

THROMBOSE VEINEUSE EN REANIMATION PEDIATRIQUE:

PREVENTION, DEPISTAGE ET TRAITEMENT

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Pas de conflit d'intérêt

DANS LA VIE DE TOUS LES JOURS…

- Pierre, 4 ans – hospitalisé en réanimation pour premier épisode de pneumopathie droite avec Détresse Respi
- Intubé ventilé 48 heures puis en lunettes à haut débit 20L/'
- Pose de KTSC 3 voies à droite à l'arrivée car « impiquable » - 4 tentatives (non réalisée sous écho)
- Radio de contrôle: KT en place
- Antibiothérapie: Ceftriaxone
- Dextrion G5% comme perfusion de base (1750 ml/m^2)

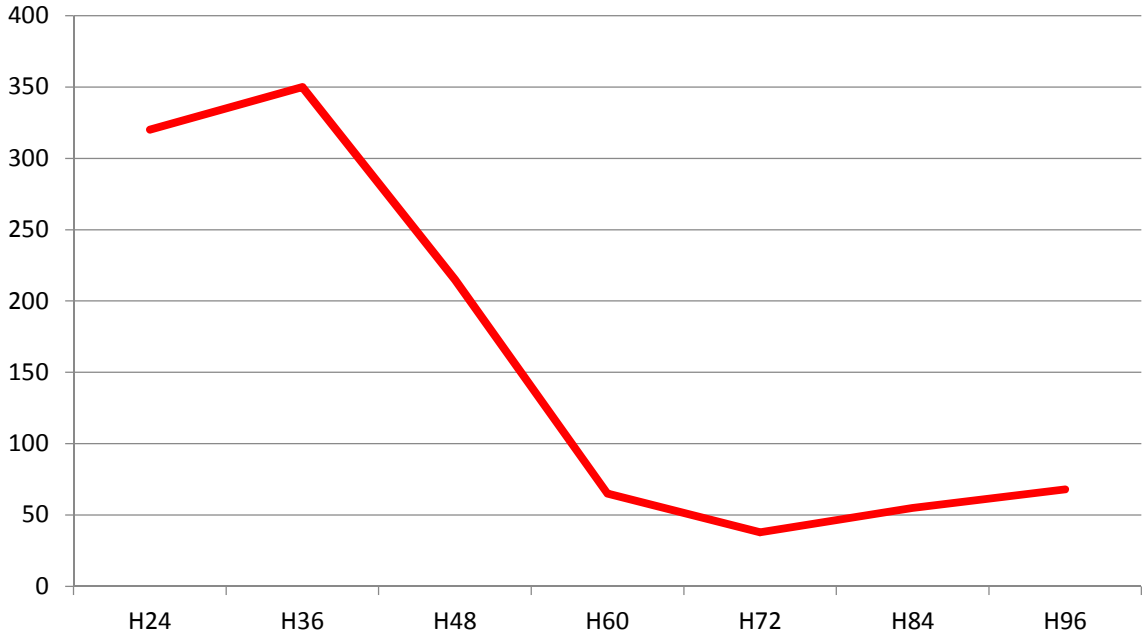
H96 DU DEBUT DE LA PRISE EN CHARGE

- Réfection du pansement de KT car humide
- La puéricultrice de nuit a transmis à la puéricultrice de jour qu'elle avait eu des difficultés sur la voie médiale (augmentation des pressions)
- Le médecin a dit que le KT était positionnel et que la voie médiale devait se coller à la paroi
- Au tour de midi, la puéricultrice demande si elle peut faire une rinçure héparinée car la voie médiale ne passe pas
- A l'examen clinique: syndrome cave supérieur

Température (°C)



CRP (mg/L)



DIAGNOSTIC

- Echographie Doppler cave supérieur
- Thrombose de la veine sous-clavière sans extension intracardiaque
- Extension dans la veine brachiocéphalique (obstruction complète)

TRAITEMENT

- ENOXAPARINE SODIQUE 150 UI/kg x 2/j en sous-cutané
- ABLATION DU CATHETER A J3
- POURSUITE DU TRAITEMENT HBPM 1 MOIS
- CONTRÔLE ECHO A 1,5 MOIS: DISPARITION DE LA THROMBOSE

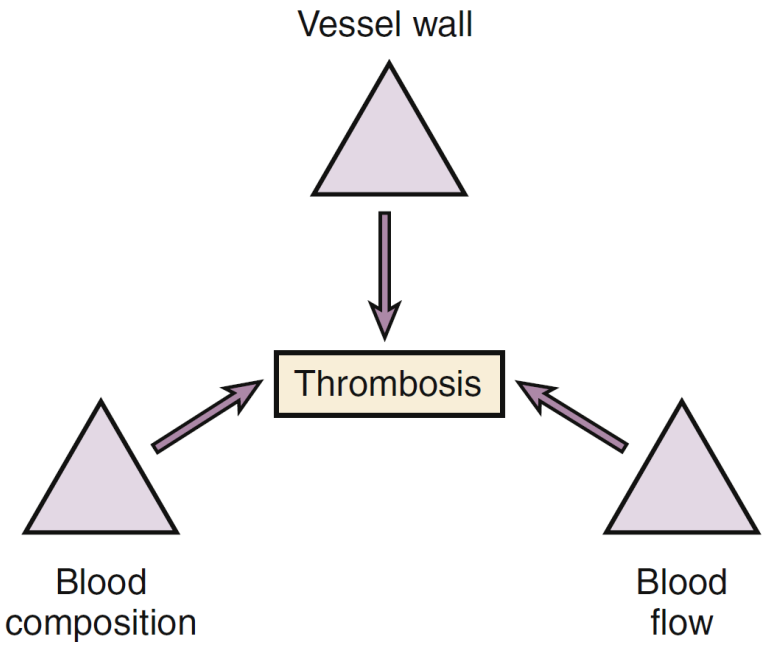
FACTEURS + POUR UNE THROMBOSE

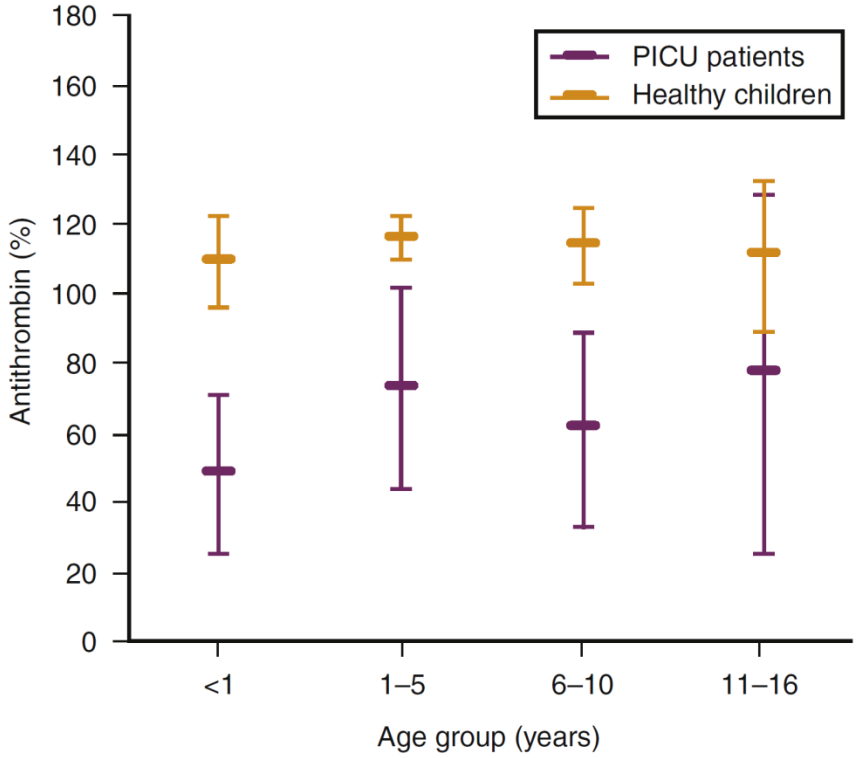
- TAILLE DU CATHETER
- SYNDROME INFLAMMATOIRE/SEPSIS

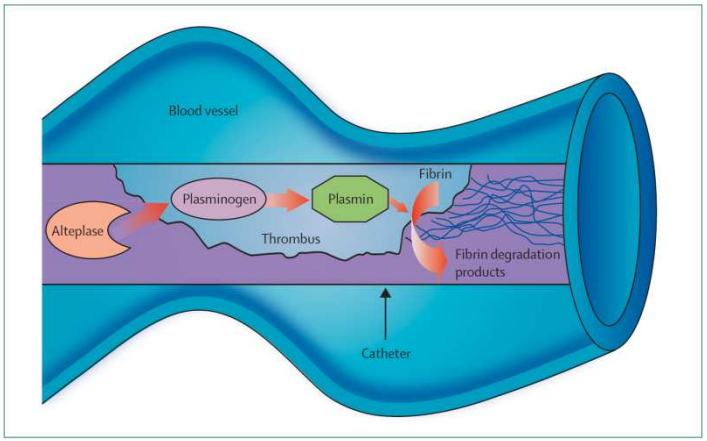
VOUS AURIEZ FAIT QUOI D'AUTRE ?

