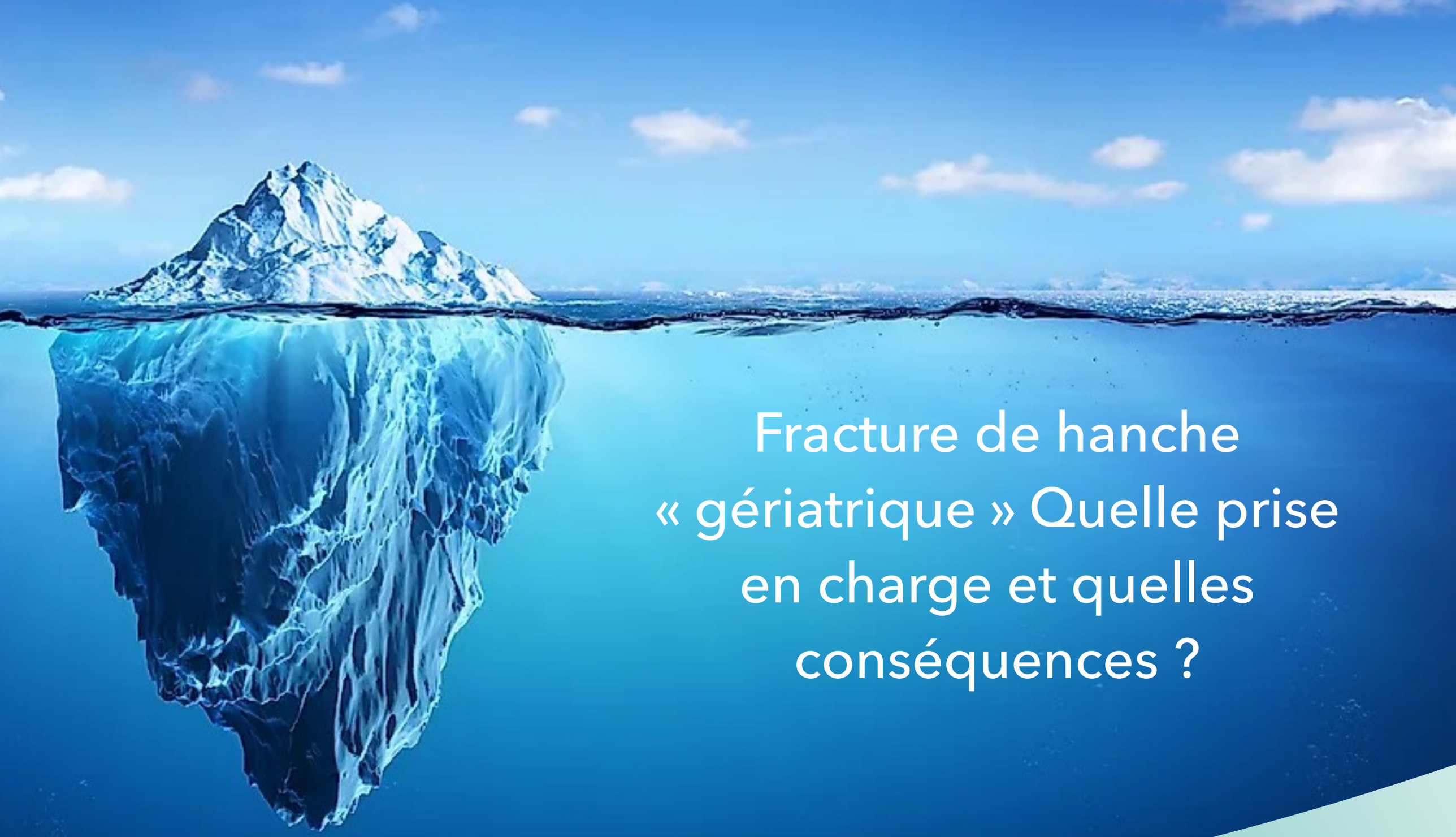

Fracture de hanche « gériatrique » Quelle prise en charge et quelles conséquences ?

SAC 13/05/26

LIÈGE université Médecine

CHU de Liège

Recommandation sur l'anesthésie du sujet âgé : l'exemple de fracture de l'extrémité supérieure du fémur☆,☆☆

Frédéric Aubrun [1], Christophe Baillard [2], Jean-Baptiste Beuscart [3], Valérie Billard [4], Jacques Boddaert [5], Éric Boulanger [3], Nicolas Dufeu [6], Arnaud Friggeri [7], Frédéric Khiami [5], Pierre Krolak Salmon [8], Philippe Merloz [9], Vincent Minville [10], Serge Molliex [11], Christelle Mouchoux [12], Laure Pain [13], Vincent Piriou [7], Matthieu Raux [14], Frédérique Servin [15]

- 178 références
- comité : SFAR / SOFCOT / SFGG / SFPC
- 26 recommandations

Anesthésie-réanimation 2019

Plan

- Introduction

- Enjeux de la chirurgie précoce

- Gestion de l’anti-coagulation

- Quel rôle pour l’anesthésiste ?

- Quelle place pour le gériatre ?

Quelques chiffres

- Orthopédie :

25 % de l'activité élective du bloc opératoire

30 % de l'activité urgente

65 000 FESF (2019) => 150 000 (2050) France

350 000 FESF (2015) => 10,3-15,2 Mds $ (USA)

4,5 millions FESF (2050) Monde

- Gériatrie :

25 % de la population > 65 ans

16 % de la population > 85 ans (France 2020)

Source : Anesthésie-réanimation 2018

Quelques notions d'orthopédie



Profils gériatriques

- Vigoureux ou robuste :

Autonomes avec peu de comorbidités

- Fragiles :

Perte plus marquée des réserves disponibles en cas d'augmentation des besoins

- Dépendants - polypathologiques :

Nombreuses comorbidités à mettre en balance avec les bénéfices attendus de l'intervention

Profils gériatriques

	Profil gériatrique et facteurs de risques			
	0	**1**	**2**	**Score**
Age	74 ans ou moins	Entre 75 ans et 84 ans	85 ans ou plus	
Provenance	Domicile	Domicile avec aide professionnelle	FL ou EHPAD	
Médicaments	3 médicaments ou moins	4 à 5 médicaments	6 médicaments ou plus	
Humeur	Normale	Parfois anxieux ou triste	Déprimé	
Perception de sa santé par rapport aux personnes de même âge	Meilleure santé	Santé équivalente	Moins bonne santé	
Chute dans les 6 derniers mois	Aucune chute	Une chute sans gravité	Chute(s) multiples ou compliquée(s)	
Nutrition	Poids stable, apparence normale	Perte d'appétit nette depuis 15 jours ou perte de poids (3kg en 3 mois)	Dénutrition franche	
Maladies associées	Absence de maladie connue et traitée	De 1 à 3 maladies	Plus de 3 maladies	
AIVQ (confection des repas, téléphone, prise des médicaments, transports)	Indépendance	Aide partielle	Incapacité	
Mobilité (se lever, marcher)	Indépendance	Soutien	Incapacité	
Continence (urinaire et/ou fécale)	Continence	Incontinence occasionnelle	Incontinence permanente	
Prise des repas	Indépendance	Aide ponctuelle	Assistance complète	
Fonctions cognitives (mémoire, orientation)	Normales	Peu altérées	Très altérées (confusion aigüe, démence)	
Total .... / 26				10/20

TOTAL Volet A		
< ou = 8 : Personne peu fragile	**[9-11] : Personne fragile**	**> ou = 12 : Personne très fragile**

Grille Fragilité SEGA version modifiée et validée 2014

Réseau RéGéCA - Université de Reims Champagne Ardenne, Faculté de médecine EA 3797, Reims, F-51092

Score prédictif : NHFS

Table 1. The Nottingham Hip Fracture Score (NHFS)

Variable	Value	Score	Total NHFS	Predicted 30-day mortality (%)
Age	66–85 years	3	0	0.9
	≥86 years	4		
Sex	Male	1	1	1.5
Admission Hb	≤10 g dl^{-1}	1	2	2.4
MMTS	≤6 out of 10	1	3	3.8
Living in an institution	Yes	1	4	6.2
Number of co-morbidities	≥2	1	5	9.8
Malignancy	Yes	1	6	15
			7	23
			8	33
			9	47
			10	57

Predicted 30-day mortality is calculated by substituting the total NHFS into the equation: $100/(1 + \exp(4,718 - (\text{NHFS}/2)))$ 30-day mortality (%). MMTS, Mini-mental test score.

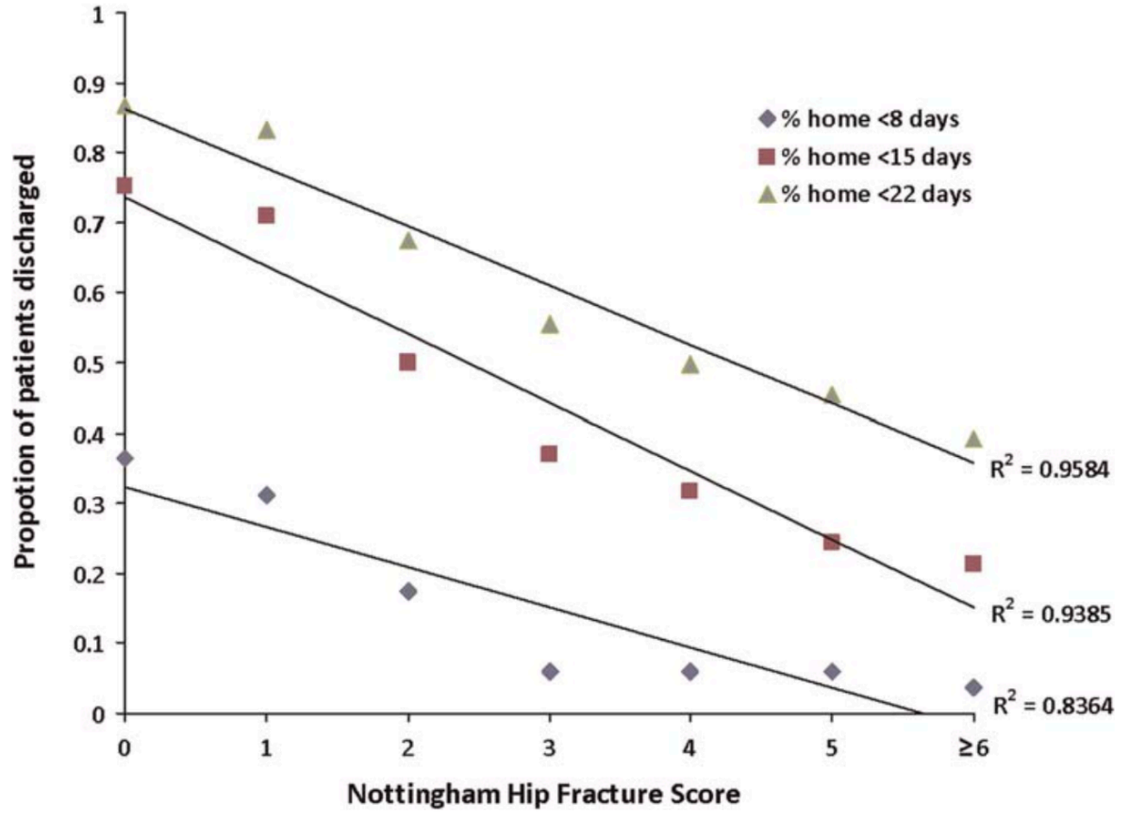

Figure 2. Proportion of patients discharged back to their own home after hip fracture surgery at 7, 14 and 21 days, according to their admission NHFS.

The Nottingham Hip Fracture Score as a predictor of early discharge following fractured neck of femur

Iain Keith Moppett[1], Matthew Dominic Wiles[2], Chris G. Moran[3], Opinder Sahota[4]

Age and Ageing 2012

Score prédictif : NHFS

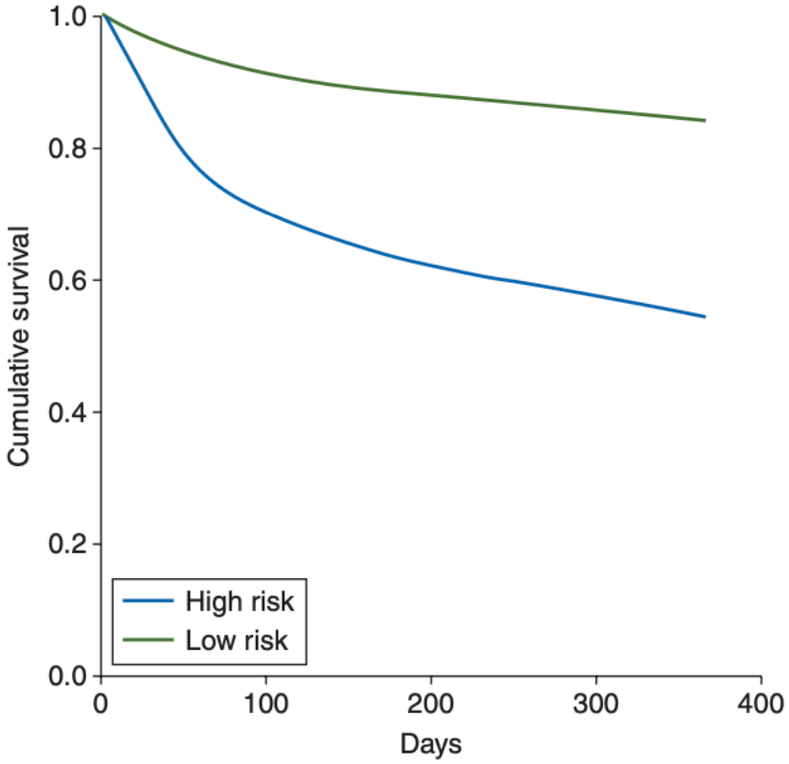

Fig 1 The Kaplan–Meier curve showing 1 yr postoperative mortality after hip fracture surgery. Low- and high-risk groups have an NHFS of ≤4 and >4, respectively.

Table 2 Effect of time to surgery for a fractured femoral neck on 1 yr mortality, risk stratified using the NHFS. *$P<0.001$ early *vs* late surgery; †$P=0.102$ early *vs* late surgery

	Early surgery (≤48 h from admission)	Late surgery (>48 h from admission)
Number of cases	2098	4104
Death within 1 yr [*n* (%)]	540 (25.7)	1276 (31.1)*
Death within 1 yr for low-risk cohort (NHFS ≤4) [*n* (%)]	162 (13.2)	381 (17.5)*
Death within 1 yr for high-risk cohort (NHFS >5) [*n* (%)]	378 (43.4)	895 (46.4)†

British Journal of Anaesthesia **106** (4): 501–4 (2011)
Advance Access publication 28 January 2011 · doi:10.1093/bja/aeq405

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CLINICAL PRACTICE

Nottingham Hip Fracture Score as a predictor of one year mortality in patients undergoing surgical repair of fractured neck of femur

M. D. Wiles[1*], C. G. Moran[2], O. Sahota[3] and I. K. Moppett[1]

Plan

- Introduction

- Enjeux de la chirurgie précoce

- Gestion de l’anti-coagulation

- Quel rôle pour l’anesthésiste ?

- Quelle place pour le gériatre ?

Enjeux de la chirurgie précoce : Morbidité

Table III. Bivariate analysis of complications by early *versus* non-early surgery

	All patients, n (%)	Early surgery (< 24 hrs), n (%)	Non-early surgery (> 24 hrs), n (%)	p-value*
Complication	n = 26 051	n = 5921	n = 20 130	
Any complication(s)	4403 *(16.9)*	926 *(15.6)*	3476 *(17.3)*	0.003
Wound complications	307 *(1.2)*	58 *(1.0)*	250 *(1.2)*	0.101
Septic complications	555 *(2.1)*	115 *(1.9)*	439 *(2.2)*	0.263
Cardiac complications	586 *(2.3)*	123 *(2.1)*	463 *(2.3)*	0.310
Respiratory complications	1344 *(5.2)*	235 *(4.0)*	1109 *(5.5)*	< 0.001
Renal complications	211 *(0.8)*	44 *(0.7)*	167 *(0.8)*	0.514
DVT/PE	464 *(1.8)*	93 *(1.6)*	370 *(1.8)*	0.164
Urinary complications	1467 *(5.6)*	338 *(5.7)*	1127 *(5.6)*	0.758
Re-admission	2407 *(9.2)*	491 *(8.3)*	1916 *(9.5)*	0.004
Extended LOS (≥ 6 days)	6677 *(25.6)*	1319 *(22.3)*	5357 *(26.6)*	< 0.001
Return to operating room	688 *(2.6)*	145 *(2.5)*	541 *(2.7)*	0.304
Death	1425 *(5.5)*	297 *(5.0)*	1129 *(5.6)*	0.078

*using the Bonferroni correction, the level of statistical significance is 0.004 DVT, deep vein thrombosis; PE, pulmonary embolism; LOS, length of stay

Table IV. Propensity-adjusted multivariable logistic regression for complications, with adjusted odds ratios (OR) and 95% confidence intervals (CI) for patients that underwent early surgery *versus* non-early surgery

Complication	Propensity-adjusted OR	95% CI	p-value*
Any complication(s)	0.94	0.87 to 1.02	0.129
Wound complications	0.81	0.60 to 1.08	0.145
Sceptic complications	0.98	0.80 to 1.21	0.877
Cardiac complications	1.00	0.82 to 1.23	0.972
Respiratory complications	0.78	0.67 to 0.90	0.001
Renal complications	1.02	0.73 to 1.43	0.898
Deep vein thrombosis/pulmonary embolism	0.83	0.66 to 1.05	0.124
Urinary complications	1.05	0.92 to 1.19	0.463
Re-admission	0.92	0.83 to 1.02	0.118
Extended length of stay (≥ 6 days)	0.84	0.78 to 0.90	< 0.001
Return to operating room	0.94	0.78 to 1.13	0.513
Death	0.99	0.86 to 1.13	0.870

*using the Bonferroni correction, the level of statistical significance is 0.004

doi:10.1302/0301-620X.99B9.BJJ-2017-0101.R1 $2.00

Bone Joint J 2017;99-B:1216–22.
Received 24 January 2017; Accepted after revision 19 May 2017

Enjeux de la chirurgie précoce : Mortalité

Table VI. Treatment outcome according to seven guideline recommendations and according to the best practice.

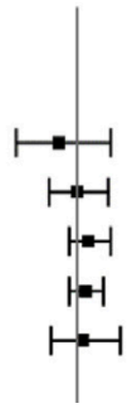
		Mortality 30 days			Mortality 365 days			Revision 365 days		
Outcome	**Total**	**n (%)**	**OR (95% CI)**	**p-value**	**n (%)**	**OR (95% CI)**	**p-value**	**n (%)**	**OR (95% CI)**	**p-value**
Surgery within 48 hours										
Yes	23,390	1,969 (8.4)	Reference		5,860 (25.1)	Reference		1,168 (5.0)	Reference	
No	4,931	477 (9.7)	1.04 (0.93 to 1.16)	0.499	1,427 (28.9)	1.13 (1.05 to 1.22)	0.001	262 (5.3)	1.06 (0.92 to 1.22)	0.405
Surgeon has > 3 years experience										
Yes	23,815	2065 (8.7)	Reference		6,091(25.8)	Reference		1,171 (5.0)	Reference	
No	4,686	381 (8.1)	0.97 (0.86 to 1.09)	0.573	1,196 (25.5)	1.04 (0.96 to 1.12)	0.380	259 (5.5)	1.12 (0.98 to 1.29)	0.100

BJO
TRAUMA
Hip fracture treatment in Norway
DEVIATION FROM EVIDENCE-BASED TREATMENT GUIDELINES: DATA FROM THE NORWEGIAN HIP FRACTURE REGISTER, 2014 TO 2018

Bone Joint Open 2020

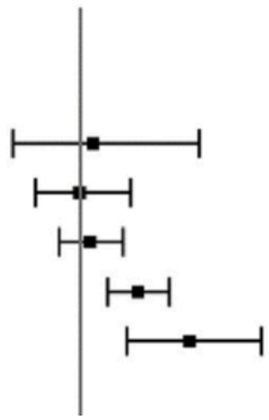
Impact de la chirurgie différée

	Within Events/N (%)	After Events/N (%)	Adjusted HR* (95% CI)
Overall			
After 3 h vs within 3 h	102/851 (12.0)	3804/35701 (10.7)	0.92 (0.74, 1.15)
After 6 h vs within 6 h	295/2762 (10.7)	3611/33790 (10.7)	1.00 (0.88, 1.14)
After 12 h vs within 12 h	797/7588 (10.5)	3109/28964 (10.7)	1.05 (0.97, 1.15)
After 24 h vs within 24 h	2461/23941 (10.3)	1445/12611 (11.5)	1.04 (0.97, 1.12)
After 48 h vs within 48 h	3662/34438 (10.6)	244/2114 (11.5)	1.03 (0.89, 1.19)

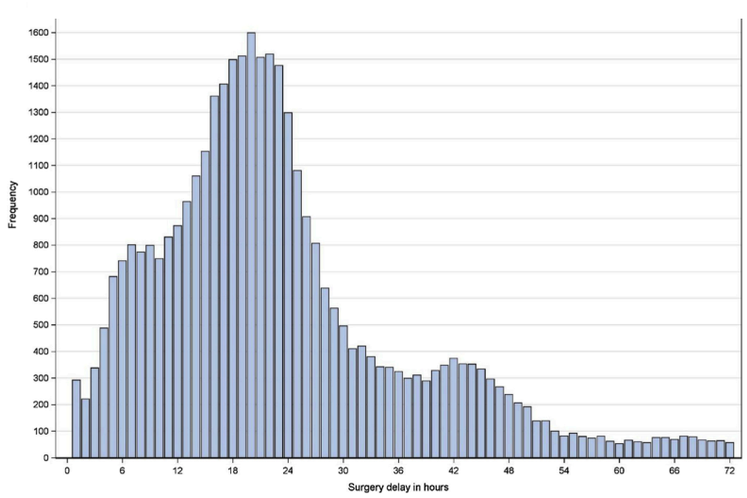


Mortalité à 0-30 jours

	Within Events/N (%)	After Events/N (%)	Adjusted HR* (95% CI)
Overall			
After 3 h vs within 3 h	61/749 (8.1)	2529/31897 (7.9)	1.04 (0.78, 1.39)
After 6 h vs within 6 h	199/2467 (8.1)	2391/30179 (7.9)	1.00 (0.85, 1.16)
After 12 h vs within 12 h	542/6791 (8.0)	2048/25855 (7.9)	1.03 (0.93, 1.14)
After 24 h vs within 24 h	1592/21480 (7.4)	998/11166 (8.9)	1.18 (1.09, 1.29)
After 48 h vs within 48 h	2397/30776 (7.8)	193/1870 (10.3)	1.35 (1.15, 1.59)



