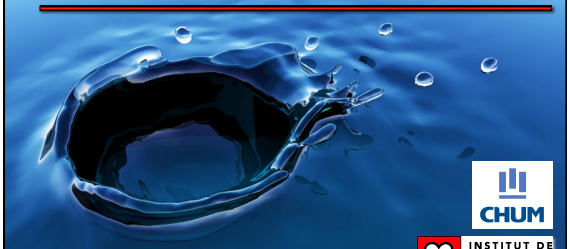
OPTIMISATION PÉRIOPÉRATOIRE:
L'APPROCHE LIQUIDIENNE CIBLÉE



Sylvain Bélisle, M.D., FRCPC

CHUM

INSTITUT DE CARDIOLOGIE DE MONTRÉAL

Déclaration des liens financiers

Présentateur rémunéré
- AstraZeneca
- Bristol-Myers Squibb
- Ortho Biotech
- Janssen-Ortho
- Fresenius Kabi
- Lilly
- Organon
- Héma-Québec

Fonds de recherche
- Novo Nordisk
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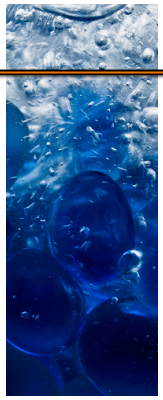
- Alliance
- Hemosol
- Bayer
- Fresenius Kabi

Postes
- Comité Consultatif Scientifique et Médical Héma-Québec
- Comité Consultatif National en Médecine Transfusionnelle
- Canadian Consensus Conference on Plasma Volume Expansion (CRIC)
- GIHP
- GITAP



Un peu d'histoire

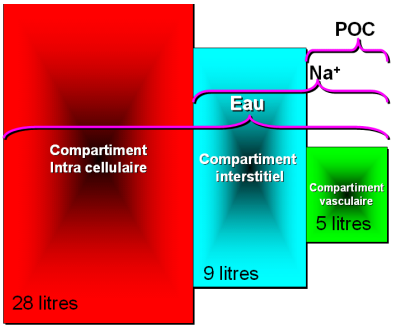
- Thomas Latta et Robert Lewins (1832): première réplétion liquidienne intraveineuse pour le choléra
- L'ère «rétrograde»: 1907-1924
- L'ère «sucrée»: 1924-1952
- L'ère «salée»: >1952
- L'ère des routines et des formules:
  - permissive fixe >1960
  - restrictive fixe >2000
- L'ère précoce dirigée: >2000

Un geste quotidien et indispensable

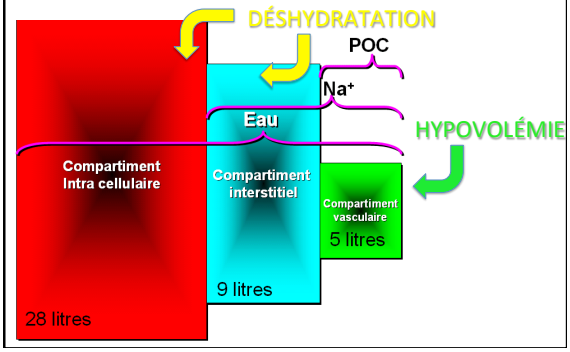
POURQUOI REVOIR NOTRE APPROCHE?

- La réplétion liquidienne périopératoire influence le devenir des patients
- Un approche «classique» est moins performante qu'une approche fondée sur l'optimisation du débit cardiaque