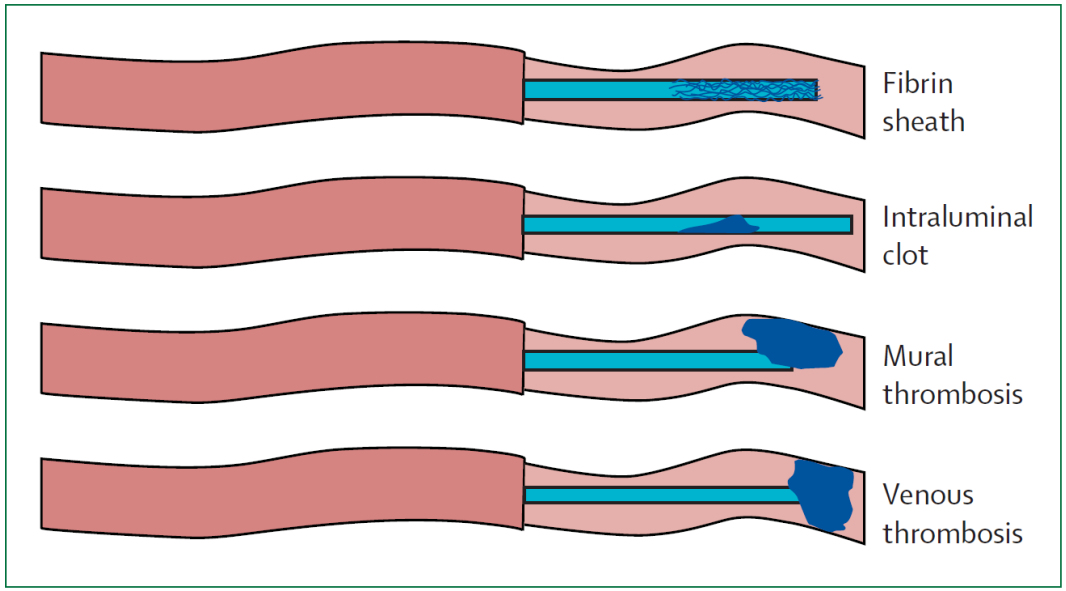
- CONTRÔLE POSITION DU CATHETER (RADIO)
- VERIFICATION COMPATIBILITE DROGUES
- POSITIONNEMENT DU PATIENT

GENESE


Vessel wall
Thrombosis
Blood composition
Blood flow


PICU patients
Healthy children
Antithrombin (%)
180
160
140
120
100
80
60
40
20
0
<1
1–5
6–10
11–16
Age group (years)


Blood vessel
Plasminogen
Plasmin
Fibrin
Alteplase
Thrombus
Fibrin degradation products
Catheter


Fibrin sheath
Intraluminal clot
Mural thrombosis
Venous thrombosis

THROMBOSE VEINEUSE PROFONDE EN REANIMATION PEDIATRIQUE

Registre	Age	Période	Incidence
Canadian Registry	0–1 mois	1990-1993	2.4/1000 admissions en néonatologie
	1 mois–18 ans	1990-1992	0.07/10000 enfants
German Registry	0–1 mois	1992-1994	0.51/10000 naissances
Dutch Paediatric Surveillance Unit	0–1 mois	1997-1998	14.5/10000 nouveau-nés
	0 –18 mois	1997-1998	0.14/10000 enfants
US National Hospital Discharge Survey	0–1 mois	1979-2001	1.50/10000 nouveau-nés
	0–17 ans	1979-2001	0.49/10000 enfants
British Paediatric Surveillance Survey	1 mois–16 ans	2001-2003	0.07/10000 enfants

Tableau 1: **Incidence des événements thromboemboliques veineux chez l'enfant**

Journal of Thrombosis and Haemostasis, **12**: 1096–1109 DOI: 10.1111/jth.12598

ORIGINAL ARTICLE

Central venous catheter-related thrombosis and thromboprophylaxis in children: a systematic review and meta-analysis

E. VIDAL,* A. SHARATHKUMAR,† J. GLOVER‡ and E. V. S. FAUSTINO§

**Department of Structural and Cellular Biology, Tulane University School of Medicine, New Orleans, LA; †Department of Pediatrics, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL; ‡Cushing/Whitney Medical Library, Yale School of Medicine; and §Department of Pediatrics, Yale School of Medicine, New Haven, CT, USA*

37 articles analysés (N= 3128)

26 études de cohorte et 11 RCTs

N = 85 en moyenne(13–645)

14 études uniquement Nnés

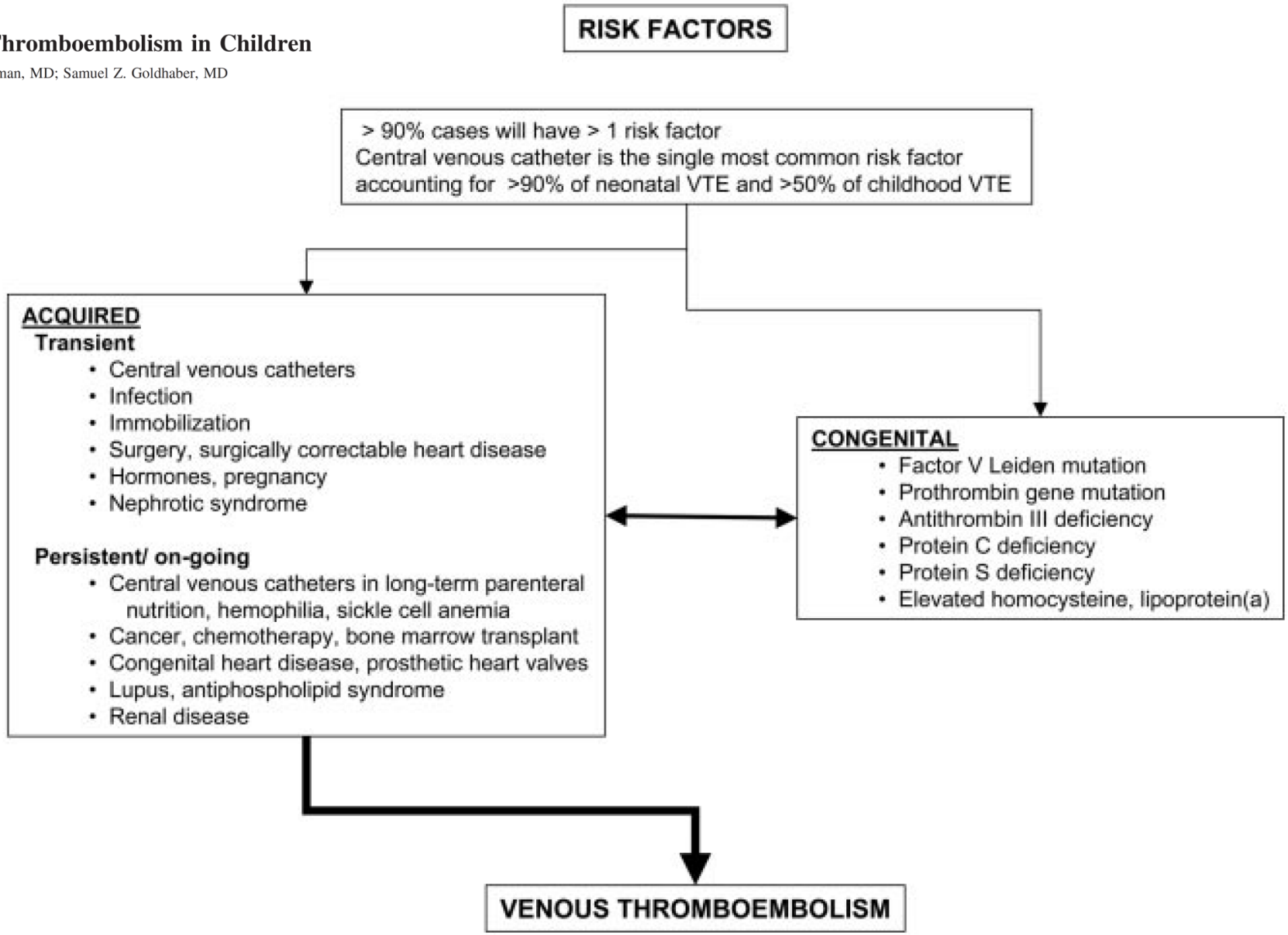
56% des études PICU /NICU

Outil diagnostique: US (73%)

