CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

PICC and hematology

2017

Dr ROSAY

Unité d'accès vasculaire

DAR CLB Lyon

Disclosure

- CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

- Bard: Congress, Research, Consultant, Education

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Lymphoma

- Fever, weight loss more than 10% body weight in preceding 6 months and drenching night sweats which constitutes the B symptoms, lump in neck, axilla or groin.
- Excision biopsy of lymph node for Histopathological Examination (HPE), Immuno-histochemistry (IHC) and molecular studies.
- Blood investigations including Lactate dehydrogenase (LDH), Serum Uric Acid, Renal Functions.
- Imaging tests like Computerised Tomography (CT), Positron emission tomography (PET CT).
- Bone marrow biopsy.

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

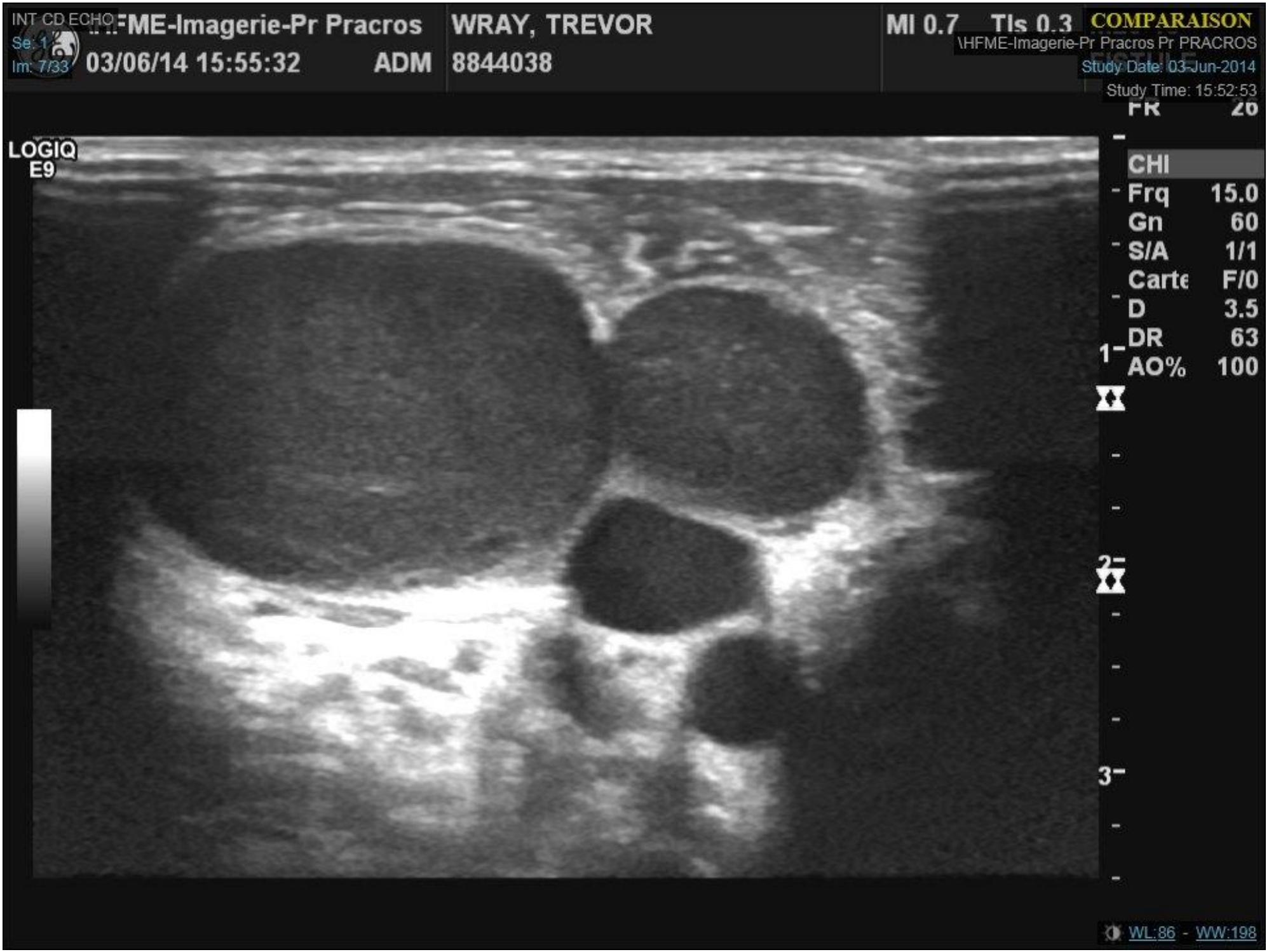
Lymphoma Treatment

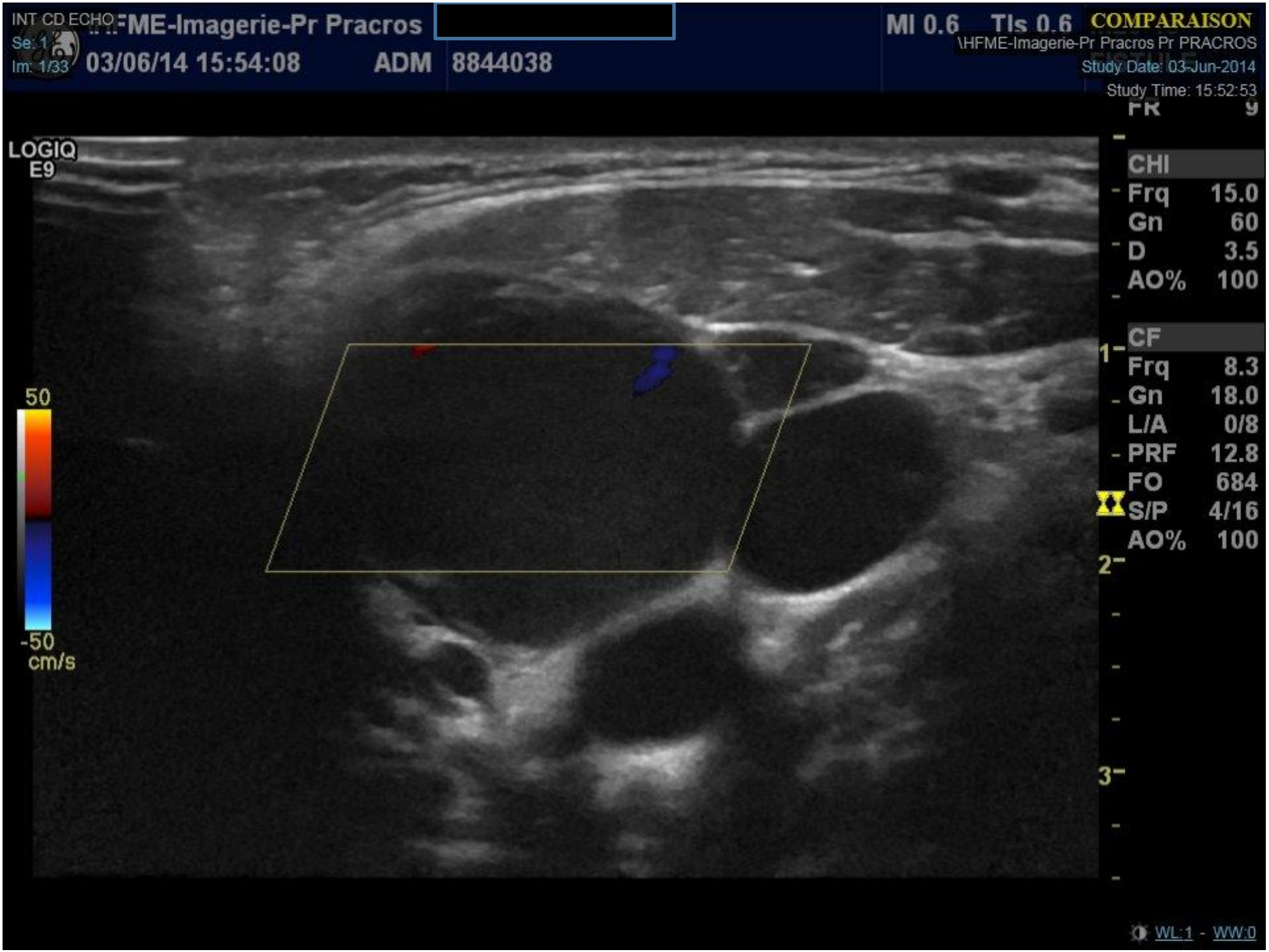
- **Hodgkin lymphoma (HL)** Chemotherapy with ABVD or BEACOPP regimen and Involved field radiation therapy (IFRT).
- **Non-Hodgkin lymphoma (NHL)** Chemo-immunotherapy (R-CHOP) for B cell lymphomas and chemotherapy (CHOP) for T cell lymphomas.