Mortalité à 31-90 jours



Impact of comorbidity on the association between surgery delay and mortality in hip fracture patients: A Danish nationwide cohort study

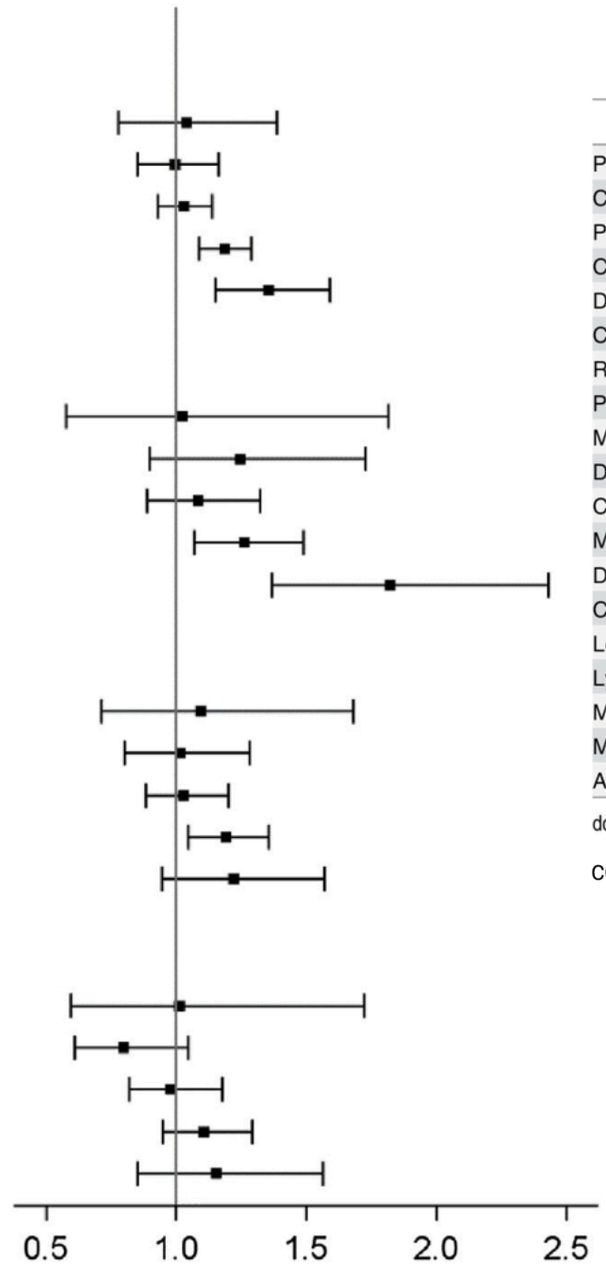
Buket Öztürk[a,*], Søren P. Johnsen[a,b], Niels Dieter Röck[c], Lars Pedersen[a], Alma B. Pedersen[a]

[a] *Department of Clinical Epidemiology, Aarhus University Hospital, Denmark*
[b] *Center for Clinical Health Services Research, Department of Clinical Medicine, Aalborg University, Denmark*
[c] *Department of Orthopedic Surgery O, Odense University Hospital, Denmark*

Injury 2019

Impact de la chirurgie différée

	Within Events/N	(%)	After Events/N	(%)	Adjusted HR* (95% CI)
Overall					
After 3 h vs within 3 h	61/749	(8.1)	2529/31897	(7.9)	1.04 (0.78, 1.39)
After 6 h vs within 6 h	199/2467	(8.1)	2391/30179	(7.9)	1.00 (0.85, 1.16)
After 12 h vs within 12 h	542/6791	(8.0)	2048/25855	(7.9)	1.03 (0.93, 1.14)
After 24 h vs within 24 h	1592/21480	(7.4)	998/11166	(8.9)	1.18 (1.09, 1.29)
After 48 h vs within 48 h	2397/30776	(7.8)	193/1870	(10.3)	1.35 (1.15, 1.59)
CCI: None (0)					
After 3 h vs within 3 h	14/283	(4.9)	694/13096	(5.3)	1.02 (0.58, 1.82)
After 6 h vs within 6 h	45/1034	(4.4)	663/12345	(5.4)	1.24 (0.90, 1.73)
After 12 h vs within 12 h	140/2829	(4.9)	568/10550	(5.4)	1.08 (0.89, 1.32)
After 24 h vs within 24 h	436/9022	(4.8)	272/4357	(6.2)	1.26 (1.07, 1.49)
After 48 h vs within 48 h	649/12694	(5.1)	59/685	(8.6)	1.82 (1.37, 2.43)
CCI: Medium (1-2)					
After 3 h vs within 3 h	29/319	(9.1)	1081/12748	(8.5)	1.09 (0.71, 1.68)
After 6 h vs within 6 h	86/995	(8.6)	1024/12072	(8.5)	1.01 (0.80, 1.28)
After 12 h vs within 12 h	230/2652	(8.7)	880/10415	(8.4)	1.03 (0.88, 1.20)
After 24 h vs within 24 h	682/8552	(8.0)	428/4515	(9.5)	1.19 (1.04, 1.36)
After 48 h vs within 48 h	1031/12277	(8.4)	79/790	(10.0)	1.22 (0.95, 1.57)
CCI: High (3+)					
After 3 h vs within 3 h	18/147	(12.2)	754/6053	(12.5)	1.01 (0.59, 1.72)
After 6 h vs within 6 h	68/438	(15.5)	704/5762	(12.2)	0.80 (0.61, 1.04)
After 12 h vs within 12 h	172/1310	(13.1)	600/4890	(12.3)	0.98 (0.82, 1.17)
After 24 h vs within 24 h	474/3906	(12.1)	298/2294	(13.0)	1.11 (0.95, 1.29)
After 48 h vs within 48 h	717/5805	(12.4)	55/395	(13.9)	1.15 (0.85, 1.56)



Comorbidity	Score
Prior myocardial infarction	1
Congestive heart failure	1
Peripheral vascular disease	1
Cerebrovascular disease	1
Dementia	1
Chronic pulmonary disease	1
Rheumatologic disease	1
Peptic ulcer disease	1
Mild liver disease	1
Diabetes	1
Cerebrovascular (hemiplegia) event	2
Moderate-to-severe renal disease	2
Diabetes with chronic complications	2
Cancer without metastases	2
Leukemia	2
Lymphoma	2
Moderate or severe liver disease	3
Metastatic solid tumor	6
Acquired immuno-deficiency syndrome (AIDS)	6

doi:10.1371/journal.pone.0154627.t003

CCI (Charlson comorbidity index) score.

Fig. 4. 31–90-days mortality.
* Adjusted for age, gender, BMI, type of fracture, type of surgery, housing condition, marital status, CCI, use of anticoagulation drugs, psychiatric drugs, NSAIDs and steroids.

Injury 2019

Impact des comorbidités sur la mortalité

	Within 24h Events/N (%)		After 24h Events/N (%)		Adjusted HR* (95% CI)
0-30					
Cancer***	501/3939	(12.7)	277/2090	(13.3)	0.94 (0.80, 1.11)
CPD****	462/3018	(15.3)	281/1756	(16.0)	0.98 (0.83, 1.15)
CTD*****	107/1132	(9.5)	65/634	(10.3)	1.11 (0.78, 1.57)
CVD******	1048/7391	(14.2)	633/4348	(14.6)	0.97 (0.87, 1.09)
Dementia	443/2396	(18.5)	254/1302	(19.5)	1.00 (0.84, 1.19)
Diabetes	311/2378	(13.1)	184/1349	(13.6)	0.98 (0.80, 1.21)
Liver disease	40/310	(12.9)	24/178	(13.5)	0.99 (0.55, 1.78)
Renal disease	213/1019	(20.9)	119/609	(19.5)	0.86 (0.67, 1.10)
Ulcer disease	144/1260	(11.4)	114/669	(17.0)	1.45 (1.09, 1.92)
31-90					
Cancer***	371/3438	(10.8)	221/1813	(12.2)	1.14 (0.96, 1.36)
CPD****	244/2556	(9.5)	179/1475	(12.1)	1.25 (1.01, 1.55)
CTD*****	80/1025	(7.8)	49/569	(8.6)	1.06 (0.72, 1.56)
CVD******	622/6343	(9.8)	399/3715	(10.7)	1.14 (0.99, 1.30)
Dementia	291/1953	(14.9)	162/1048	(15.5)	1.03 (0.84, 1.26)
Diabetes	185/2067	(9.0)	129/1165	(11.1)	1.26 (0.98, 1.61)
Liver disease	21/270	(7.8)	9/154	(5.8)	0.67 (0.23, 1.94)
Renal disease	85/806	(10.5)	80/490	(16.3)	1.81 (1.30, 2.51)
Ulcer disease	107/1116	(9.6)	57/555	(10.3)	1.13 (0.80, 1.58)

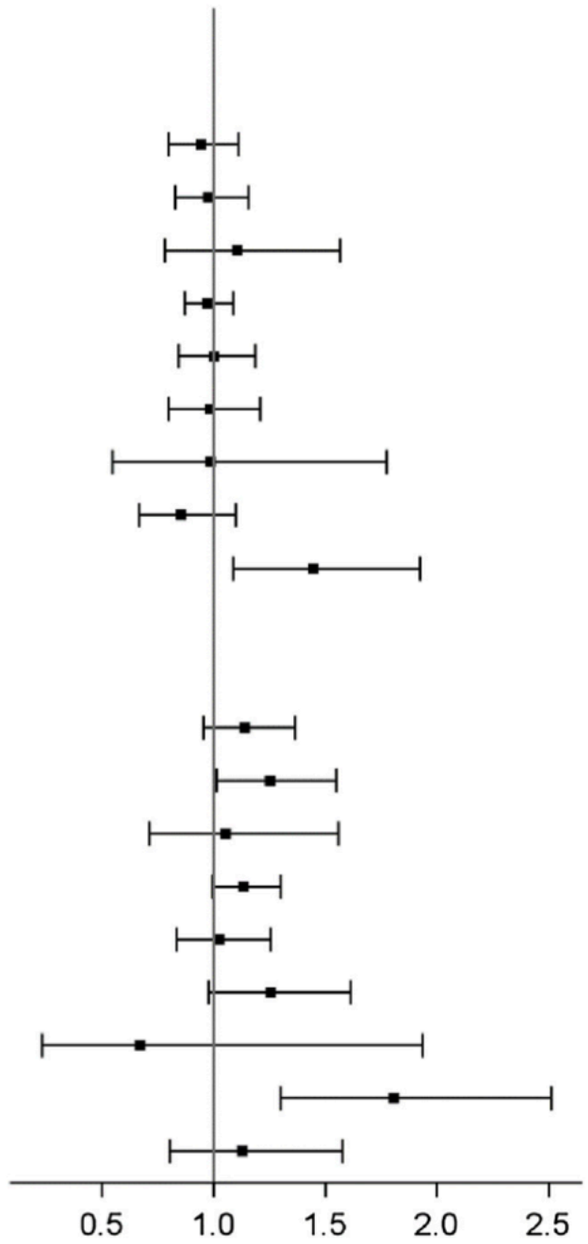


Fig. 5. Delay of >24 vs ≤24 h according to specific comorbidities**.
* Adjusted for age, gender, BMI, type of fracture, type of surgery, housing condition, marital status, use of anticoagulation drugs, psychiatric drugs, NSAIDs, steroids and the comorbidity groups in CCI expect for the stratified group. ** Hemiplegia and AIDS are not presented due to few observations. *** Cancer including any tumor, leukemia, lymphoma, metastatic solid tumor. **** Chronic pulmonary disease. ***** Connective tissue disease. ****** Cardiovascular disease including myocardial infarction, congestive heart failure, peripheral vascular disease and cerebrovascular disease.

Score prédictif : NHFS

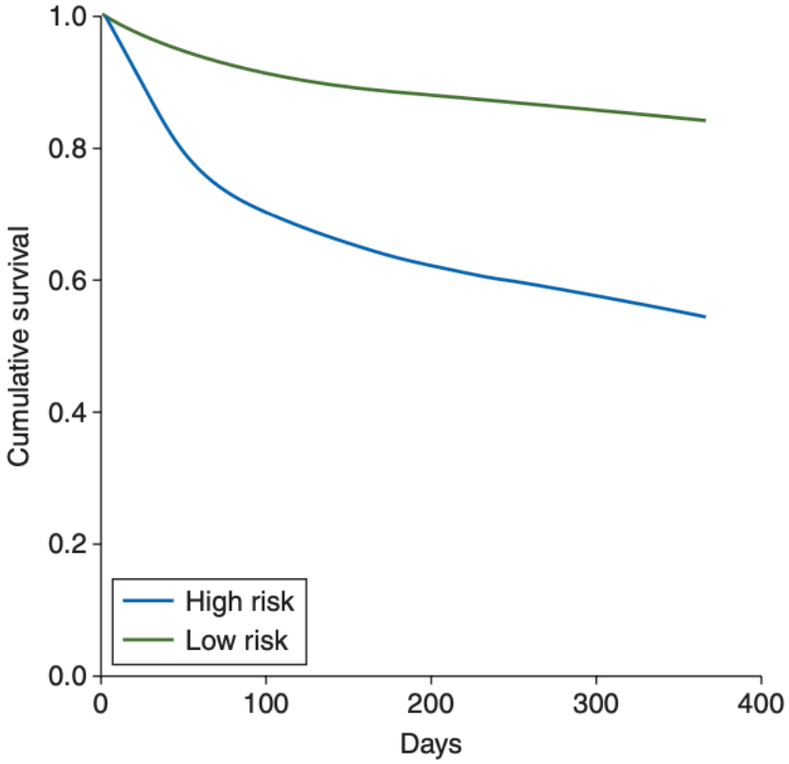


Fig 1 The Kaplan–Meier curve showing 1 yr postoperative mortality after hip fracture surgery. Low- and high-risk groups have an NHFS of ≤4 and >4, respectively.

Table 2 Effect of time to surgery for a fractured femoral neck on 1 yr mortality, risk stratified using the NHFS. *$P<0.001$ early *vs* late surgery; †$P=0.102$ early *vs* late surgery

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Number of cases	2098	4104
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CLINICAL PRACTICE

Nottingham Hip Fracture Score as a predictor of one year mortality in patients undergoing surgical repair of fractured neck of femur

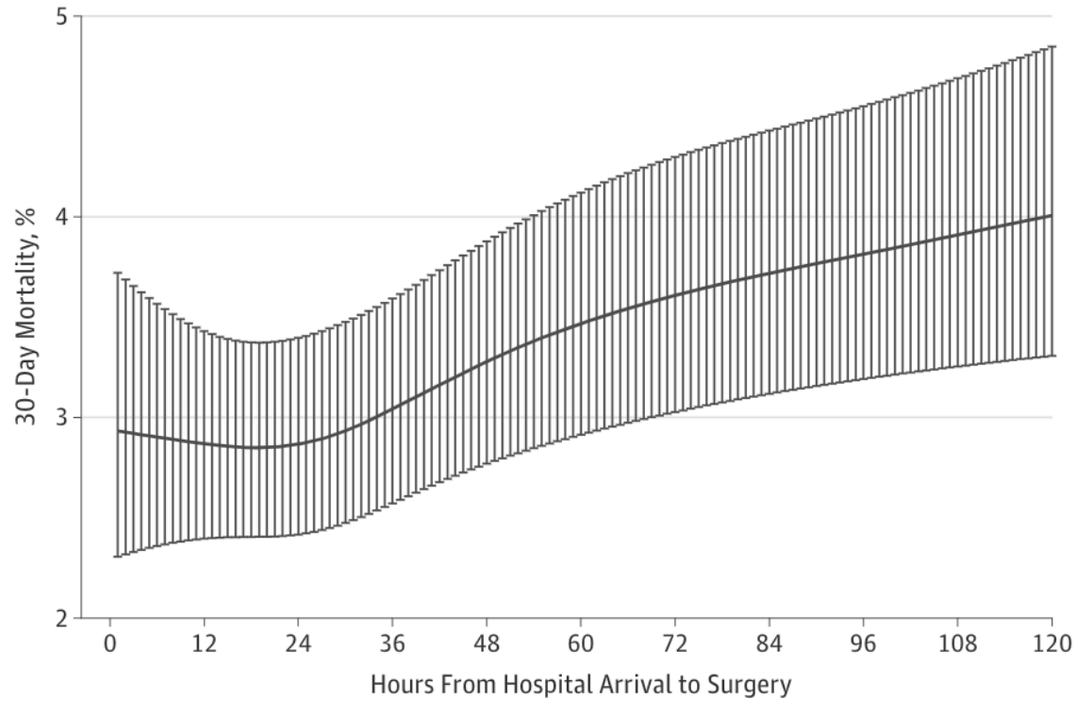
M. D. Wiles[1*], C. G. Moran[2], O. Sahota[3] and I. K. Moppett[1]

Enjeux de la chirurgie précoce : Mortalité

Wait Time and 30-Day Mortality in Adults Undergoing Hip Fracture Surgery

Original Investigation **Research**

Figure 1. Probability of the Primary Outcome According to Wait Times for Surgery as a Continuous Variable



Probabilities (95% CIs) models used restricted cubic splines adjusting for age, sex, calendar year, income quintile, rurality, transfer from any health care institution, Deyo-Charlson score, history of frailty, diabetes, heart failure, chronic obstructive pulmonary disease, myocardial infarction, or hypertension, fracture and surgery type, Injury Severity Score, surgeon volume and experience, hospital volume and type, and surgery duration. Analysis conducted among 41 186 of 42 230 patients. C statistic was 0.756. Variance inflation factors were 4 or less for included variable included, indicating an absence of collinearity. Probabilities of the primary outcome according to wait-times for surgery are presented for patients with average fracture, physician, and hospital system characteristics in the cohort.

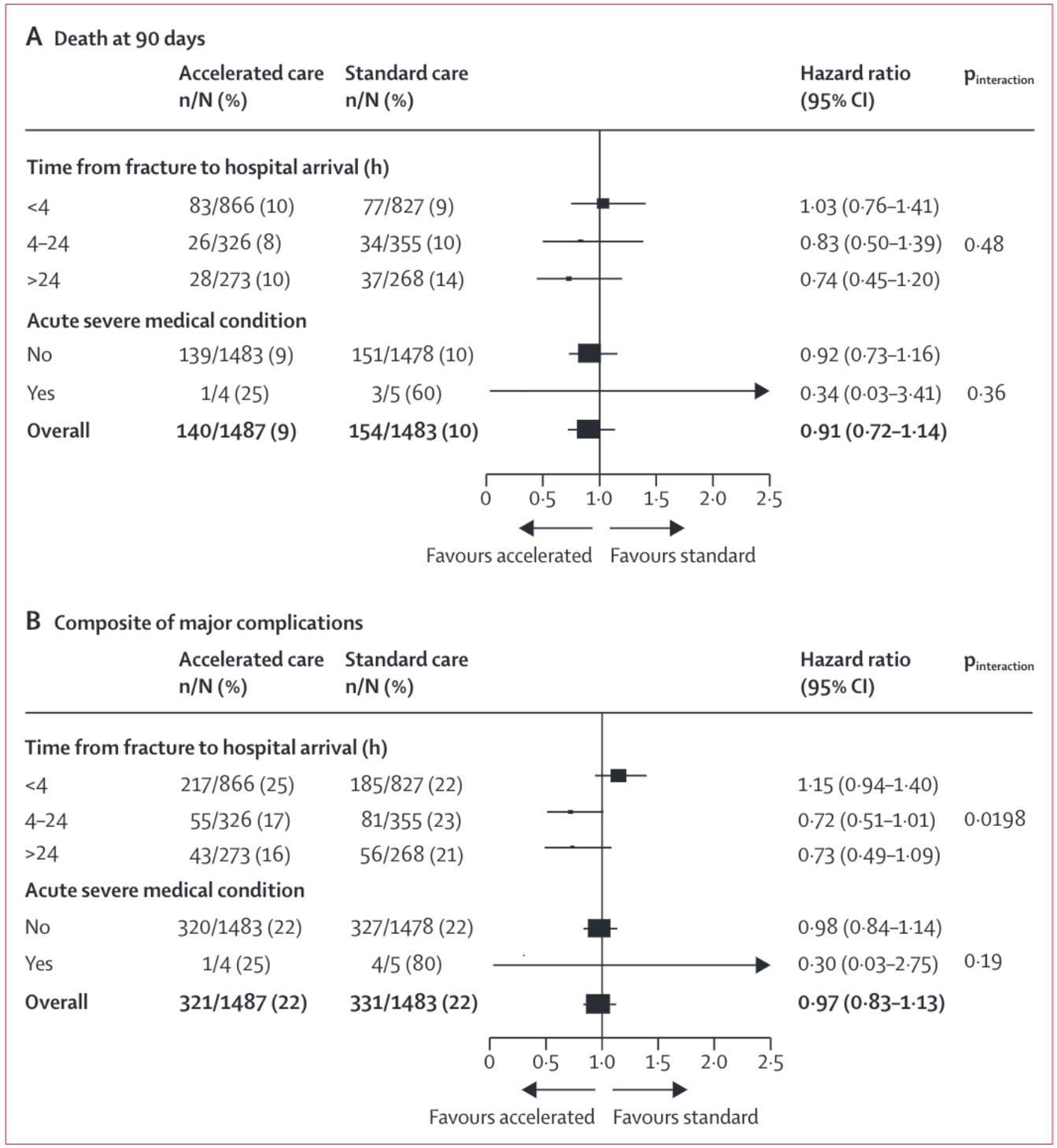
JAMA | Original Investigation

Association Between Wait Time and 30-Day Mortality in Adults Undergoing Hip Fracture Surgery

Daniel Pincus, MD; Bheeshma Ravi, MD, PhD; David Wasserstein, MD, MSc; Anjie Huang, MSc; J. Michael Paterson, MSc; Avery B. Nathens, MD, MPH, PhD; Hans J. Kreder, MD, MPH; Richard J. Jenkinson, MD, MSc; Walter P. Wodchis, PhD

2017

Enjeux de la chirurgie précoce : Mortalité



A Death at 90 days

	Accelerated care n/N (%)	Standard care n/N (%)	Hazard ratio (95% CI)	$p_{interaction}$
Time from fracture to hospital arrival (h)				
<4	83/866 (10)	77/827 (9)	1·03 (0·76–1·41)	
4–24	26/326 (8)	34/355 (10)	0·83 (0·50–1·39)	0·48
>24	28/273 (10)	37/268 (14)	0·74 (0·45–1·20)	
Acute severe medical condition				
No	139/1483 (9)	151/1478 (10)	0·92 (0·73–1·16)	
Yes	1/4 (25)	3/5 (60)	0·34 (0·03–3·41)	0·36
Overall	**140/1487 (9)**	**154/1483 (10)**	**0·91 (0·72–1·14)**	

0 0·5 1·0 1·5 2·0 2·5

Favours accelerated Favours standard

B Composite of major complications

	Accelerated care n/N (%)	Standard care n/N (%)	Hazard ratio (95% CI)	$p_{interaction}$
Time from fracture to hospital arrival (h)				
<4	217/866 (25)	185/827 (22)	1·15 (0·94–1·40)	
4–24	55/326 (17)	81/355 (23)	0·72 (0·51–1·01)	0·0198
>24	43/273 (16)	56/268 (21)	0·73 (0·49–1·09)	
Acute severe medical condition				
No	320/1483 (22)	327/1478 (22)	0·98 (0·84–1·14)	
Yes	1/4 (25)	4/5 (80)	0·30 (0·03–2·75)	0·19
Overall	**321/1487 (22)**	**331/1483 (22)**	**0·97 (0·83–1·13)**	

0 0·5 1·0 1·5 2·0 2·5

Favours accelerated Favours standard

***Figure 3*: Results by prespecified subgroups for the two coprimary outcomes**
Mortality at 90 days (A) and composite of major complications (B). n=number of events. N=number of patients.

