STRATIFICATION DU RISQUE THROMBOTIQUE LIE AU CANCER

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THROMBOSE ASSOCIEE AU CANCER : RELATION RECONNUE

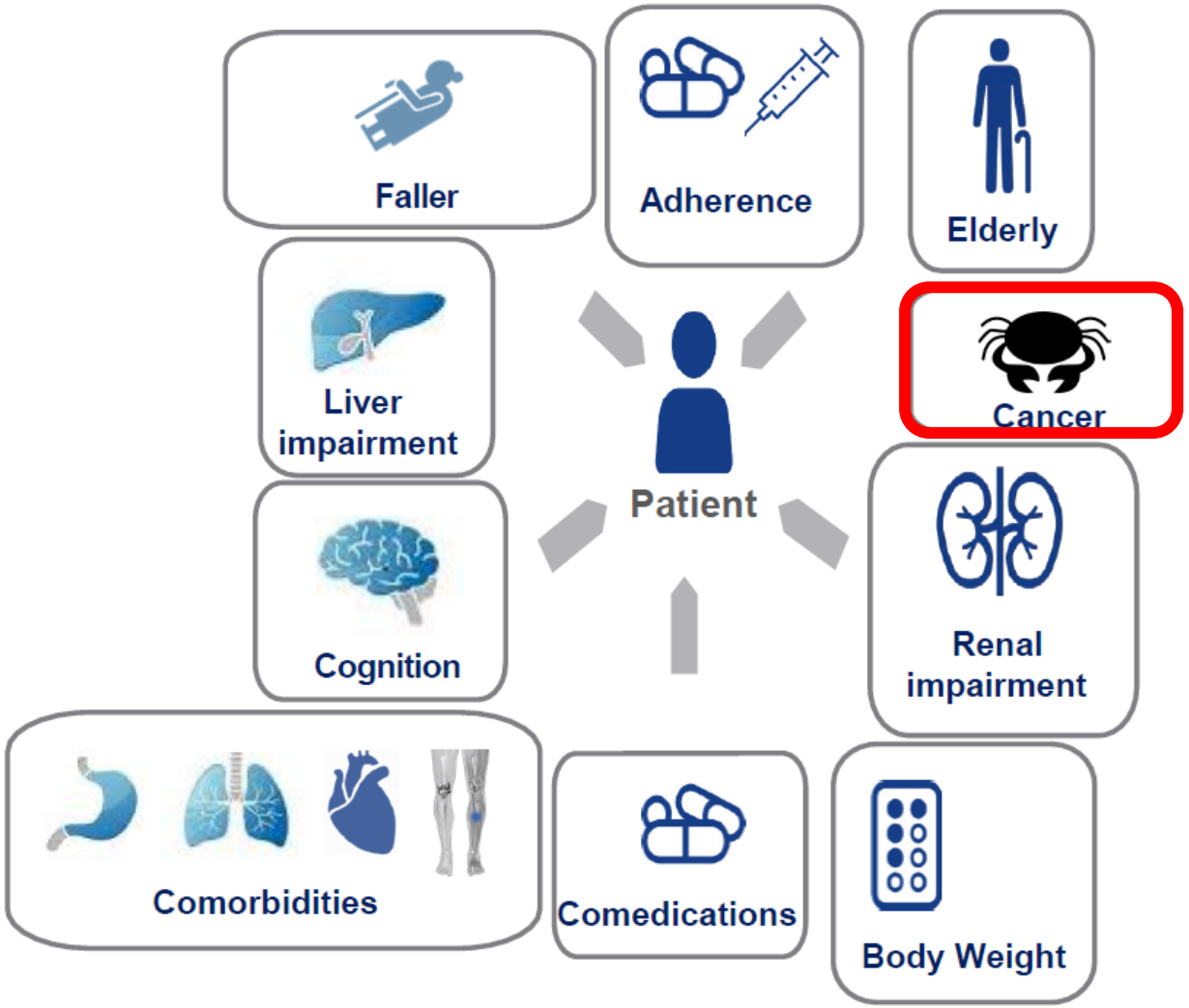
- **Depuis observation historique de Trousseau en 1865**

  Trousseau A. Clinique médicale de l'Hôtel-Dieu de Paris; Paris, France, 1865; Vol. 2, pp. 281-332

- **Risque d'ETE est ↑ x 3 au cours du cancer et x 9 dans population générale** (Falanga, ESMO, clinical practice guidleines 2023, sous presse)
- **15 à 20% TVP ± EP au cours d'un cancer**
- **Risque de récidive est ↑ x 3 si cancer**
- **Risque de TVP post-opératoire ↑ x 2 si cancer**
- **Risque de décès est ↑ x 2-3 si ETE et cancer**
- **MTEV chez 50% des autopsies de cancers**
- **MTEV 2ème cause de mortalité au cours du cancer**

Barsam et al Br J Hematol 2013

CHALLENGES CHEZ LE PATIENT ATTEINT DE CANCER



Scotte, Elalamy et al Cancers 2019; 11(1): 48-62

NOUVELLES PERSPECTIVES POUR UN VIEUX PROBLEME

JMV—Journal de Médecine Vasculaire (2020) 45, 6S8-6S16

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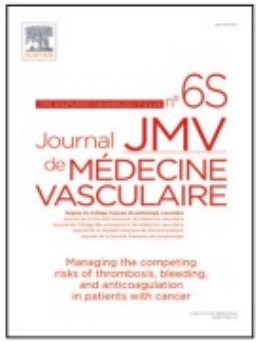

Cancer and thrombosis: new insights to an old problem

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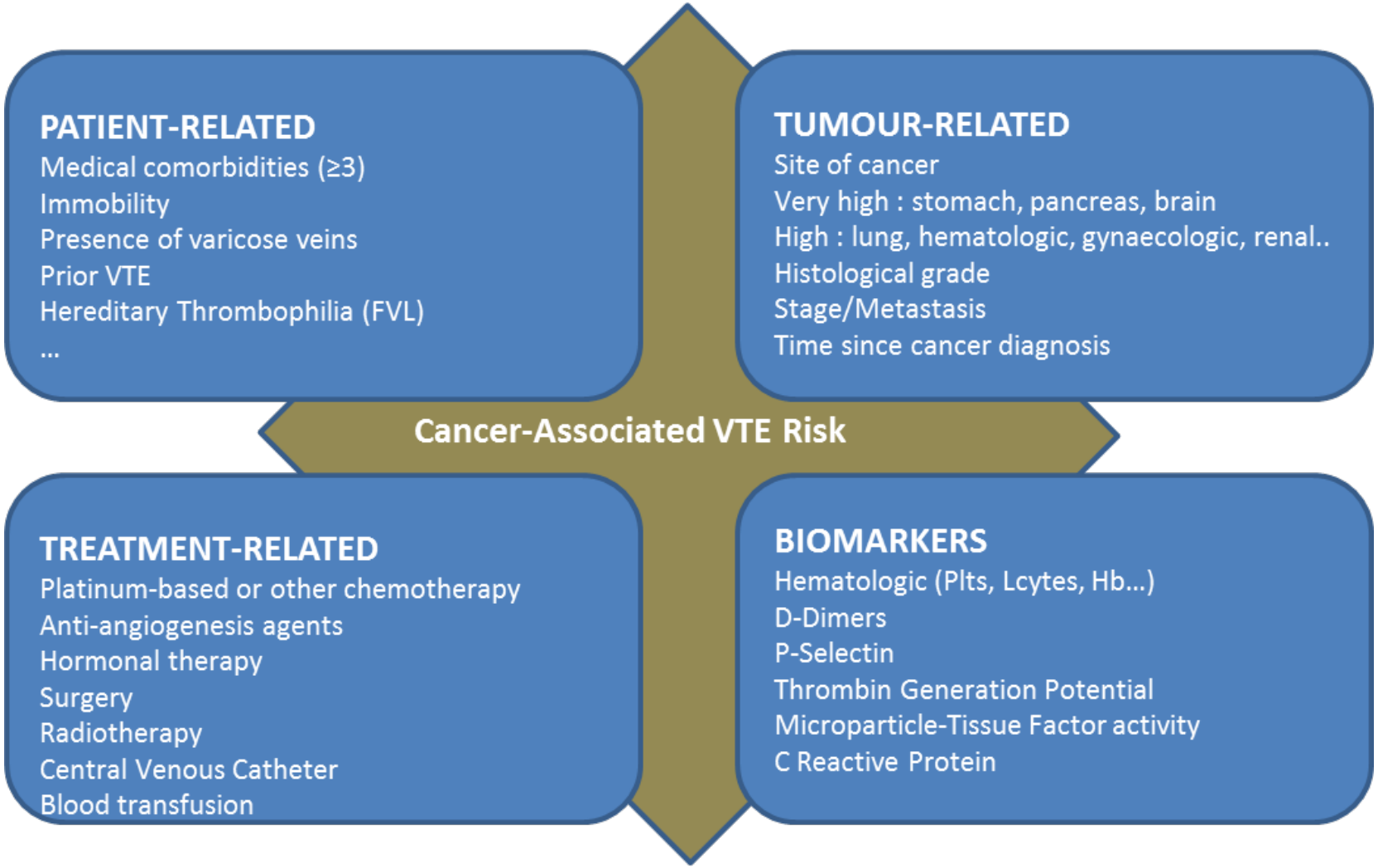
[c] *Hematology Division, Brigham and Women's Hospital, Harvard Medical School, Boston, MA*
[d] *Division of Hematology, Massachusetts General Hospital, Harvard Medical School, Boston, MA*