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Neck lymph nodes

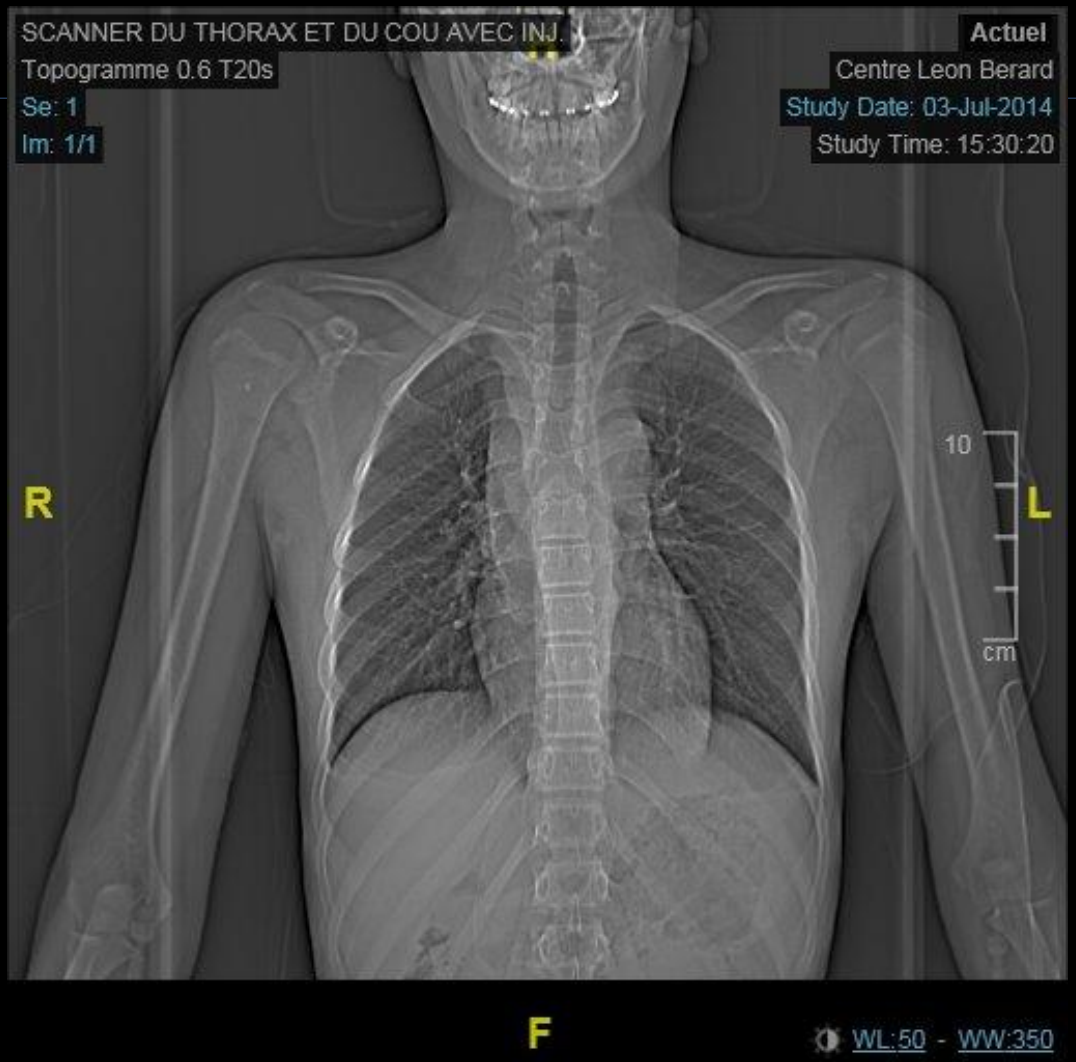
CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD


INT CD ECHO
Se: 1
Im: 7/33
HFME-Imagerie-Pr Pracros
03/06/14 15:55:32 ADM
WRAY, TREVOR
8844038
MI 0.7 TIs 0.3
COMPARAISON
\HFME-Imagerie-Pr Pracros Pr PRACROS
Study Date: 03-Jun-2014
Study Time: 15:52:53
LOGIQ
E9
PR 20
CHI
Frq 15.0
Gn 60
S/A 1/1
Carte F/0
D 3.5
DR 63
AO% 100
1
2
3
WL:86 - WW:198

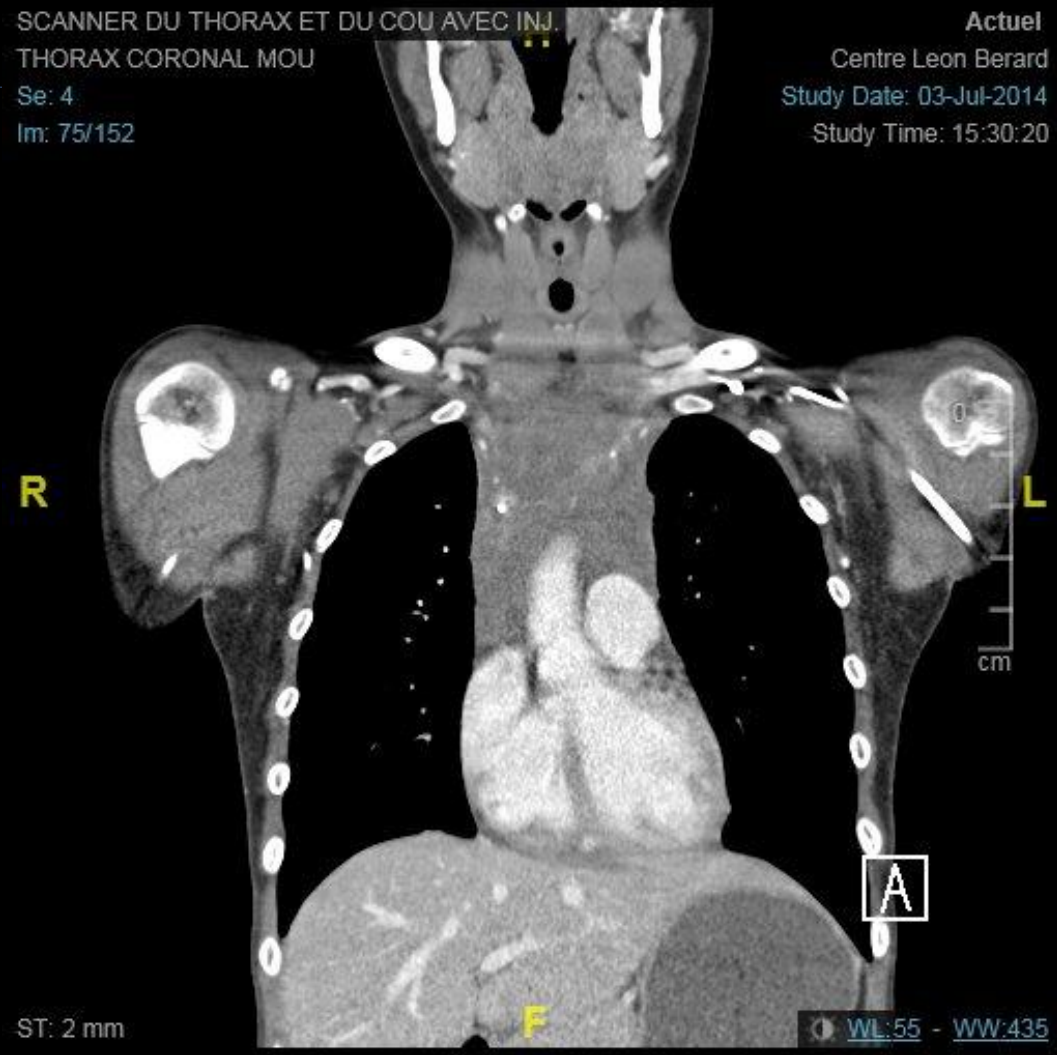

INT CD ECHO
Se: 1
Im: 1/33
ME-Imagerie-Pr Pracros
03/06/14 15:54:08
ADM
8844038
MI 0.6
TIs 0.6
COMPARAISON
\HFME-Imagerie-Pr Pracros Pr PRACROS
Study Date: 03-Jun-2014
Study Time: 15:52:53
LOGIQ
E9
50
-50
cm/s
CHI
Frq 15.0
Gn 60
D 3.5
AO% 100
CF
Frq 8.3
Gn 18.0
L/A 0/8
PRF 12.8
FO 684
S/P 4/16
AO% 100
WL:1 - WW:0