« Among patients with a hip fracture, accelerated surgery did not lower the risk of mortality or a composite of major complications compared with standard care.
However, it did reduce the risk of delirium, urinary tract infection, and moderate-to-severe pain and resulted in faster mobilisation, standing, weight bearing, and hospital discharge. »

Accelerated surgery versus standard care in hip fracture (HIP ATTACK): an international, randomised, controlled trial

*The HIP ATTACK Investigators**

Lancet, 2020

Conclusion de la chirurgie précoce

« En l'état actuel des connaissances, il n'est pas acceptable d'envisager une chirurgie de la FESF au-delà de 48h en raison du sur-risque de mortalité… » (SFAR 2018)

- Réduire la mortalité
- Réduire la morbidité
- Réduire la durée de séjour
- Réduire le coût sociétal

Opération endéans 48h

mais

10% des fractures de hanche sous anticoagulants oraux

Plan

- Introduction

- Enjeux de la chirurgie précoce

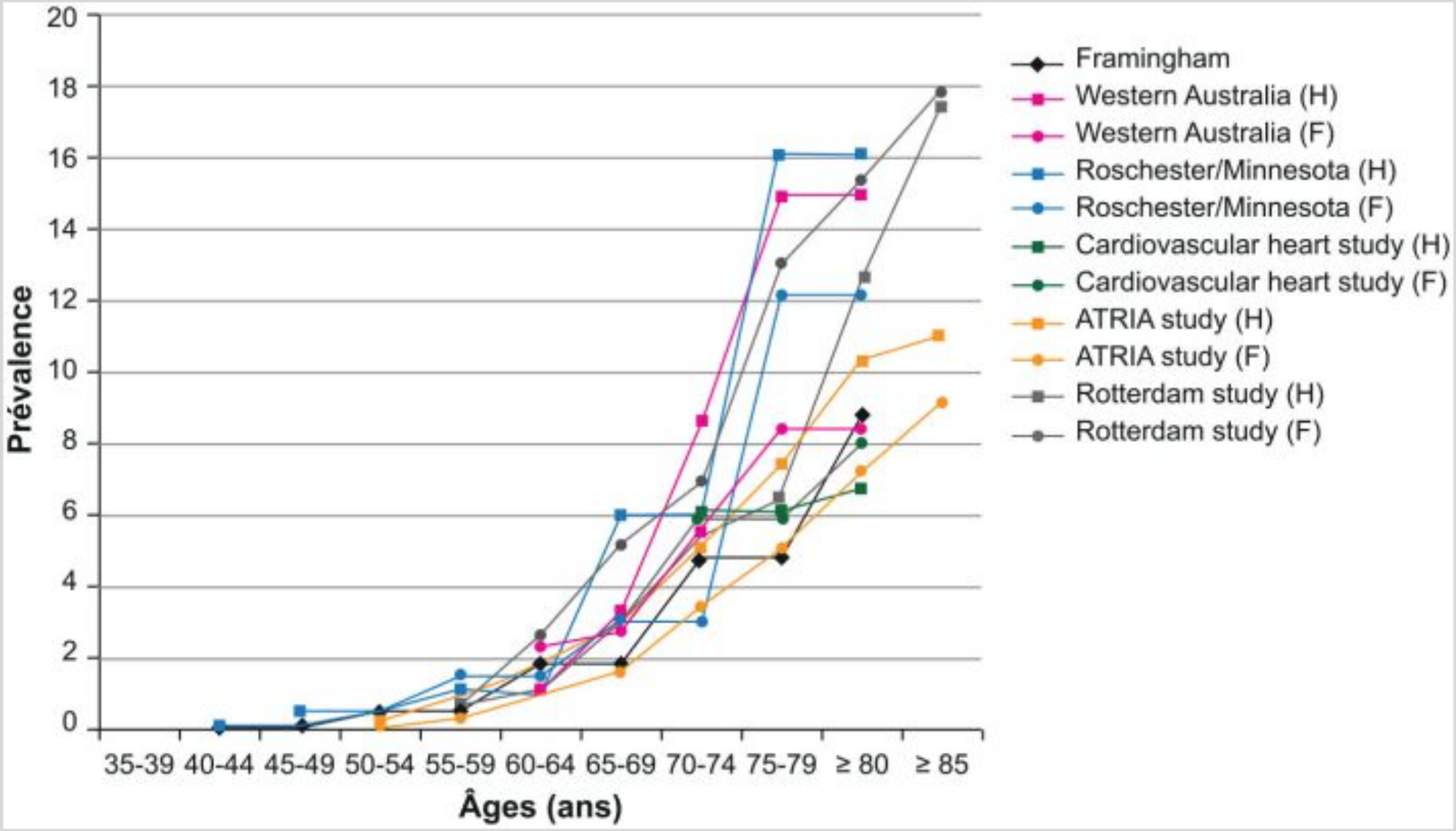
- Gestion de l’anti-coagulation

- Quel rôle pour l’anesthésiste ?

- Quelle place pour le gériatre ?

Gestion de l'anticoagulation

Figure 1.5 Prévalence selon l'âge de la fibrillation auriculaire (d'après Charlemagne et coll., 2011)



Pour information :

Prise en charge périopératoire de la fracture du col du fémur en urgence sous anticoagulants et antiagrégants plaquettaires : gestion des antivitamines K

Anesthésie-réanimation 12 /2020

Prévalence et démographie des anticoagulants

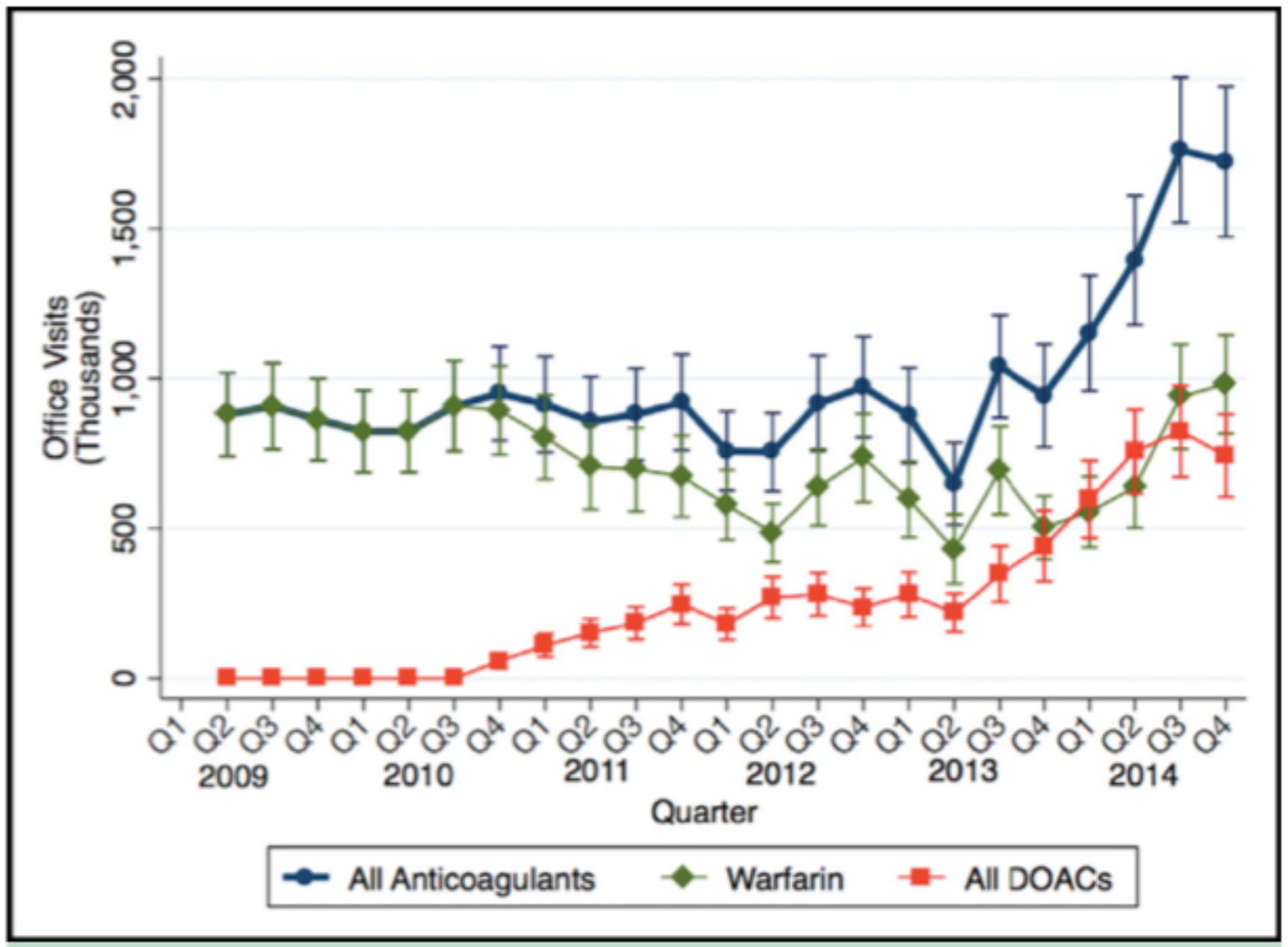


Figure 2 Quarterly visits for atrial fibrillation by anticoagulant type. DOAC = direct oral anticoagulant. Source: IMS Health National Disease and Therapeutic Index, 2009-2014.

USA :
- 1 000 000 patients sous NACO
- 40% des fractures de hanche sous AC ou AAP

THE AMERICAN JOURNAL of MEDICINE®

National Trends in Ambulatory Oral Anticoagulant Use

Geoffrey D. Barnes, MD, MSc,[a] Eleanor Lucas, BA,[b] G. Caleb Alexander, MD, MS,[b] Zachary D. Goldberger, MD, MS[c]

[a]Frankel Cardiovascular Center and Institute for Healthcare Policy and Innovation, University of Michigan, Ann Arbor; [b]Department of Epidemiology and the Center for Drug Safety and Effectiveness, Johns Hopkins Bloomberg School of Public Health, Baltimore, Md; [c]Division of Cardiology, University of Washington, Seattle.

Pharmacologie des anticoagulants oraux

Table 1 Pharmacokinetic parameters (median values) of rivaroxaban, apixaban and dabigatran in healthy adults

Agent	F_{abs}, %	C_{max}, ng/ml	AUC, ng · h/ml	t_{max}, h	$t_{½}$, h	V_d, l	CL/F, l/h	Plasma protein binding, %	Renal excretion of unchanged drug, %
Rivaroxaban	80–100 [3]	141* [17]	1020* [17]	2–4 [3]	5–13 [3]	50 [3]	10 [3]	92–95 [3]	33 [3]
Apixaban	50 [5]	460† [23]	4100† [23]	3–4 [5]	12 [5]	21 [5]	3 [5]	87 [5]	27 [5]
Dabigatran	6.5 [6]	110‡ [24]	900‡ [24]	1–2 [6]	12–17 [6]	60–70 [6]	105–170 [24]	34–35 [6]	85 [25]

*With 10 mg oral dose.
†With 20 mg oral dose.
‡With 150 mg oral dose.
Values rounded to nearest integer.
AUC area under the concentration–time curve, *CL/F* apparent clearance, C_{max} maximum plasma concentration, F_{abs} absolute bioavailability, t_{max} time to maximum concentration, $t_{½}$ apparent half-life, V_d volume of distribution at steady state.

Interactions avec les inhibiteurs enzymatiques :

Rivaroxaban et Apixaban CYP3A4 :
- Anti-fongiques (-azole) +150%
- Anti -rétroviraux +150%
- Macrolides (Clarithro / Erythro - mycine)

Dabigatran P-gP, CYP450 :
- Amiodarone + 60%
- Tacrolimus + 150%

Pharmacocinétique du Xarelto

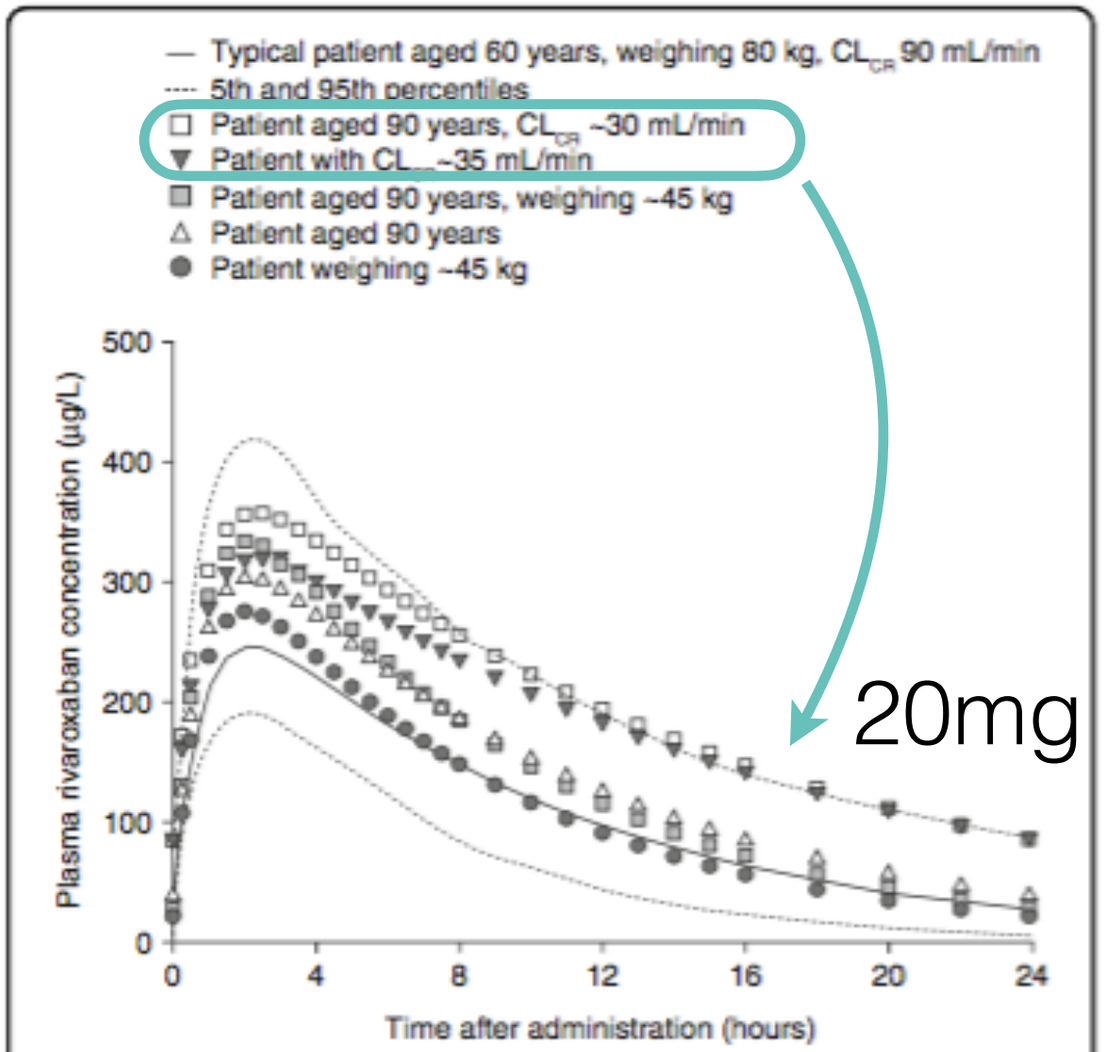
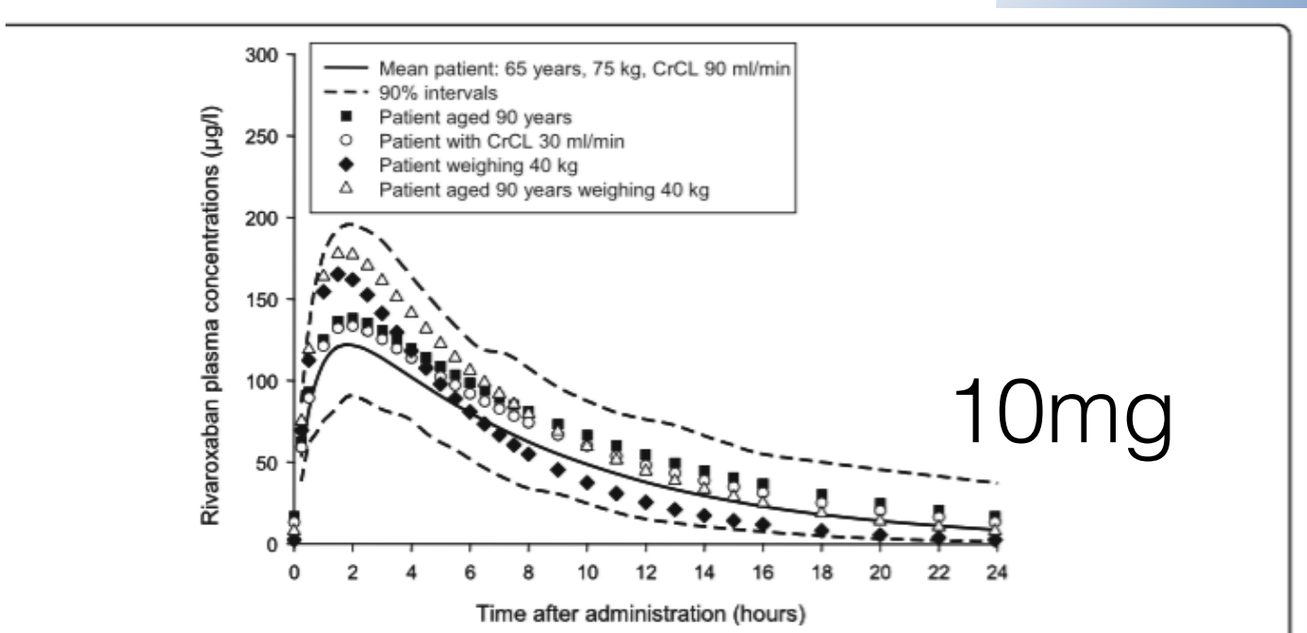


Figure 3 Predicted plasma rivaroxaban concentration–time profiles for extremes in age, renal function and body weight. Patients receiving rivaroxaban 20 mg once daily. The simulated patients had typical mean characteristics (age 60 years, body weight 80 kg, CrCl 90 ml/min) unless specified otherwise [12]. CL$_{CR}$/CrCl, creatinine clearance. Reproduced from Mueck W, Lensing AW, Agnelli G *et al.* Rivaroxaban: population pharmacokinetic analyses in patients treated for acute deep-vein thrombosis and exposure simulations in patients with atrial fibrillation treated for stroke prevention. *Clin Pharmacokinet* 2011; 50:675–686 with permission from Adis (© Springer International Publishing AG 2011. All rights reserved).