e14 *Circulation* **January 17, 2006**

Venous Thromboembolism in Children

Sudha Parasuraman, MD; Samuel Z. Goldhaber, MD



Perinatal diseases	Birth asphyxia
	Respiratory distress syndrome
	Infants of diabetic mothers
	Neonatal infections
	Necrotizing entercolitis
	Dehydration
	Congenital nephrotic syndrome
	Polycytemia
Medical interventions	Central lines (arterial or venous)
	Surgery
	Renal transplantation
	Immobilisation
	Plaster casts
	Extracorporeal membrane oxygenation
Acute diseases	Trauma
	Sepsis
	Dehydration
	Acute rheumatic diseases
	Neprotic syndrome
	Acute lymphoblastic leukemia
Chronic diseases	Malignancies
	Renal diseases
	Cardiac malformations
	Chronic rheumatic diseases
	Metabolic diseases
Drugs	*E. coli* asparaginase
	Prednisone
	Coagulation factor concentrates
	Heparins
	Antifibrinolytic agents
	Oral contraceptives
	Oral contraceptives and testosterone

Thrombosis Research 131, Suppl. 1 (2013) S39–S41

Contents lists available at SciVerse ScienceDirect

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journal homepage: www.elsevier.com/locate/thromres

Venous thromboembolism in neonates and children – Update 2013

Ulrike Nowak-Göttl[a,*], Verena Janssen[a], Daniela Manner[a], Gili Kenet[b]

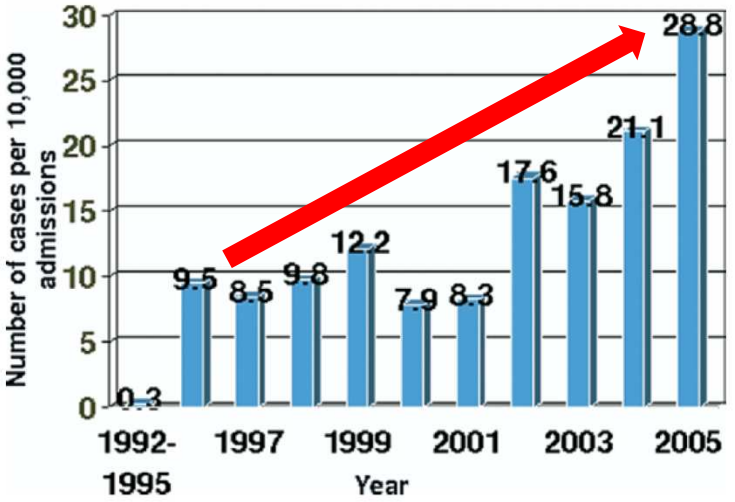
[a]Thrombosis & Hemostasis Treatment Unit, Department of Clinical Chemistry, University Hospital of Kiel & Lubbock, Germany
[b]The Israel National Hemophilia Centre, Sheba Medical Centre, Tel-Hashomer, The Sackler Medical School, Tel Aviv University, Israel

JOURNAL OF VASCULAR SURGERY
Volume 47, Number 4 April 2008

Incidence, risk factors, and treatment patterns for deep venous thrombosis in hospitalized children: An increasing population at risk

John A. Sandoval, MD,[a] Michael P. Sheehan, MD,[a] Charles E. Stonerock, MD,[a,b] Shoaib Shafique, MD,[a,b] Frederick J. Rescorla, MD,[a,c] and Michael C. Dalsing, MD,[a,b] *Indianapolis, Ind*

Risk factor	*Incidence, %*		P
	Prehospital (n = 21)[a]	*Inpatient (n = 78)*	
Central venous catheter			
Femoral	0	22	.02
Subclavian	14	14	.98
Internal jugular	10	9	.94
Prior DVT	38	5	.01
Congenital thrombophilia	33	18	.13
Malignancy	14	13	.86
Immobility >72 hours	5	4	.85
Trauma	5	6	.78
Oral contraceptive	10	5	.45
Congenital heart disease	5	5	.95
Renal disease	5	4	.85



Thrombosis in Pediatric Intensive Care

John Roy and Paul Monagle

Table 80–1 Summary of the Epidemiology, Clinical Features, Diagnosis, and Complications of the Most Common Types of Non-CNS Thromboembolism in Children

	Type/Location	Age/Sex	Incidence	Underlying Illness or Risk Factors	Clinical Features	Diagnosis	Complications
Spontaneous VTE	Lower limb	M = F Teenagers	1.2 per 10,000 hospital admissions		Leg, inguinal, or abdominal pain Leg swelling or discoloration	Doppler US	Immediate: PE Cardiac extension Chylothorax SVC syndrome Long-term: Recurrent VTE PPS
	Axillary	M = F Teenagers	Very rare	Mass lesion Thoracic inlet obstruction New sport involving arms	Arm swelling, pain, and discoloration	Doppler US	
CVAD-related VTE	Line tip thrombosis	Higher in neonates	Catheter material	Cancer, sepsis, trauma, surgery, immobility, long-term lines, congenital heart disease, burns, cardiac catheterization	Inability to flush or draw from line	Linogram Echocardiogram if tip in RA	Variceal hemorrhage
	Fibrin sleeve				Asymptomatic	Linogram, venography	
	CVAD-related DVT Iliofemoral, IVC, jugular, subclavian				Asymptomatic Limb or facial swelling, pain, discoloration SVC syndrome, chylothorax	Doppler US for neck, limb, and abdominal TE Venography (radiograph, CT, or MR) for intrathoracic TE	
PE			Up to 30% children with CVC-related DVT	CVAD-related DVT RA thrombus, cancer, CHD, cardiomyopathy, burns, sepsis, trauma, nephrotic syndrome, APLA, transplantation	Asymptomatic (up to 50%) Tachycardia Chest pain Respiratory distress Increased oxygen requirements Acute right heart failure Collapse Sudden death	V/Q scan Pulmonary angiography Plain radiography, CT, MR ECG Autopsy most common diagnostic test in children	Death Pulmonary hypertension and heart failure Recurrence
Renal vein thrombosis	Neonates: Unilateral, 70% Bilateral, 30%	M = 64%		Asphyxia, polycythemia and dehydration, sepsis, cyanotic CHD, infant of diabetic mother	Flank mass Hematuria, Proteinuria Thrombocytopenia Renal failure	Doppler US (CT, MRI)	Adrenal hemorrhage Renal failure Hypertension
	Older children			Nephrotic syndrome, burns, SLE, transplant	Diarrhea and vomiting Dehydration, hypovolemia		
Portal vein thrombosis				Neonates: UVC Children: Liver transplant, abdominal sepsis, splenectomy, sickle cell disease, APLA Up to 50% idiopathic	Acute abdomen Portal hypertension- GI bleeding, splenomegaly	Doppler US MRI/MRA CT	Death Portal hypertension and variceal hemorrhage

DIAGNOSTIC CLINIQUE

- **ASYMPTOMATIQUE (➔ 60% des cas avec un cathéter central)**

- **CATHETER**
  - obstruction,
  - ↗ pressions sur la ligne de perfusion,
  - fuites à l'entrée du cathéter

- **OEDEMES (membre), DOULEUR, DECOLORATION**

- **SYNDROME CAVE**

- **COMPLICATION/SIGNES ASSOCIES**
  - Chylothorax
  - Infection sur cathéter
  - Embolie pulmonaire
  - Embolie paradoxale
  - Thrombose intracardiaque

DIAGNOSTIC BIOLOGIQUE

bjh guideline

British Journal of Haematology, **154,** 196–207

Guideline on the investigation, management and prevention of venous thrombosis in children*

Elizabeth Chalmers,[1] Vijeya Ganesen,[2] Ri Liesner,[2] Sanjay Maroo,[1] Timothy Nokes,[3] D. Saunders[2] and Michael Williams[4]

[1]Royal Hospital for Sick Children, Glasgow, [2]Great Ormond Street Hospital, London [3]Derriford Hospital, Plymouth, and [4]Birmingham Children's Hospital, Birmingham, UK

Laboratory investigations are required to aid the exclusion of systemic disorders in children presenting with a suspected VTE (1C).