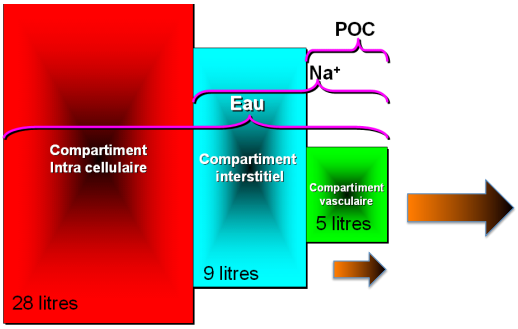
Les secteurs liquidiens



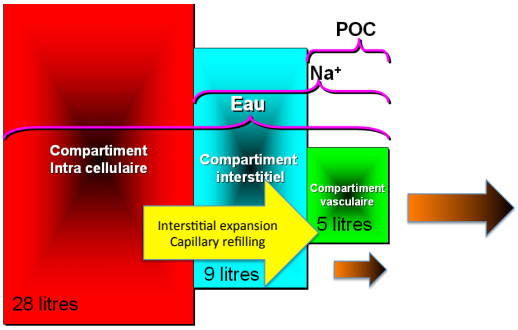
Les secteurs liquidiens

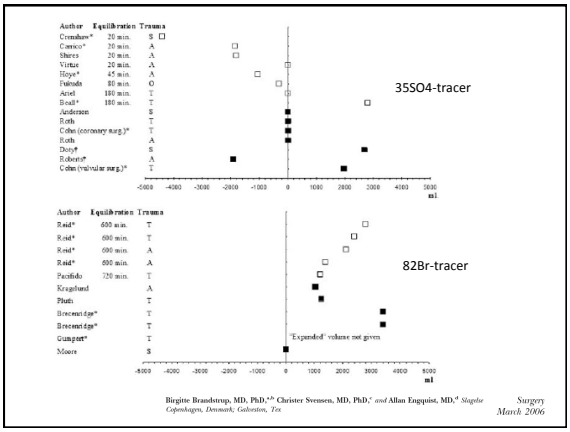


Périopératoire



Périopératoire: CENTRIFUGE





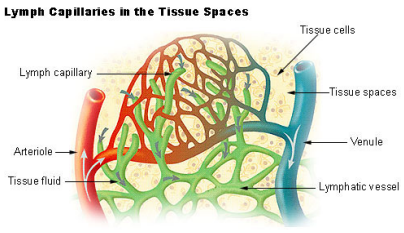
Le troisième espace n'existe pas!

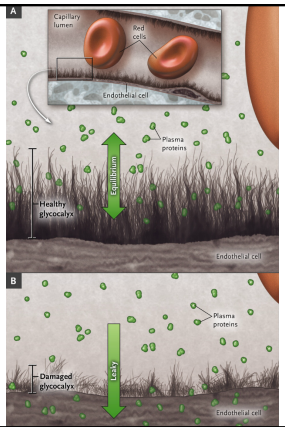
- N'a jamais été véritablement localisé
- Quantification sujette à plusieurs erreurs méthodologiques
- Probablement un concept erroné en périopératoire

Inflation du compartiment interstitiel

Par perméabilité augmentée

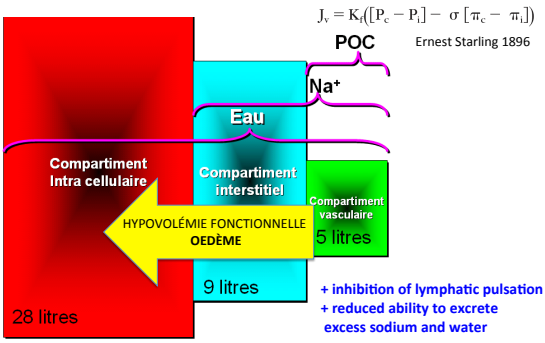
- Pression hydrostatique — Perméabilité
- Pression oncotique — Réseau lymphatique





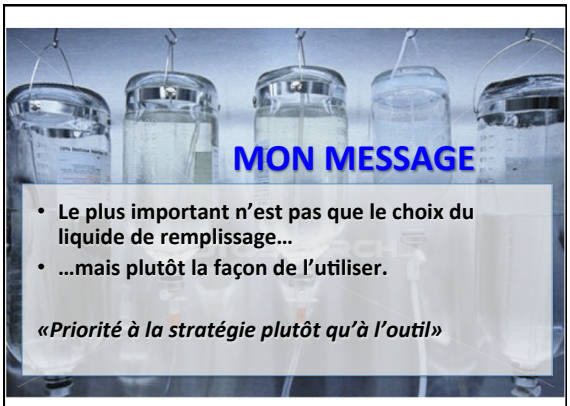
NEJM 2013;369:1243

Soins Intensifs: CENTRIPÈTE



LES BUTS: passer d'un effet physiologique à un bénéfice

- Restaurer un compartiment liquidien
- Optimiser la circulation
- Améliorer la perfusion tissulaire
- CORRIGER ou PRÉVENIR les dysfonctions d'organes



MON MESSAGE

- **Le plus important n'est pas que le choix du liquide de remplissage…**
- **…mais plutôt la façon de l'utiliser.**

«Priorité à la stratégie plutôt qu'à l'outil»

La restriction liquidienne (cristalloïde) périopératoire

aNORMAL SALIN

- Chez l'humain: est associé à l'insuffisance rénale (RIFLE)
- Chez l'humain: est associé à un taux d'épuration plus élevé
- Chez l'humain: est associé à plus de SIRS lors de pancréatites
- Chez l'animal: est associé à des lésions rénales, à plus d'hypotension et de cytokines