2 Simulations of rivaroxaban plasma concentration–time profiles in typical patients compared with overall population
tes. Typical patients are elderly (90 years), have moderate to severe renal impairment; CrCl 30 ml/min), have low body weight (40 kg), or are with low body weight. Patients receiving rivaroxaban 10 mg once daily (mean with 90% interval) [11]. CrCL/CrCl, creatinine clearance.
uced with permission from Mueck W, Borris LC, Dahl OE *et al.* Population pharmacokinetics and pharmacodynamics of once- and twice-daily ban for the prevention of venous thromboembolism in patients undergoing total hip replacement. *Thromb Haemost* 2008;100:453–461.

Pharmacologie des anticoagulants oraux

Urgent surgery and RIVAROXABAN (XARELTO®)

[Rivaroxaban] ≤ 30 ng/ml	•• Operate
30 ng/ml < [Rivaroxaban] ≤ 200 ng/ml	•• Wait up to12 h* and obtain new dosage** or (if time is not compatible with emergency) •• Operate, if abnormal bleeding : antagonise the anticoagulant effect***
200 ng/ml < [Rivaroxaban] ≤ 400 ng/ml	• Wait up to12-24 h and obtain new dosage** or (if time is not compatible with emergency) • Maximum delay surgery • Operate, if abnormal bleeding : antagonise ***
[Rivaroxaban] > 400 ng/ml	• Overdose – Major haemorrhagic risk

*It is not possible to accurately determine the time to reach a threshold of 30 ng/ml, so the sentence "until 12h"
**This second assay can be used to estimate the time required to obtain the threshold of 30 ng/ml
***This proposal applies primarily to emergency situations where you cannot wait :

- **PCC 25-50 UI/kg or FEIBA=30-50 UI/Kg** depending on the availability
- No data are available on the thrombotic risk of high doses of PCC or FEIBA in these patients
- Reversal by CCP or FEIBA does not fully correct the abnormalities of haemostasis tests
- rFVIIa is not considered first-line

GIHPD 2013

Pharmacocinétique du Xarelto

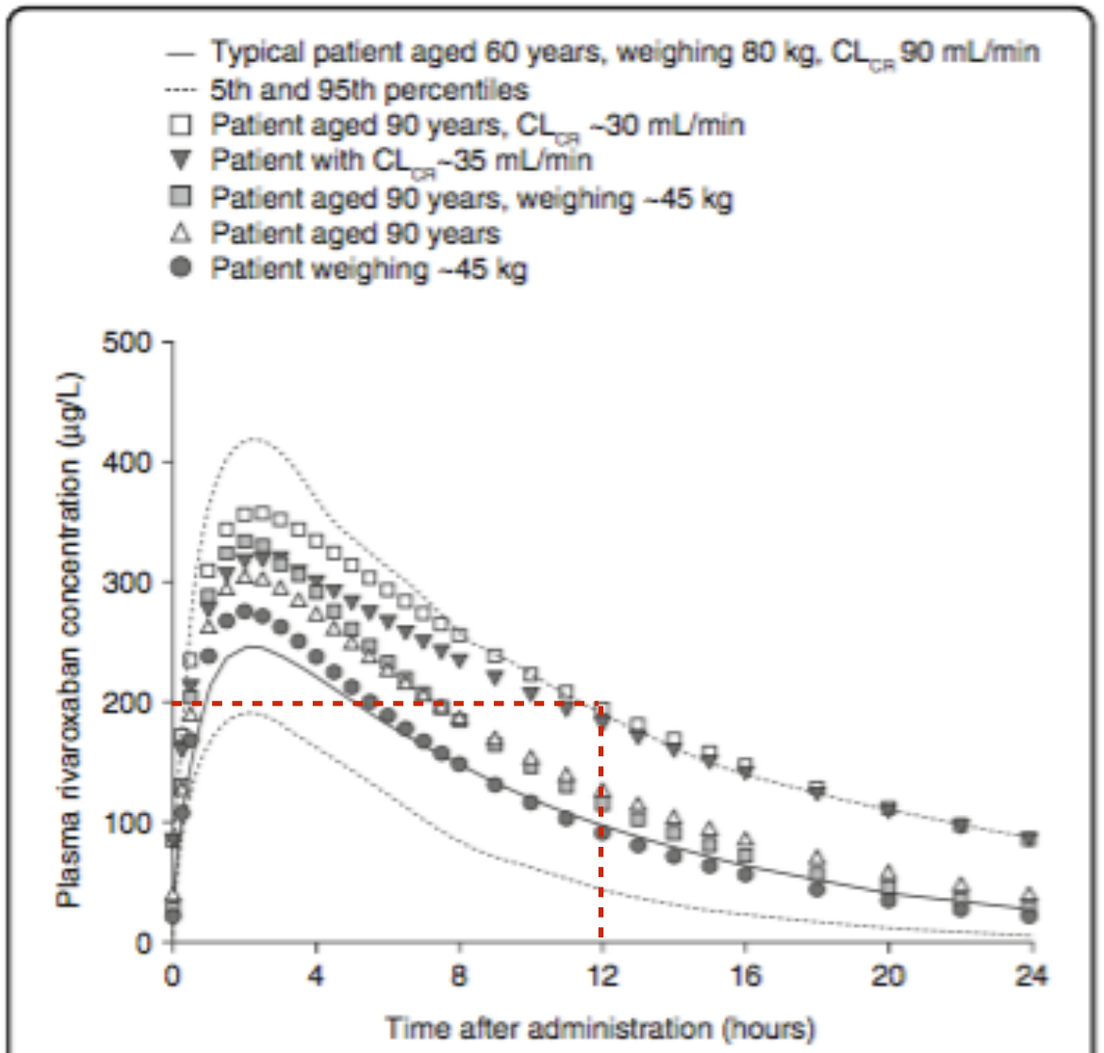
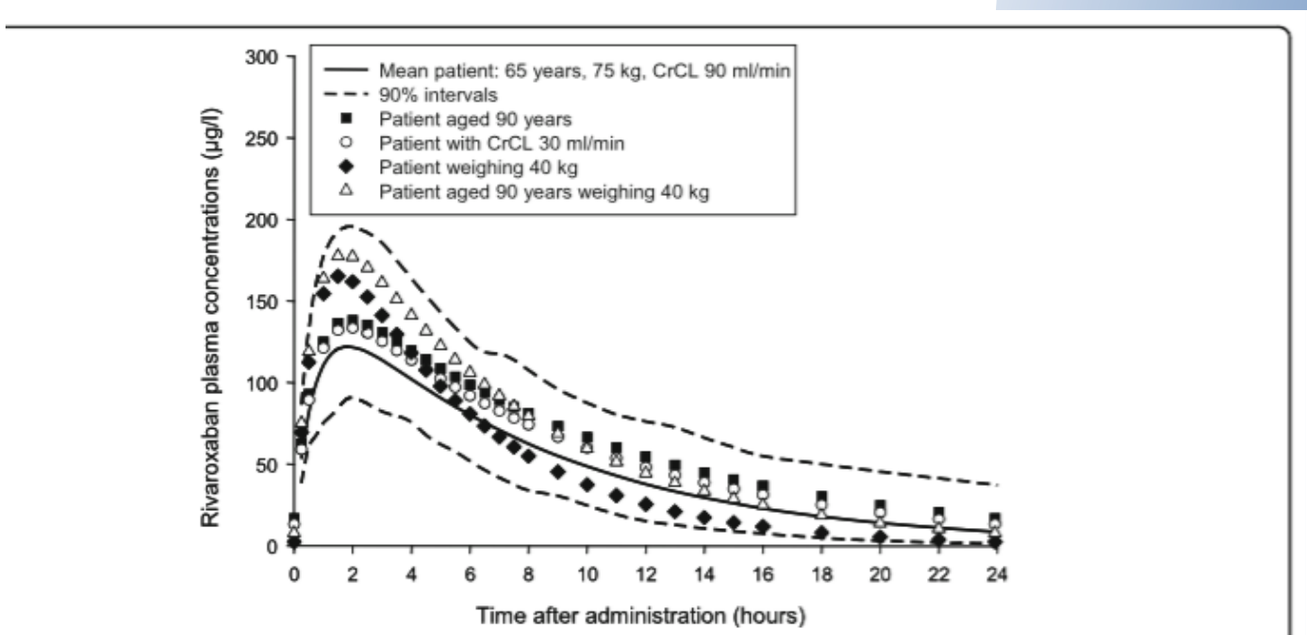


Figure 3 Predicted plasma rivaroxaban concentration–time profiles for extremes in age, renal function and body weight. Patients receiving rivaroxaban 20 mg once daily. The simulated patients had typical mean characteristics (age 60 years, body weight 80 kg, CrCl 90 ml/min) unless specified otherwise [12]. CL_{CR}/CrCl, creatinine clearance. Reproduced from Mueck W, Lensing AW, Agnelli G *et al*. Rivaroxaban: population pharmacokinetic analyses in patients treated for acute deep-vein thrombosis and exposure simulations in patients with atrial fibrillation treated for stroke prevention. *Clin Pharmacokinet* 2011; 50:675–686 with permission from Adis (© Springer International Publishing AG 2011. All rights reserved).



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Chirurgie de la hanche sous anticoagulation

Table 1 Patient characteristics and surgery-related factors of all hip fracture patients according to antithrombotic treatment

	All patients	Users of NOACs[a]			Users of VKAs[b]			Users of antiplatelets		
		Non-users	Former	Current	Non-users	Former	Current	Non-users	Former	Current
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)
Total	74,791 (100.0)	73,507 (98.3)	221 (0.3)	1063 (1.4)	68,948 (92.2)	1681 (2.2)	4162 (5.6)	43,245 (57.8)	6979 (9.3)	24,567 (32.8)
Type of fracture										
Femoral neck	39,605 (53.0)	38,935 (53.0)	111 (50.2)	559 (52.6)	36,485 (52.9)	916 (54.5)	2204 (53.0)	23,062 (53.3)	3628 (52.0)	12,915 (52.6)
Per- or sub-trochanteric	35,186 (47.0)	34,572 (47.0)	110 (49.8)	504 (47.4)	32,463 47.1)	765 (45.5)	1958 (47.0)	20,183 (46.7)	3351 (48.0)	11,652 (47.4)
Surgery delay (hours)										
No data	171 (0.2)	171 (0.2)	0 (0.0)	0 (0.0)	154 (0.2)	5 (0.3)	12 (0.3)	106 (0.2)	19 (0.3)	46 (0.2)
<24	45,027 (60.2)	44,438 (60.5)	120 (54.3)	469 (44.1)	42,694 (61.9)	763 (45.4)	1570 (37.7)	26,132 (60.4)	4065 (58.2)	14,830 (60.4)
24–36	13,654 (18.3)	13,430 (18.3)	38 (17.2)	186 (17.5)	12,453 (18.1)	315 (18.7)	886 (21.3)	7788 (18.0)	1282 (18.4)	4584 (18.7)
>36	15,939 (21.3)	15,468 (21.0)	63 (28.5)	408 (38.4)	13,647 (19.8)	598 (35.6)	1694 (40.7)	9219 (21.3)	1613 (23.1)	5107 (20.8)

Preoperative antithrombotic therapy and risk of blood transfusion and mortality following hip fracture surgery: a Danish nationwide cohort study

C. Daugaard[1] · A.B. Pedersen[1] · N.R. Kristensen[1] · S.P. Johnsen[1,2]

Received: 17 September 2018 / Accepted: 18 November 2018

Osteoporosis 2019

Chirurgie de la hanche sous anticoagulation

Table 5 Adjusted hazard ratio (HR) with 95% confidence interval (95% CI) for 30-day mortality according to antithrombotic therapy. Results stratified by surgery delay

	Surgery delay		
	< 24 h	24–36 h	> 36 h
NOAC[a]			
Non-users	Reference	Reference	Reference
Former users	1.23 (0.89–1.69)	0.21 (0.03–1.61)	0.79 (0.36–1.73)
Current users	1.08 (0.83–1.39)	0.95 (0.69–1.30)	0.70 (0.54–0.91)
Vitamin K antagonists			
Non-users	Reference	Reference	Reference
Former users	1.12 (0.93–1.34)	1.29 (0.92–1.80)	1.14 (0.92–1.42)
Current users	1.04 (0.91–1.18)	1.10 (0.90–1.34)	0.87 (0.74–1.03)
Antiplatelets			
Non-users	Reference	Reference	Reference
Former users	1.11 (0.99–1.23)	1.18 (1.05–1.34)	1.07 (0.91–1.27)
Current users	1.20 (1.13–1.27)	1.36 (1.25–1.49)	1.11 (0.98–1.25)

n = 74791
n (NACO) = 1063
n (AVK) = 4162
n (AAP) = 24597

Hypothèse : Davantage de comorbidités associées aux AAP qu'aux NACO.

Preoperative antithrombotic therapy and risk of blood transfusion and mortality following hip fracture surgery: a Danish nationwide cohort study

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Osteoporosis 2019

Chirurgie de la hanche sous anticoagulation

Table 6 Results restricted to hip fracture patients with atrial fibrillation or flutter. Adjusted relative risk for red blood cell transfusion within 7 days after surgery and adjusted hazard ratio for 30-day mortality according to antithrombotic therapy

	Adjusted relative risk (RR) with 95% confidence interval (95% CI) for red blood cell transfusion within7 days after surgery	Adjusted hazard ratio (HR) with 95% confidence interval (95% CI) for 30-day mortality
NOAC[a]		
Non-users	Reference	Reference
Former users	0.88 (0.75–1.03)	0.59 (0.43–0.82)
Current users	0.97 (0.90–1.04)	0.59 (0.48–0.73)
Vitamin K antagonists		
Non-users	Reference	Reference
Former users	0.93 (0.87–1.00)	0.82 (0.69–0.98)
Current users	0.92 (0.87–0.97)	0.65 (0.56–0.76)
Antiplatelets		
Non-users	Reference	Reference
Former users	1.08 (1.03–1.15)	0.95 (0.81–1.13)
Current users	1.16 (1.12–1.20)	1.02 (0.94–1.10)

n = 74791
n (NACO) = 1063
n (AVK) = 4162
n (AAP) = 24597

Preoperative antithrombotic therapy and risk of blood transfusion and mortality following hip fracture surgery: a Danish nationwide cohort study

C. Daugaard[1] · A.B. Pedersen[1] · N.R. Kristensen[1] · S.P. Johnsen[1,2]

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Osteoporosis 2019

Chirurgie de la hanche sous anticoagulation

Table 1
Baseline characteristics of patients.

	Closed reduction internal fixation (n = 1143)			Hemiarthroplasty (n = 571)		
	No anticoagulants (n = 977)	DOACs (n = 60)	p-value	No anticoagulants (n = 489)	DOACs (n = 29)	p-value
Age	82.7 ± 8.0	86.1 ± 5.7	0.001	82.8 ± 7.6	86.2 ± 7.1	0.02
Gender (% men)	22%	26.7%	0.5	31.5%	44.8%	0.2
Socio-economic level	16.5%	8.3%	0.1	14.6%	12.5%	0.95
low	35.3%	29.2%		31.2%	33.3%	
middle	48.2%	62.5%		54.2%	54.2%	
high						
ASA score	58%	22%	<0.001	51.4%	31%	0.05
1-2	42%	78%		48.6%	69%	
3-4						
Duration of surgery	110.7 ± 48.9	122.0 ± 58.0	0.09	126.2 ± 39.8	143.7 ± 38.5	0.02
Preoperative Hb	11.9 ± 1.6	11.7 ± 1.7	0.3	12.3 ± 1.5	12.1 ± 1.6	0.6
Time from admission to surgery	31.2 ± 22.2	40.2 ± 26.9	0.003	36.6 ± 25.8	42.3 ± 27.3	0.3
% Surgeries within 48 hours	82%	74%	0.2	77.5%	74%	0.9

*Significance $p < 0.05$ compared to controls.
DOAC - direct oral anticoagulation medications, ASA score – American Society of Anesthesiology score.

Surmortalité dans le groupe NACO, mais population non-équivalente !

Table 2
Blood loss estimates and mortality of the patients treated with DOACs and the controls.

	Closed reduction internal fixation (n = 1143)			Hemiarthroplasty (n = 571)		
	No anticoagulants (n = 977)	DOACs (n = 60)	p-value	No anticoagulants (n = 489)	DOACs (n = 29)	p-value
% Hb change	24.0 ± 10.8	22.6 ± 9.7	0.332	21.0 ± 9.2	21.7 ± 10.4	0.698
% Subjects who required blood transfusion	7.9%	8.3%	0.807	7.4%	10.3%	0.472
% One-month mortality	4.4%	6.7%	0.343	6.1%	6.9%	0.698
% One-year mortality	16.1%	26.7%	0.047	21.1%	13.8%	0.479

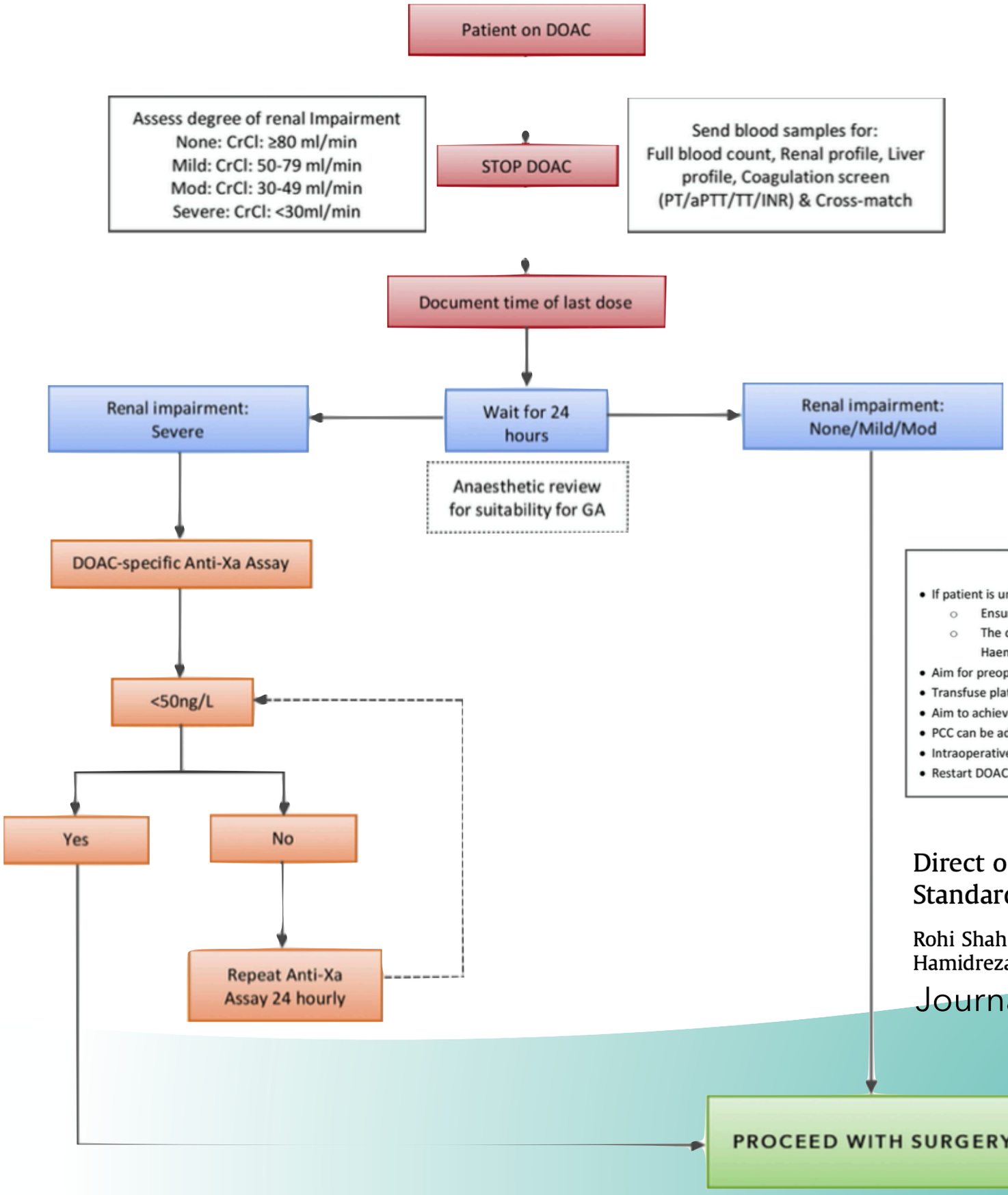
DOAC - direct oral anticoagulation medications.

Safety of urgent hip fracture surgery protocol under influence of direct oral anticoagulation medications

Haggai Schermann*, Ron Gurel, Aviram Gold, Eran Maman, Oleg Dolkart, Ely L. Steinberg, Ofir Chechik

Division of Orthopedics, Tel Aviv Sourasky Medical Center, Affiliated with Tel Aviv University, Tel Aviv, Israel

Algorithme NACO



ADDITIONAL POINTS:

- If patient is unsuitable for GA, allow for a minimum of 48 hours (4 half-lives) prior to performing neuraxial anaesthesia.
  - Ensure DOAC levels are <50ng/L.
  - The decision to proceed should be undertaken as part of a multidisciplinary team approach involving the patient, Anaesthetic, Haematology and Orthogeriatric teams.
- Aim for preoperative Hb: >100g/L
- Transfuse platelets to maintain: >100x10^9/L
- Aim to achieve meticulous haemostasis intra-operatively
- PCC can be administered as pro-haemostatic therapy with neuraxial anaesthesia - discuss with haematology.
- Intraoperative administration tranexamic acid 1g IV for all patients
- Restart DOAC 48 hours post-op. VTE prophylaxis in the interim should be with LMWH.

