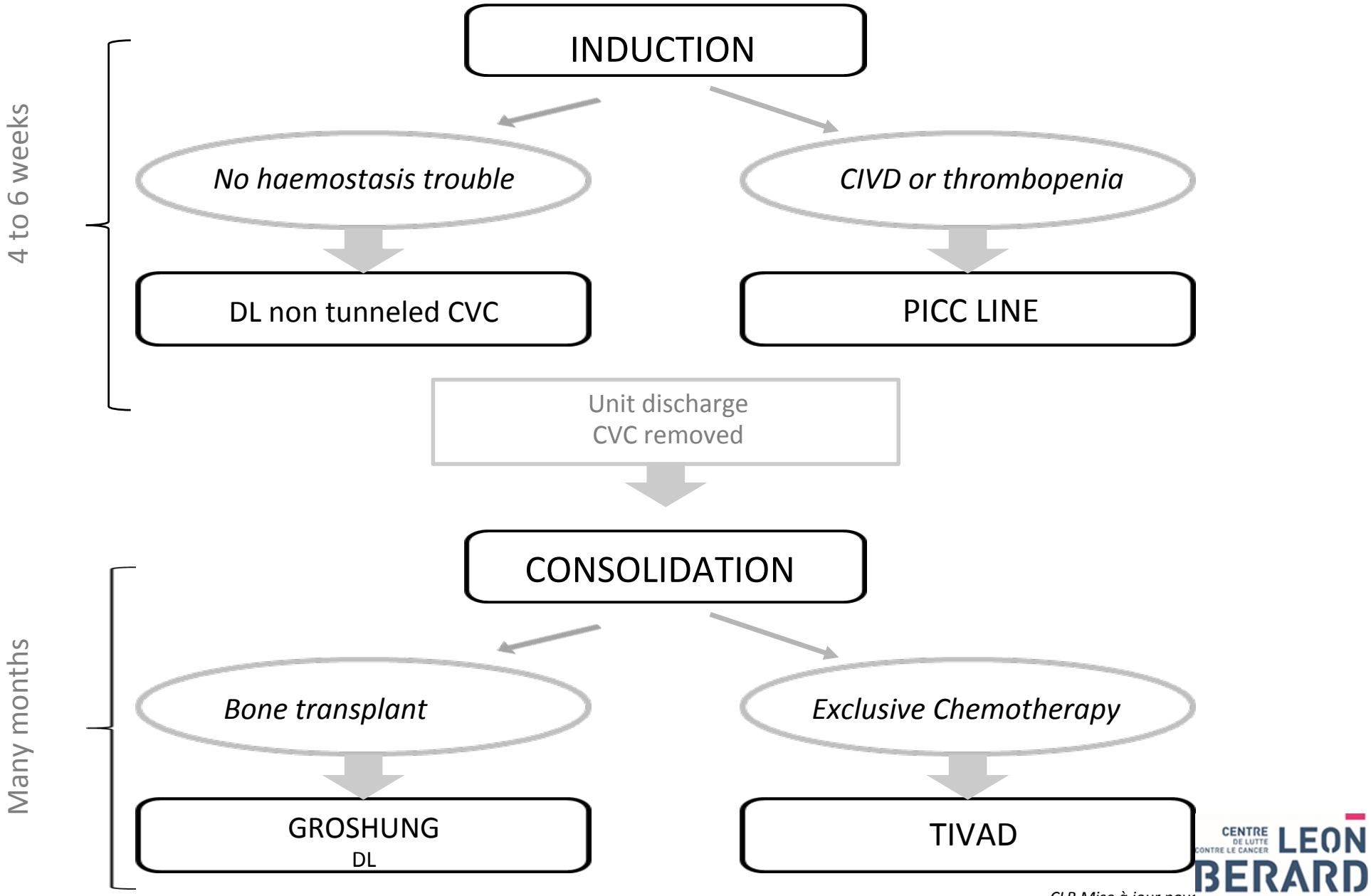
algorithm


THE SPINAL NERVES

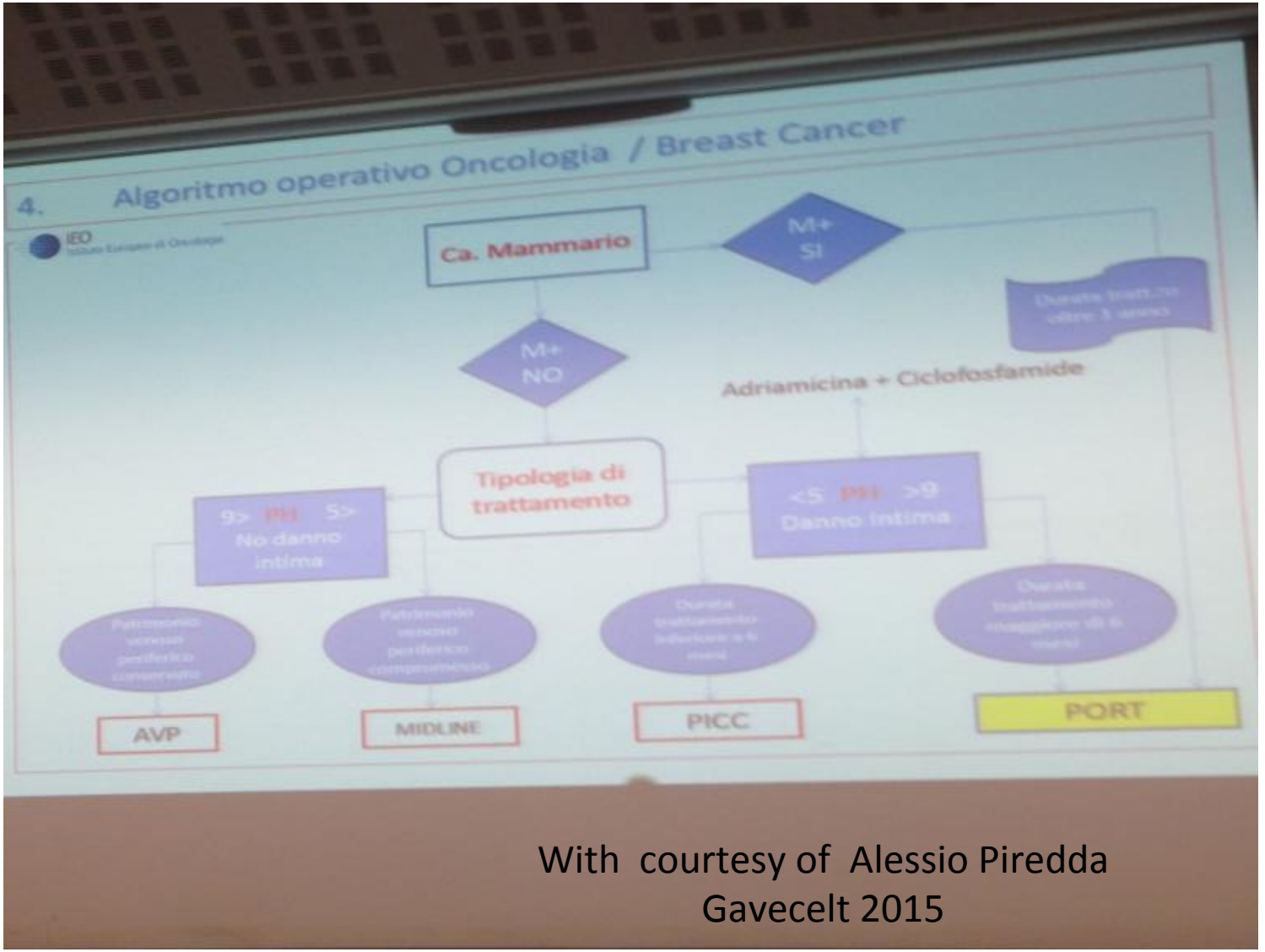
Decisionnal tree for central venous access



Decisionnal Algorithm for the choice in hematology with acute myloid leukemia patients eligible to a intensive treatment