LES 4 DIMENSIONS DU RISQUE THROMBOTIQUE : HYPERCOAGULABILITE



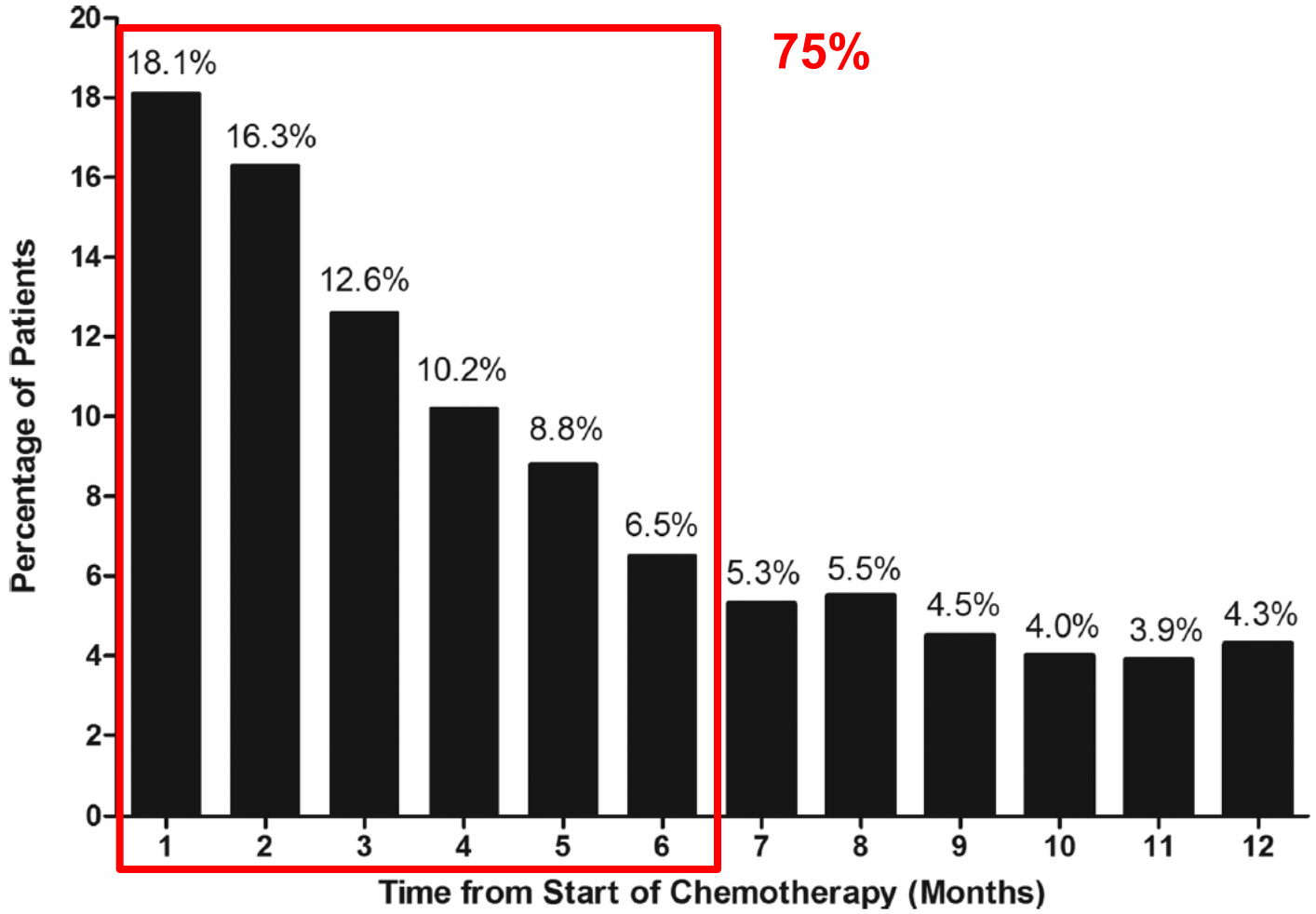
Ay et al Thromb Haemost 2017; 117: 219-230

Table 1 Cancer therapies associated with increased VTE risk

Type of Therapy	Specific Agents	Comments	References
Cisplatin	Cisplatin	Other platinum based therapies (ex oxaliplatin) haven't been shown to increase VTE risk	[15,74]
Antiangiogenic agents (VEGF inhibitors, multi-target tyrosine kinase inhibitors)	Bevacizumab, sunitinib, sorafenib, ponatinib		[75,76]
Hormonal therapies	Tamoxifen, raloxifene, aromatase inhibitors	Raloxifene appears to have less VTE risk vs tamoxifen	[77]
Monoclonal antibody Epidermal growth factor receptor (EGFR) inhibitors	Cetuximab, panitumumab	No increased risk in EGFR-specific tyrosine kinase inhibitors	[78]
Thalidomide analogs	Lenalidomide, pomalidomide, thalidomide	Thrombotic risk mainly in combination with other agents	[79]
Cyclin-dependent kinase inhibitors	Palbociclib, ribociclib, abemaciclib		[80]
L-asparaginase	L-asparaginase	Most common site is dural sinus thrombosis, VTE risk higher in adults. Can increase risk of bleeding as well in children.	[81]

Leiva, JMV—Journal de Médecine Vasculaire (2020) 45, 6S8-6S16

RISQUE DE MTEV ET TIMING CHIMIOTHÉRAPIE



Khorana et al Cancer 2013

FACTEURS DE RISQUE DE THROMBOSE ET CANCER

Score	Risk factors
Khorana score (KS) [59]	Tumor site of origin: Very high risk: stomach, pancreas High risk: lung, lymphoma, gynecologic, bladder, testicular Prechemotherapy platelet count ≥350 × 10^9/L Hemoglobin level < 10 g/dL or use of erythropoiesis-stimulating agents Prechemotherapy leukocyte count > 11 × 10^9/L BMI ≥35 kg/m^2
Vienna CATS score [83]	KS plus the following: Soluble P-selectin >53.1 ng/L D-dimer ≥1.44 µg/L
PROTECHT score [84]	KS plus the following: Use of platinum-based therapy Use of gemcitabine
CONKO score [60]	Tumor site of origin: Very high risk: stomach, pancreas High risk: lung, lymphoma, gynecologic, bladder, testicular Prechemotherapy platelet count ≥350 × 10^9/L Hemoglobin level < 10 g/dL or use of erythropoiesis-stimulating agents Prechemotherapy leukocyte count > 11 × 10^9/L WHO performance status ≥2
Tic-ONCO score [85]	Tumor site of origin: Very high risk: stomach, pancreas High risk: lung, lymphoma, gynecologic, bladder, testicular Genetic risk score (germline polymorphisms in *F5*, *F13*, or *SERPINA10*) Body mass index >25 kg/m^2 Family history of VTE
ONKOTEV score [86]	KS >2 Metastatic cancer Personal history of VTE Macroscopic vascular or lymphatic compression
COMPASS-CAT score [62]	Breast, lung, ovarian, or colorectal cancer only Cancer-related risk factors: Anthracycline or anti-hormonal therapy in women with breast cancer Time since cancer diagnosis ≤6 months Central venous catheter Advanced cancer stage Predisposing risk factors: Cardiovascular risk factors (≥2 of peripheral artery disease, ischemic stroke, coronary artery disease, hypertension, hyperlipidemia, diabetes, obesity) Recent hospitalization for acute medical illness Personal history of VTE Prechemotherapy platelet count ≥350 × 10^9/L

Leiva, JMV—Journal de Médecine Vasculaire (2020) 45, 6S8-6S16

FACTEURS DE RISQUE DE THROMBOSE ET CANCER

Genetic Mutation	Tumor type	Incidence of VTE	Comments	References
***ALK* rearrangement**	Lung	26.9% to 47.1%	2.2-to-5-fold increase compared to no *ALK* rearrangement	[67,87-91]
***ROS1* rearrangement**	Lung	34.6% to 41.6%	3-to-5-fold increase compared to no *ROS1* rearrangement	[65,66]
***KRAS* mutation**	Lung, colon	16.1% to 54%	2.6-fold increase	[68-70,87]
***JAK2* V617F mutation**	Hematopoietic (myeloproliferative neoplasm)	12%	2-fold increase compared to *CALR* or triple negative	[92,93]
***IDH1 and IDH2* wild type**	Brain	18.2% to 25.6%	Mutant *IDH1/IDH2* associated with decreased VTE risk	[35,71]

Leiva, JMV—Journal de Médecine Vasculaire (2020) 45, 6S8-6S16

Preventing venous thromboembolism in oncology practice: Use of risk assessment and anticoagulation prophylaxis

Retrospective, single-center cohort study of patients with pancreatic and gastric cancers to examine rates of prophylactic anticoagulation prescription for eligible patients at high risk of VTE based on the validated Khorana score.
N=437 patients (pancreatic and gastric cancers),
N=181 (41%) had a score of ≥ 3 (high risk)
None had an anticoagulation prescription for prophylaxis

Characteristic	Overall[a] (N = 437)	Gastric cancer (N = 125)	Pancreatic cancer (N = 316)
Age, mean y (SD)	64.2 (11.7)	59.9 (13.1)	65.8 (10.8)
Female, N (%)	202 (46.2)	44 (35.2)	162 (51.3)
Khorana score			
2, N (%)	49 (11.2)	15 (12.0)	34 (10.9)
≥3, N (%)	11 (2.5)	4 (3.2)	8 (2.5)

Martin et al Res. Pract. Thromb. Haemost.. 2020;4:1211–1215.

Preventing venous thromboembolism in oncology practice: Use of risk assessment and anticoagulation prophylaxis

Survey sent to 98 oncologists

1. How often do you ...	Never	Rarely	Sometimes	Usually	Always
Use risk scores to identify patients at high risk of VTE?	58%	29%	8%	4%	0%
Talk to your patients with cancer about the risk of blood clots?	0%	29%	29%	38%	4%
2. How familiar are you with ...		**Not at all**	**A little bit**	**Somewhat**	**Quite a bit**
ISTH recommendations for VTE risk assessment and primary prophylaxis?		67%	21%	8%	4%
The Khorana score?		67%	17%	13%	4%

Martin et al Res. Pract. Thromb. Haemost.. 2020;4:1211–1215.