Direct oral anticoagulants (DOACs) and neck of femur fractures: Standardising the perioperative management and time to surgery

Rohi Shah [a, b, *], Nomaan Sheikh [a], Jitendra Mangwani [b], Nicolette Morgan [b], Hamidreza Khairandish [a]

Journal of Clinical Orthopaedics and Trauma 2021

Plan

- Introduction

- Enjeux de la chirurgie précoce

- Gestion de l’anti-coagulation

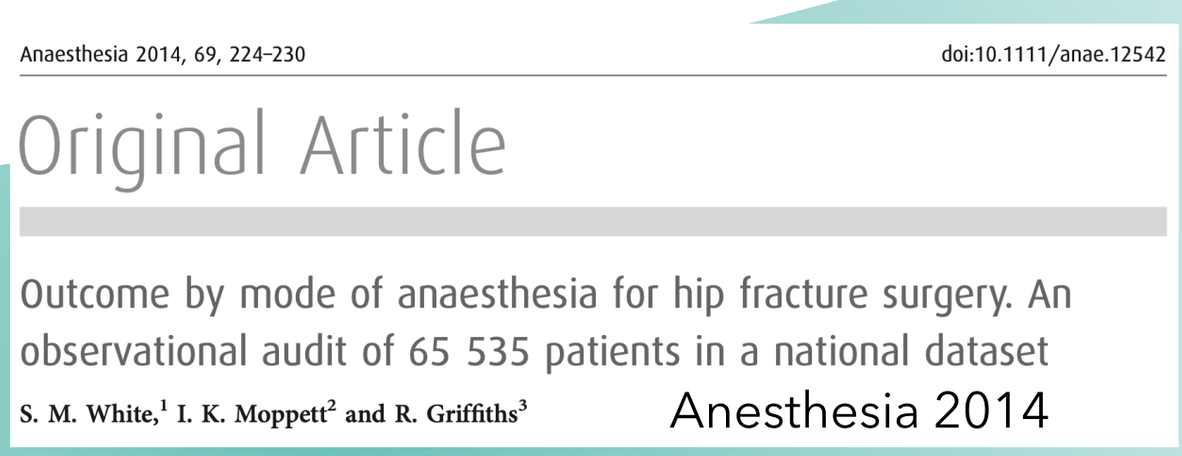
- Quel rôle pour l’anesthésiste ?

- Quelle place pour le gériatre ?

Rôle de l’anesthésiste : per-opératoire

<u>Technique d’anesthésie :</u>

« L'analyse rétrospective d'un ensemble de données nationales portant sur 65 535 patients n'a révélé aucune différence significative dans la mortalité postopératoire à 5 ou 30 jours entre l'AG et la rachianesthésie. Nous concluons que la recherche en anesthésie devrait se concentrer sur les résultats de la mortalité qui peuvent être influencés par de nombreuses variables non anesthésiques… »


Anaesthesia 2014, 69, 224–230 doi:10.1111/anae.12542

Original Article

Outcome by mode of anaesthesia for hip fracture surgery. An observational audit of 65 535 patients in a national dataset

S. M. White,[1] I. K. Moppett[2] and R. Griffiths[3]

Anesthesia 2014

Rôle de l'anesthésiste : bilan pré-opératoire

Table 3. Association Between Transthoracic Echocardiogram (TTE) and Treatment Timing

Treatment Timing	Underwent TTE (Average)	Did Not Undergo TTE (Average)	*P*-Value
Length of stay, days	8.7	6.4	.001
Time from admission to surgery, hours	66.5	34.8	.001
Time from admission to medical optimization, hours	43.2	12.4	.001
Time from medical optimization to surgery, hours	23.3	22.4	.64
Time from surgery to discharge, days	6.1	5.2	.83

Table 4. Effect of Transthoracic Echocardiogram (TTE) on Mortality

Mortality	Underwent TTE (n (%))	Did Not Undergo TTE (n (%))	*P*-Value
In-hospital	5 (3.8)	10 (1.8)	.18
30-day	9 (6.9)	37 (6.6)	.90
1-year	27 (20.6)	113 (20.1)	.89

Table 5. Effect of Transthoracic Echocardiogram (TTE) on Complications

Complication	Underwent TTE (n (%))	Did Not Undergo TTE (n (%))	*P*-Value
Myocardial infarction	0	8 (2)	.36
Cardiac arrest	2 (2)	3 (1)	.24
Cerebrovascular accident	3 (2)	4 (1)	.13
Arrhythmia	7 (5)	16 (3)	.17
Intensive care unit stay	4 (3)	22 (4)	.80
Surgical complication	1 (1)	3 (1)	.57
Respiratory failure	7 (5)	16 (3)	.17
Gastrointestinal complication	2 (2)	11 (2)	.74
Bacteremia or sepsis	3 (2)	3 (1)	.08
Acute renal failure	6 (5)	8 (1)	.03
Pulmonary embolism	2 (2)	<2 (1)	.16
Pneumonia	10 (8)	27 (5)	.19
Deep vein thrombosis	3 (2)	11 (2)	.73
Transfusion	58 (44)	259 (46)	.72
Urinary tract infection	40 (31)	138 (25)	.15

Effect of Preoperative Transthoracic Echocardiogram on Mortality and Surgical Timing in Elderly Adults with Hip Fracture

Kevin Luttrell, MD,[*†] *and Arvind Nana, MD*[*†‡]

JAGS 2015

Per-opératoire

- Médication :

Eviter les médications anti-cholinergiques

Tableau 3 Échelle des médicaments anticholinergiques (Anticholinergic Drug Scale [ADS]).

Niveau 1 : potentiel anticholinergique démontré		
Acide valproïque	Dipyridamole	Oxazépam
Alprazolam	Divalproex	Oxycodone
Amantadine	Famotidine	Pancuronium
Ampicilline	Fentanyl	Paroxétine
Azathioprine	Fluoxétine	Perphénazine
Bromocriptine	Fluphénazine	Phénelzine
Captopril	Flurazépam	Piperacilline
Cefoxitine	Fluvoxamine	Prednisolone
Céphalotine	Furosémide	Prochlorpérazine
Chlordiazépoxide	Gentamicine	Sertraline
Chlorthalidone	Hydralazine	Témazépam
Clindamycine	Hydrocortisone	Théophylline
Clonazépam	Isosorbide	Thiothixène
Chlorazépate	Lopéramide	Tramadol
Codéine	Lorazépam	Triamcinolone
Cortisone	Méthylprednisolone	Triatérène
Cyclosporine	Midazolam	Triazolam
Déxaméthasone	Morphine	Vancomycine
Diazépam	Nifédipine	Warfarine
Digoxine	Nizatidine	
Diltiazem	Olanzapine	
Niveau 2 : effet anticholinergique habituellement observé à dose élevée		
Carbamazépine	Disopyramide	Oxcarbazépine
Cimétidine	Loxapine	Pimozide
Cyclobenzaprine	Mépéridine	Ranitidine
Cyproheptadine	Méthotriméprazine	
Niveau 3 : potentiel anticholinergique élevé		
Amitriptyline	Dicyclomine	Oxybutynine
Atropine	Dimenhydrinate	Procyclidine
Benztropine	Diphenhydramine	Prométhazine
Bromphéniramine	Doxépine	Propanthéline
Chlorphéniramine	Hydroxyzine	Pyrilamine
Chlorpromazine	Hyoscyamine	Scopolamine
Clémastine	Imipramine	Toltérodine
Clomipramine	Méclizine	Trihexyphénidyl
Clozapine	Nortriptyline	Trimipramine
Désipramine	Orphénadrine	

Salahudeen *et al. BMC Geriatrics* (2015) 15:31
DOI 10.1186/s12877-015-0029-9

BMC Geriatrics

RESEARCH ARTICLE Open Access

Anticholinergic burden quantified by anticholinergic risk scales and adverse outcomes in older people: a systematic review

Mohammed Saji Salahudeen, Stephen B Duffull and Prasad S Nishtala*

Per-opératoire

- Pression artérielle :

maintenir > 70% de la PAm de référence pré-opératoire

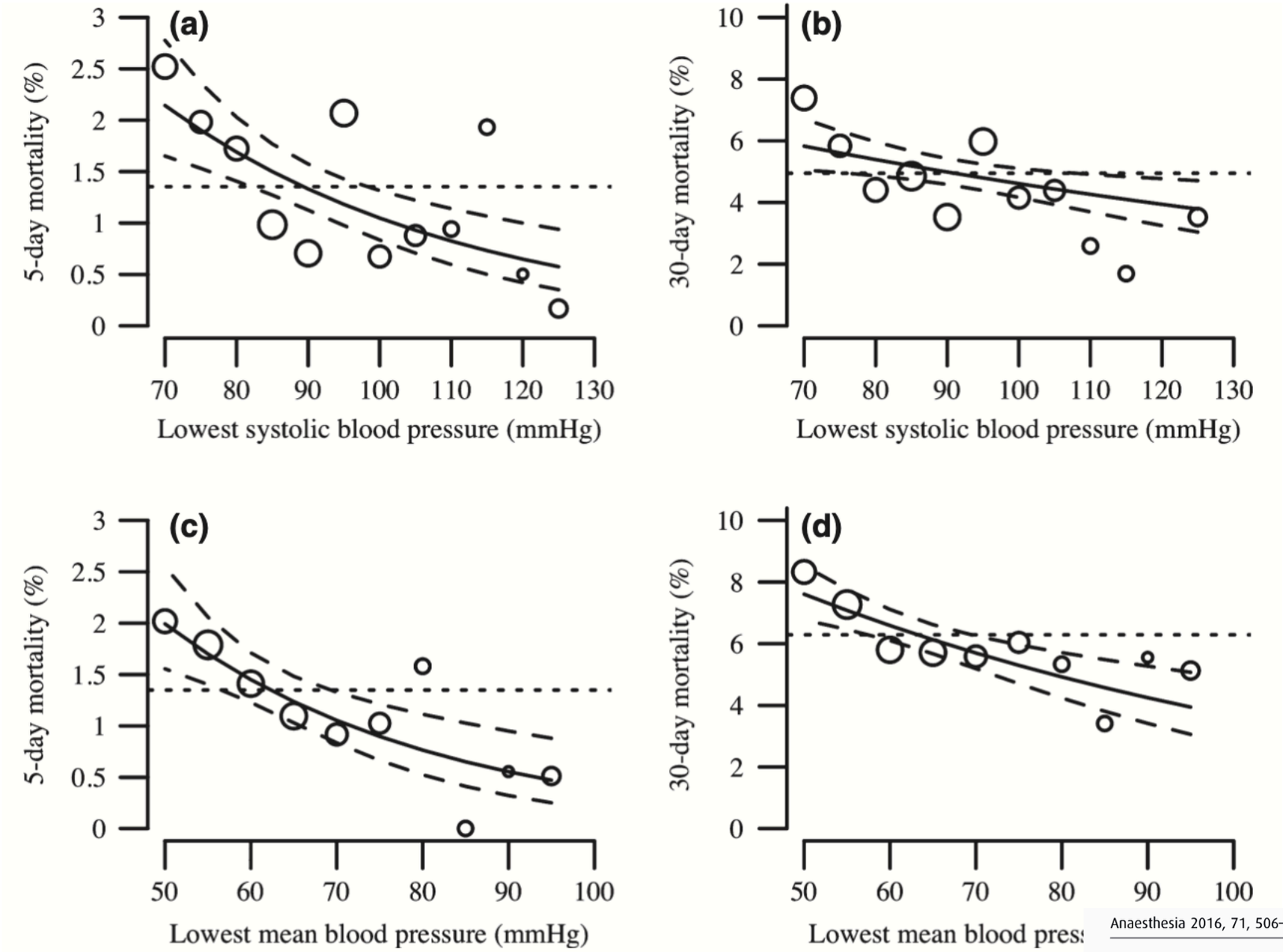
traiter toute hypotension sans délai

- Monitoring thermique

chez tous les patients et encore plus gériatriques,

« pré-chauffage » en avant-salle, avant induction

Rôle de l'anesthésiste : per-opératoire



Anaesthesia 2016, 71, 506–514 doi:10.1111/anae.13415

Original Article

CPD available at http://www.learnataagbi.org

Secondary analysis of outcomes after 11,085 hip fracture operations from the prospective UK Anaesthesia Sprint Audit of Practice (ASAP-2)

S. M. White,[1] I. K. Moppett,[2] R. Griffiths,[3] A. Johansen,[4] R. Wakeman,[4] C. Boulton,[4] F. Plant,[5]

Rôle de l'anesthésiste : per-opératoire

Electroencéphalogramme :

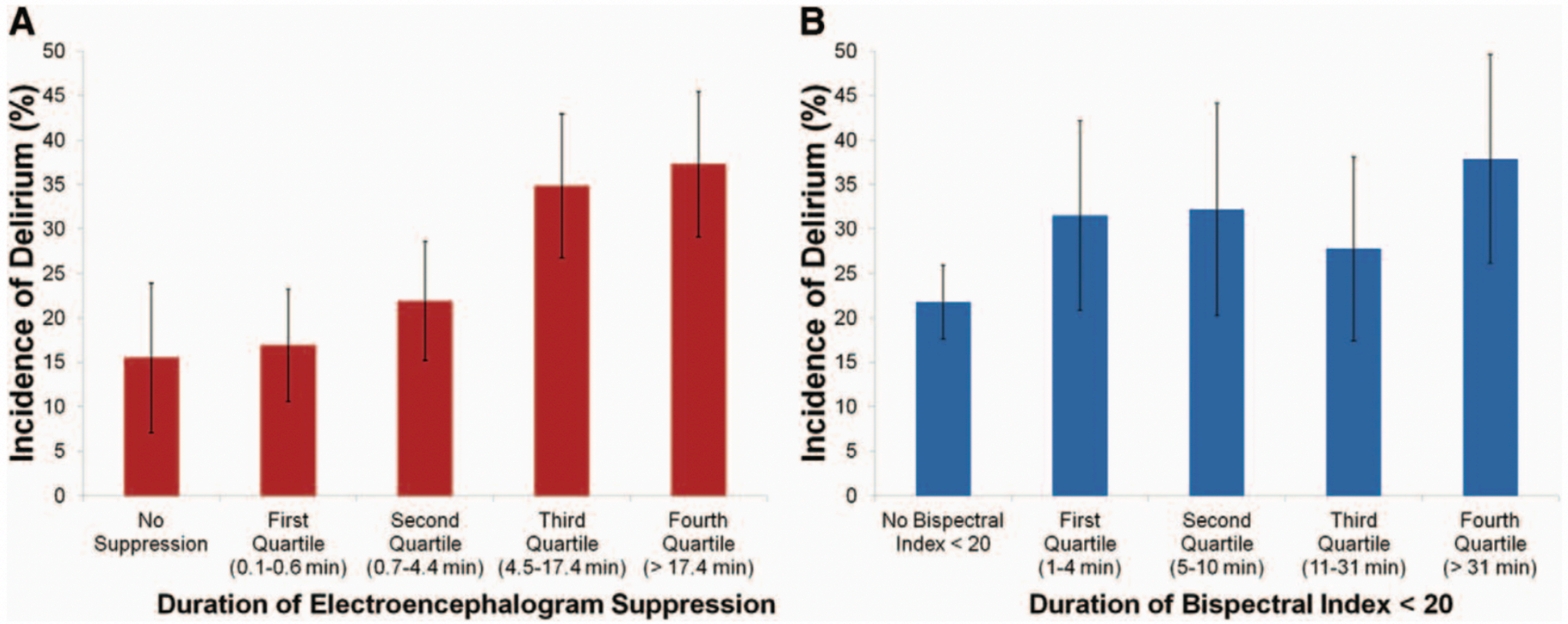


Figure 2. This descriptive figure depicts the univariable relationships between these 2 electroencephalogram parameters and incident delirium. There is no control for covariates in this descriptive figure. A, Incidence of delirium among patients who experienced no electroencephalogram suppression (n = 71) and among patients who experienced electroencephalogram suppression (n = 548) divided into quartiles based on duration of electroencephalogram suppression. B, Incidence of delirium among patients who never experienced bispectral index <20 (n = 362) and among patients who experienced bispectral index <20 (n = 257) divided into quartiles based on duration of bispectral index <20. Error bars represent 95% confidence intervals around the incidence of delirium in each group.

Intraoperative Electroencephalogram Suppression Predicts Postoperative Delirium

Bradley A. Fritz, MD,* Philip L. Kalarickal, MD,* Hannah R. Maybrier, BS,* Maxwell R. Muench, BS,* Doug Dearth, MD,* Yulong Chen, BA,* Krisztina E. Escallier, MD,* Arbi Ben Abdallah, PhD,* Nan Lin, PhD,† and Michael S. Avidan, MBBCh*

Anesthesia-Analgesia 2016

Rôle de l'anesthésiste : per-opératoire

Technique d'anesthésie :

Etudes récentes :

- essais prospectifs randomisés
- cohorte +/- 1000 patients
- évaluation de la mortalité
- évaluation du délirium

Comparative Study > BMJ Open. 2017 Oct 22;7(10):e016937.
doi: 10.1136/bmjopen-2017-016937.

Comparison of regional with general anaesthesia on postoperative delirium (RAGA-delirium) in the older patients undergoing hip fracture surgery: study protocol for a multicentre randomised controlled trial

Ting Li [1], Joyce Yeung [2 3], Jun Li [1], Yan Zhang [4], Teresa Melody [3], Ye Gao [1], Yi Wang [1], Qianquan Lian [1], Fang Gao [1 2], RAGA-Delirium Investigators

> BMJ Open. 2018 Oct 18;8(10):e023609. doi: 10.1136/bmjopen-2018-023609.

Improve hip fracture outcome in the elderly patient (iHOPE): a study protocol for a pragmatic, multicentre randomised controlled trial to test the efficacy of spinal versus general anaesthesia

Ana Kowark [1], Christian Adam [2], Jörg Ahrens [3], Malek Bajbouj [4], Cornelius Bollheimer [5], Matthias Borowski [6], Richard Dodel [7], Michael Dolch [8], Thomas Hachenberg [9], Dietrich Henzler [10], Frank Hildebrand [11], Ralf-Dieter Hilgers [12], Andreas Hoeft [13], Susanne Isfort [14], Peter Kienbaum [15], Mathias Knobe [11], Pascal Knuefermann [16], Peter Kranke [17], Rita Laufenberg-Feldmann [18], Carla Nau [19], Mark D Neuman [20], Cynthia Olotu [21], Christopher Rex [22], Rolf Rossaint [1], Robert D Sanders [23], Rene Schmidt [24], Frank Schneider [25 26], Hartmut Siebert [27], Max Skorning [28], Claudia Spies [29], Oliver Vicent [30], Frank Wappler [31], Dieter Christian Wirtz [32], Maria Wittmann [13], Kai Zacharowski [33], Alexander Zarbock [34], Mark Coburn [1], iHOPE study group

doi: 10.1136/bmjopen-2016-013473.

Regional versus General Anesthesia for Promoting Independence after Hip Fracture (REGAIN): protocol for a pragmatic, international multicentre trial

Mark D Neuman [1 2 3 4], Susan S Ellenberg [5], Frederick E Sieber [6], Jay S Magaziner [7], Rui Feng [5], Jeffrey L Carson [8], REGAIN Investigators

Collaborators, Affiliations + expand

PMID: 27852723 PMCID: PMC5129073 DOI: 10.1136/bmjopen-2016-013473

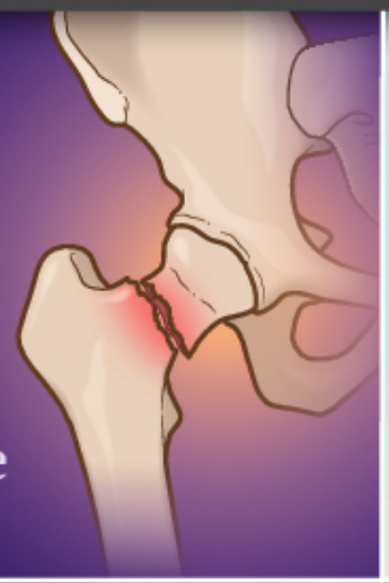
The NEW ENGLAND JOURNAL of MEDICINE

Spinal Anesthesia vs. General Anesthesia for Hip Surgery

MULTICENTER, PRAGMATIC, RANDOMIZED SUPERIORITY TRIAL

1600

Adults, ≥50 yrs old, who could walk independently before a hip fracture

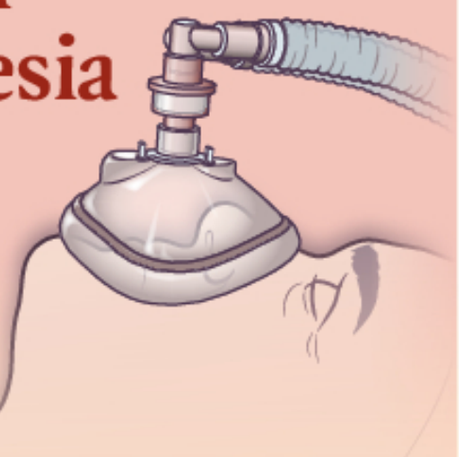


Spinal Anesthesia

(N=795)

General Anesthesia

(N=805)



Death or inability to walk without human assistance at 60 days

18.5%
(132 of 712 patients)

18.0%
(132 of 733 patients)

Relative risk, 1.03; 95% CI, 0.84 to 1.27; P=0.83

Spinal anesthesia was not superior to general anesthesia for survival and ambulation; the incidence of postoperative delirium was similar in the two groups.

M.D. Neuman et al. 10.1056/NEJMoa2113514

Table 2. Comparison of Postoperative Outcomes, Total Hospital Charges, and Length of Stay Between GA and NA After Propensity Score Matching

	GA (n = 31,011)	NA (n = 31,011)	OR (95% CI)	*P* value
Postoperative outcomes (%)				
In-hospital mortality	197 (0.64)	127 (0.41)	0.64 (0.52 to 0.81)	**<.001**
In-hospital pulmonary embolism	118 (0.38)	69 (0.22)	0.58 (0.43 to 0.79)	**<.001**
In-hospital deep vein thrombosis	796 (2.57)	571 (1.84)	0.71 (0.64 to 0.79)	**<.001**
In-hospital blood transfusion	3,358 (10.8)	3,228 (10.4)	0.96 (0.91 to 1.01)	.090
In-hospital wound infection	127 (0.41)	121 (0.39)	0.95 (0.74 to 1.22)	.703
Total hospital charges, mean (SD), CNY	54,754.8 (23,602.5)	49,851.8 (20,429.7)		**<.001**
Length of stay, mean (SD), d	13.8 (6.55)	13.7 (6.22)		.217

Abbreviations: CNY, Chinese Yuan, GA, general anesthesia; NA, neuraxial anesthesia; OR, odds ratio; 95% CI, 95% confidence interval.