Hyperchlorémie induite

- Vasoconstriction artère afférente glomérulaire
- Augmentation de la consommation en oxygène des cellules tubulaires au niveau de la médulla
- Oligurie
- Retard de la reprise du transit intestinal
- Augmentation des niveaux de douleur

Major Complications, Mortality, and Resource Utilization After Open Abdominal Surgery

0.9% Saline Compared to Plasma-Lyte (*Ann Surg* 2012;255:821–829)

TABLE 4. Impact of Balanced Fluid Use on Resource Utilization

	Original Cohort			Matched Cohort		
	Balanced (N = 926)	0.9% Saline (N = 30994)	*P*	Balanced (N = 926)	0.9% Saline 3:1 Match (N = 2778)	*P*
Medication						
Albumin	10.0%	11.1%	0.30	10.0%	9.3%	0.52
Antinausea medication	0.5%	1.3%	0.03	0.5%	1.2%	0.10
Buffers	4.2%	9.0%	<0.001	4.2%*	6.3%*	0.02
Diuretics	25.7%	29.1%	0.03	25.7%	22.8%	0.07
Crystalloid used mean mL (SD)	1658 (1288)	2003 (1531)	<0.001	1658 (1288)*	1976 (1560)*	<0.001
Blood transfusions						
Yes	1.8%	13.3%	<0.001	1.8%*	11.5%*	<0.001
Median units if transfused	2.69	2.88	0.01	2.69*	2.92*	0.005
Value tests						
Arterial blood gas	13.7%	21.3%	<0.001	13.7%*	22.9%*	<0.001
Lactic acid level	3.3%	9.8%	<0.001	3.3%*	8.0%*	<0.001
Blood culture	16.4%	21.3%	<0.001	16.4%	16.1%	0.80
CT scan abdomen	15.2%	21.1%	<0.001	15.2%	15.5%	0.85
CT scan chest	3.8%	5.4%	0.03	3.8%	3.6%	0.84
CT scan brain	2.7%	4.7%	0.005	2.7%	3.5%	0.26
LOS days, mean (SD)	6.4 (4.8)	6.9 (5.0)	<0.001	6.4 (4.8)*	5.9 (4.4)*	<0.001
Ventilator usage	10.9%	15.9%	<0.001	10.9%	10.9%	0.98
Ventilator days, mean (SD)	2.5 (2.5)	3.3 (3.5)	<0.001	2.5 (2.5)*	3.0 (3.2)*	<0.001
Readmission within 30 days	26.9%	29.7%	0.07	26.9%	25.5%	0.39
Additional procedures						
Dialysis	1.0%	8.3%	<0.001	1.0%*	4.8%*	<0.001

N=3704

Association Between a Chloride-Liberal vs Chloride-Restrictive Intravenous Fluid Administration Strategy and Kidney Injury in Critically Ill Adults

JAMA. 2012;308(15):1566-1572

Table 3. Incidence of Acute Kidney Injury Stratified by Risk, Injury, Failure, Loss, and End-Stage (RIFLE) Serum Creatinine Criteria

	No. (%) [95% CI] of Patients[a]		
	Control Period (n = 760)	Intervention Period (n = 773)	*P* Value
RIFLE class			
Risk	71 (9.0) [7.2-11.0]	57 (7.4) [5.5-9.0]	.16
Injury	48 (6.3) [4.5-8.1]	23 (3.0) [1.8-4.2]	.002
Failure	57 (7.5) [5.6-9.0]	42 (5.4) [3.8-7.1]	.10
Injury and failure	105 (14) [11-16]	65 (8.4) [6.4-10.0]	<.001

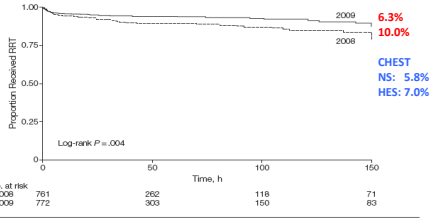
Adjusted Risk of AKI with chloride restriction: OR 0.52 [95% CI, 0.37-0.75]

N=1553

Association Between a Chloride-Liberal vs Chloride-Restrictive Intravenous Fluid Administration Strategy and Kidney Injury in Critically Ill Adults

JAMA. 2012;308(15):1566-1572

Figure 2. Renal Replacement Therapy (RRT) in the Intensive Care Unit (ICU)



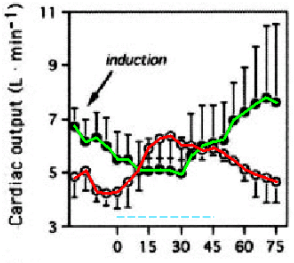
CHEST
NS: 5.8%
HES: 7.0%

Adjusted Risk of RRT with chloride restriction: OR 0.52 [95% CI, 0.33-0.81]