ÉVALUATION DU RISQUE THROMBOTIQUE AMBULATOIRE EN PRÉ-CHIMIOTHÉRAPIE

Patient Characteristic	Score
Site of Cancer	
Very high risk (stomach, pancreas)	2
High risk (lung, lymphoma, gynecologic, GU excluding prostate)	1
Platelet count $\geq$ 350 x 10^9/L	1
Hb < 100 g/L or use of ESA	1
Leukocyte count > 11 x 10^9/L	1
BMI $\geq$ 35 kg/m^2	1

High-risk: score ≥ 3
Intermediate risk: score =1-2
Low-risk: score =0

Score of ≥3 predicts higher VTE rate and 4-fold higher mortality rate

Khorana et al. Blood. 2008; Sohal et al. Cancer. 2015

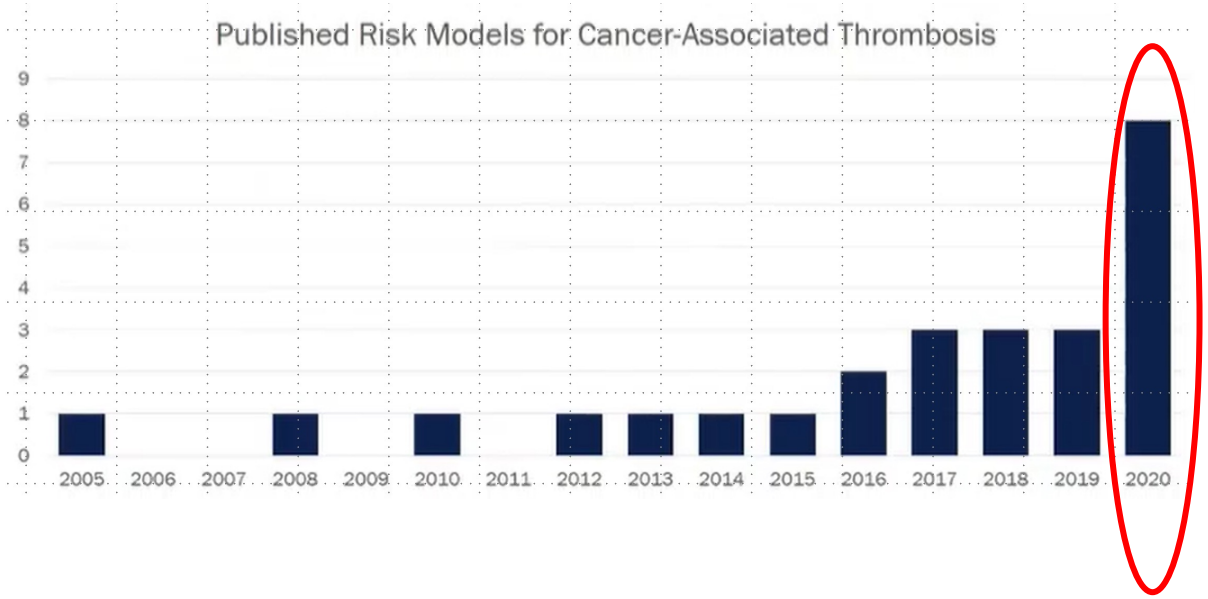
OUTILS D'EVALUATION DES RISQUES DE PREDICTION DE LA TAC

Risk score	Characteristics of variables/population included	External validation[a]	Used for selection of patients for thromboprophylaxis?
Khorana [9]	(original)	+++	Yes (retrospective) Yes (prospective randomized trials)
Vienna (2010) [10]	Adds D-dimer, sP-selectin	–	–
PROTECHT [29]	Removes BMI, adds chemotherapy	–	–
ONKOTEV [44]	Adds variables: metastatic disease, prior VTE, compression	–	–
COMPASS-CAT [45]	Breast, colorectal, lung, ovarian only	+ (lung)	–
Tic-ONCO [46]	Adds genetic risk factors	–	–
Pabinger et al. (2018) [13]	Adds D-dimer, removes all other variables except site	+	–
IMPEDE [16]	Multiple myeloma only	+	–
SAVED [17]	Multiple myeloma only	+	–

[a]The plus sign (+) refers to whether external validation was done or not. In the first row, several external validations were done, so signified by three plus signs (+++); the minus signs (–) indicate not done.
Abbreviations: BMI, body mass index; sP-selectin, soluble P-selectin; VTE, venous thromboembolism.

Khorana, The Oncologist, 2021

RAM (Risk Assessment Model) ENCORE ET PLUS...



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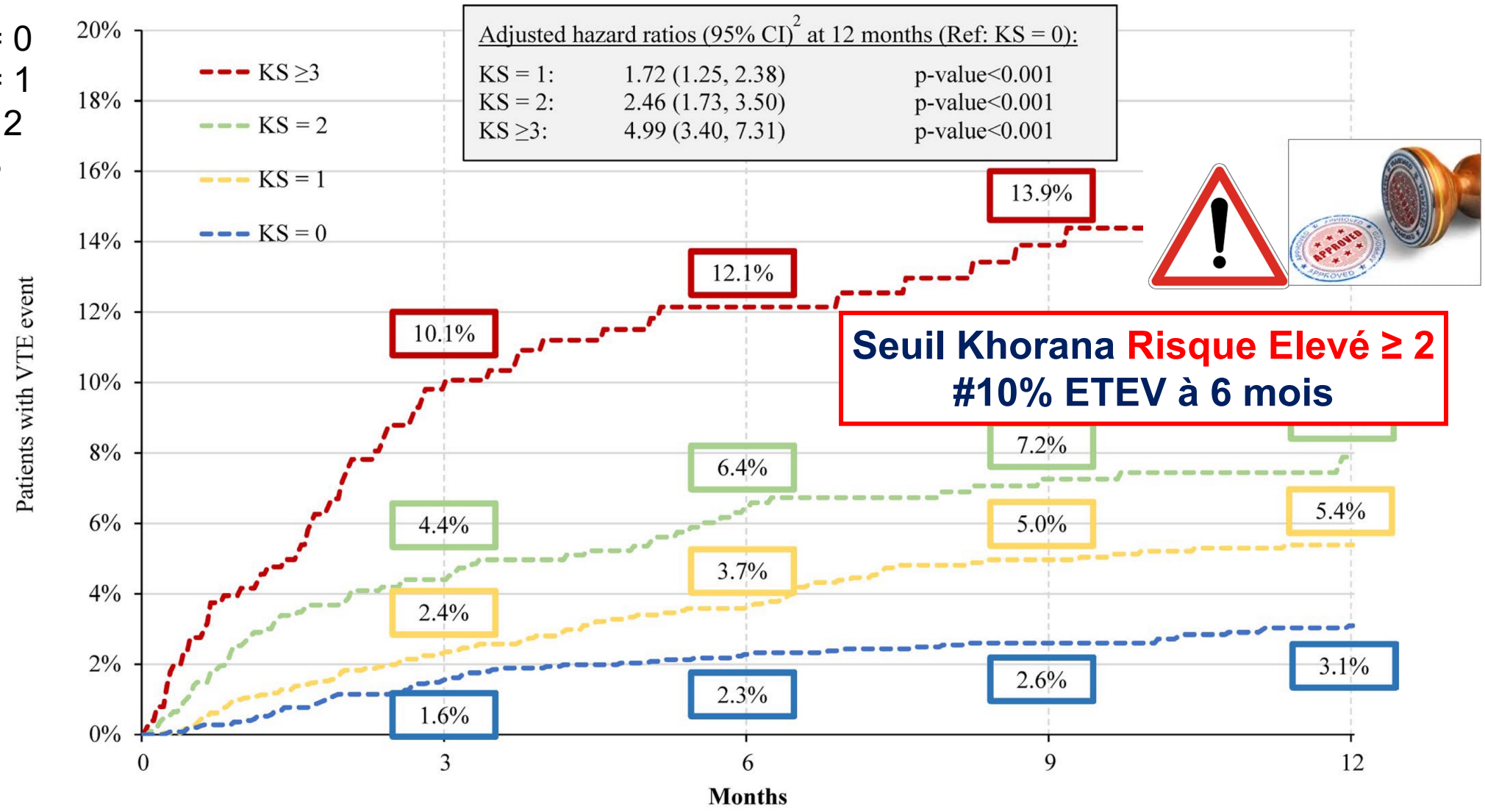
Gerotziafas et al. Thromb Res 2020; 191S1: S50–S57
Khorana et al The Oncologist 2021;26:e2–e7

SCORE KHORANA ET PREDICTION DE LA TAC

n= 2488 in KS = 0
n= 2125 in KS = 1
n=1074 in KS = 2
n=507 in KS ≥ 3



Khorana et al. Cancer Medicine. 2020;00:1–12
Khorana ISTH SSC July 2021

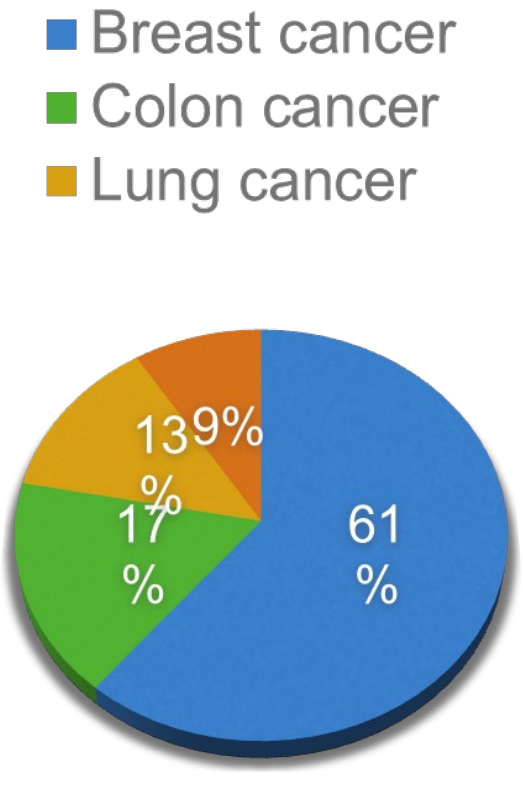
DESIGN DU SCORE COMPASS-CAT

- **Multinational, prospective, non-interventional study**
- N=1023 ambulatory cancer patients on chemotherapy
- Types of cancer : **breast, lung, colon or ovarian,**
- Follow up: 3, 6 and 12 months after inclusion
- Primary end-point : **Symptomatic and objectively confirmed VTE**
- Data acquisition: Standardized interview (38 pages CRF)
- **New RAM applicable at any time during patient's journey**

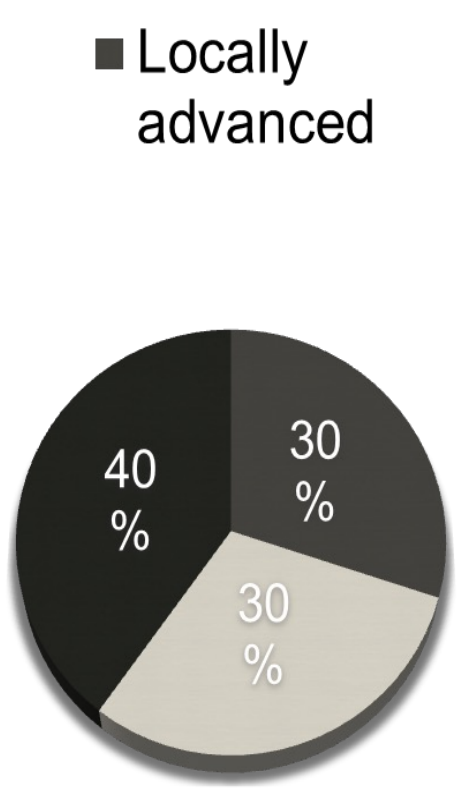
Gerotziafas et al The Oncologist 2017; 22:1–10