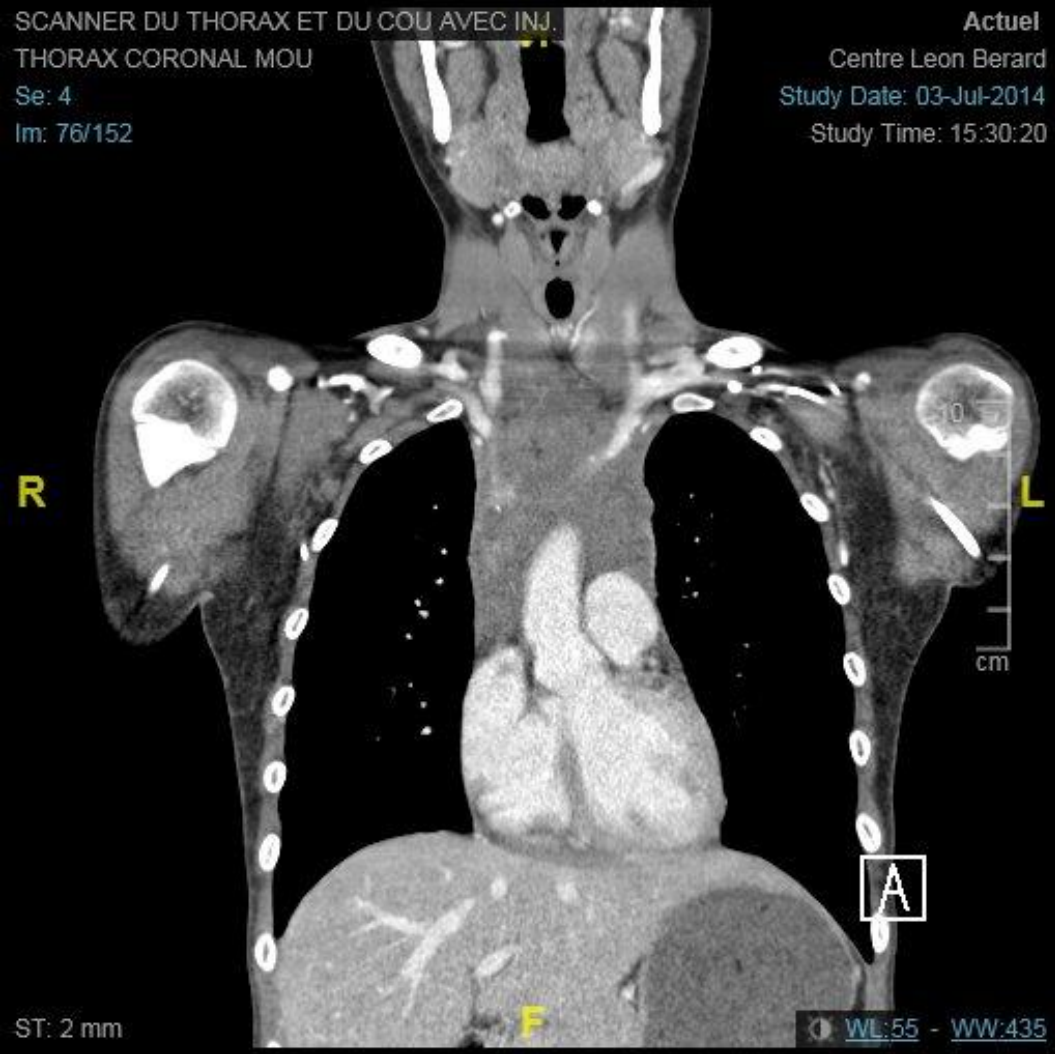
Big mediastinum

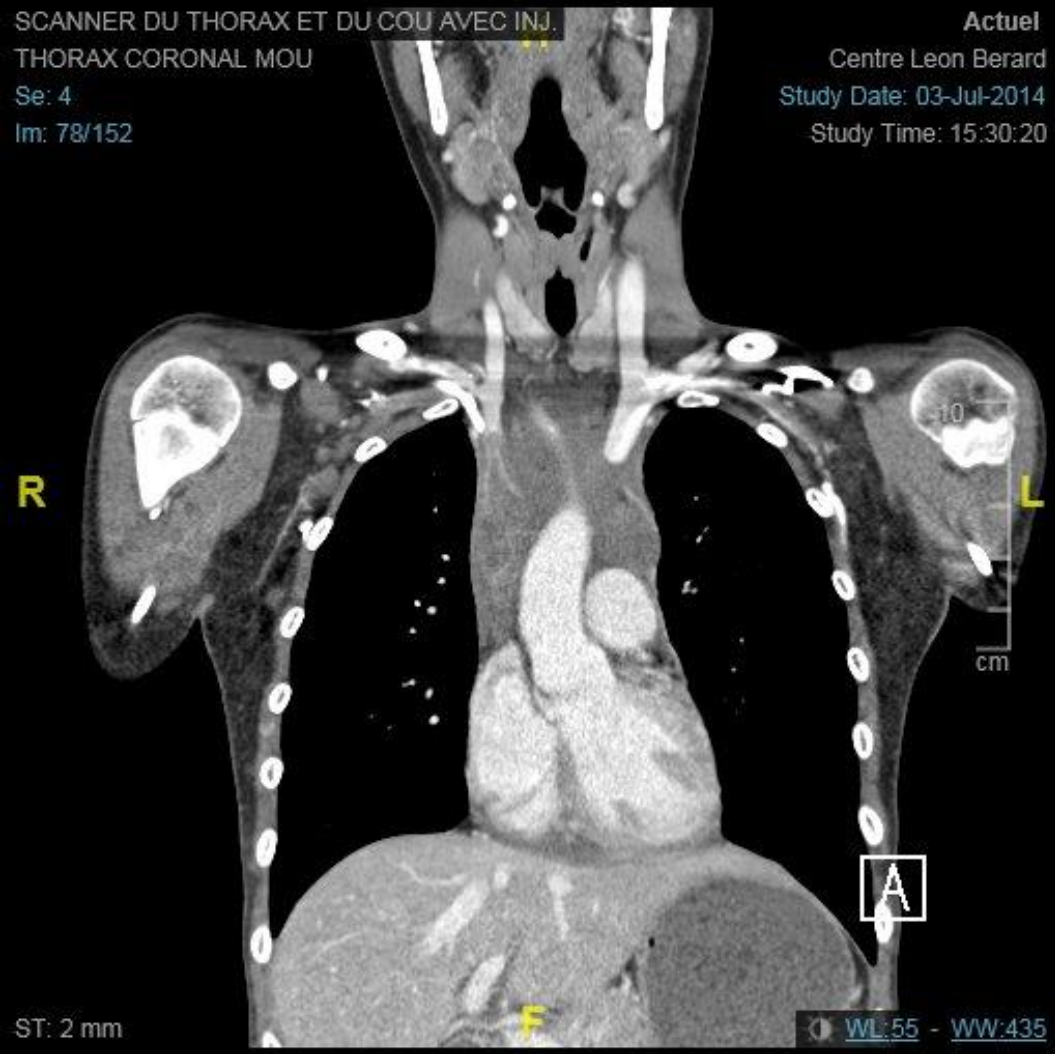
CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD



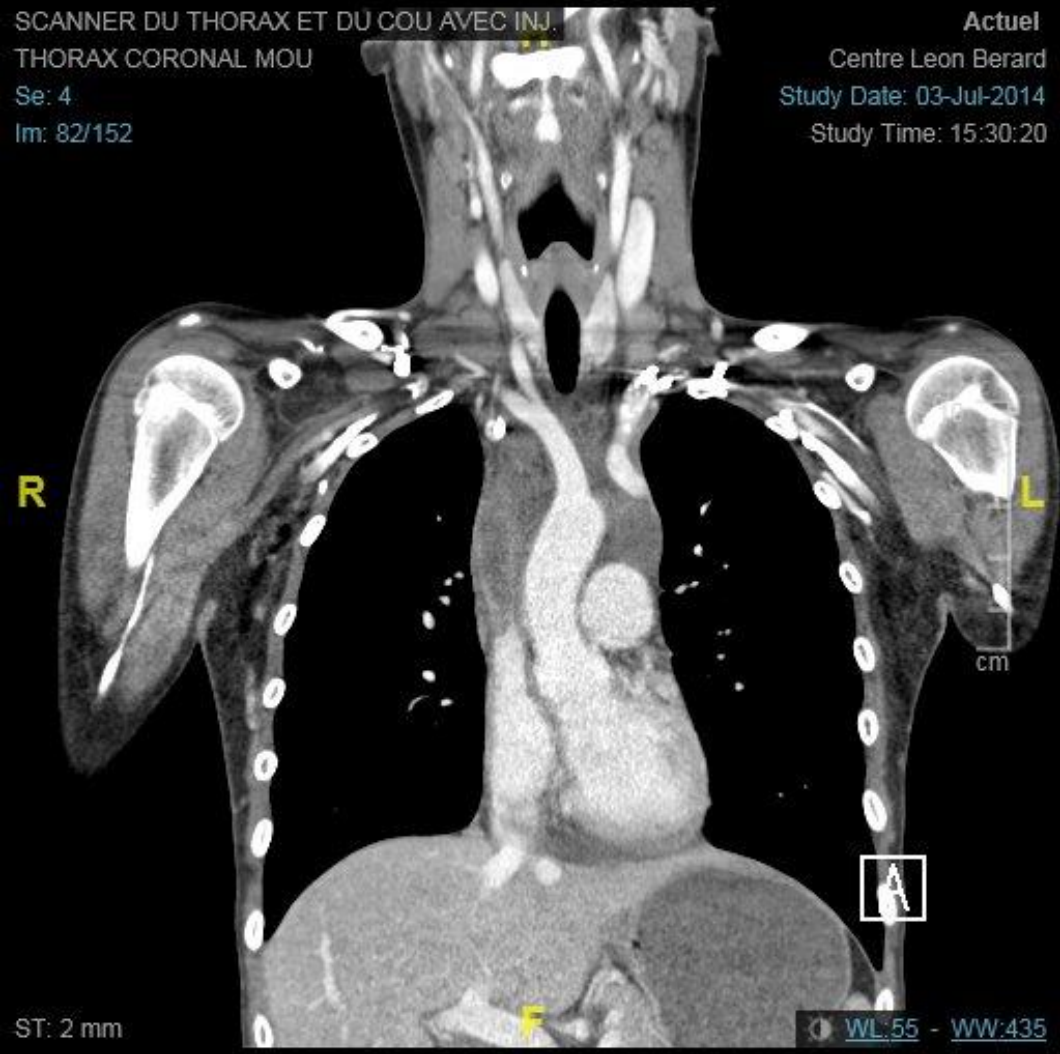
CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD


SCANNER DU THORAX ET DU COU AVEC INJ.
THORAX CORONAL MOU
Se: 4
Im: 75/152
Actuel
Centre Leon Berard
Study Date: 03-Jul-2014
Study Time: 15:30:20
R
L
cm
A
ST: 2 mm
F
WL:55 - WW:435

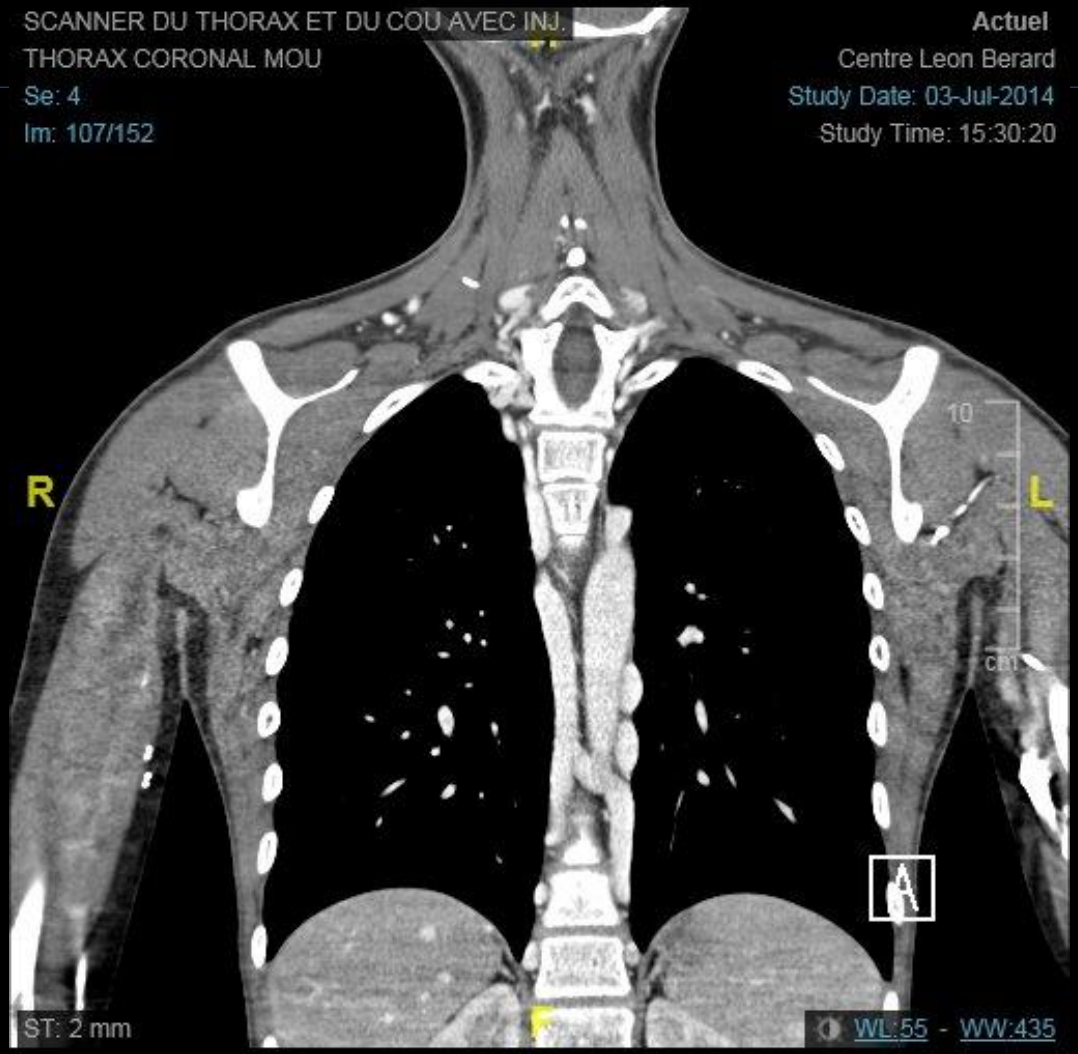

SCANNER DU THORAX ET DU COU AVEC INJ.
THORAX CORONAL MOU
Se: 4
Im: 76/152
Actuel
Centre Leon Berard
Study Date: 03-Jul-2014
Study Time: 15:30:20
R
L
cm
A
ST: 2 mm
F
WL:55 - WW:435



CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD



CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD



CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Big mediastinum

- Sometime problematic in pediatrics for general anesthesia …
- Sometime compressed superior vein cava

•Evaluation with prior CT Scan

Discussion:

•First chemotherapy or steroid via peripheral vein

•Heparinotherapy

•femoral vein

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Blood cancer: Leukemia

- **Bleeding manifestations** including bleeding gums, bleeding from nose, blood in vomitus, blood in sputum, blood stained urine, black coloured stools, fever, lump in neck, axilla or groin, lump in upper abdomen.
- **Blood investigations** including haemoglobin, total leukocyte count, platelet count, peripheral smear, red cell indices.

  Bone marrow studies including aspiration, Flow-cytometry, Cytogenetics, Fluorescent in situ hybridisation and molecular studies.