Neuraxial Compared With General Anesthesia on Postoperative Outcomes After Hip Arthroplasty for Geriatric Hip Fracture: Results From a National Database

Meng, Fanqiang MD[1]; Wang, Yuqing MD[1]; Shen, Liusong MD[1]; Sheng, Junzhi MD[1]; Long, Huizhong MD[1]; Chen, Hu MD, PhD[2]; Li, Xiaoxiao MS[3,4]; Xie, Dongxing MD, PhD[1,3,4,5,6,7]; Ding, Xiang MD, PhD[1,3,4,5,6,7]

Author Information

Anesthesia & Analgesia 142(5):p 848-855, May 2026. | ***DOI:*** 10.1213/ANE.0000000000007758

Rôle de l'anesthésiste : syndrome confusionnel

<u>Facteurs favorisants :</u>

- Déshydratation
- Douleurs
- Iatrogénie (médicament)

<u>Facteurs prédisposant :</u>

- Altération fonctions cognitives
- Déficience visuelle / auditive

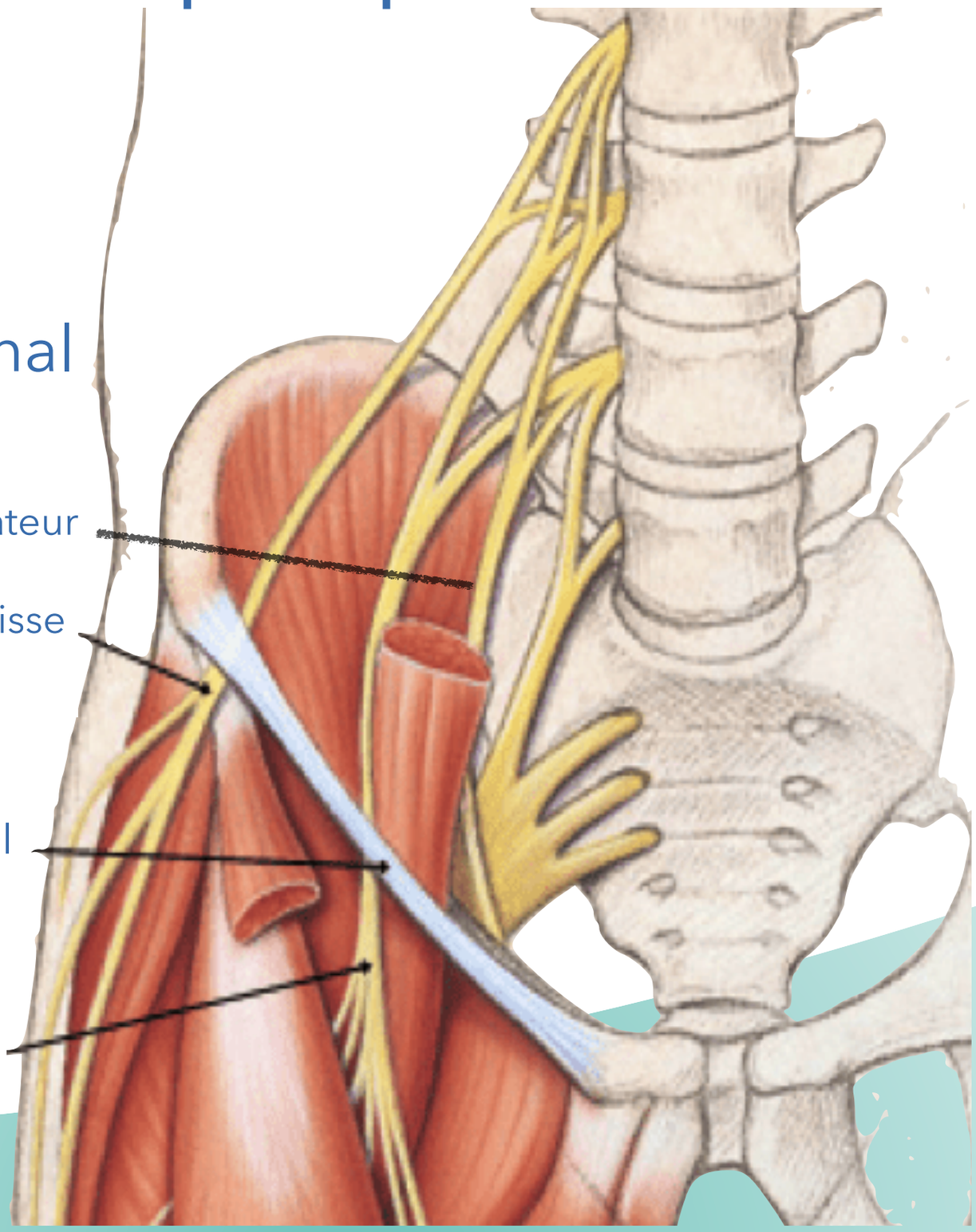
<u>Programme de prévention :</u>

- Retrait précoce des entraves (sonde urinaire, cathéter,…)
- Stimulation sensorielle
- Orientation temporo - spatiale (calendrier, horloge,…)
- Respect du rythme nycthémérale (intérêt mélatonine)

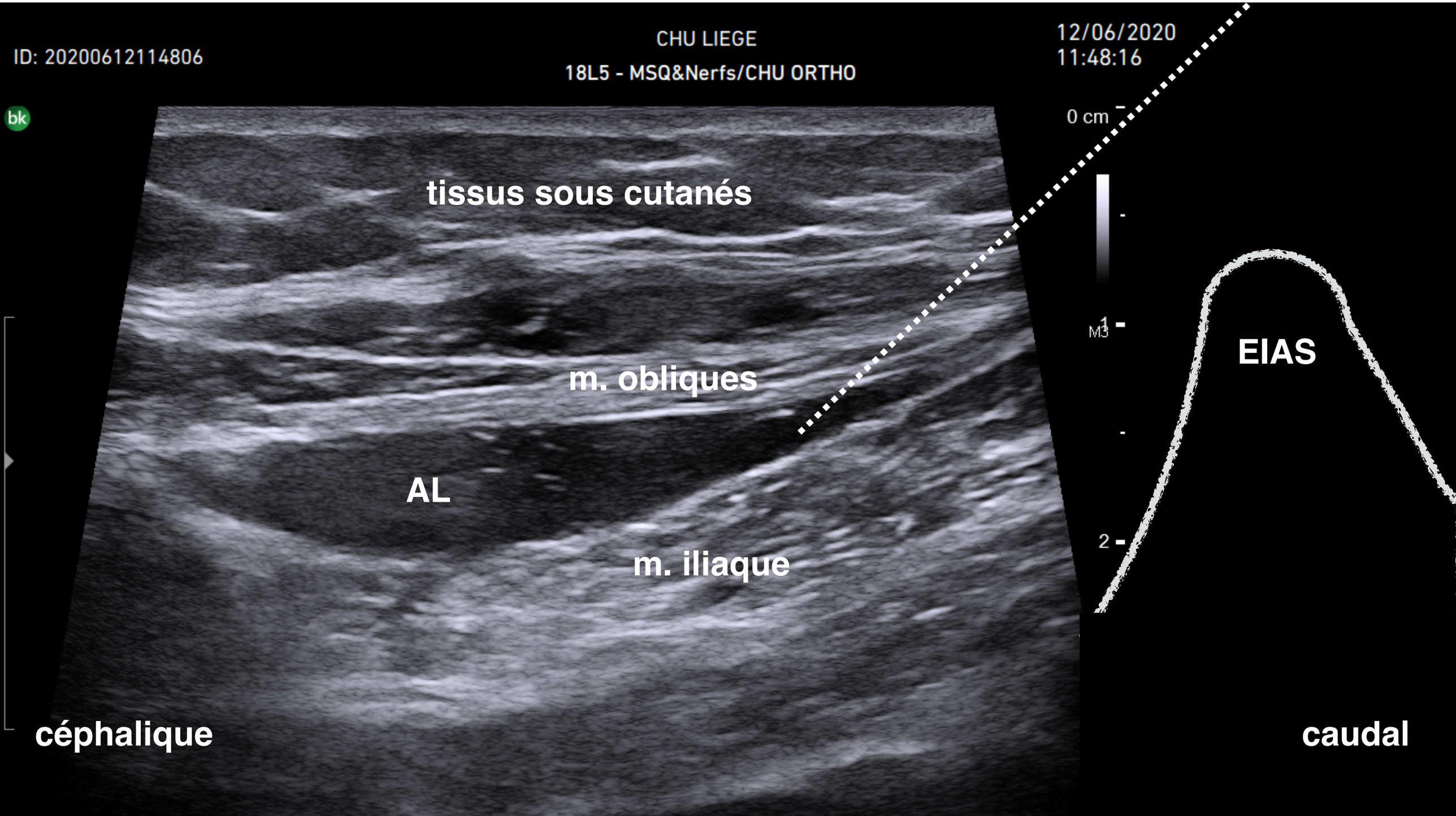
Rôle de l'anesthésiste : per-opératoire

<u>Anesthésie loco-régionale :</u>

Bloc fascia iliaca-supra-inguinal



Per-opératoire : bloc fascia-iliaca supra-inguinal



Association of Peripheral Nerve Block with Postoperative Myocardial Injury in High-risk Cardiac Older Adults Undergoing Hip Fracture Surgery

A two-center retrospective cohort study of 1,467 patients age ≥ 65 yr

Inclusion:

- Nonpathologic fracture
- General or spinal anesthesia

Analysis adjusted:

- Patient characteristics
- Comorbidities
- Perioperative events

Significantly lower incidence of postoperative myocardial injury in patients who received single-shot peripheral nerve block

Odds ratio, 0.60; 95% CI, 0.44 to 0.82

Peripheral nerve block cohort also had:

- Shorter hospital stay
- Lower incidence of ICU admission
- Shorter ICU stay

Peripheral nerve block may reduce the risk of myocardial injury after hip fracture repair, but the findings are limited by potential confounders and incomplete dataset

ANESTHESIOLOGY®

Zhang H, *et al.* ANESTHESIOLOGY, 2026.

Plan

- Introduction

- Enjeux de la chirurgie précoce

- Gestion de l’anti-coagulation

- Quel rôle pour l’anesthésiste ?

- Quelle place pour le gériatre ?

Post-opératoire

- Avis gériatrique :

46/58 études montrent un résultat positif / bénéfique différents critères :
mortalité, durée d'hospi, coût, réadmission…

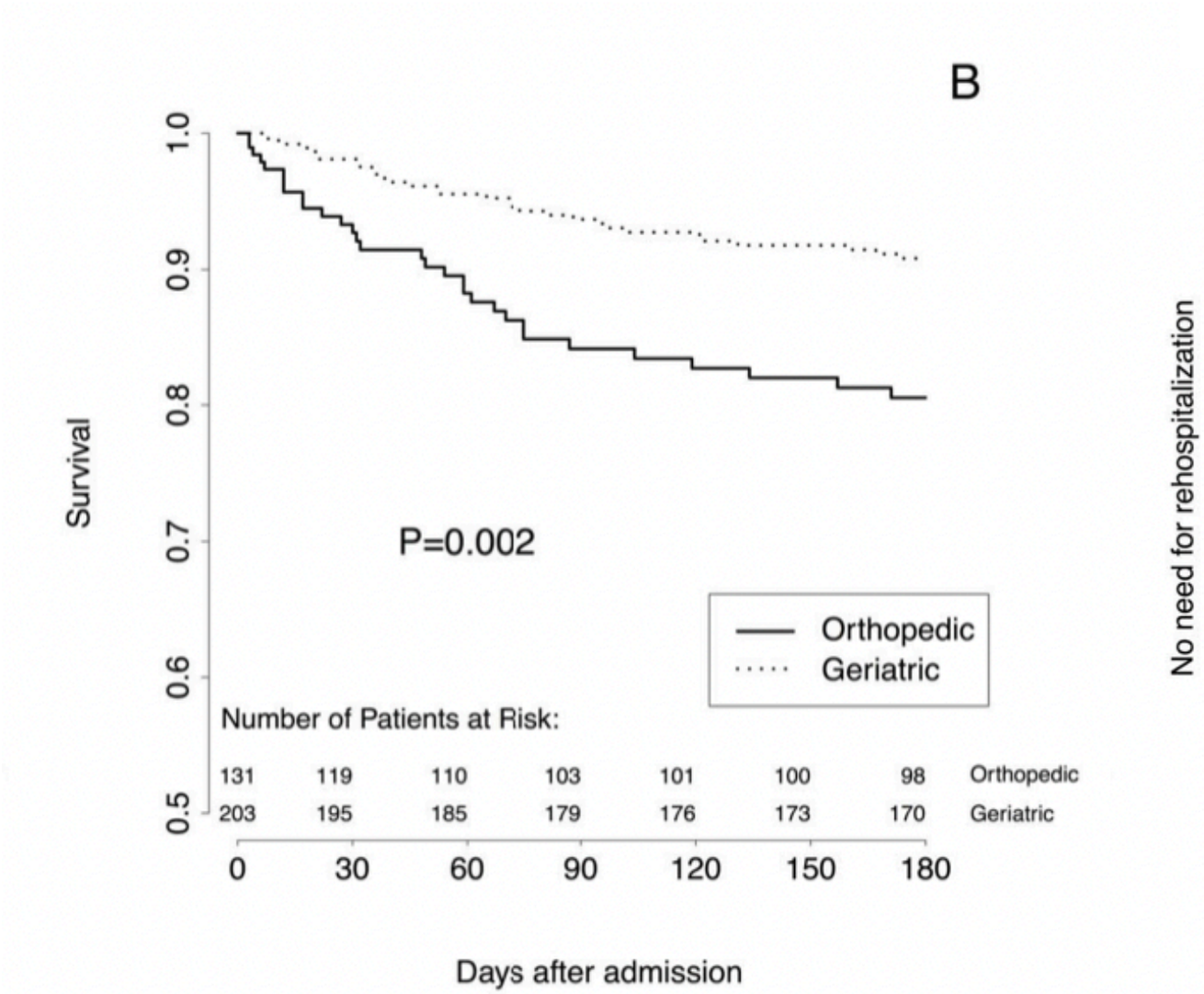
- Traitement confusion :

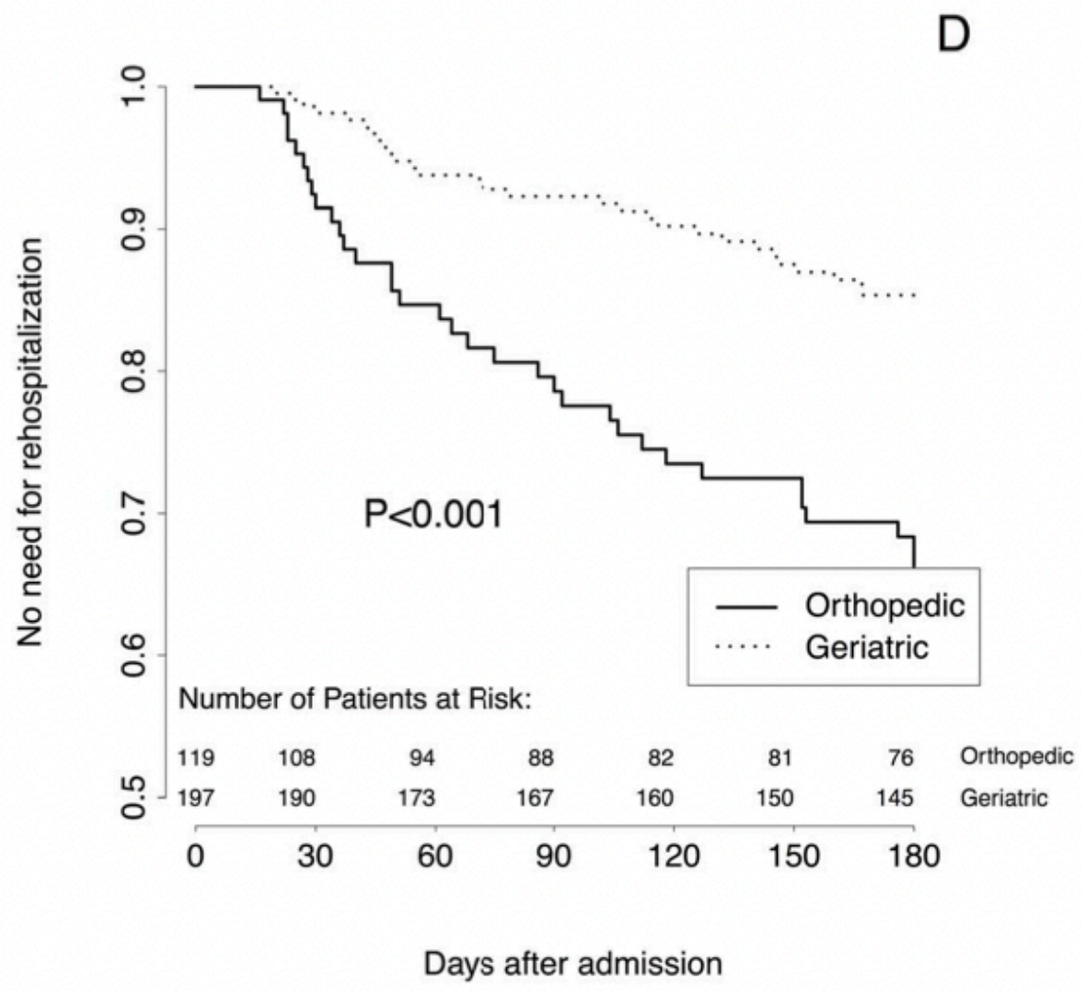
mélatonine
haldol
risperdal
antalgique court durée:
tradonal odis
oxynorm

- le National Institute for Health and Clinical Excellence (NICE, 2011) recommande que les patients âgés bénéficient d'une évaluation orthogériatrique à l'arrivée à l'hôpital, d'une prise en charge formalisée en unité orthogériatrique ou en unité orthopédique avec programme de soins dédiés incluant des points orthogériatriques réguliers ;
- l'American Academy of orthopaedic surgeons (AAOS) recommande un programme de soins multidisciplinaire en ciblant particulièrement les patients avec syndromes démentiels (*level: strong evidence*) ;
- l'Association of Anaesthesists of Great Britain and Ireland (AAGBI 2011) recommande un protocole *fast-track* dès l'admission au sein d'un protocole de soins multidisciplinaire et mené par les orthogériatres, ainsi qu'une bonne communication entre les acteurs de la filière ;
- le New Zealand Guidelines group (2003) supporte un programme dédié incluant une évaluation précoce multidisciplinaire par une équipe gériatrique (Level A) et l'implication précoce des gériatres dans le protocole de soins pour réduire les syndromes confusionnels (Level B) ;
- le Scottish Intercollegiate Guidelines Network (2009) recommande l'accès facilité d'un support médical orthogériatrique en unité d'orthopédie en préopératoire et l'intervention d'une équipe multidisciplinaire pour la réhabilitation ;
- les recommandations de la Clinical Excellence Commission (Australie, 2012) soutiennent la prise en charge associant orthogériatre, gériatre, médecin (généraliste) et chirurgien au sein d'un modèle de soins orthogériatrique, avec une répartition des responsabilités à discuter localement.