COMPASS-CAT
CARACTÉRISTIQUES DES CANCERS

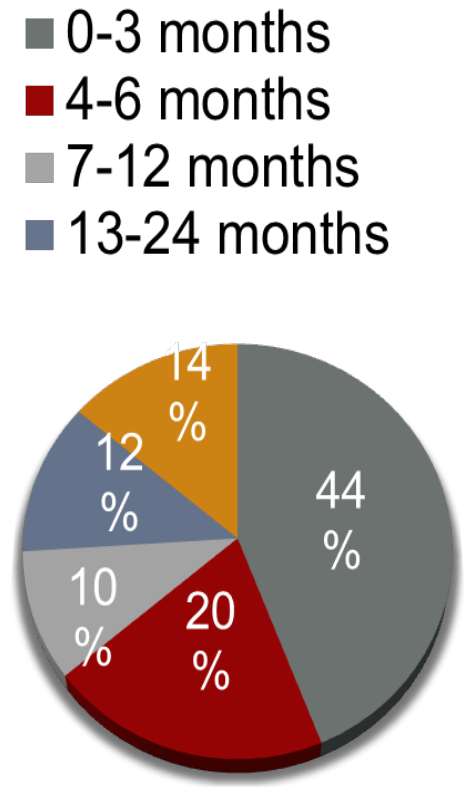
Type of cancer



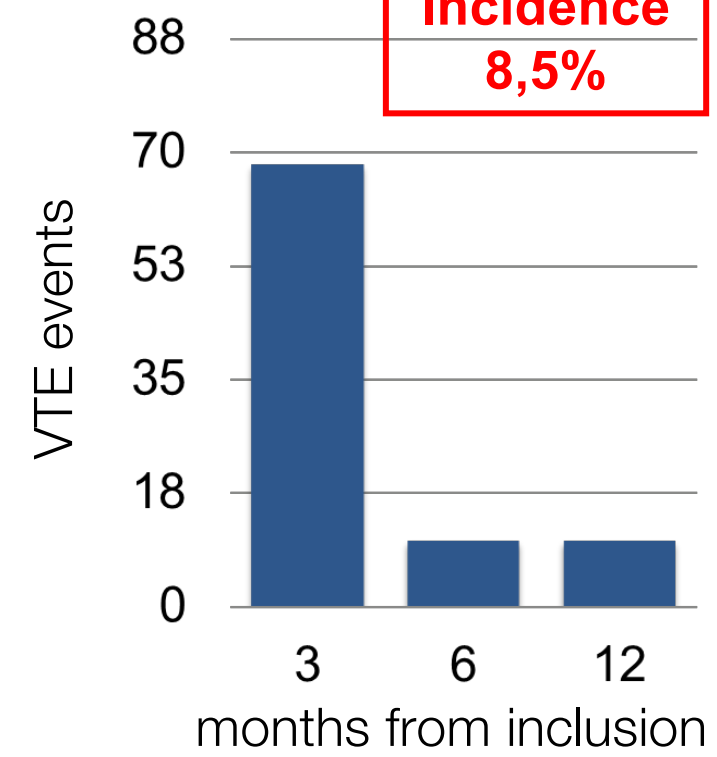
Stage of cancer



Time since diagnosis



VTE Incidence 8,5%



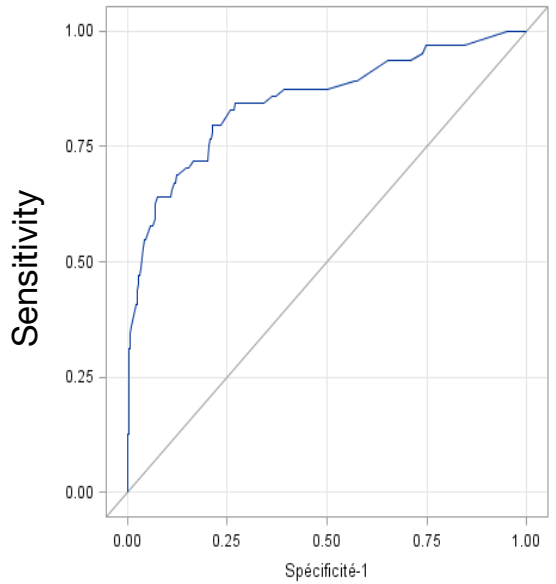
Gerotziafas et al The Oncologist 2017; 22:1–10

SCORE COMPASS-CAT

Predictors for VTE	Score
Cancer related risk factors	
Anti-hormonal therapy for women with hormone receptor-positive breast cancer or on anthracycline treatment	6
Time since cancer diagnosis ≤ 6 months	4
CVC	3
Advanced stage of cancer	2
Predisposing risk factors	
Cardiovascular risk factors (composed by at least 2 of the following predictors: personal history of peripheral artery disease, ischemic stroke, coronary artery disease, hypertension, hyperlipidemia, diabetes, obesity)	5
Recent hospitalization for acute medical illness	5
Personal history of VTE	1
Biomarkers	
Platelets count ≥ $350x10^9$/L	2

Gerotziafas et al. The Oncologist 2017; 22:1–10

VTE risk level	Ranges of COMPASS-CAT RAM (min-max)	Ranges of COMPASS-CAT Score (min-max)	Rate of VTE
Low (n=506)	≤ 4,7	0 to 6	1,7%
High (n=517)	≥ 4,8	≥ 7	13,3%



Specificity - 1

AUC: 0,85
NPV: 98%
Sensitivity: 88%
Specificity: 52%

COMPASS - CAT
VALIDATION EXTERNE

Retrospective data-base analysis : **n=3814 cancer patients**

94% diagnosed <6 months prior to inclusion

46% on active therapy

52% localized disease

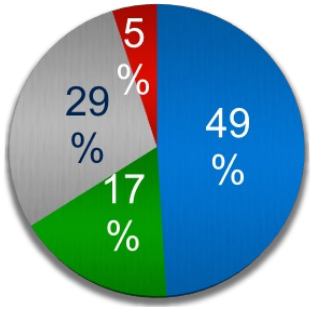
48% advanced stage disease

6% symptomatic VTE at 6-month follow-up

AUC 0.62 (95%CI 0.58-0.66)

PPV	**6.3%**
NPV	**97.7%**
Sensitivity	**95%**
Specificity	**12%**

Types of cancer



"In lung cancer, COMPASS-CAT best distinguished between patients at low or high risk of VTE"

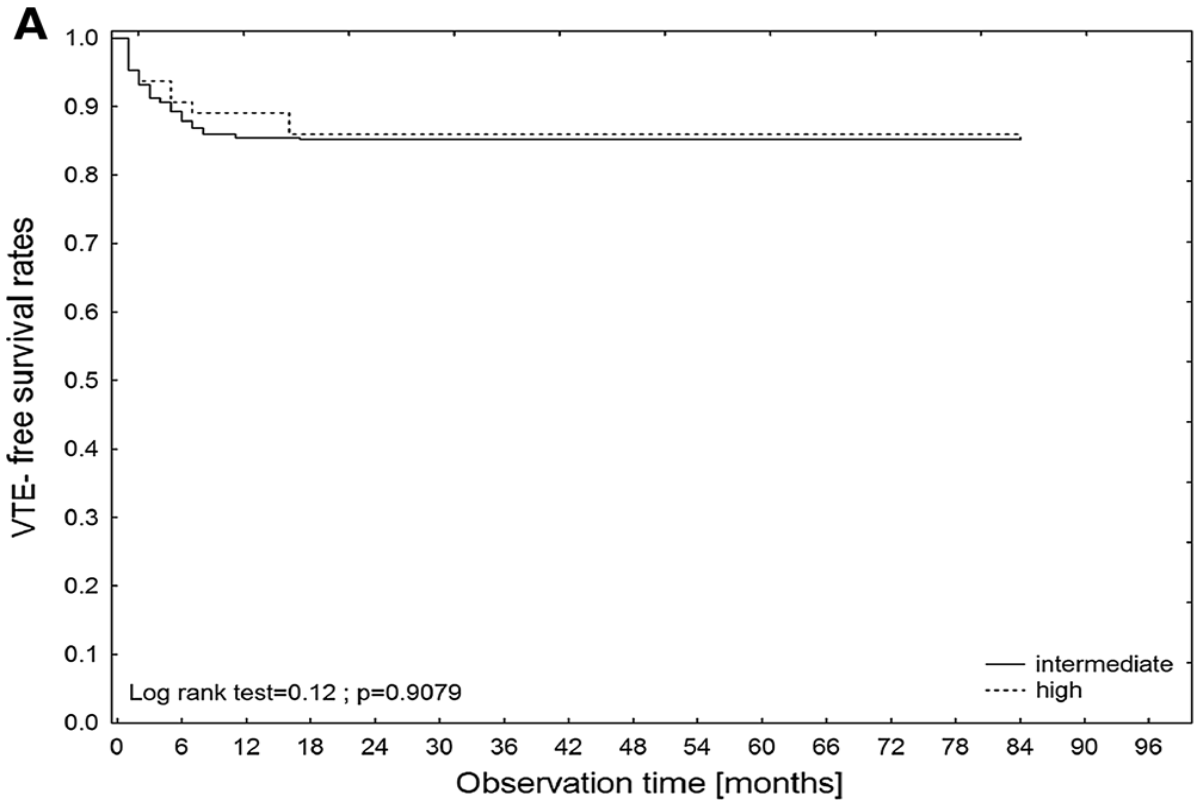
ASCO recommendations

Key et al J Clin Oncol 2019

Spyropouloset al Oncologist. 2020;25(7):e1083-e1090

KHORANA SCORE ET PREDICTION DE CAT

LYMPHOMA



Hodgkin lymphoma (n=187)
Diffuse large B cell lymphoma (n=241)
64 VTEs (15%)
Median follow-up 4.7 months

Rupa-Matysek J Med Oncol. 2017;35:5.
Vathiotis et al Clin Appl Thromb Hemost. 2018 Nov;24(8):1347-1351

THROMBOSIS LYMPHOMA (TroLY) SCORE

Variable	points
Previous VTE	2
Reduced mobility	1
Previous AMI/stroke	2
Obesity (BMI>25)	2
Extranodal	1
Mediastinum	2
Advanced Stage	2
Vascular Device	1
Hb<100	1
Neutropenia	1

Prospective observational study
1723 pts with lymphoproliferative diseases
467 patients with indolent NHL
647 patients with aggressive NHL,
366 patients with HL, and 235 CLL/SLL)
Follow up: from diagnosis to 3 months after the completion of therapy
End-Pt : Venous or arterial thrombosis 9%
(76% VTE and 26% Arterial thrombosis)

Low Risk	**≤ 1**
Interm^{te} Risk	**2-3**
High Risk	**≥ 4**

Antic et al. Blood Rev. 2018;32(2):144-158.