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Blood cancer: Acute and chronic leukemias

- **Acute lymphoblastic leukemia (ALL) Acute myeloid leukemia (AML)**: Intensive chemotherapy phase for initial 6 months and consolidation chemotherapy for 2 years. Prophylactic cranial and stem cell transplantation for high-risk patients.
- **Chronic lymphocytic leukemia (CLL)**: Chemo-immunotherapy (FCR or BR regimen) for symptomatic patients. **Chronic myeloid leukemia (CML)** Targeted therapy with tyrosine kinase inhibitor (Imatinib) as first-line treatment.

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Blood cancer: Acute and chronic leukemias

- Complex chemotherapy

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

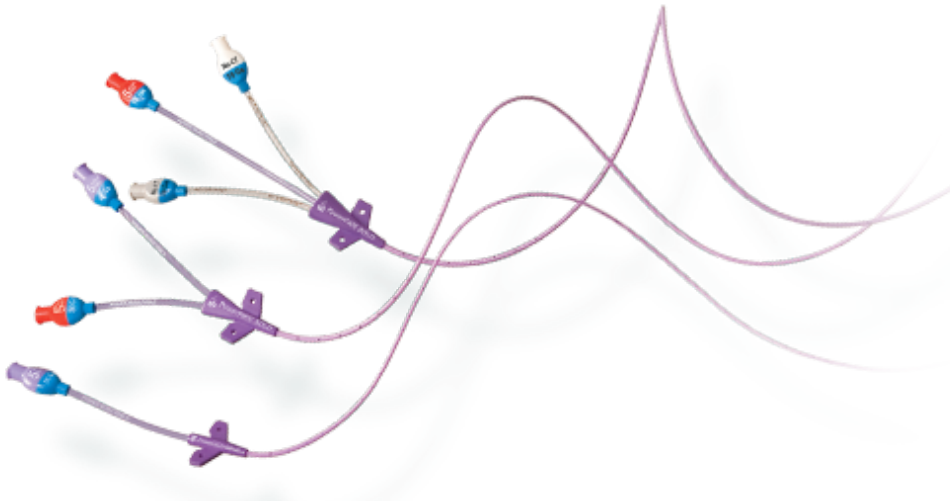
Why CVC?

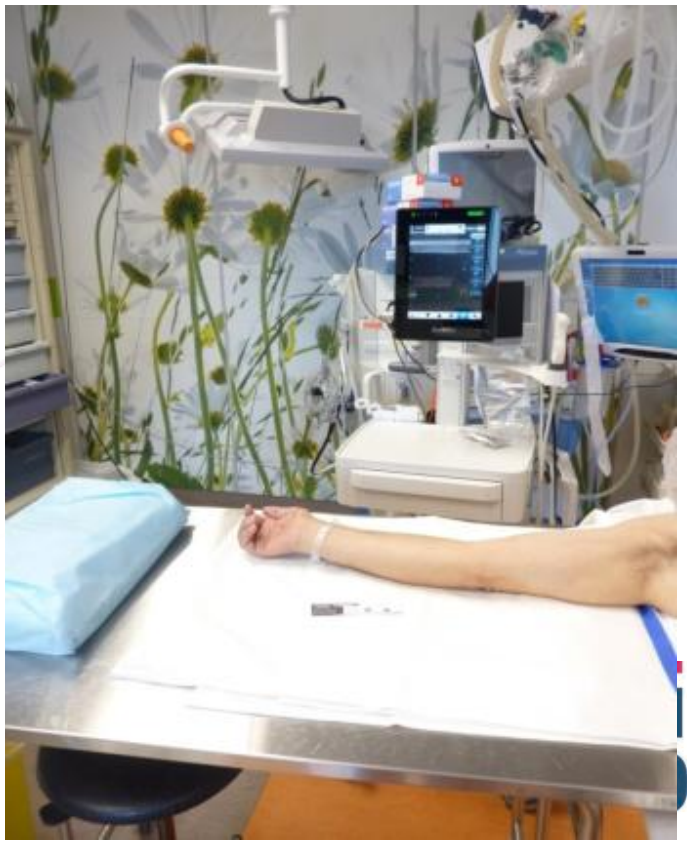
- Complex chemotherapy
- Frequent antibiotherapy
- Nutritional support (mucositis)
- Tumour lysis Syndrome: prophylaxis or treatment
  - Hydratation
  - Electrolyte imbalance
- Regular blood tests
- Frequent blood transfusions

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Why PICC?

- Frequent hemostasis disorders
  - Easy to place with Ultra Sound
  - Easy to remove

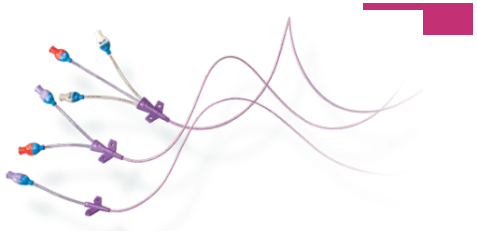




Recommendations from a formalized expert consensus
Good practice and risk management for the use of PICC (Peripherally inserted central catheter)

- To avoid the mechanical risks associated with a percutaneous subclavicular or internal jugular access, a PICC is indicated in the case of a patient with any hemostatic disorders (SA).

Why PICC?



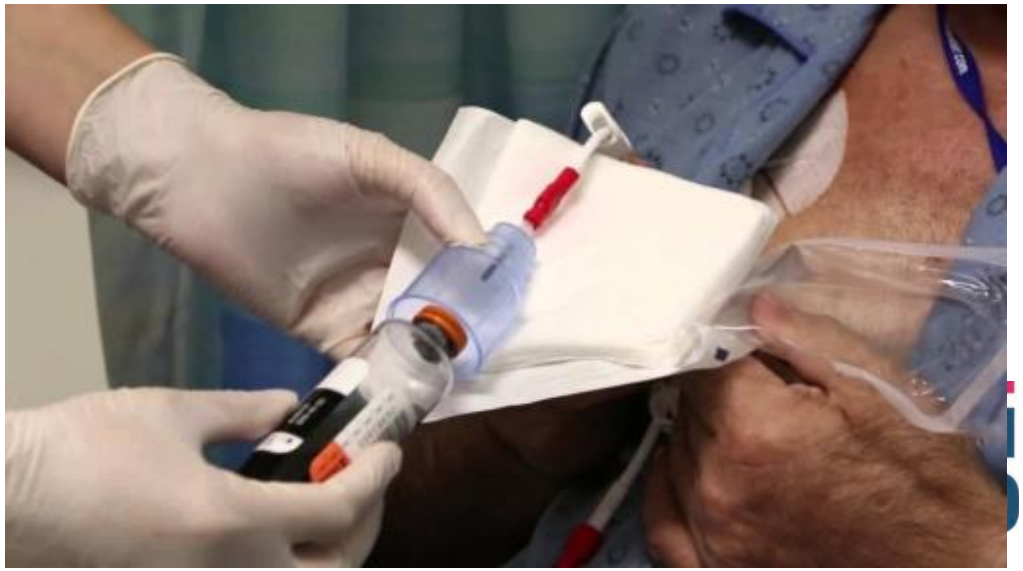
- Frequent haemostasis disorders
- Frequent sepsis syndroma
  - Easy to remove even in presence of hemostasis disorders
  - Compressible

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Frequent fever, infectious complications

CRBSI:

- **Peripheral vein And Central vein**



Positif blood culture with the same pathogen

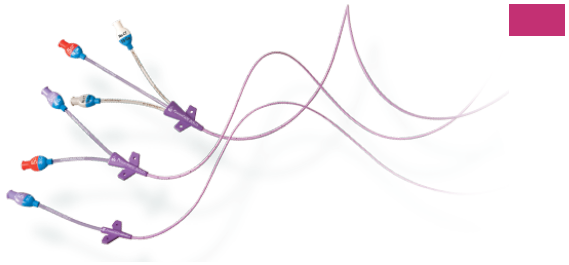
- **Differential time to positivity** :positive result of culture from a CVC is obtained at least **2 hr earlier** than is a positive result of culture from peripheral blood)
- **Simultaneous quantitative cultures** of blood samples with a ratio of **5 : 1** (CVC vs. peripheral)

Central venous catheter-related infections in hematology and oncology: 2012 updated guidelines on diagnosis, management and prevention by the Infectious Diseases Working Party of the German Society of Hematology and Medical Oncology

M. Hentrich[1], E. Schalk[2], M. Schmidt-Hieber[3], I. Chaberny[4], S. Mousset[5], D. Buchheidt[6], M. Ruhnke[7], O. Penack[8], H. Salwender[9], H.-H. Wolf[10], M. Christopeit[10], S. Neumann[11], G. Maschmeyer[12] & M. Karthaus[1]

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Why PICC?