SFAR 2019

Unité d'ortho-gériatrie





OPEN ACCESS Freely available online

PLOS ONE

Postoperative Admission to a Dedicated Geriatric Unit Decreases Mortality in Elderly Patients with Hip Fracture

Jacques Boddaert[1,2*¶], Judith Cohen-Bittan[1], Frédéric Khiami[3], Yannick Le Manach[4], Mathieu Raux[1,5,8], Jean-Yves Beinis[6], Marc Verny[1,2], Bruno Riou[1,7,8]

Unité d'ortho-gériatrie

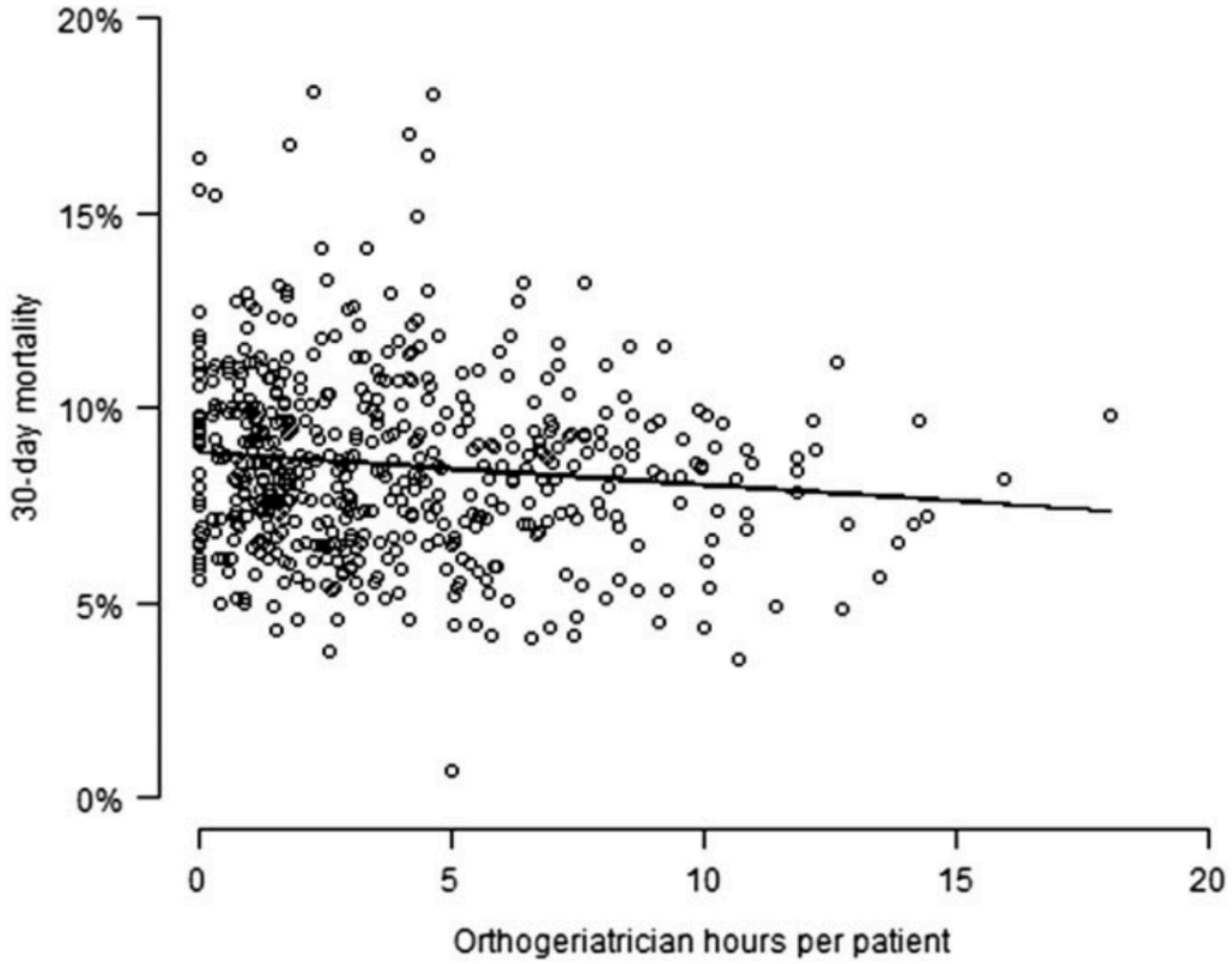


Figure 2. Association between average per-patient hours worked by orthogeriatricians in orthopaedic departments and annual 30-day mortality.

Age and Ageing 2016; **0:** 1–7
doi: 10.1093/ageing/afw201

Increased orthogeriatrician involvement in hip fracture care and its impact on mortality in England

Jenny Neuburger[1,2,3], Colin Currie[4], Robert Wakeman[5], Antony Johansen[6], Carmen Tsang[1,2], Fay Plant[7], Helen Wilson[8], David A Cromwell[1,2], Jan van der Meulen[1], Bianca De Stavola[9]

Age and Ageing 2016

Table 1. Baseline and Operative Characteristics of Pre-ASAP and Post-ASAP Cohorts

	Pre-ASAP	Post-ASAP	*P* value
Number of patients, n	480	365	
Demographic characteristics			
Age (y; median [IQR])	81 [71–88]	81 [71–87]	.54
Gender, n of women (%)	333 (69.4)	253 (69.3)	1
ASA physical status, n (%)			.11
I	16 (3.3)	5 (1.4)	
II	312 (65)	237 (64.9)	
III	152 (31.7)	121 (33.2)	
IV	2 (0.5)	0 (0)	
Weight (kg; median [IQR])	63 [55–72]	62 [55–71]	.97
Height (m; median [IQR])	1.65 [1.6–1.7]	1.64 [1.6–1.7]	.57
BMI ($kg \cdot m^{-2}$; median [IQR])	23.1 [20.8–25.7]	23.2 [20.8–25.7]	.68
Medical preoperative conditions			
Lee's Score, n (%)			.59
0	214 (44.6)	179 (49.2)	
1	160 (33.3)	105 (28.8)	
2	83 (17.3)	62 (17)	
3	21 (4.4)	15 (4.1)	
4	2 (0.4)	2 (0.5)	
5	0 (0)	1 (0.3)	
Diabetes, n (%)	57 (11.9)	42 (11.5)	.91
NHFS (median [IQR])	5 [4–6]	5 [3–6]	.75
Atrial fibrillation, n (%)	81 (16.9)	56 (15.4)	.39
Alcohol chronic abuse, n (%)	71 (14.8)	54 (14.8)	1
Tobacco consumption, n (%)	115 (24)	90 (24.7)	.87
Dementia, n (%)	121 (25.2)	75 (20.5)	.12
Functional status METs ≤4, n (%)	236 (49.2)	140 (38.4)	**.002**
Preoperative creatinine ($mg \cdot dL^{-1}$; median [IQR])	0.9 [0.7–1.2]	0.9 [0.7–1.1]	.1
Preoperative Hb ($g \cdot dL^{-1}$; median [IQR])	12.4 [11.2–13.4]	12.5 [11.3–13.8]	.13
Antiplatelet therapy, n (%)	215 (44.8)	148 (40.5)	.23
Anticoagulant therapy, n (%)	74 (15.4)	53 (14.5)	.77
ARS score			.41
0, n (%)	271 (56)	220 (60)	
1, n (%)	105 (22)	67 (19)	
≥2, n (%)	104 (22)	78 (21)	
Surgical characteristics			
Side, n of left side (%)	233 (48.5)	182 (49.9)	.73
Intraoperative atropine, n (%)	20 (4.2)	9 (2.5)	.25
Intraoperative ephedrine, n (%)	264 (55)	151 (41.4)	**<.001**
Intraoperative norepinephrine, n (%)	16 (3.3)	81 (22.2)	**<.001**
Type of anesthesia, n of spinal (%)	86 (17.9)	190 (52.1)	**<.001**
Hemiarthroplasty, n (%)	147 (30.6)	109 (29.9)	.82
Intramedullary nail, n (%)	248 (51.7)	205 (56.2)	.21
Dynamic hip screw, n (%)	84 (17.5)	47 (12.9)	.07
Triple screw, n (%)	1 (0.2)	4 (1.1)	.17

ORIGINAL CLINICAL RESEARCH REPORT

Impact of a Multidisciplinary Algorithm on Early Complications After Hip Fracture Surgery: A Retrospective Time-Series Study

Michele Carella, MD, PhD, ESRA-DRA,[1,2] Florian Beck, MD,[1,3] Ambre Tanke, MD,[1] and Vincent L. Bonhomme, MD, PhD[1,3]

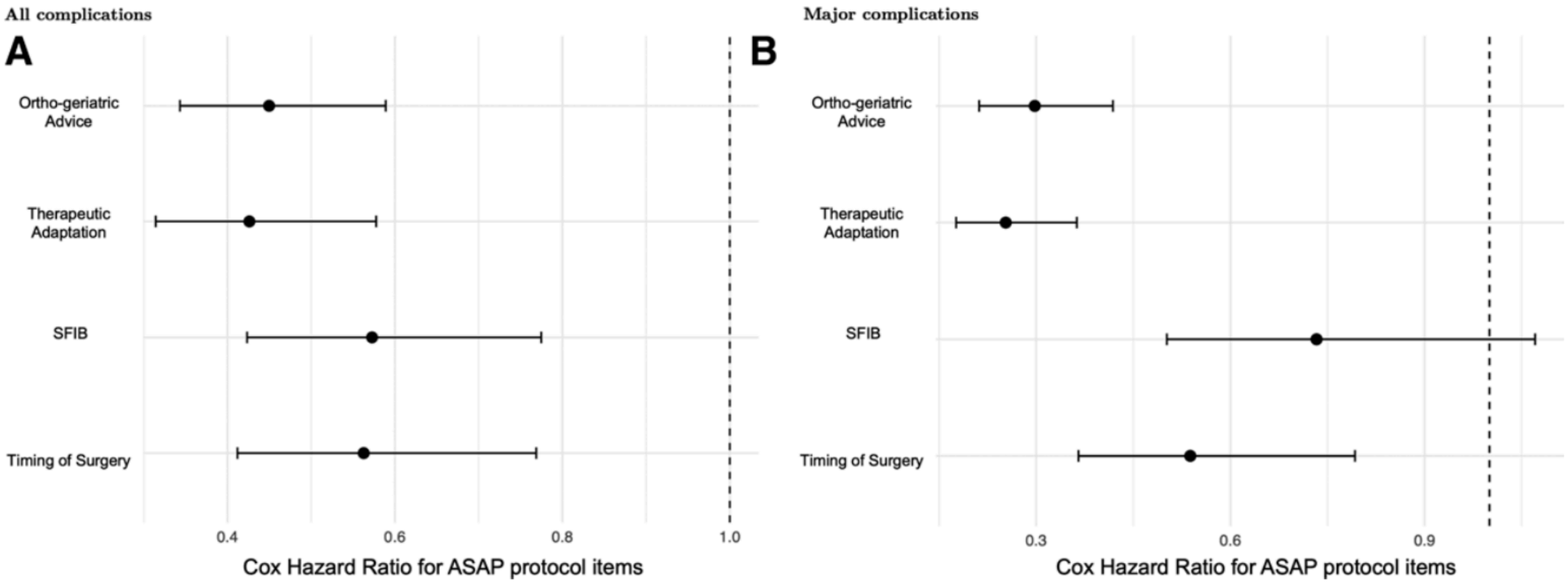


Figure 5. Qualitative analysis performed regarding single ASAP items, analyzed using Cox proportional-hazard models for all (Clavien–Dindo grade 1/2/3/4, A) or only major (Clavien–Dindo grade 2/3/4, B) EPOC during the first 7 d after surgery. This figure illustrates the individual association of each ASAP component with complication risk. Time to surgery: delay < 12 h. Therapeutic adaptation: adaptation of the patient's chronic therapy. Orthogeriatric advice: orthogeriatric consultation during the first 48 h in the hospital. ASAP indicates advice, surgery, analgesia, and pharmacology; EPOC, early postoperative complications; SFIB, supra-inguinal fascia iliaca block.

ASAP Bundle Adherence

Adherence to the four ASAP components increased substantially after implementation of the pathway and adherence to the components of the ASAP bundle was markedly higher in the post-ASAP cohort. Specifically, 72.1% of patients in this group received a peripheral nerve block before skin incision, compared to only 2.3% in the pre-ASAP group ($P < .001$).

Median time to surgery in hours (interquartile range [IQR]) fell from 16.3 [6.2–42.3] to 11.5 [5.6–19.1], pre-ASAP and post-ASAP, respectively ($P < .001$), with the proportion operated on within 12 hours rising from 36.5% to 43.6% ($P = .04$).

Acute Pain Medicine

ORIGINAL CLINICAL RESEARCH REPORT

Impact of a Multidisciplinary Algorithm on Early Complications After Hip Fracture Surgery: A Retrospective Time-Series Study

Michele Carella, MD, PhD, ESRA-DRA,[1,2] Florian Beck, MD,[1,3] Ambre Tanke, MD,[1] and Vincent L. Bonhomme, MD, PhD[1,3]

Conclusion

- Profils gériatriques => stratifier le risque, évaluation préopératoire

- Enjeux de la chirurgie précoce => endéans les 24 (48h)

- Rôle de l'anesthésiste => homéostasie, analgésie, prévention confusion

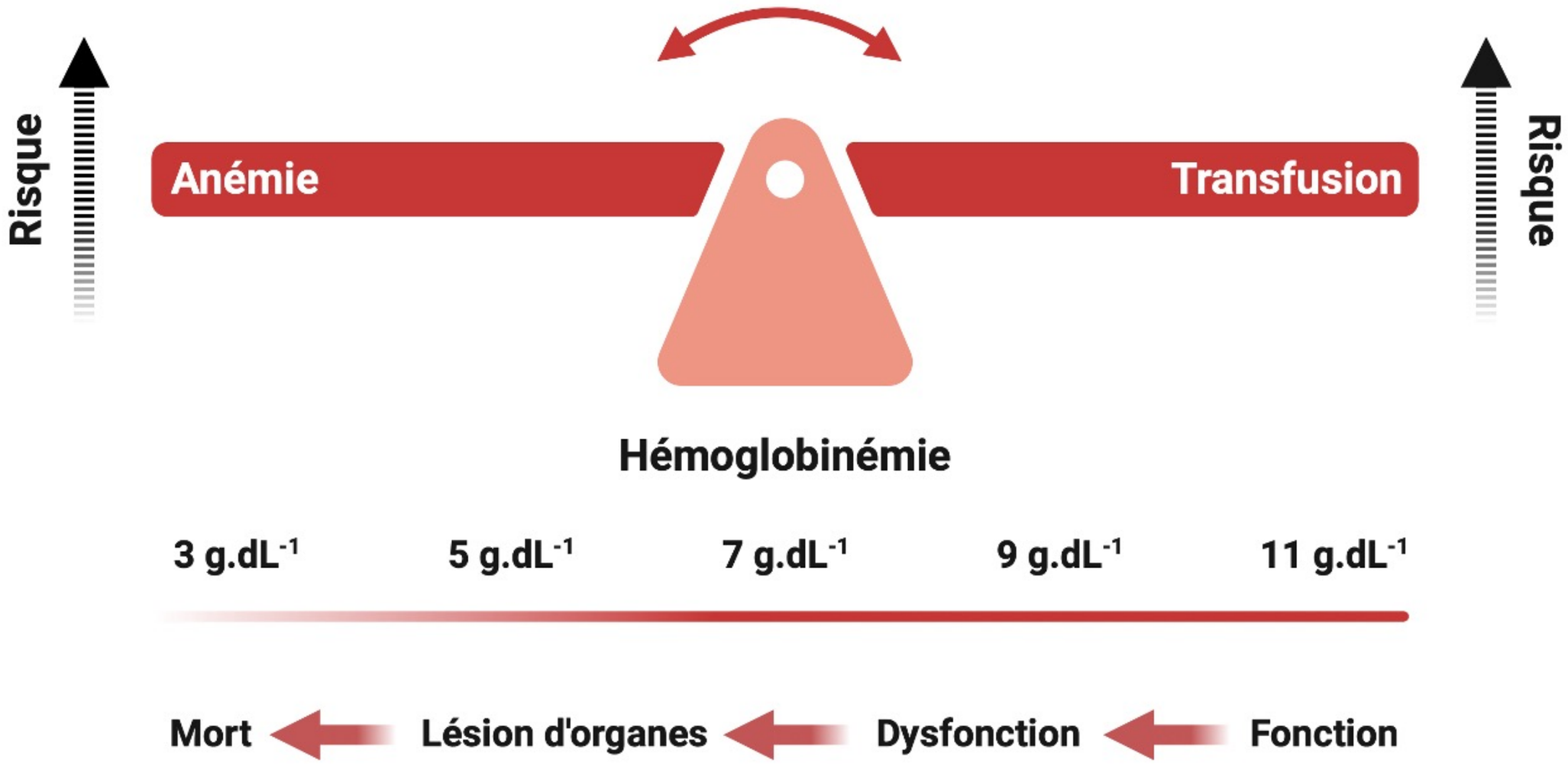
- Gestion de l'anti-coagulation => faux problème

- Prise en charge multi-disciplinaire : gériatre

There is a fracture,
i need to fix it !

CHU de Liège

Anémie / Transfusion



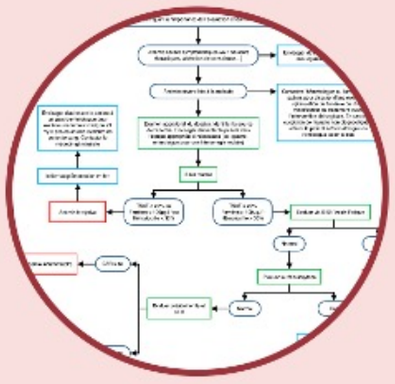
Patient Blood Management

« Patient Blood Management is a patient-centered, systematic, evidence-based approach to improve patient outcomes by managing and preserving a patient's own blood, while promoting patient safety and empowerment »

Patient Blood Management

Optimisation de la masse sanguine

Diagnostic, recherche étiologique et traitement de l'anémie



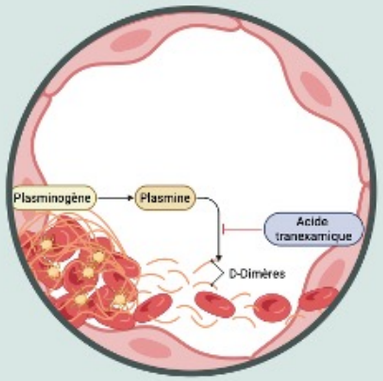
Fe

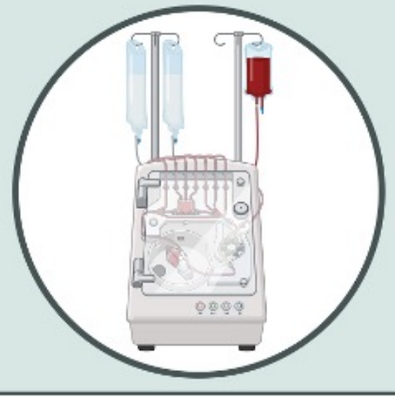
Epo

B9

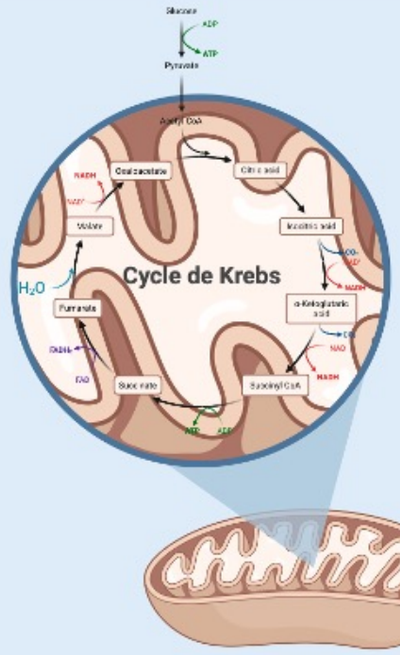
B12

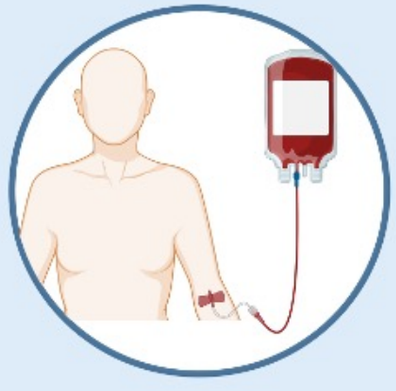
Minimisation des pertes sanguines





Optimisation de la tolérance à l'anémie





Minimisation des pertes : Acide Tranexamique

Table 1. Typical Dosing Regimens for Perioperative TXA Administration

Setting	Typical TXA dosing regimen[a]	Notes
Adult cardiac surgery[10,11]	10–30 mg/kg IV loading dose; then 2–16 mg/kg/h infusion; ±1–2 mg/kg for pump prime	Target plasma concentrations 20–100 μg/mL (depending on desired degree of fibrinolysis inhibition)[b]
Obstetrics[8]	1 g IV over 10 min; can repeat 1-g IV if bleeding persists after 30 min	Recommended to give within first 3 h of birth
Acute trauma[6,12]	1 g IV over 10 min; then 1 g infused over 4–8 h	Recommended to give within first 3 h of injury (ideally within first hour)
Orthopedic surgery[13,14]	10–20 mg/kg IV in single or divided doses (or 1–3 g topical dose)	Target plasma concentration ≥10 μg/mL
Neurosurgery[15]	10 mg/kg IV loading dose; then 0.5–2 mg/kg/h infusion	
Pediatric surgery[16]	10–30 mg/kg IV loading dose; then 5–10 mg/kg/h infusion	Maximum loading dose 2 g; target plasma concentrations between 20 and 70 μg/mL[b]
Pediatric cardiac surgery[16–18]	30 mg/kg (age <12 mo) or 10 mg/kg (age ≥12 mo) IV loading dose; then 10 mg/kg/h infusion; ±addition to pump prime for concentration of 60 μg/mL	Maximum loading dose 2 g; intermediate target plasma concentration 60 μg/mL (lower target concentration of 20 μg/mL or higher target concentration of 150 μg/mL requires dosage scheme adjustment)[b]

Abbreviations: IV, intravenous; RCT, randomized controlled trial; TXA, tranexamic acid.

[a]While these values represent commonly used regimens, there exists significant variability in TXA dosing strategies. Furthermore, more RCTs are needed to confirm safety and efficacy of these recommended doses in various clinical situations and in high-risk populations.

[b]TXA dosing regimens extrapolated from pharmacokinetic studies.