EXTERNAL MULTINATIONAL VALIDATION COHORT

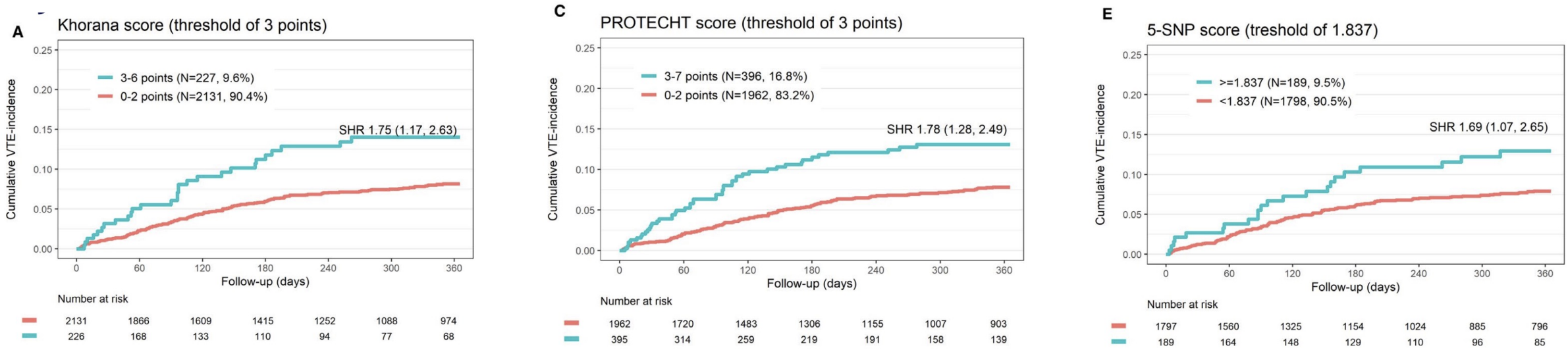
Risk group Throly score	Thrombosis	
	n	%
Low (0,1)	18 of 440	4.1
Intermediate (2,3)	51 of 586	8.7
High ≥ 4	73 of 440	16.6

N=1723; 84% Outpatients
VTE in 9% (N=158)

	TroLy >2
PPV	22%
NPV	**96%**
Sensitivity	51%
Specificity	**72%**

Antic et al. Blood Rev. 2018;32(2):144-158.

Evaluation of the Khorana, PROTECHT, and 5-SNP scores for prediction of venous thromboembolism in patients with cancer



N=2729 pts with advanced stage solid tumors and 6 month FU => 5.6% VTE

Scores able to identify cancer pts with an approximately 2-fold higher risk of VTE of about 12% during 6-month FU

The sensitivity at 6 months was 16.6% (95% CI: 10.5–22.7), 28.9% (95% CI: 21.5–36.3), and 14.9% (95% CI: 8.5-21.2)

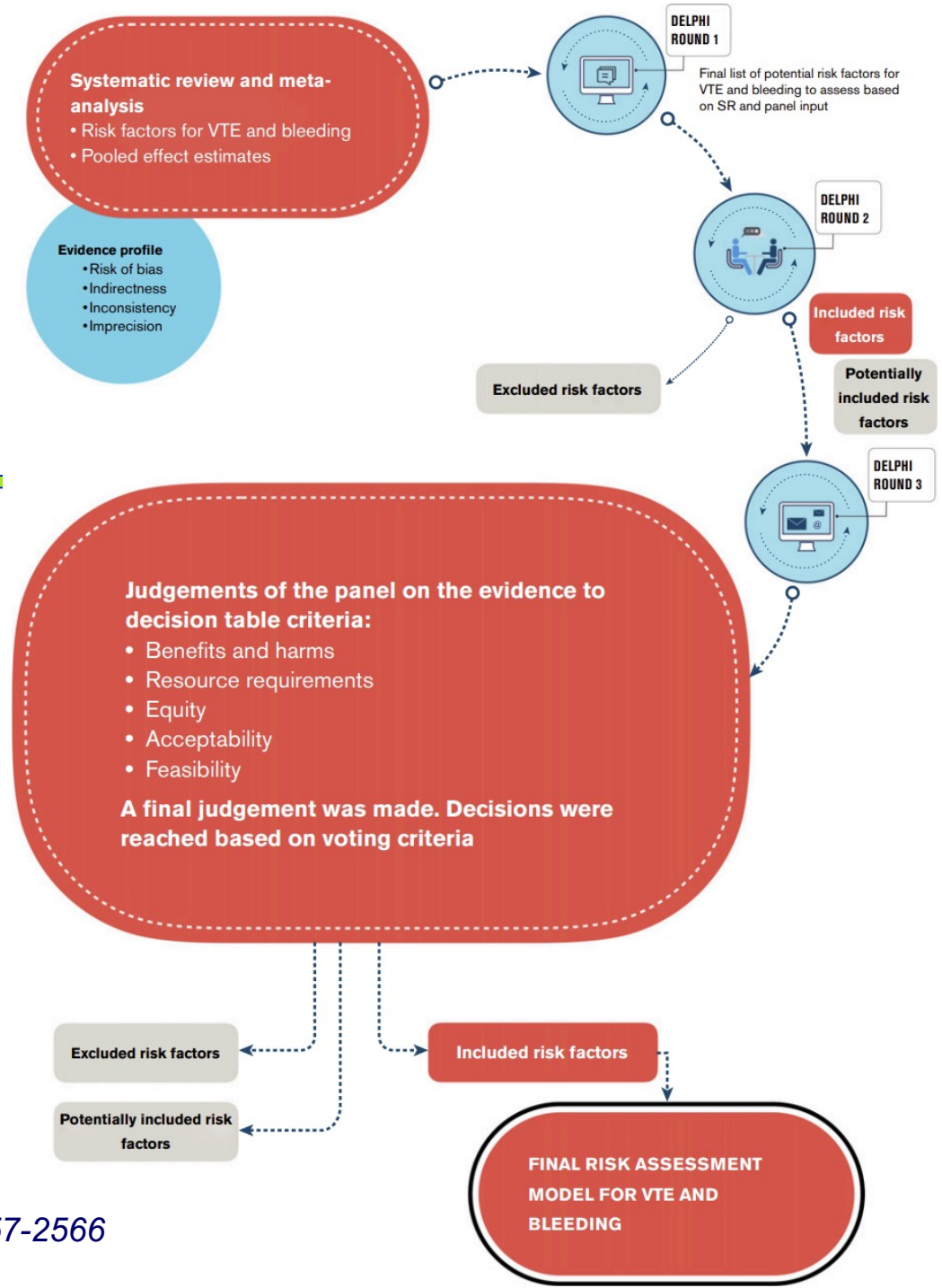
The VTE risk among low-risk patients was still considerable (about 5%–6%)

Poor overall discrimination of the Khorana, PROTECHT, and 5-SNP scores

About 50% of cancer pts who will develop VTE in the first 6 months were not identified as high-risk pts

Guman et al J Thromb Haemost. 2021;00:1–10.

RISK MODELS FOR VTE AND BLEEDING IN MEDICAL INPATIENTS: SYSTEMATIC IDENTIFICATION AND EXPERT ASSESSMENT



Darzi et al BloodAdvances 2020; 4(12): 2557-2566

Source	Risk factors	
Bleeding		
Included studies in the systematic review	1. Age ≥65 y	10. CVC use
	2. Sex	11. Active gastroduodenal ulcers in past 3 mo
	3. Renal failure	12. Hepatic disease
	4. Malignancy	13. Antithrombotic medication use†
	5. Critical illness	14. Rehospitalization†
	6. Autoimmune disease	15. Blood dyscrasias
	7. Obesity	16. Recent bleeding
	8. Hormone use	17. Low hemoglobin
	9. Thrombocytopenia	
Panel input	None	

Darzi et al BloodAdvances 2020; 4(12): 2557-2566

Risk factors	OR (95% CI) from systematic review	β coefficients (log OR)	SE	Contribution to overall risk, %
VTE				
Age >60 y	1.34 (1.17-1.55)	0.29	0.07	3.6
Previous VTE	6.08 (3.71-9.97)	1.81	0.25	22.7
Acute infections	1.48 (1.16-1.89)	0.39	0.12	4.9
Immobility	3.17 (2.18-4.62)	1.15	0.19	14.4
Acute paresis	2.97 (1.20-7.36)	1.09	0.46	13.6
Active malignancy	2.65 (1.79-3.91)	0.98	0.20	12.3
Critical illness	1.65 (1.39-1.95)	0.50	0.09	6.3
Known history of thrombophilia	5.88 (2.80-12.35)	1.77	0.38	22.2
Total		7.98		
Bleeding				
Age ≥65 y	1.95 (1.59-2.38)	0.67	0.10	12.3
Renal failure	1.43 (1.06-1.93)	0.36	0.15	6.6
Thrombocytopenia	1.79 (0.97-3.29)	0.58	0.31	10.7
Active gastroduodenal ulcers	2.74 (1.42-5.26)	1.01	0.34	18.6
Hepatic disease	1.53 (1.09-2.15)	0.43	0.17	7.9
Recent bleeding	5.15 (2.45-10.81)	1.64	0.38	30.2
Critical illness	2.10 (1.42-3.11)	0.74	0.20	13.7
Total		5.43		

Praticité/Pertinence/Performance => Validation Externe?