CLB Mise à jour nove



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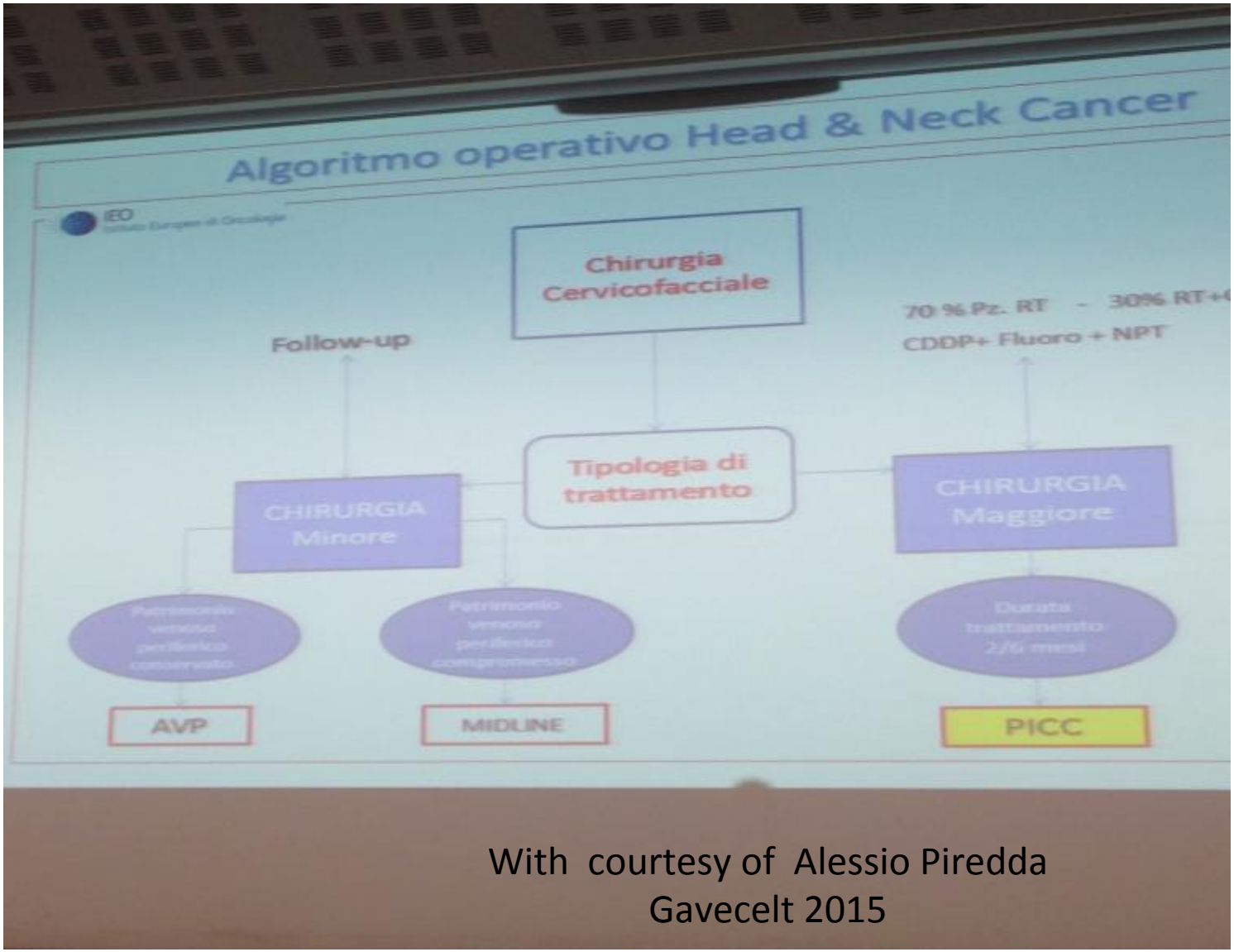
Gavecelt 2015



With courtesy of Alessio Piredda
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MOBIRA

Cancer Treatments' evolutions

BREAST CANCER ADJUVANT TREATMENT	**Subcutaneous TRANSTUZUMAB reduces lenght I.V. adjuvent CT**
LUNG CANCER	**Increased efficacy of oral Therapy For NSCLC** **- Molecular Target Therapy** **- EGFR/ALK inihibitors**
LARGE BOWEL CANCER	**- Increased use of oral 5FU** **- Ostomy increase risk for infection**

Take home message

INS (2016) Standards for Infusion Therapy

VAD Planning (Device Choice)

"The appropriate type of VAD is selected to accommodate the patient's vascular access needs based on:

- the prescribed therapy or treatment regimen;
- anticipated duration of therapy;
- vascular characteristics;
- and patient's age, comorbidities, history of infusion therapy, preference for VAD location,
- and ability and resources available to care for the device"

CVC Type, Insertion Site, Placement

Recommendation #1.1: There is insufficient evidence to recommend one type of CVC routinely for all patients with cancer; the choice of catheter should be influenced by the expected duration of use, chemotherapy regimens, and patient ability to provide care; the minimum number of lumens essential for the management of the patient is recommended; these issues should be discussed with the patient.

Patient centered

ASCO GUIDELINES
Clinical Tools and Resources

Central Venous Catheter (CVC) Care for the Patient with Cancer

Clinical Practice Guideline

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- Device choice should be patient centered
- Requires the input of a multi disciplinary team
- Should ensure the prevention of dammage

Life hangs by a thread

In oncology, this thread is frequently a CVA