Haematology investigations (full blood count, clotting screen) and renal function should be undertaken to confirm safe baselines prior to anticoagulation (1C).

D-Dimers should not be used to exclude VTE in children (2C).

Evénements thromboemboliques veineux chez l'enfant

Manuela Albisetti, Zurich
Traduction: Gabriele Martin, Genève

PAEDIATRICA Vol. 18 No. 6 2007

- Quick, aPTT, Fibrinogène
- Antithrombine, activité
- Protéine C, activité
- Protéine S, activité
  Protéine S, libre
  Protéine S, totale
- Résistance à la PCa et/ou mutation Leiden du facteur V
- Mutation G20210A du facteur II
- Lipoprotéine (a)
- Homocystéine
- Lupus anticoagulant
  Anticorps anticardiolipine
  Anticorps beta-2-glycoprotéine I



DIAGNOSTIC D'IMAGERIE

bjh guideline

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US is recommended for the initial assessment of the peripheral upper limb, axillary, subclavian and internal jugular veins but may be relatively insensitive for the detection of central intra-thoracic VTE (1B).

Contrast MRV is recommended for assessing the central veins for VTE (1C).

Multi-detector computerized tomography (CT) venography (MDCT venography) may be considered for the assessment of the central veins if MRV is unavailable.

Magnetic resonance imaging (MRI) should always be preferred to CT due to radiation dose considerations in children (2C).

Diagnosis and Management of Deep Venous Thrombosis and Pulmonary Embolism in Neonates and Children

Paul Monagle, MD, MBBS, MSc, FCCP, FRCPA, FRACP[1,2,3]

Seminars in Thrombosis & Hemostasis Vol. 38 No. 7/2012

Site of thrombosis	Recommended/commonly used diagnostic tests	Tests for which there is evidence NOT to use in children
Upper limb DVT	• Combination of ultrasound and venography • CT or MRV • ECHO for intracardiac component	• Ultrasound alone
Lower limb DVT	• Ultrasound • MRV or CT for intra abdominal component	
Renal vein thrombosis	• Ultrasound	
Portal vein thrombosis	• Ultrasound or MRV	
Cerebral sino venous thrombosis	• MRV	• CT • Ultrasound
Pulmonary embolism	• V/Q scan • CT angiography • MRV • Pulmonary angiography	• Clinical prediction scores • D-dimers

Abbreviations: CT, computed tomography; DVT, deep venous thrombosis; ECHO, ecocardiography; MRV, magnetic resonance venography; V/Q, ventilation perfusion.

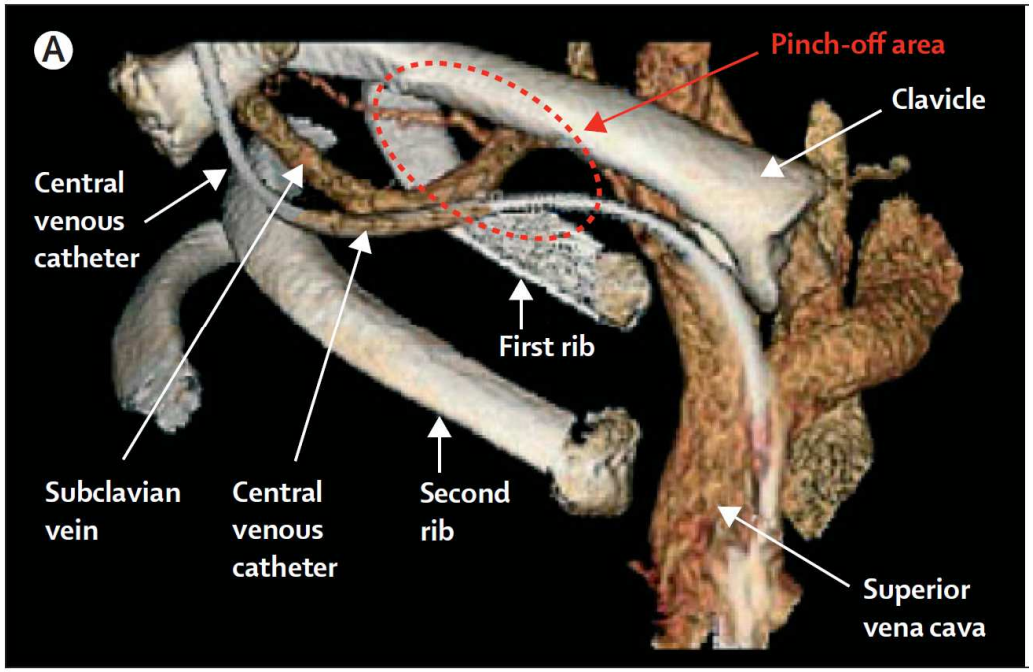
TRAITEMENT

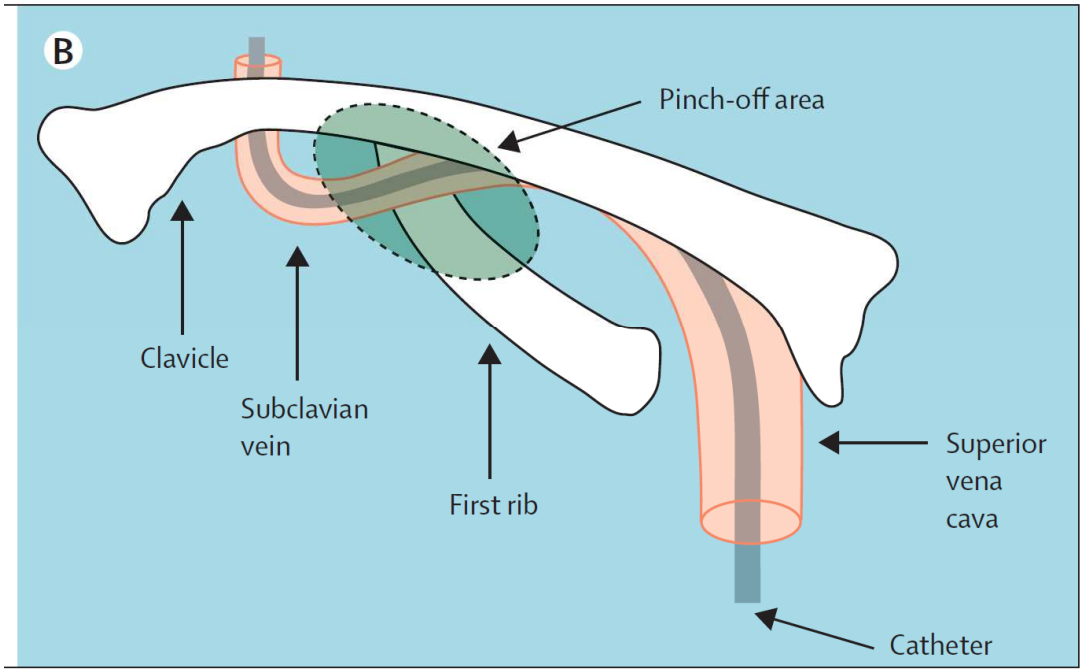
Management of occlusion and thrombosis associated with long-term indwelling central venous catheters