Darzi et al BloodAdvances 2020; 4(12): 2557-2566

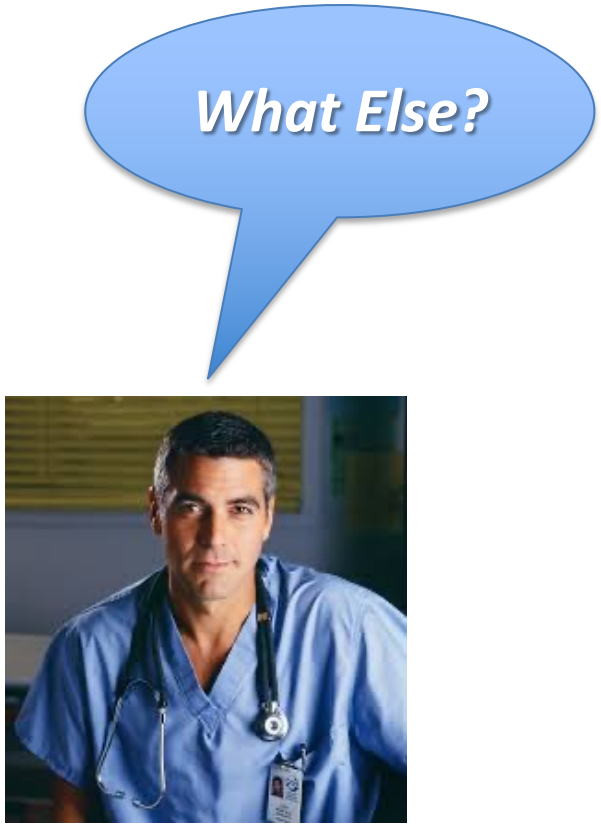
RECOMMANDATIONS POUR UNE ÉVALUATION DU RISQUE THROMBOTIQUE CHEZ LE PATIENT ATTEINT DE CANCER

- La TAC* est un “marqueur de **mauvais pronostic**” au cours du cancer.
- Chez le patient ambulatoire, l’évaluation du risque doit être basée sur un **score validé.**
- Les patients avec cancer doivent être évalués **à l’initiation** de la chimiothérapie et **régulièrement par la suite**.
- Les experts recommandent aux oncologues d’**éduquer** leurs patients vis-à-vis de la TAC, tout particulièrement dans les situations à risque élevé : la chirurgie majeure, l’hospitalisation, ou en cas de traitement anti-néoplasique systémique.

**TAC : Thrombose Associée au Cancer*

Key et al J Clin Oncol 2019; www.asco.org/supportive-care-guidelines

THROMBOSE & CO…



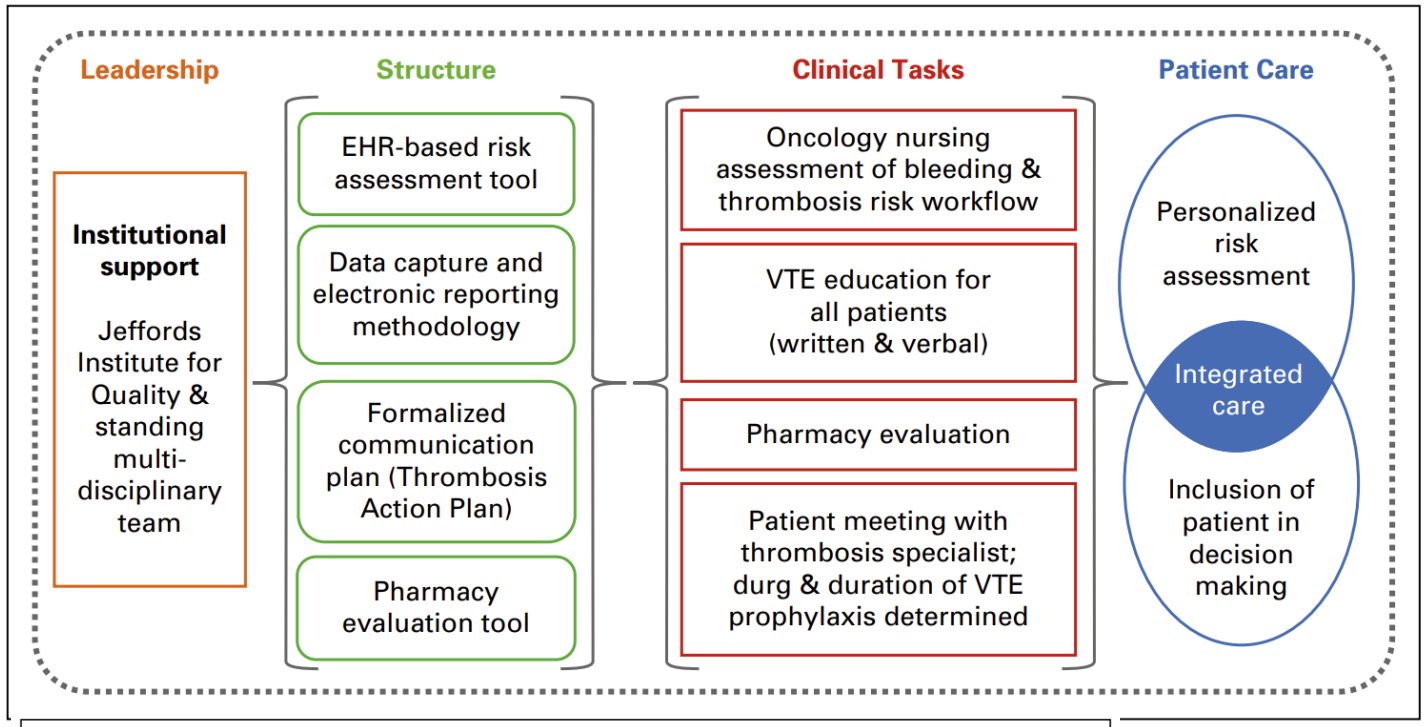
- **Co-facteurs** *(Synergie Cellulaire et Plasmatique …)*
- **Co-morbidités** *(Facteurs liés au Patient…)*
- **Co-médications** *(Chimiothérapie, ITK…)*
- **Co-ntexte** *(Chirurgie, Alitement…)*

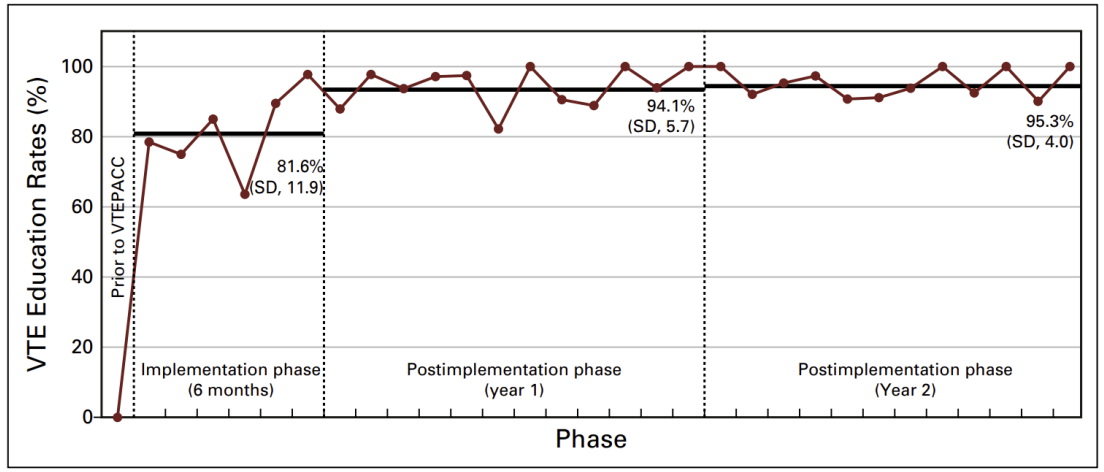
Co-mplications

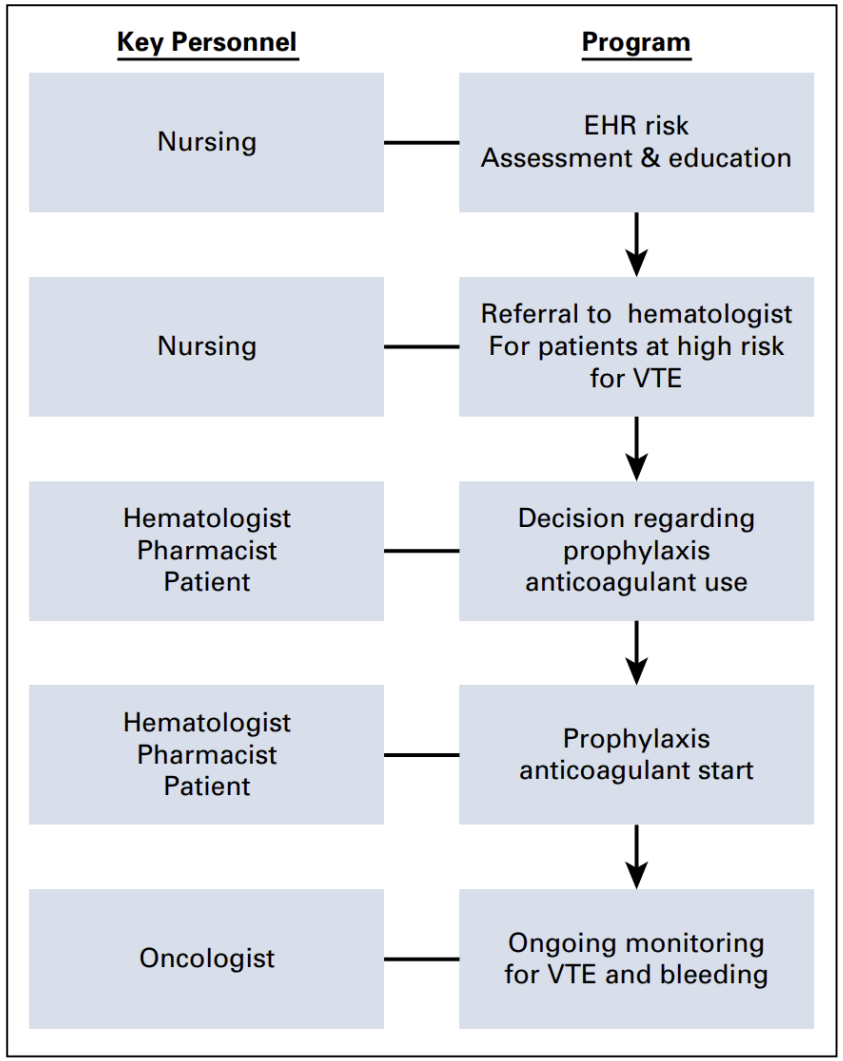
Co-nnaissance *(Patient à Risque…)*

Co-ntrôle *(Thromboprophylaxie…)*

Successful Model for Guideline Implementation to Prevent CAT: VTE Prevention in Ambulatory Cancer Clinic