- Frequent haemostasis disorders
- Frequent sepsis syndroma
- First intention CVC:
  - Great quality of material
  - Less infectious complications,
  - Less expensive

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Stem cells transplantation: Why DL?

- Chemiotherapy
- Severe aplasia neutropenia: ATB
- With often mucitis -→TPN

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Application of peripherally inserted central catheter in acute myeloid leukaemia patients undergoing induction chemotherapy

M.-H. Chen RN, Nurse Practitioner [1] | W.-L. Hwang MD, Attending Physician [1] | K.-H. Chang PhD, Assistant Professor [2] | L.C.J. Chiang RN, PhD, Assistant Professor [3] | C.L.J. Teng MD, PhD, Assistant Professor [1,4,5]

Eur J Cancer Care 2016; 1–6

TABLE 1 Clinical characteristic comparison between patients in PICC and IV groups

	All patient (n = 89)	PICC group (n = 43)	IV group (n = 46)	p
Age (years)	47.8 ± 14.4	46.7 ± 14.4	48.9 ± 14.5	.648[a]
Gender (n, %)				
M	45 (51.0)	22 (51.0)	23 (50.0)	1.000[b]
F	44 (49.0)	21 (49.0)	23 (50.0)	
Leucocyte (no./μl)	48,276.5 ± 60461.9	47,484.7 ± 54922.9	49,016.7 ± 65819.6	.786[a]
Haemoglobin (g/dl)	8.1 ± 2.1	8.0 ± 1.9	8.1 ± 2.3	.718[a]
Platelet (no./μl)	74,098.9 ± 73751.7	70,139.5 ± 70139.5	77,800.0 ± 77696.2	.825[a]
Bacteraemia				
Yes	20 (22.5)	9 (20.9)	11 (23.9)	.803[a]
No	69 (77.5)	34 (79.1)	35 (76.1)	

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Application of peripherally inserted central catheter in acute myeloid leukaemia patients undergoing induction chemotherapy

M.-H. Chen RN, Nurse Practitioner [1] | W.-L. Hwang MD, Attending Physician [1] | K.-H. Chang PhD, Assistant Professor [2] | L.C.J. Chiang RN, PhD, Assistant Professor [3] | C.L.J. Teng MD, PhD, Assistant Professor [1,4,5]

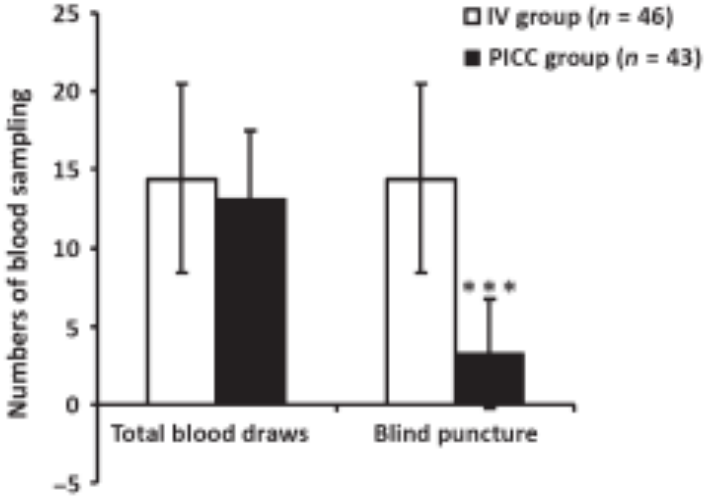


FIGURE 1 The average number of total blood samplings in the peripherally inserted central catheter (PICC) group and the intravenous (IV) line group were 13.2 ± 4.2 and 14.4 ± 6.0, respectively ($p = .271$). However, the number of blind punctures performed in the PICC group and IV line group were 3.3 ± 3.6 and 14.4 ± 6.0, respectively. Patients in the PICC group experienced significantly fewer blind punctures than those in the IV line group ($p = .000$). ***$p < 0.001$.

TABLE 4 Causes of removal of peripherally inserted central catheter

	n (%)	Duration (days)
Total	43 (100.0)	24.0 ± 7.0
Treatment complete	33 (76.7)	26.8 ± 5.0
Local infection	4 (9.3)	15.8 ± 6.3
Systemic infection	3 (7.0)	19.7 ± 5.5
Phlebitis	2 (4.7)	10.0 ± 2.8
Others	1 (2.3)	14

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Experience of Peripherally Inserted Central Venous Catheter in Patients with Hematologic Diseases

Yoshinori Hashimoto, Takanori Fukuta, Junko Maruyama, Hiromi Omura and Takayuki Tanaka

(Intern Med 56: 389-393, 2017)
(DOI: 10.2169/internalmedicine.56.7625)

Table 1. Patients Characteristics.

Disease	Number of PICC (%)
AML	53 (37.3)
ML	51 (35.9)
MDS	11 (7.7)
MM	8 (5.6)
CML-BC	5 (3.6)
AA	5 (3.6)
POEMS syndrome	3 (2.1)
ALL	2 (1.4)
Others	4 (2.8)
Total	142 (100)

AML: acute myeloid leukemia, ML: malignant lymphoma, MDS: myelodisplastic syndrome, MM: multiple myeloma, CML-BC: chronic myelogenous leukemia-blast phase, AA: aplastic anemia, ALL: acute lymphoblastic leukemia

Table 2. Reasons for PICC Removal.

Disease	Number of PICC (%)
Treatment completion	63 (44.4)
Catheter occlusion	14 (9.9)
Clinical suspicion of infection	10 (7.0)
Fever of unknown origin	4 (2.8)
Catheter damage	2 (1.4)
Pain at the insertion site	1 (0.7)
Pruritus around the dedicated anchor	1 (0.7)
Accidental removal	1 (0.7)
Other	1 (0.7)
Death	22 (15.5)
Transfer to another hospital	7 (4.9) (6/7 catheters were kept in place)
In use	16 (11.3)
Total	142 (100)

Peripherally inserted central catheters (PICCs) in the management of oncohematological patients submitted to autologous stem cell transplantation

Silvia Bellesi · Patrizia Chiusolo · Gennaro De Pascale · Mauro Pittiruti · Giancarlo Scoppettuolo · Elisabetta Metafuni · Sabrina Giammarco · Federica Sorà · Luca Laurenti · Giuseppe Leone · Simona Sica

Support Care Cancer (2013) 21:531–535

Table 1 Patients' characteristics

No. of patients	57
Sex (female/male)	23/34
Age at transplant (years)	48 (19–68)
Disease	AML 5
	Multiple myeloma 14
	Non-Hodgkin's lymphoma 26
	Hodgkin's lymphoma 5
	POEMS 2
	Germ cell tumor 5
Number of auto-SCT	Single 54
	Double 3
Duration of PICC	Range 6–124 days
	Median 19 days
	Period of inclusion 1,276 days

Table 3 Reasons for PICC removal

Reason for PICC removal	End of therapy	40/60	70
	Fever of unknown origin	9/60	15
	Catheter-related thrombosis	2/60	3.3
	Accidental removal	3/60	5
	CRBSI	2/60	3.3
	Catheter occlusion	1/60	1.6
	Peripheral blood sepsis	1/60	1.6
	Death	1/60	1.6

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

A role for peripherally inserted central venous catheters in the prevention of catheter-related blood stream infections in patients with hematological malignancies

Toshiro Sakai · Kyuhei Kohda · Yuichi Konuma · Yasuko Hiraoka · Yukari Ichikawa · Kaoru Ono · Hiroto Horiguchi · Ayumi Tatekoshi · Kouichi Takada · Satoshi Iyama · Junji Kato