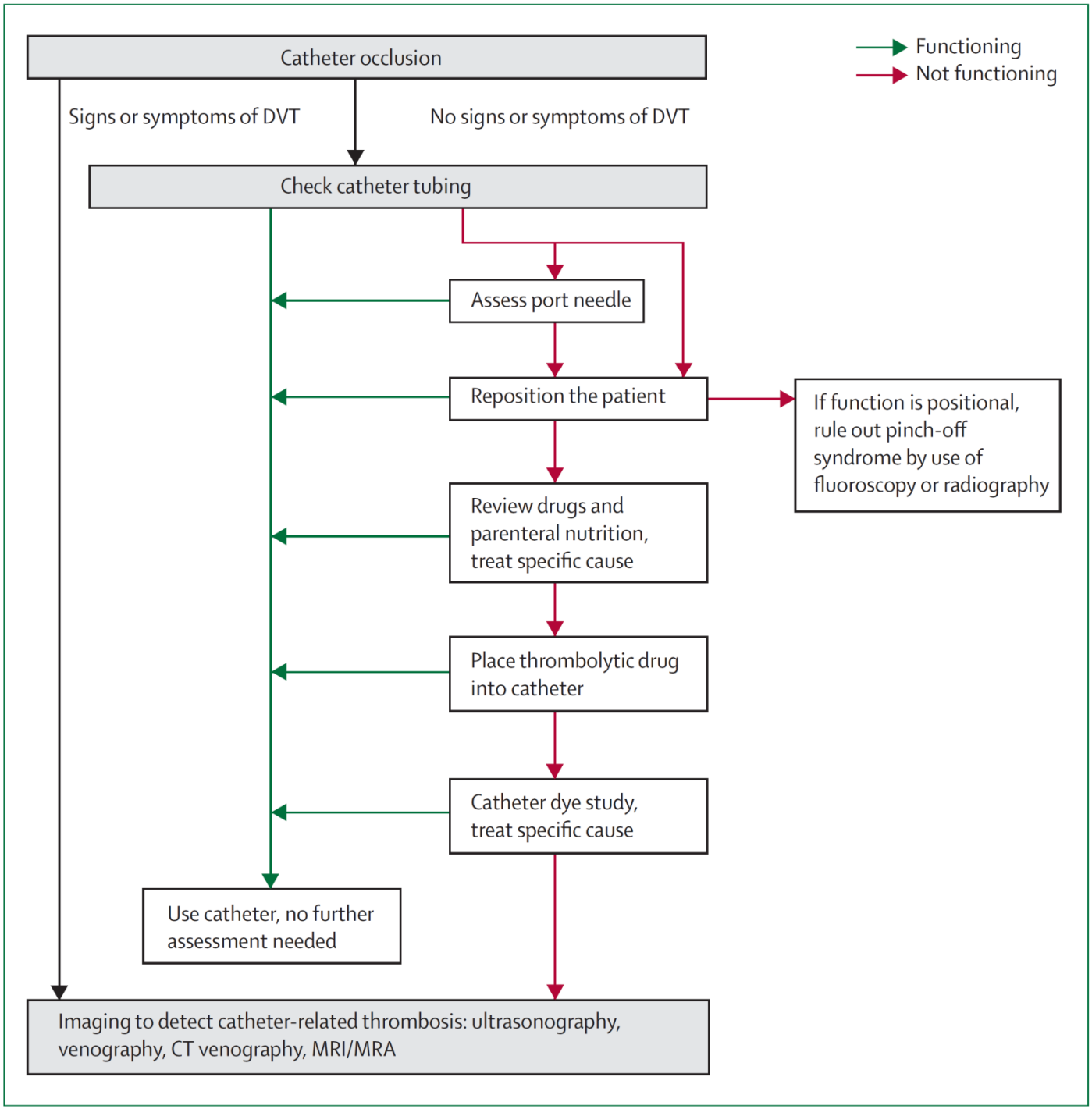
Jacquelyn L Baskin, Ching-Hon Pui, Ulrike Reiss, Judith A Wilimas, Monika L Metzger, Raul C Ribeiro, Scott C Howard

Lancet 2009; 374: 159–69

	Diagnosis	Treatment	Level of evidence*
Mechanical obstruction			
Kink in catheter or tubing, tight suture, or clamp closed on external catheter[23–25]	Inspect catheter	Correct mechanical dysfunction	5
Port access needle dislodged or occluded in port[26–28]	Assess port access needle placement	Replace needle if necessary	5
Catheter tip blocked by vessel wall[23–25]	Reposition patient	Reposition patient	5
Pinch-off syndrome[26–28]	Fluoroscopy	Remove catheter if at risk for fracture	3b
Obstruction related to drug or parenteral nutrition			
Low pH (acidic)[23,24,29,30]	Review drug	Hydrochloric acid 0·1 mol/L†	4
High pH (basic)[23,24,29,31]	Review drug	Sodium hydroxide 0·1 mol/L or sodium bicarbonate 1·0 mol/L	4
Calcium phosphate precipitate[24,25,29,30,32]	Review drug	Hydrochloric acid 0·1 mol/L†	4
Lipid emulsion[24,25,29,33]	Review parenteral nutrition preparations	Ethanol 70%	4
Thrombotic obstruction			
Fibrin sheath or intraluminal clot[34,35]	Radiography after instillation of contrast into the catheter (linogram)	Intraluminal thrombolytic drugs	1b
Mural thrombus or venous thrombosis[34,35]	Ultrasound or venography	Anticoagulant treatment (rarely resolves with intraluminal thrombolytic drugs)	2c


A
Pinch-off area
Clavicle
Central venous catheter
First rib
Subclavian vein
Central venous catheter
Second rib
Superior vena cava


B
Pinch-off area
Clavicle
Subclavian vein
First rib
Superior vena cava
Catheter


Functioning
Not functioning
Catheter occlusion
Signs or symptoms of DVT
No signs or symptoms of DVT
Check catheter tubing
Assess port needle
Reposition the patient
If function is positional, rule out pinch-off syndrome by use of fluoroscopy or radiography
Review drugs and parenteral nutrition, treat specific cause
Place thrombolytic drug into catheter
Catheter dye study, treat specific cause
Use catheter, no further assessment needed
Imaging to detect catheter-related thrombosis: ultrasonography, venography, CT venography, MRI/MRA

HEPARINE SODIQUE NON FRACTIONNEE

I. Loading dose: heparin 75 units/kg IV over 10 min

II. Initial maintenance dose: 28 units/kg per h for infants aged < 1 y; 20 units/kg per h for children aged > 1 y

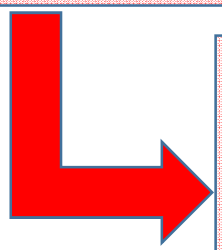
III. Adjust heparin to maintain aPTT of 60-85 s (assuming this reflects an anti-Xa level of 0.35-0.70):

aPTT, s	Bolus, units/kg	Hold, min	% Rate Change	Repeat aPTT
< 50	50	0	+ 10	4 h
50-59	0	0	+ 10	4 h
60-85	0	0	0	Next day
86-95	0	0	−10	4 h
96-120	0	30	−10	4 h
> 120	0	60	−15	4 h

IV. Obtain blood for aPTT 4 h after administration of the heparin loading dose and 4 h after every change in the infusion rate

V. When aPTT values are therapeutic, a daily CBC and aPTT

Adapted with permission.[53] aPTT = activated partial thromboplastin time.



Time Since Last Heparin Dose, min	Protamine Dose
< 30	1.0 mg/100 units heparin received
30-60	0.5-0.75 mg/100 units heparin received
60-120	0.375-0.5 mg/100 units heparin received
> 120	0.25-0.375 mg/100 units heparin received

Maximum dose of 50 mg. Infusion rate of a 10 mg/mL solution should not exceed 5 mg/min. Hypersensitivity reactions to protamine sulfate may occur in patients with known hypersensitivity reactions to fish or those previously exposed to protamine therapy or protamine-containing insulin.



CHEST Supplement

ANTITHROMBOTIC THERAPY AND PREVENTION OF THROMBOSIS, 9TH ED: ACCP GUIDELINES

Antithrombotic Therapy in Neonates and Children

Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

Paul Monagle, MBBS, MD, FCCP; Anthony K. C. Chan, MBBS; Neil A. Goldenberg, MD, PhD; Rebecca N. Ichord, MD; Janna M. Journeycake, MD, MSCS; Ulrike Nowak-Göttl, MD; and Sara K. Vesely, PhD

HEPARINE BAS POIDS MOLECULAIRE

Drug	Weight	Age	Initial Treatment Dose	Initial Prophylactic Dose
Weight-dependent dose of reviparin	< 5 kg	na	150 u/kg/dose q12h	50 u/kg/dose q12h
	> 5 kg	na	100 u/kg/dose q12h	30 u/kg/dose q12h
Age-dependent dose of enoxaparin[a]	na	< 2 mo	1.5 mg/kg/dose q12h	0.75 mg//kg/dose q12h
	na	> 2 mo	1.0 mg/kg/dose q12h	0.5 mg/kg/dose q12h
Pediatric (all ages) dose of dalteparin[b]	na	all	129 ± 43 u/kg/dose q24h	92 ± 52 u/kg/dose q24h
Age-dependent dose of tinzaparin	na	0-2 mo	275 u/kg	…
	na	2-12 mo	250 u/kg	…
	na	1-5 y	240 u/kg	
	na	5-10 y	200 u/kg	
	na	10-16 y	175 u/kg	

na = not applicable.
[a] Enoxaparin has 110 anti-factor Xa units/mg.[115]
[b] Dalteparin has 100 anti-factor Xa units/mg.