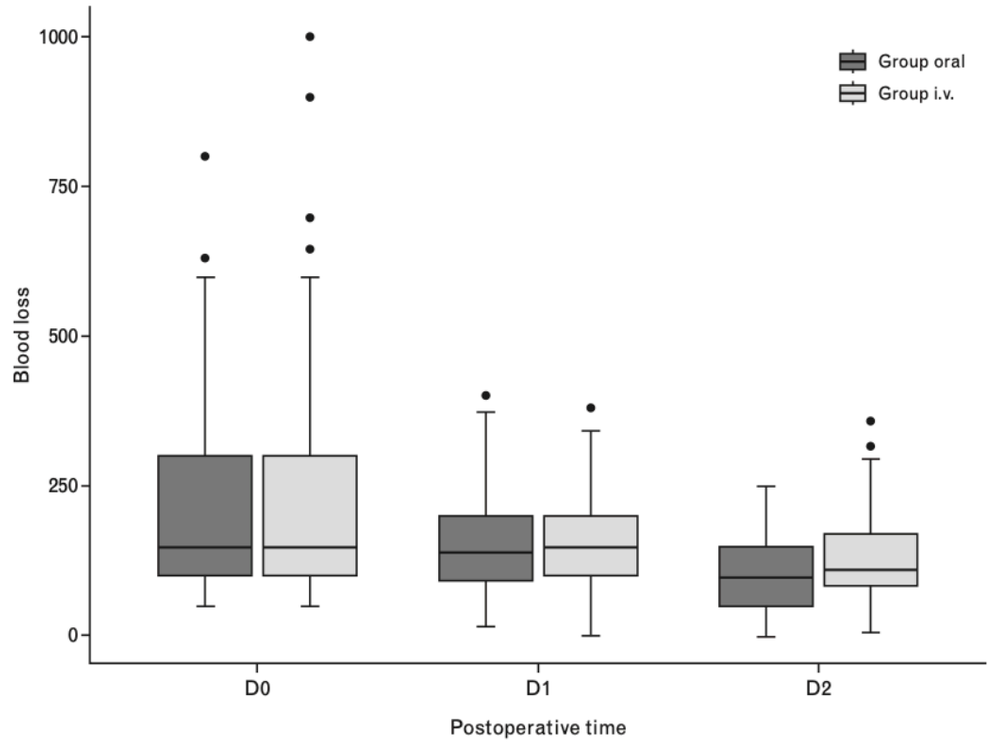
Patient Blood Management

SPECIAL ARTICLE

Update on Applications and Limitations of Perioperative Tranexamic Acid

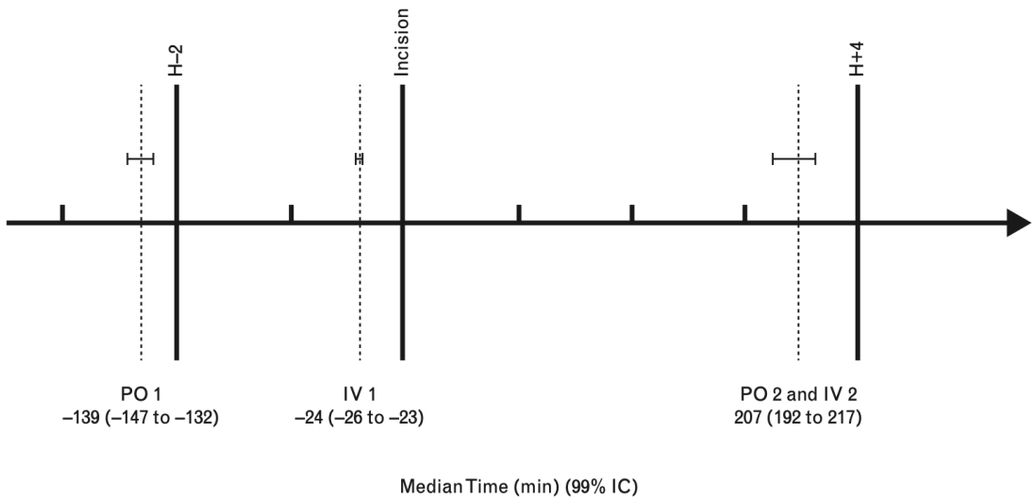
Prakash A. Patel, MD, FASE,* Julie A. Wyrobek, MD,† Alexander J. Butwick, MBBS, FRCA, MS,‡ Evan G. Pivalizza, MD,§ Gregory M. T. Hare, MD, PhD, FRCPC,‖ C. David Mazer, MD,‖ and Susan M. Goobie, MD, FRCPC¶

Fig. 4 Evolution of measured total blood loss over the time points of interest (D0, intra-operative blood loss; D-1, one day after surgery; D-2, 2 days after surgery) in Group oral (dark grey) and in Group i.v. (light grey).



Group oral : EMM (ml)	220.2	147.9	105.6
95% CI	186.5 to 253.9	131.2 to 164.6	91.7 to 119.4
Group i.v.: EMM (ml)	224.7	152.9	125.3
95% CI	191.7 to 257.6	136.6 to 169.2	111.7 to 138.8
Mean difference (ml)	–4.5	–5.0	–19.7
95% CI	–51.6 to 42.7	–28.3 to 18.4	–39.1 to 0.3

Fig. 3 Timeline of the effective administration of tranexamic acid, with 99% confidence intervals (99% CI).



EJA

Eur J Anaesthesiol 2024; **41:**217–225

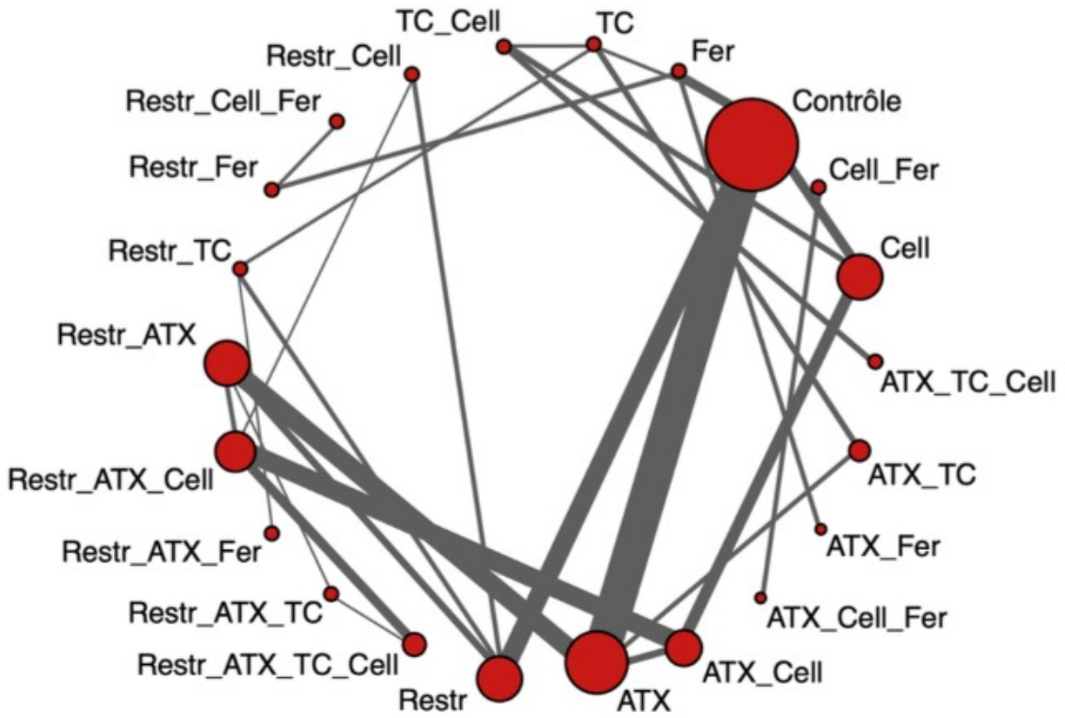
ORIGINAL ARTICLE

Oral as compared to intravenous tranexamic acid to limit peri-operative blood loss associated with primary total hip arthroplasty

A randomised noninferiority trial

Nicolas Piette, Florian Beck, Michele Carella, Gregory Hans, Didier Maesen, William Kurth, Jean-Pierre Lecoq and Vincent L. Bonhomme

Patient Blood Management



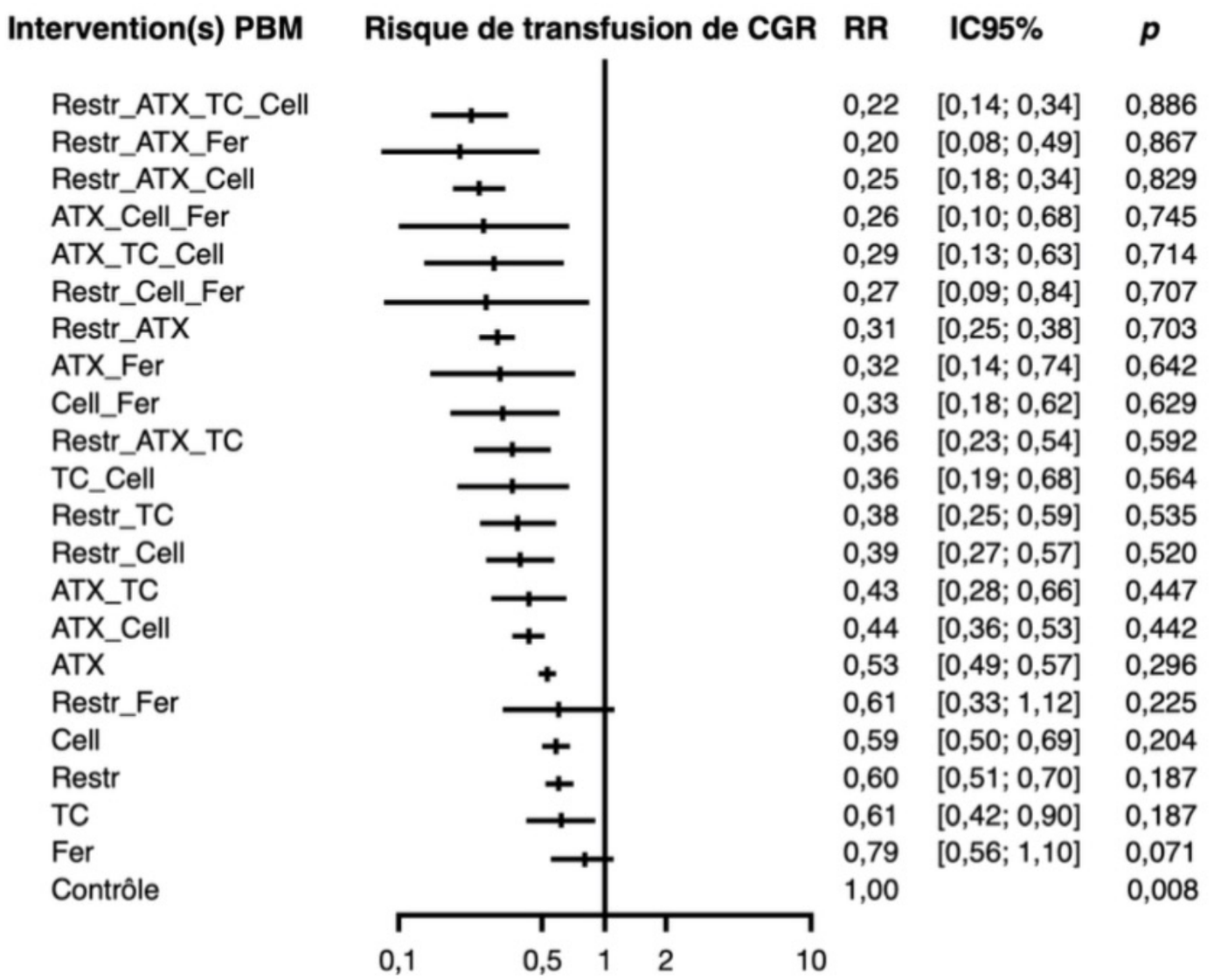
BJA

British Journal of Anaesthesia, 126 (1): 149–156 (2021)

doi: 10.1016/j.bja.2020.04.087
Advance Access Publication Date: 30 June 2020
Review Article

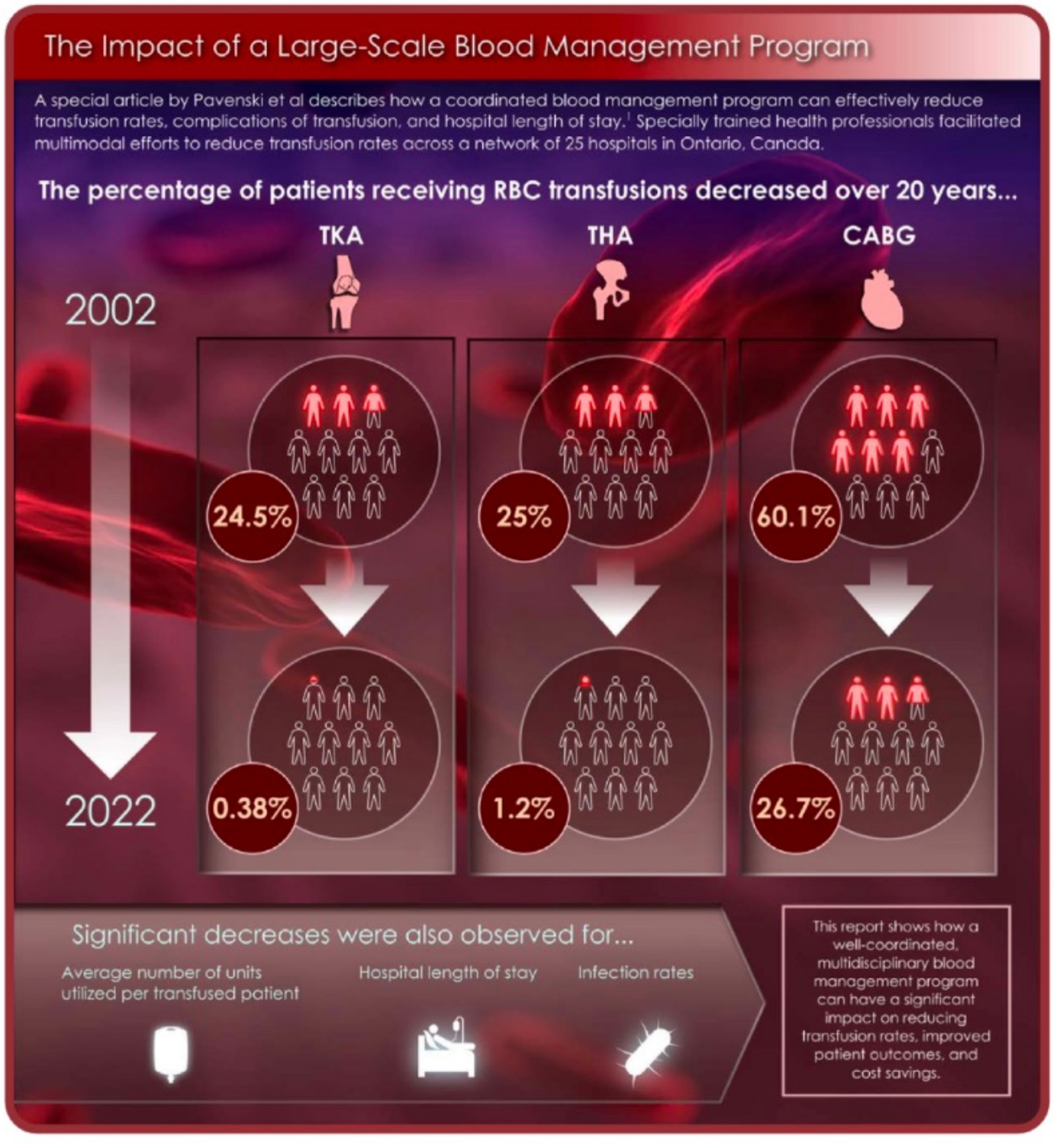
Patient blood management interventions do not lead to important clinical benefits or cost-effectiveness for major surgery: a network meta-analysis

Marius A. Roman[1,*], Riccardo G. Abbasciano[1], Suraj Pathak[1], Shwe Oo[2], Syabira Yusoff[1,*,7], Marcin Wozniak[1], Saqib Qureshi[3], Florence Y. Lai[1], Tracy Kumar[1], Toby Richards[4], Guiqing Yao[5], Lise Estcourt[6] and Gavin J. Murphy[1]



Hétérogénéité globale : $Tau^2 = 0,093$; $I^2 = 71\%$, $P<0,001$

PBM



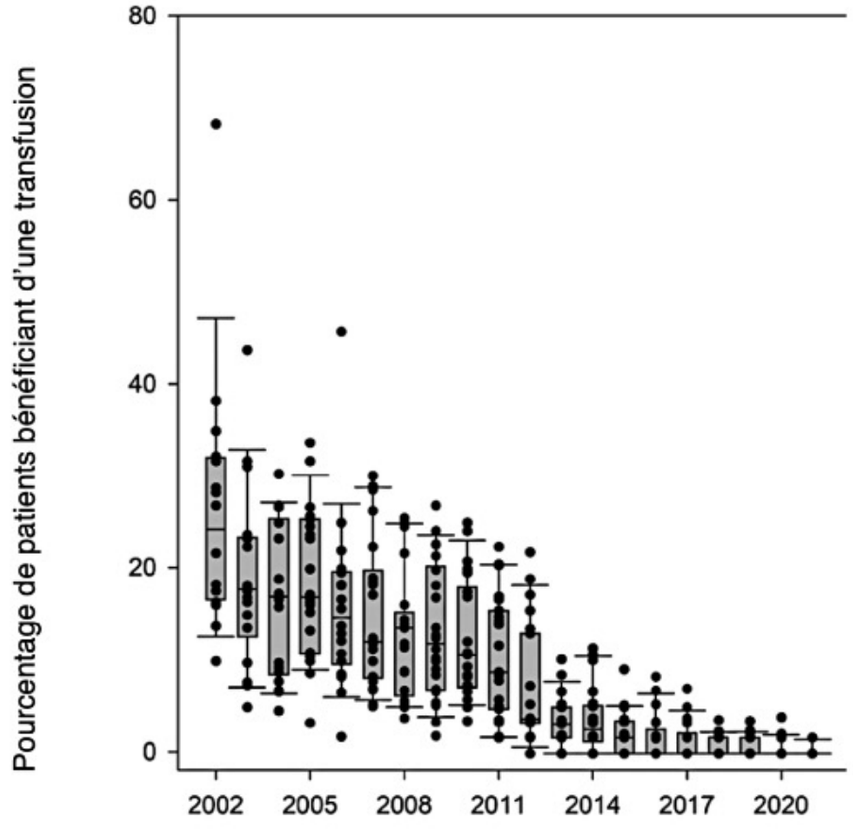


Figure 3 : Données provenant de l'étude ONTraC, représentant l'évolution des taux de transfusion de globules rouges lors d'arthroplasties du genou entre 2002 et 2021. Adaptation de [17], avec autorisation.

ANESTHESIA & ANALGESIA®

Anémie / Transfusion

La question fondamentale de la transfusion n'est pas d'amener la concentration d'hémoglobine à un niveau prédéfini mais plutôt de s'assurer que la transfusion aide à répondre à la demande métabolique

Restrictive Hb 7,0 - 8,0 g/dL
VS
Liberal Hb 9,0 - 10,0 g/dL

21433 patients dans 48 études, la stratégie restrictive réduit l'exposition au transfusion allogénique de 41% sans modifier la mortalité à 30 jours ou les comorbidités (infarctus, stroke, TVP, infection,…)

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 DECEMBER 29, 2011 VOL. 365 NO. 26

Liberal or Restrictive Transfusion in High-Risk Patients after Hip Surgery

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Transfusion thresholds for guiding red blood cell transfusion

Jeffrey L Carson, Simon J Stanworth, Jane A Dennis, Marialena Trivella, Nareg Roubinian, Dean A Fergusson, Darrell Triulzi, Carolyn Dorée, Paul C Hébert Authors' declarations of interest

Version published: 21 December 2021 Version history

Transfusion « restrictive vs liberal » REALITY trial

JAMA Network™

QUESTION Is a restrictive strategy of blood transfusion noninferior to a liberal strategy among patients with acute myocardial infarction (MI) and anemia?

CONCLUSION This trial found that a restrictive transfusion strategy vs a liberal one resulted in a noninferior rate of MACE among patients with acute MI and anemia, but the confidence interval included what may be a clinically important harm.

POPULATION

385 Men
281 Women

Adults with MI and anemia (hemoglobin, 7-10 g/dL)

Median age: **77** years

LOCATIONS

35 Hospitals in France and Spain

INTERVENTION

668 Patients randomized
666 Patients analyzed

342
Restrictive transfusion
Transfusion triggered by hemoglobin ≤8 g/dL

324
Liberal transfusion
Transfusion triggered by hemoglobin ≤10 g/dL

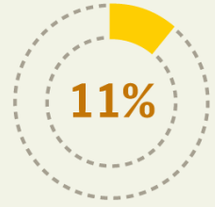
PRIMARY OUTCOME

MACE (composite of all-cause death, stroke, recurrent MI, or emergency revascularization prompted by ischemia) at 30 days. (Noninferiority = upper CI of <1.25)

FINDINGS

Occurrence of MACE at 30 days

Restrictive transfusion
36 of 342 patients
(95% CI, 7.5% to 14.6%)



Liberal transfusion
45 of 324 patients
(95% CI, 10.0% to 17.9%)

Between-group difference:
-3.0% (95% CI, -8.4% to 2.4%)

Relative risk for the primary outcome:
0.79 (1-sided 97.5% CI, 0 to 1.19), meeting criteria for noninferiority

Ducrocq G, Gonzalez-Juanatey JR, Puymirat E, et al. Effect of a restrictive vs liberal blood transfusion strategy on major cardiovascular events among patients with acute myocardial infarction and anemia: the REALITY randomized clinical trial. *JAMA*. Published February 9, 2021. doi:10.1001/jama.2021.0135

Seuil transfusionnel en 2023

Table 2. Clinical Recommendations: Red Blood Cell Transfusion Thresholds

Clinical Recommendation	Level of Evidence
CR5—Restrictive RBC transfusion threshold (hemoglobin concentration <7 g/dL) in critically ill but clinically stable intensive care patients	Strong recommendation, moderate certainty in the evidence of effects
CR6—Restrictive RBC transfusion threshold (hemoglobin concentration <7.5 g/dL) in patients undergoing cardiac surgery	Strong recommendation, moderate certainty in the evidence of effects
CR7—Restrictive transfusion threshold (hemoglobin concentration <8 g/dL) in patients with hip fracture and cardiovascular disease or other risk factors	Conditional recommendation, moderate certainty in the evidence of effects
CR8—Restrictive transfusion threshold (hemoglobin concentration 7-8 g/dL) in hemodynamically stable patients with acute gastrointestinal bleeding	Conditional recommendation, low certainty in the evidence of effects

Abbreviations: CR, clinical recommendation; RBC, red blood cell.

Clinical Review & Education

JAMA | Special Communication

Red Blood Cell Transfusion
2023 AABB International Guidelines