Int J Hematol (2014) 100:592–598
DOI 10.1007/s12185-014-1677-9

Table 1 Patients' characteristics

	PICC	CVC	*P*
No. of patients	84	85	
No. of catheters	101	148	
Sex (M/F)	53/31	54/31	0.95
Age (years) (mean ± SD)	61.0 ± 11.8	61.5 ± 14.2	0.65
Diagnosis			
ML	31	41	
AML	29	23	
MM	12	6	
ALL	3	6	
MDS	3	5	
CML	3	2	
Other	3	2	
HSCT			
Auto-HSCT	40	23	
Allo-HSCT	24	11	
Insertion site			
Basilic (R/L)	101 (29/72)		
Subclavian		111	
Jugular		26	
Inguinal		11	
Duration of catheterization (days)			
Mean ± SD	72.4 ± 63.99	28.0 ± 17.62	<0.01
Range	5–318	2–91	

SD standard deviation, *auto-HSCT* autologous hematopoietic stem cell transplantation, *allo-HSCT* allogeneic hematopoietic stem cell transplantation, *ML* malignant lymphoma, *AML* acute myeloid leukemia, *MM* multiple myeloma, *ALL* acute lymphoid leukemia, *MDS* myelodysplastic syndrome, *CML* chronic myeloid leukemia, *R* right arm, *L* left arm

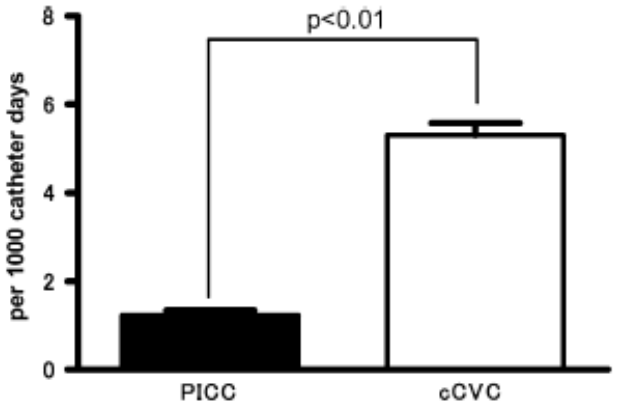


Fig. 1 Comparison of the CR-BSI rate between the cCVC and PICC groups. The CR-BSI rates were 1.23 per 1000 catheter days and 5.30 per 1000 catheter days in the PICC and cCVC groups, respectively. The CR-BSI rate in the PICC group was significantly lower than that in the cCVC group ($P < 0.01$)

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Infective and thrombotic complications of central venous catheters in patients with hematological malignancy: prospective evaluation of nontunneled devices

Leon J. Worth · John F. Seymour · Monica A. Slavin

Support Care Cancer (2009) 17:811–818

Table 3 Catheter outcomes, by device

Outcome	PICC (*N*=75)			Nontunneled CVC (*N*=31)			*p* value	Overall (*N*=106)		
	n	Per 1,000 CVC days	95% CI	*n*	Per 1,000 CVC days	95% CI		*n*	Per 1,000 CVC days	95% CI
Exit site infection	1	0.55	0.01–3.07	1	1.71	0.04–9.54	0.50	2	0.83	0.10–3.01
Thrombosis	14	7.71	4.22–12.94	2	3.42	0.41–12.37	0.14	16	6.67	3.81–10.83
CR-BSI	12	6.61	3.42–11.55	6	10.27	3.77–22.36	0.78	18	7.50	4.45–11.86

PICC peripherally inserted CVC, *CVC* central venous catheter, *CR-BSI* catheter-related bloodstream infection

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Wocova 2016

O-13

HICKMAN VS PICC: A COMPARISON OF CENTRAL VENOUS ACCESS DEVICE COMPLICATIONS IN ACUTE MYELOID LEUKAEMIA

P. Haywood, L. Bacon
Royal Melbourne Hospital, Melbourne, Australia

Introduction: Central venous access devices (CVADs) are necessary to treat patients with acute myeloid leukaemia (AML). Serious complications such as central line associated blood stream infection (CLABSI) and venous thrombosis (VT) are not unusual.

We aimed to compare the rates of complications between Hickman catheters and peripherally inserted central catheters (PICCs) inserted over the past three years in patients with newly diagnosed AML undergoing intensive chemotherapy in our haematology unit.

Methods: The medical records of all patients who commenced induction chemotherapy for AML from Jan 2013 to Dec 2015 were reviewed. Date of insertion and removal, type of CVAD, and reason for removal were assessed. CLABSI was determined using the definition described by the National Healthcare Safety Network. VT was determined by diagnosis on ultrasound report. Statistical significance was determined using Fisher's exact test.

Results: There were 91 patients with 138 CVADs (52 Hickman, 86 PICC) with 6924 line days included in the analysis.

Rates of CLABSI and VT were broadly similar. For Hickman catheters: CLABSI 13% or 2.00 per 1,000 line days, VT 0%. For PICCs: CLABSI 8% or 2.04 per 1,000 line days, VT 7%.

Hickman catheters incurred significantly fewer non-infectious complications requiring removal; 0% vs 12.8% for PICCs ($p<0.01$).

Discussion: In our institution, the choice between Hickman catheter and PICC partly depends on convenience and staff preference. Despite the risk for bias in retrospectively collected data we feel there is sufficient evidence to justify a preference toward Hickman catheters in AML patients in our institution.

Conclusions: Hickman catheters are more durable in patients with AML in our institution, though there were no statistically significant differences in rates of CLASBI or VT; a finding consistent with other published data.

Incidence of catheter-related thrombosis in acute leukemia patients: a comparative, retrospective study of the safety of peripherally inserted vs. centrally inserted central venous catheters

Mohammad Refaei[1] · Bruna Fernandes[2] · Joseph Brandwein[3] · Iarilyn Dawn Goodyear[4] · Arun Pokhrel[5] · Cynthia Wu[3]

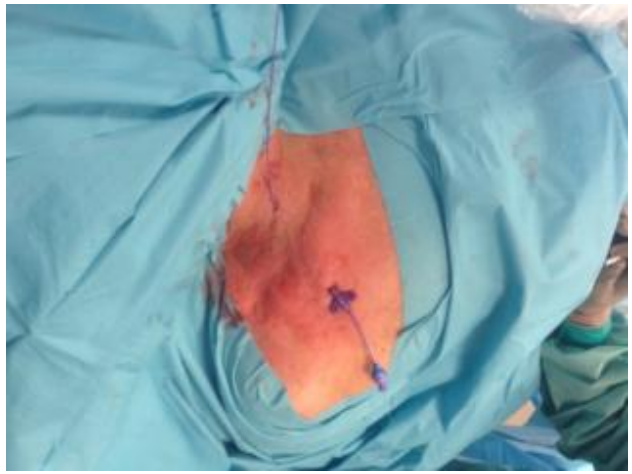
Ann Hematol
DOI 10.1007/s00277-016-2798-4

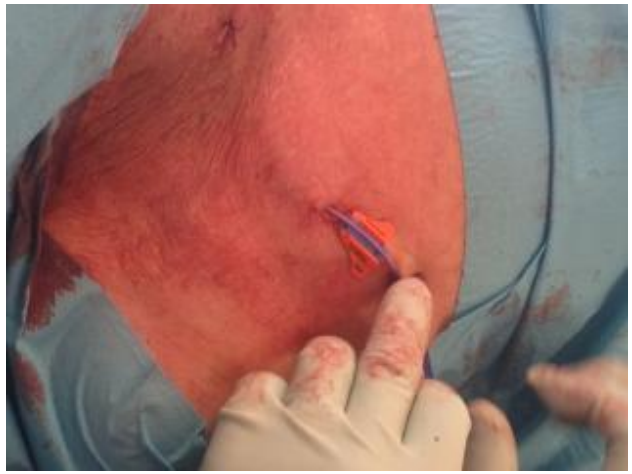
Table 3 Incidence rates per 1000 catheter days of all outcomes according to catheter type ($N = 1331$)

Outcome	Incidence rate (95 % CI)		p value
	PICC ($N = 699$)	CICC ($N = 632$)	
Catheter-related thrombosis	1.9 (1.5–2.3)	0.5 (0.4–0.7)	<0.0001
Recurrent CRT	0.2 (0.08–0.3)	0.05 (0.02–0.1)	0.07
Concurrent VTE	0.3 (0.2–0.6)	0.2 (0.2–0.3)	0.4
Catheter-related bacteremia	0.3 (0.2–0.5)	0.4 (0.3–0.6)	0.5
All-cause bacteremia	1.3 (1.0–1.7)	1.4 (1.1–1.7)	0.6
Mechanical complications	1.3 (1.0–1.7)	0.4 (0.3–0.6)	<0.0001