I	Day 1: if the baseline INR is 1.0 to 1.3: Dose = 0.2 mg/kg orally	
II	Loading days 2-4: if the INR is:	
	INR	Action
	1.1-1.3	Repeat initial loading dose
	1.4-1.9	50% of initial loading dose
	2.0-3.0	50% of initial loading dose
	3.1-3.5	25% of loading dose
	> 3.5	Hold until INR < 3.5 then restart at 50% decreased dose
III	Maintenance oral anticoagulation dose guidelines:	
	1.1-1.4	Increase by 20% of dose
	1.15-1.9	Increase by 10% of dose
	2.0-3.0	No change
	3.1-3.5	Decrease by 10% of dose
	> 3.5	Hold until INR < 3.5, then restart at 20% decreased dose

Adapted with permission.[55] INR = international normalized ratio.



CHEST Supplement
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bjh guideline

British Journal of Haematology, **154,** 196–207

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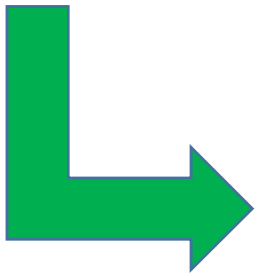
[1]Royal Hospital for Sick Children, Glasgow, [2]Great Ormond Street Hospital, London [3]Derriford Hospital, Plymouth, and [4]Birmingham Children's Hospital, Birmingham, UK

Dalteparin: 100 u/kg twice per day or 200 u/kg once per day s.c.

Enoxaparin: 1 mg/kg twice per day or 2 mg/kg once per day s.c.

Tinzaparin: 175 u/kg once per day s.c.

Infants <8 weeks of age and/or <5 kg require 50% larger doses e.g Dalteparin 150 u/kg twice per day and Enoxaparin 1·5 mg/kg twice per day, possibly due to a larger volume of distribution and/or reduced antithrombin levels.



Target anti-Xa activity taken 4 h following subcutaneous injection.

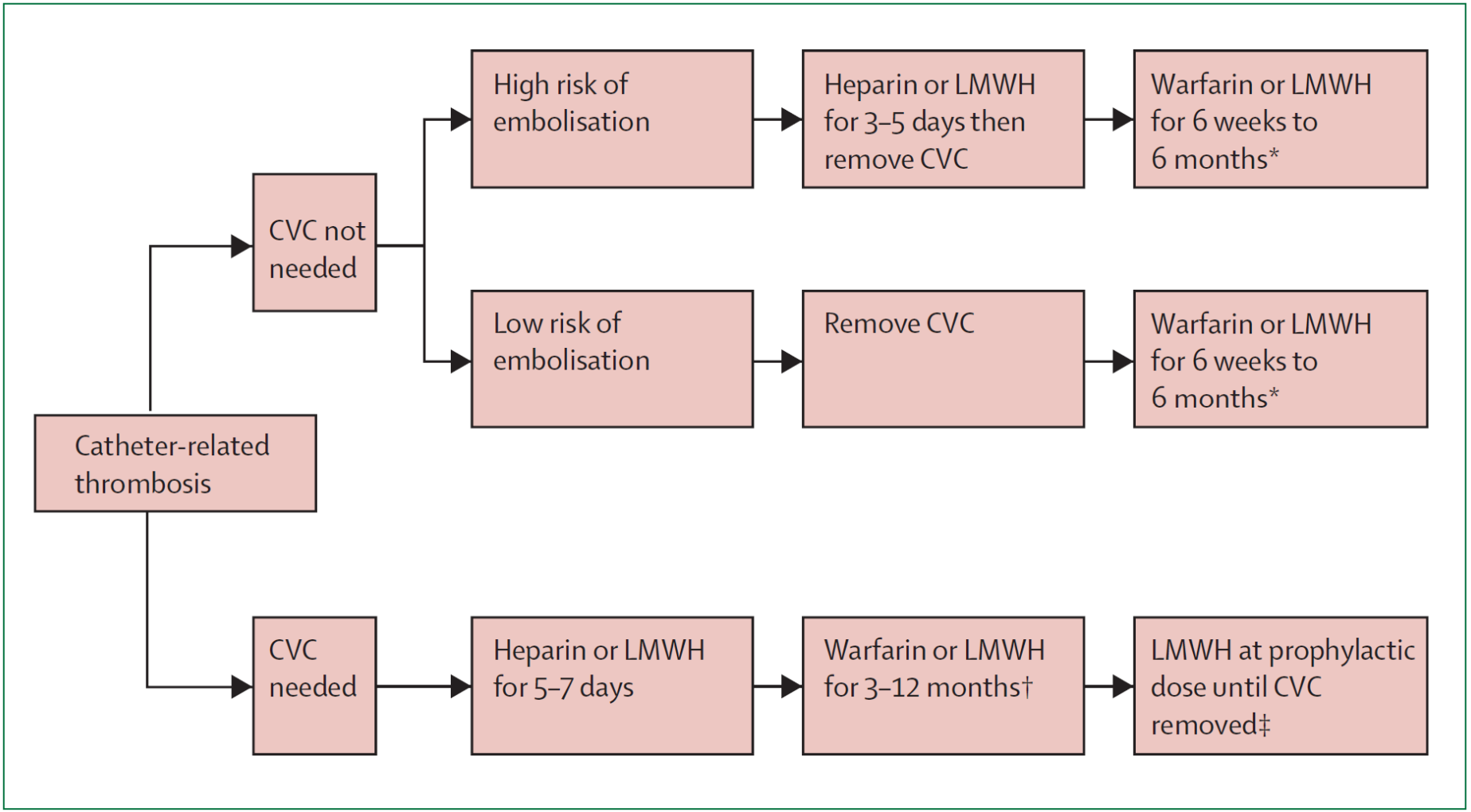
Therapeutic 0·5–1·0 u/ml.

Prophylactic 0·1–0·4 u/ml.

Management of occlusion and thrombosis associated with long-term indwelling central venous catheters

Jacquelyn L Baskin, Ching-Hon Pui, Ulrike Reiss, Judith A Wilimas, Monika L Metzger, Raul C Ribeiro, Scott C Howard