Jenkins et al. Diagnostic and Prognostic Research 2021; 5:1-8

HÉMORRAGIES MAJEURES SOUS ANTICOAGULANT ET CANCER

- **Incidence**

3,9% Etudes Cliniques Randomisées
19,8% Etudes de Vraie Vie

- **Taux de Létalité**

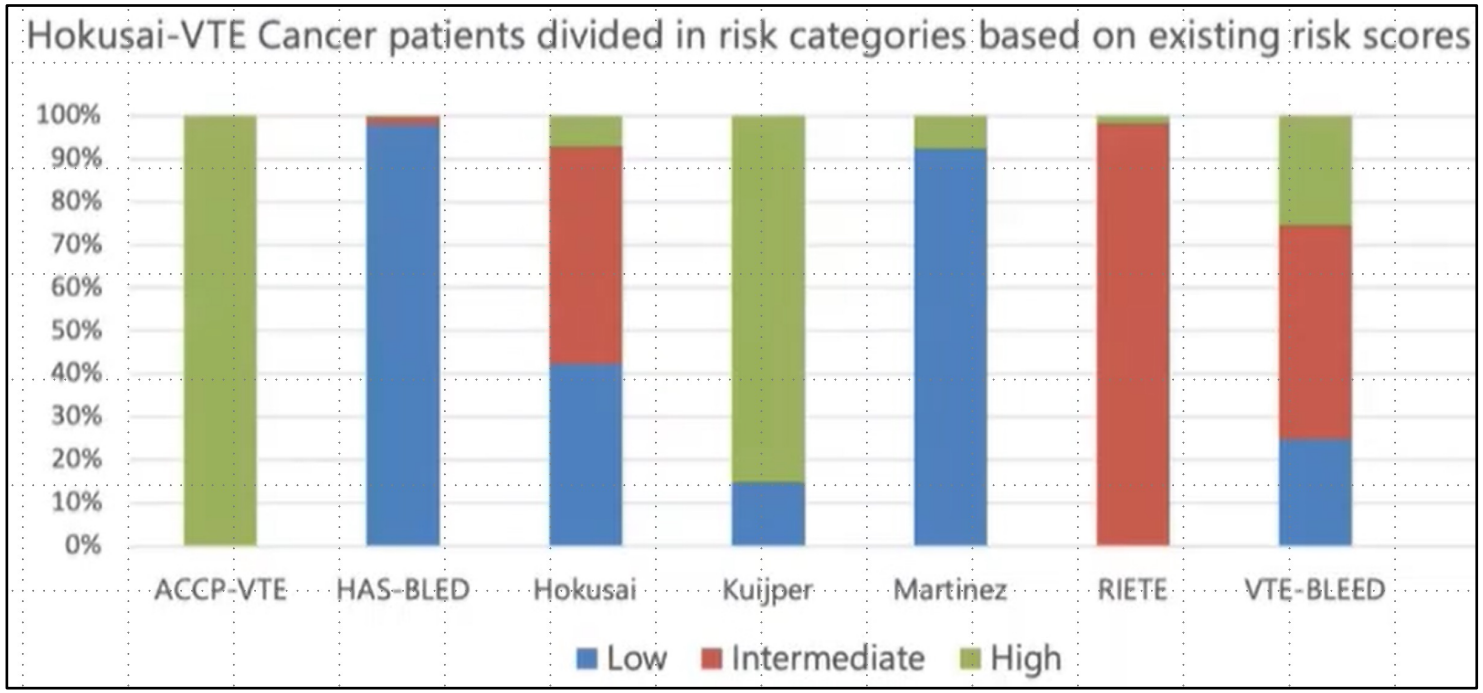
6,2% Etudes Cliniques Randomisées

30% Registre RIETE

- **Morbidité**

63% en USI

27% Arrêt du traitement anti-tumoral



General	Cancer specific
Age (>60, >70 or >75 years)	Edoxaban treatment
Female sex	GI cancer
Creatinine clearance	GI cancer * edoxaban treatment
Platelet count	Use of anticancer therapies with GI toxicity (<4 weeks)
Hb	Genitourinary cancer
SBP	Intracranial lesion
Antiplatelet therapy	Regionally advanced or metastatic cancer
	Recently diagnosed cancer (<6 months)

	sHR (95% CI)
Genitourinary cancer	2.48 (1.14-5.38)
GI cancer * edoxaban treatment	2.20 (1.07-4.53)
Anticancer therapies associated with GI toxicity	1.74 (1.03-2.92)
Regionally advanced or metastatic cancer	1.21 (0.82-1.80)
Age >75 years	1.02 (0.98-1.08)
Creatinine clearance (mL/min)	1.00 (0.99-1.00)

CAT-BLEED

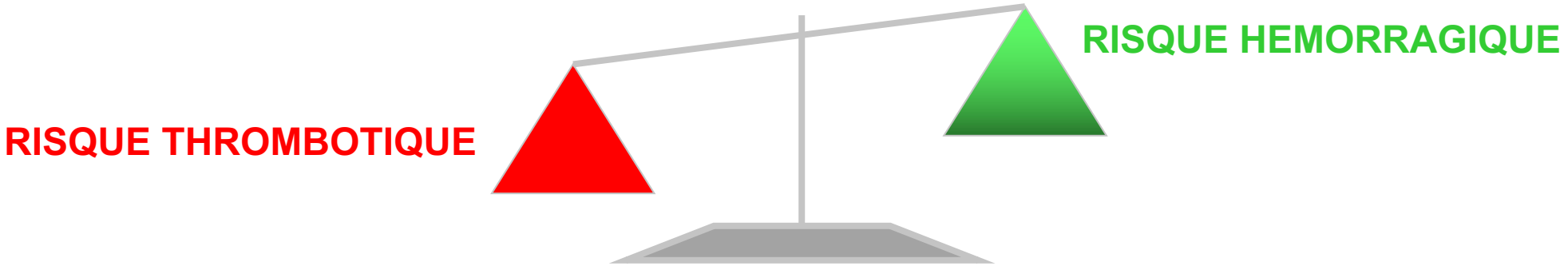
Sanfilippo al ISTH Juillet 2021 SSC CAT
De Winter et al ISTH Juillet 2021 SSC CAT