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

PICC as CICC





- Better quality PU
- Power injectable
- With integrated valve (no gazous embolism)

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Securacath

Potential role of a subcutaneously anchored securement device in preventing dislodgment of tunneled-cuffed central venous devices in pediatric patients

J Vasc Access 2017; 00 (00): 000-000
DOI: 10.5301/jva.5000780

Andrea Dolcino[1,2], Antonio Salsano[1], Andrea Dato[2], Nicola Disma[3], Alessio Pini Prato[4], Filippo Bernasconi[5], Luigi Montagnini[2], Stefano Avanzini[2], Michela Bevilacqua[2], Giovanni Montobbio[2], Girolamo Mattioli[2], Clelia Zanaboni[2]

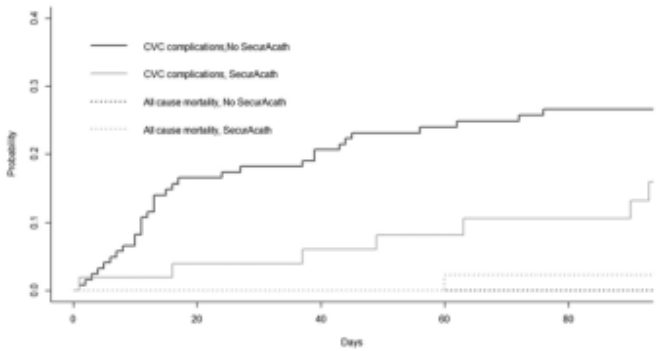


Fig. 1 - Cumulative incidence of central venous catheter (CVC)-related complications stratified based upon utilization of SAS accounting the competing risk of mortality for any cause. The trend suggests that the highest risk of dislodgment is in the very first period.

TABLE II - Details regarding complications

Complication	CVC (n = 47)	Incidence	Group A (n = 122)	Inc.	Group B (n = 51)	Inc.	p
Infection	13 (7.5%)	0.40 per 1000 CVC days	10 (8.2%)	0.38	3 (5.8%)	0.46	0.60
Dislodgment	27 (16.8%)	0.83 per 1000 CVC days	25 (14.4%)	0.95	2 (1.1%)	0.30	0.006
Thrombosis	4 (2.3%)	0.12 per 1000 CVC days	3 (1.7%)	0.11	1 (0.6%)	0.15	1
Malfunctioning	6 (3.5%)	0.18 per 1000 CVC days	5 (2.9%)	0.19	1 (0.6%)	0.15	0.67
Total complications	50 (28.9%)	1.50 per 1000 CVC days	43 (24.8%)	1.60	7 (4.1%)	1.08	0.004

CVC = central venous catheter; Inc. = incidence.

DE LUTTE CONTRE LE CANCER LEON BERARD

Glue

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Take home message

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Recommendations from a formalized expert consensus
Good practice and risk management for the use of PICC (Peripherally inserted central catheter)

- In hematology, a PICC can be proposed:
  - In the case of a therapeutic emergency (SA),
  - For induction therapy for acute leukemia (SA),
  - For the treatment of idiopathic myelosuppression (SA),
  - To provide therapeutic intensification of an already treated hematological affection (Hodgkin's lymphoma, nonHodgkin's lymphoma, myeloma, …) (MA),
  - In the case of an autograft or allograft of the hematopoietic stem cells (MA),

Central venous access devices in pediatric malignancies: a position paper of Italian Association of Pediatric Hematology and Oncology

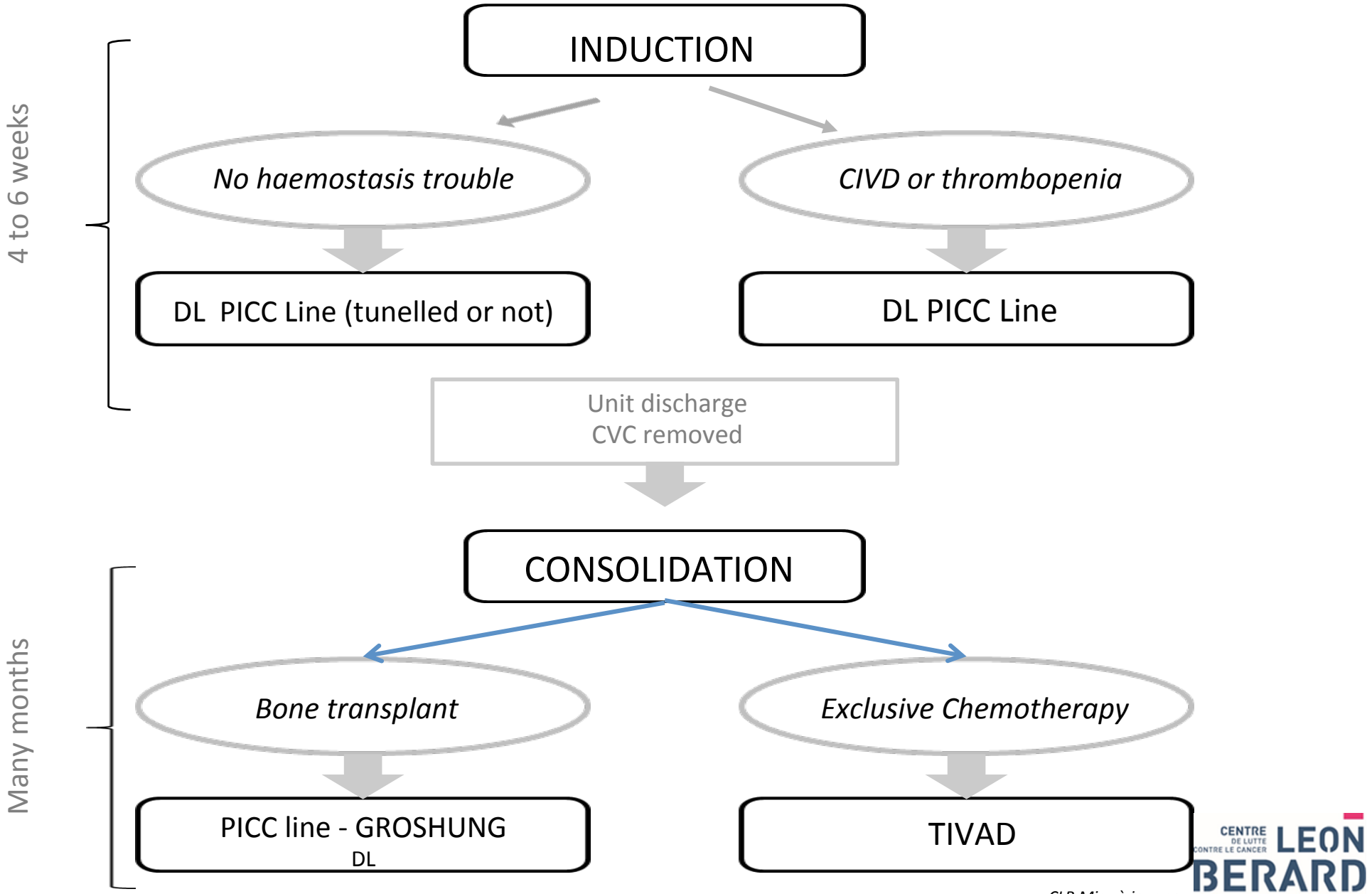
J Vasc Access 2015; 16 (2): 130-136
DOI: 10.5301/jva.5000314

TABLE I - Summary of AIEOP recommendations

Indications and selection criteria
For long-term treatments, ports should be preferred for intermittent use and cuffed tunneled catheters for frequent/ continuous use.
For short- to medium-term treatments, PICCs are a valid option, but they should be inserted only when deep veins of the arm are of appropriate diameter.
There is no evident advantage of silicon vs. polyurethane.
Double-lumen VADs should be used only in selected cases.

CENTRE DE LUTTE CONTRE LE CANCER LEON BERARD

Algorithm in hematology with acute myloid leukemia patients eligible for intensive treatment



CLB Mise à jour nove

Lyon: fête des lumières