Lancet 2009; 374: 159–69

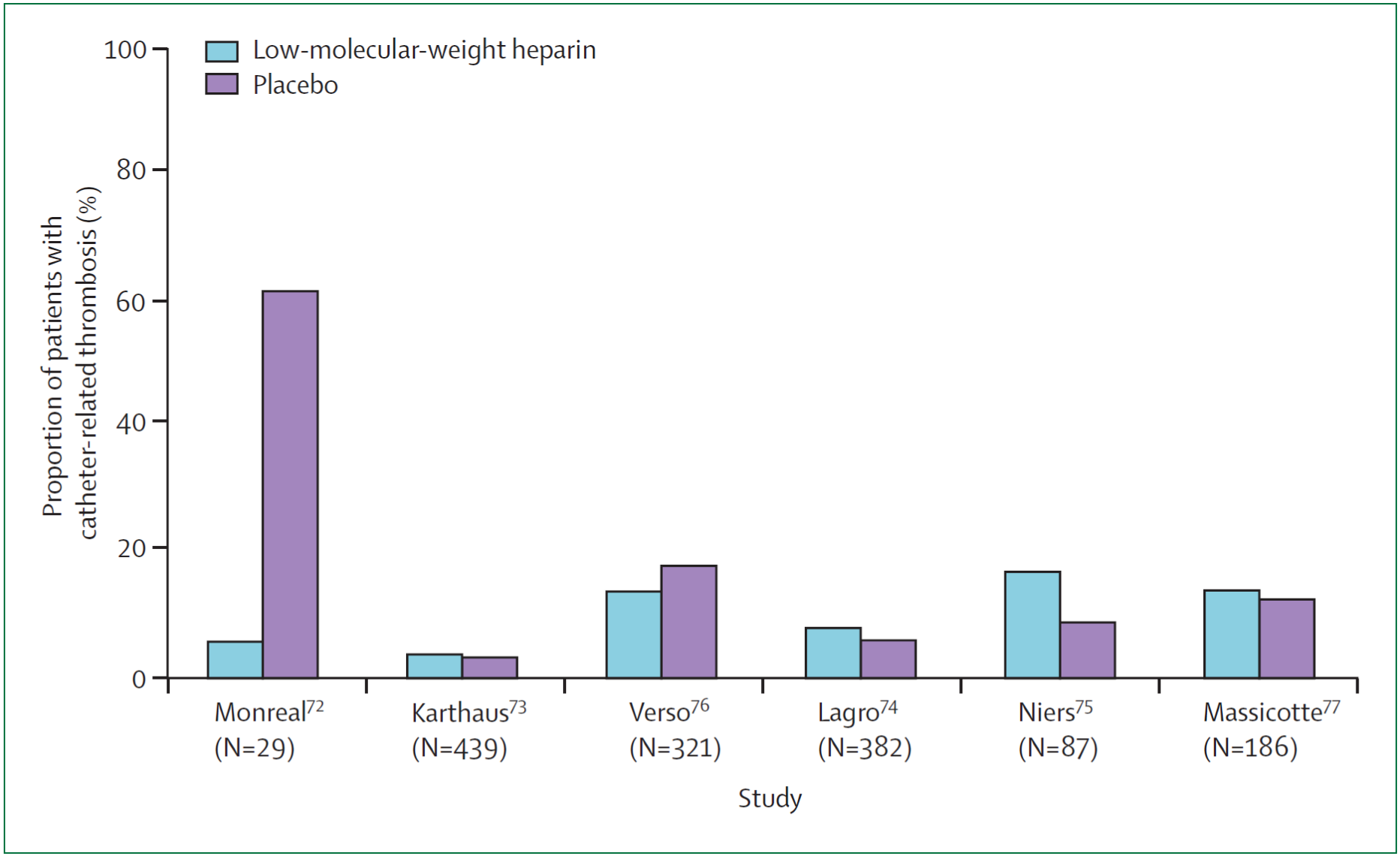


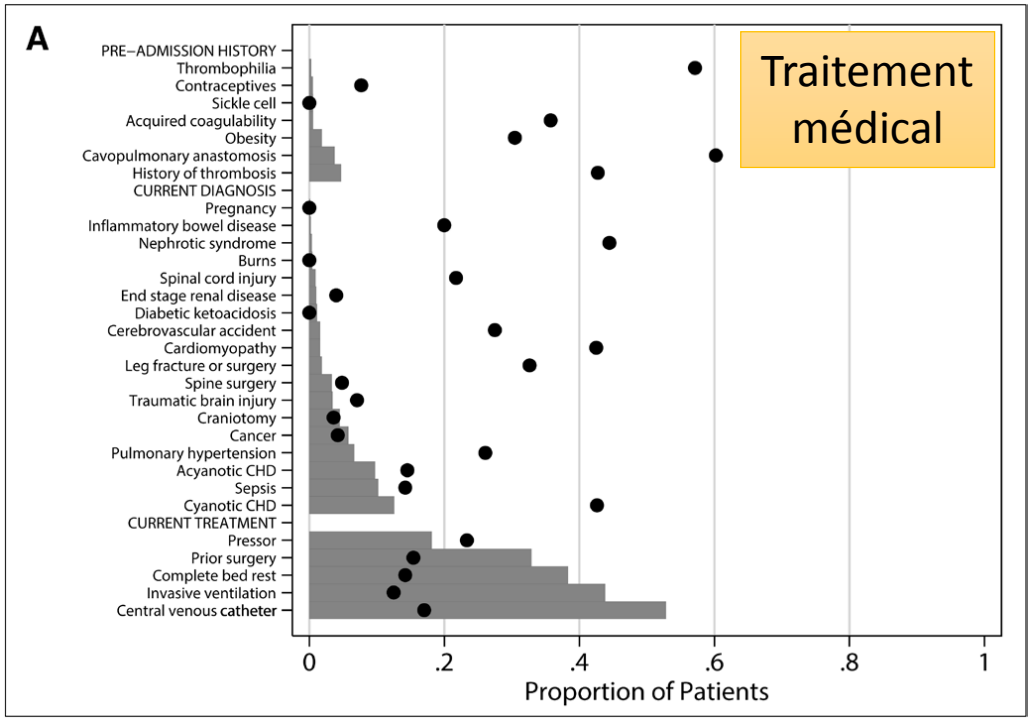
PREVENTION

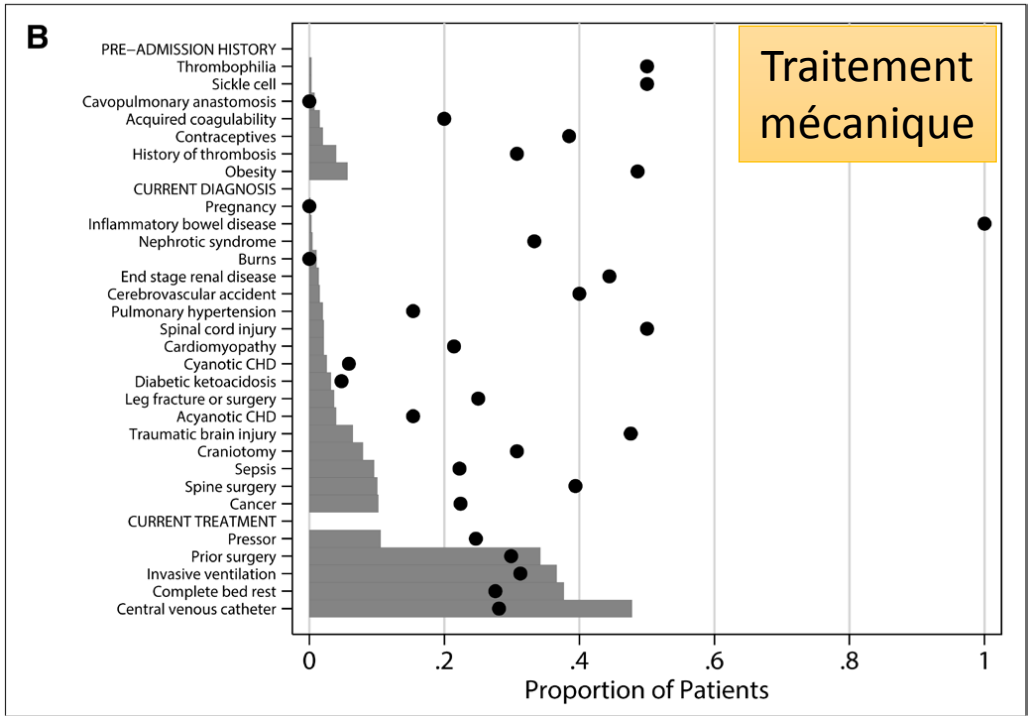
Management of occlusion and thrombosis associated with long-term indwelling central venous catheters

Jacquelyn L Baskin, Ching-Hon Pui, Ulrike Reiss, Judith A Wilimas, Monika L Metzger, Raul C Ribeiro, Scott C Howard

Lancet 2009; 374: 159–69





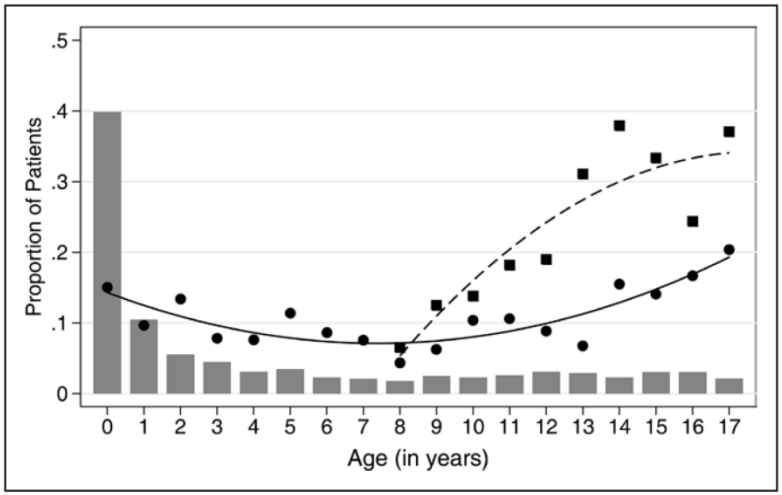


A Multinational Study of Thromboprophylaxis Practice in Critically Ill Children*

Edward Vincent S. Faustino, MD[1]; Sheila Hanson, MD, MS[2]; Philip C. Spinella, MD[3]; Marisa Tucci, MD[4]; Sarah H. O'Brien, MD, MSc[5]; Antonio Rodriguez Nunez, MD, PhD[6]; Michael Yung, MD[7]; Edward Truemper, MD, MS[8]; Li Qin, PhD[9]; Simon Li, MD, MPH[10]; Kimberly Marohn, MD[1]; Adrienne G. Randolph, MD, MSc[11]; on behalf of the PROphylaxis against ThRombosis prACTice (PROTRACT) Study Investigators of the PALISI BloodNet