STRATIFICATION AVISÉE… PROPHYLAXIE ADAPTÉE

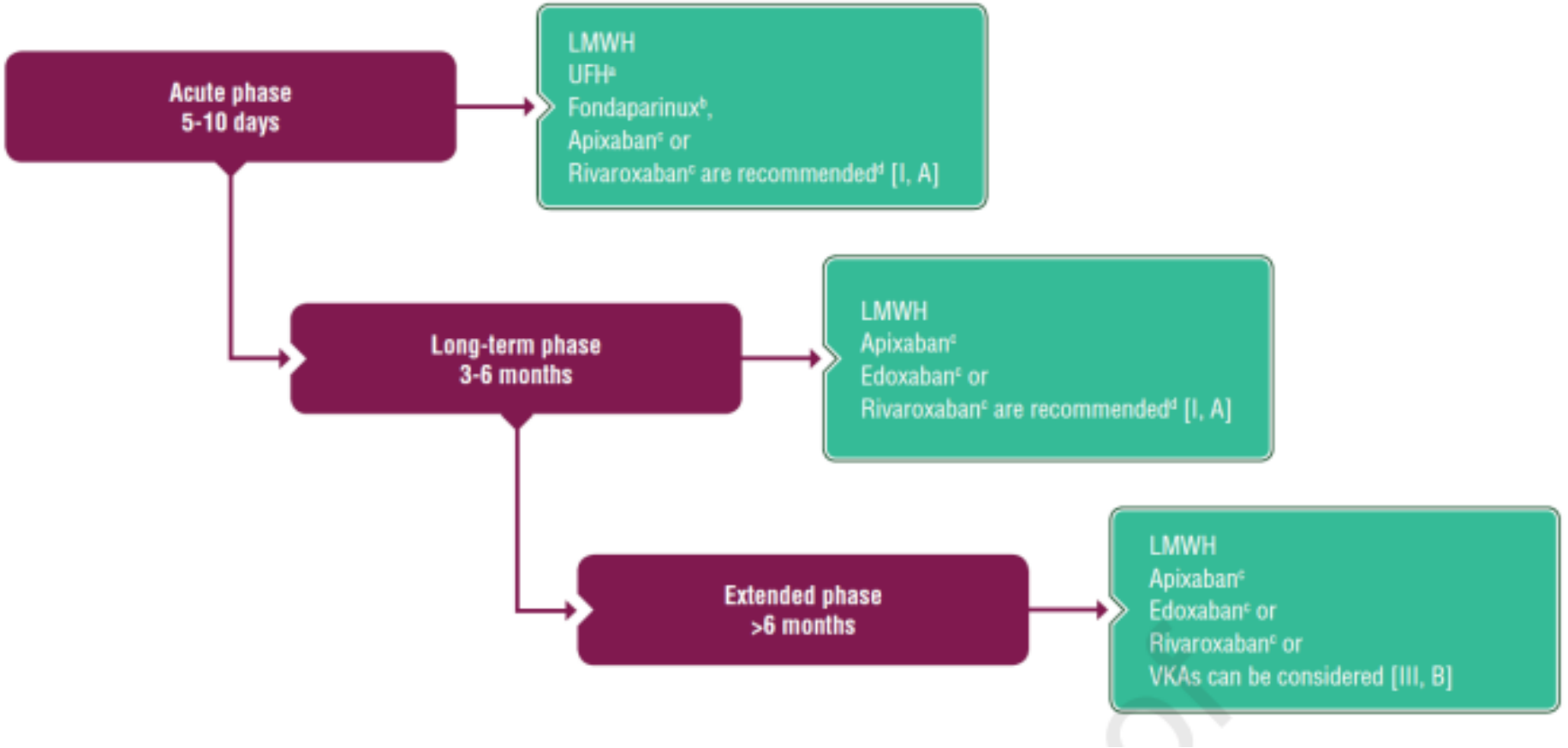
PESER LE RISQUE …

PRESCRIRE CHEZ LE FORT …

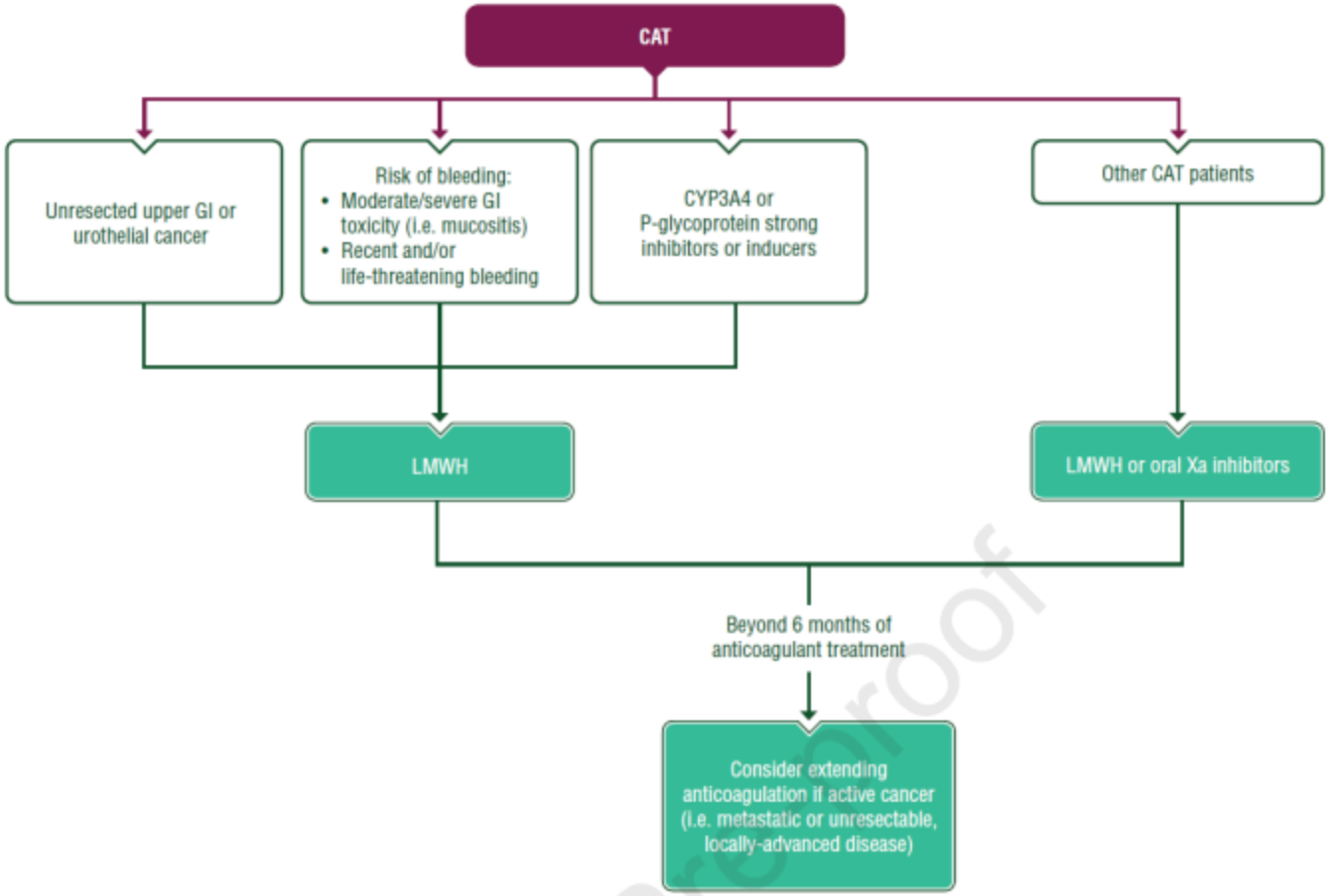
… PROSCRIRE CHEZ LE FAIBLE!



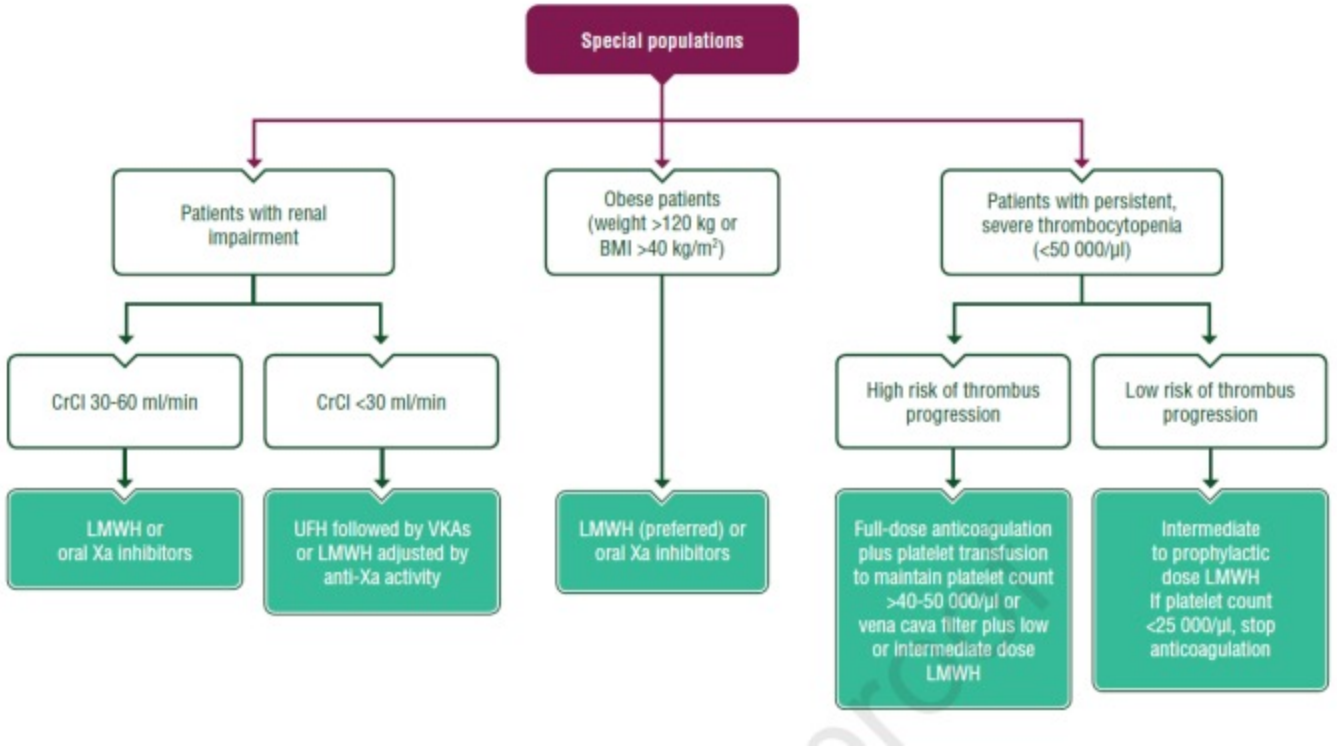
TRAITEMENT DES TAC (ESMO 2022)



ALGORITHME DE TRAITEMENT DES TAC EN AMBULATOIRE(ESMO 2022)



ALGORITHME DE TRAITEMENT DES TAC : CAS PARTICULIERS (ESMO 2022)



PREVENTION DE LA TAC EN AMBULATOIRE (ESMO 2022)

- Patient education materials on CAT including risk factors, signs and symptoms and information on positive lifestyle factors, should be one component of the information package provided to all ambulatory patients scheduled to receive systemic anti-cancer treatment [III, A].
- Cancer patients should be offered a CAT risk assessment and have an opportunity to discuss their particular risk [III, B].
- VTE risk assessment should be based on validated RAMs such as the KRS, COMPASS-CAT or the Vienna-CATS nomogram score [III, C].
- An estimated risk of VTE >8%-10% at 6 months is suggested as threshold for discussing primary thromboprophylaxis [II, C]. This risk is observed in patients with a KRS ≥2 and can individually be calculated with the Vienna-CATS nomogram score and the COMPASS score.
- For ambulatory pancreatic cancer patients on first-line systemic anticancer treatment , LMWH given at a higher dose (150/IU/kg dalteparin or 1 mg/kg enoxaparin) for a maximum of 3 months may be considered [II, C].
- In ambulatory cancer patients starting systemic anticancer treatment who have high thrombosis risk, apixaban, rivaroxaban or LMWH may be considered for primary thromboprophylaxis for a maximum of 6 months [I, B].
- In hospitalised cancer patients confined to bed with an acute medical complication, prophylaxis with LMWH, UFH [I, B] or fondaparinux [II, B] is recommended.
- Where concerns of DOAC safety exist and the patient is perceived as having clinically important risk for VTE, LMWH at conventional primary thromboprophylaxis dosing may be administered [II, C].

AVERT	APIXABAN 2,5 X 2 /PLACEBO	4,2 VS 10,2 %	3,5 VS 1,8 %
CASSINI	RIVAROXABAN 10 / PLACEBO	6 VS 8,8 %	2 VS 1%

Carrier, NEJM 2019
Khorana, NEJM 2019

PREVENTION DE LA TAC DANS LE MYELOME MULTIPLE (ESMO 2022)

- All patients with MM should be offered a VTE risk assessment and have the opportunity to discuss their particular risk [III, B].
- Patients with MM scheduled to receive or receiving IMiD treatment should be assessed for VTE risk with the IMWG/NCCN score (**Supplementary Table S5**) [III, B].
- In ambulatory patients with MM receiving IMiD treatment combined with low-dose dexamethasone and without additional risk factors, aspirin (100 mg/day) is recommended [III, B].
- In ambulatory patients with MM classified as high risk for VTE, pharmacological thromboprophylaxis with LMWH for 3-6 months is recommended [II, B].
- Extension of thromboprophylaxis should be considered on a case-by-case basis [IV, B].
- Apixaban 2.5 mg bd or rivaroxaban 10 mg od are potential options in patients with CrCl >30 ml/min who present contraindications or intolerance to LMWH [IV, C].

TRAITEMENT DE LA THROMBOSE SUR CIP (ESMO 2022)

- Routine pharmacological prophylaxis of CRT is not recommended [II, D].
- For the treatment of symptomatic CRT in cancer patients, anticoagulant treatment is recommended for a minimum of 3 months [III, A]. LMWH is suggested, although, in the absence of direct comparisons between anticoagulants in this setting, VKA or DOAC may be considered alternative options [IV, C].

- It is recommended to remove the catheter if it is not needed or is infected, anticoagulant treatment is contraindicated or there is clinical deterioration due to thrombus extension despite treatment [III, B].
- In patients with CRT, who have completed 3 months of anticoagulant treatment, extended anticoagulation until catheter removal is suggested, if the patient´s bleeding risk is low [IV, C].

MERCI

شكرًا

GRACIAS