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Critical Care Medicine



PROTRACT STUDY

Journal of Thrombl

ORIGINAL

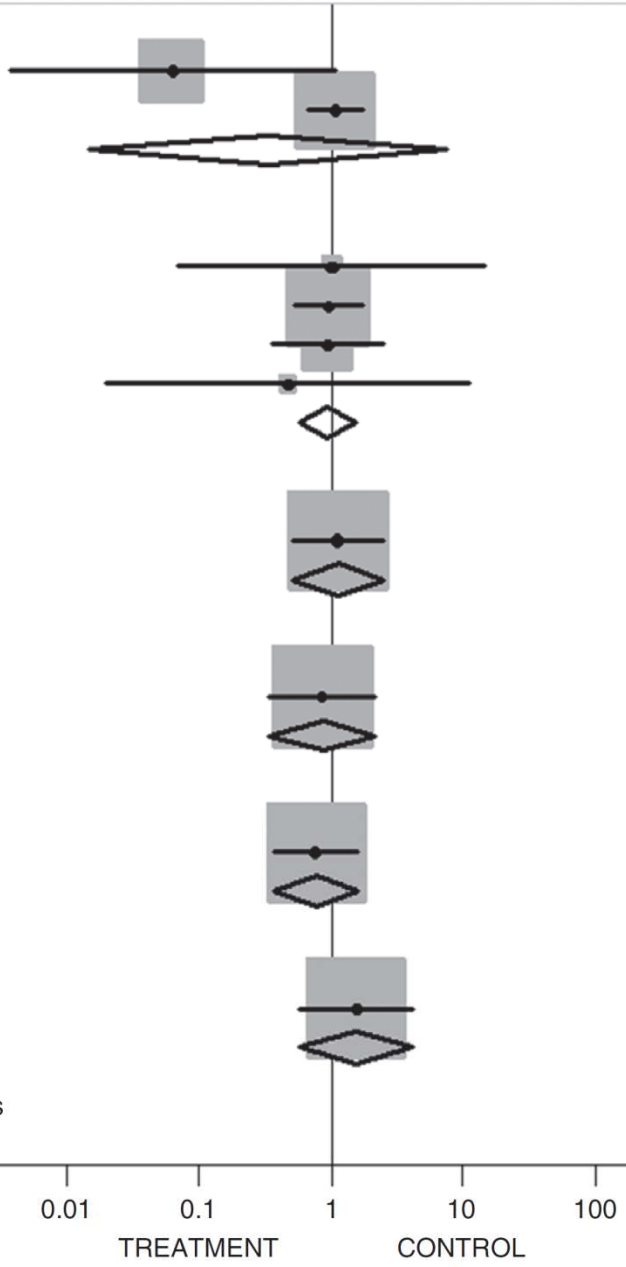
Central thrombo meta-an

E. VIDAL,* A
*Department of S
Robert H. Lurie C
of Pediatrics, Yale

224 articles
MEDLINE

AUTHOR	YEAR	TREATMENT (n/N)	CONTROL (n/N)	FREQ (95% CI)	% Weight
HEPARIN-BONDED CVC					
Pierce	2000	0/97	8/103	0.06 (0.00, 1.07)	40.37
Anton	2009	21/47	17/40	1.05 (0.65, 1.70)	59.63
Subtotal (*I*-squared = 79.6%, *P* = 0.027)				0.34 (0.01, 7.68)	100.00
UNFRACTIONATED HEPARIN					
Smith	1991	1/14	1/14	1.00 (0.07, 14.45)	3.30
Shah	2007	18/91	18/86	0.95 (0.53, 1.69)	69.35
Schroeder	2010	8/53	6/37	0.93 (0.35, 2.46)	24.97
Unal	2012	0/19	1/27	0.47 (0.02, 10.88)	2.38
Subtotal (*I*-squared = 0.0%, *P* = 0.979)				0.93 (0.57, 1.51)	100.00
LOW MOLECULAR WEIGHT HEPARIN					
Massicotte	2003	11/78	10/80	1.13 (0.51, 2.50)	100.00
Subtotal (*I*-squared = 0.0%, *P* = 0.0)				1.13 (0.51, 2.50)	100.00
WARFARIN					
Ruud	2006	6/29	8/33	0.85 (0.34, 2.17)	100.00
Subtotal (*I*-squared = 0.0%, *P* = 0.0)				0.85 (0.34, 2.17)	100.00
ANTITHROMBIN CONCENTRATE					
Mitchell	2003	7/25	22/60	0.76 (0.38, 1.55)	100.00
Subtotal (*I*-squared = 0.0%, *P* = 0.0)				0.76 (0.38, 1.55)	100.00
NITROGLYCERIN					
Jacobs	2001	7/21	5/23	1.53 (0.57, 4.10)	100.00
Subtotal (*I*-squared = 0.0%, *P* = 0.0)				1.53 (0.57, 4.10)	100.00

NOTE: Weights are from random effects analysis



28)
RCTs
5)
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%)
20%

CONCLUSION

- EVENEMENT **FREQUENT** EN REA PEDIATRIQUE
- PROPHYLAXIE ANTITHROMBOTIQUE: **PAS DE PREUVE EN PEDIATRIE**
- REPERER LES **FACTEURS DE RISQUE**
- **ECHOGRAPHIE SYSTEMATIQUE ? RENTABILITE MEDIOCRE!**
  - SI +: faut-il traiter ?
  - SI -: quel rythme de surveillance

CONCLUSION
REPERER LES POPULATIONS A RISQUE

frontiers in Pediatrics

ORIGINAL RESEARCH
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Clinical risk factors for central line-associated venous thrombosis in children

Samir H. Shah [1], Alina Nico West [1,2], Robert J. Sepanski [3], Debbie Hannah [4], William N. May [5] and Kanwaljeet J. S. Anand [1]*

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Multiple logistic regression results[a] (dependent variable = CLAVT occurrence)

Independent variable	Subcategory	CLAVT lines/ all lines in subcategory	Adjusted odds ratio (95% CI)	*p*	
CVL line type	PICC (reference)	5/1227	1.0 (–)	–	
	Arrow™	11/541	4.2 (0.9–18.8)	0.06	
	Broviac™	**6/325**	**8.9 (1.9–41.9)**	**0.006**	←
	Cook™	**33/742**	**4.2 (1.0–17.2)**	**0.05**	←
	All other line types	7/898	3.8 (0.8–17.6)	0.09	
Unit (CVL placement)	OR (reference)	13/1279	1.0 (–)	–	
	NICU	**11/377**	**5.3 (2.1–13.2)**	**0.0003**	←
	PICU	27/757	1.7 (0.8–3.8)	0.17	
	All other units	11/1320	1.0 (0.4–2.2)	0.95	
CVL insertion site	Subclavian (reference)	5/931	1.0 (–)	–	
	Femoral	**37/473**	**11.1 (3.9–31.6)**	**<0.0001**	←
	Jugular	7/502	2.4 (0.7–7.7)	0.15	
	Upper extremity	3/832	1.7 (0.3–11.2)	0.58	
	All other sites	10/995	1.9 (0.7–5.5)	0.23	

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Regular Article

Development of a new risk score for hospital-associated venous thromboembolism in critically-ill children not undergoing cardiothoracic surgery☆

Shilpa J. Arlikar [a,1], Christie M. Atchison [b,1], Ernest K. Amankwah [a], Irmel A. Ayala [c], Laurie A. Barrett [a,c], Brian R. Branchford [d], Michael B. Streiff [e], Clifford M. Takemoto [c,f], Neil A. Goldenberg [a,c,e,f,⁎]

Putative risk factor	Adjusted			
	OR	95%LCL	95%UCL	*P*-value
Age (per each 1 y increase)				
Male gender (vs. female)	0.99	0.36	2.72	0.98
Mechanical ventilation	1.87	0.63	5.50	0.26
CVC (any)	**26.64**	**7.46**	**95.13**	**<0.001**
Short term CVC				
Long term CVC				
Significant infection	**3.41**	**1.13**	**10.29**	**0.029**
Major or orthopedic surgery				
Malignancy	0.69	0.19	2.55	0.58
Dehydration				
Chronic inflammatory disease (non-Lupus)	0.37	0.03	4.49	0.43
LOS ≥4 d	**20.22**	**2.27**	**180.07**	**0.007**
Cardiac catheterization	5.49	0.81	37.24	0.08
History of prematurity				
History of VTE	3.38	0.35	32.78	0.29
Congenital heart disease				
Diabetes mellitus				
Nephrotic syndrome				

Abbreviations: OR, odds ratio; 95%LCL, 95% lower conus catheter; LOS, length of stay.