N=1553

Intravascular Fluid Administration and Hemodynamic Performance During Open Abdominal Surgery

Christer H. Svensén, MD, PhD, DEAA* (Anesth Analg 2006;103:671-6)



LR 25 ml/kg, 45 min
n=10

SHOCK, Vol. 23, No. 4, pp. 377–382, 2005

EFFECTS OF COLLOID RESUSCITATION ON PERIPHERAL MICROCIRCULATION, HEMODYNAMICS, AND COLLOIDAL OSMOTIC PRESSURE DURING ACUTE SEVERE HEMORRHAGE IN RABBITS

Makiko Komori,* Katsumi Takada,* Yasuko Tomizawa,† Shoichi Uezono,* Keiko Nishiyama,* and Makoto Ozaki*

*Department of Anesthesiology and †Cardiovascular Surgery, School of Medicine, Tokyo Women's Medical University, 8-1, Kawada-cho, Shinjuku-ku, Tokyo, 162-8666, Japan

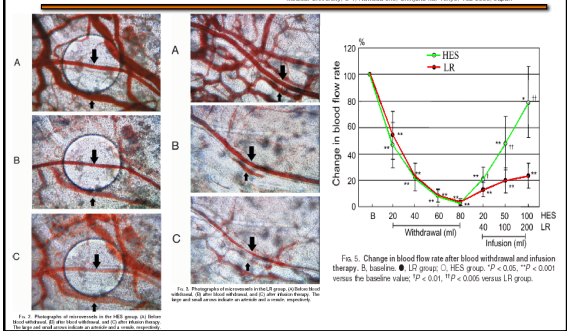


FIG. 5. Change in blood flow rate after blood withdrawal and infusion therapy. B, baseline. ●, LR group. ○, HES group. *P < 0.05, **P < 0.001 versus the baseline value; †P < 0.01, ††P < 0.005 versus LR group.

Effects of intravenous fluid restriction on postoperative complications:
Comparison of two perioperative fluid regimens
Brandstrup et al. Ann Surg 2003:238:641-648

172 résections colorectales
Volume reçu le jour de la chirurgie: 2740 / 5388 ml*
Oligurie J0: 12% versus 3%
Suivi médian: 34 jours

≈3.5 L NS

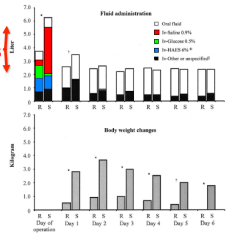


TABLE 1. Intraoperative Fluid Therapy

	Restricted Regimen	Standard Regimen
Preloading of epidural analgesia	No preloading.	500 mL HAES-6%.*
Third space loss	No replacement	Normal saline 0.9%: 7 mL/kg/h first hour; 5 mL/kg/h second and third hour; 3 mL/kg/h following hours.
Loss during fast (maintenance)	500 mL of glucose 5% in water less oral fluid intake during fast.	500 mL of normal saline 0.9%-independent of oral intake.
Blood loss	Volume-to-volume with HAES-6% with allowance for max. 500 mL extra.	Loss up to 500 mL: 1000-1500 mL of normal saline; Loss >500 mL, additional HAES-6%.
	Blood component therapy started at approximate loss >1500 mL dependent on hematocrit.	Blood component therapy started at approximate loss >1500 mL dependent on hematocrit.

*Hydroxyethyl starch 6% in normal saline.

Effects of intravenous fluid restriction on postoperative complications:
Comparison of two perioperative fluid regimens
Brandstrup et al. Ann Surg 2003:238:641-648

TABLE 3. Number of Patients With Complications (Per-Protocol Analysis)

	Blinded Assessment			Unblinded Assessment		
	Restricted Group	Standard Group	*P* value	Restricted Group	Standard Group	*P* value
Overall complications	21	40	0.003	21	43	0.000
Major complications†	8	18	0.040	8	19	0.026
Minor complications†	15	36	0.000	15	37	0.000
Tissue-healing complications†	11	22	0.040	10	24	0.009
Cardiopulmonary complications†	5	17	0.007	4	18	0.002

n = 69 in restricted group and n = 72 in standard group.
†Number of patients in subgroups does not add up to number of overall complications because some patients had more than 1 complication.

Complications postopératoires:
33% versus 51%, p=.002

NNH for major complications: 7

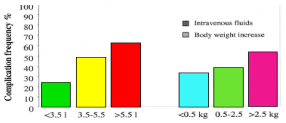


FIGURE 2. Complication frequency related to intravenous fluid administration and body weight increase on the day of operation. $P < 0.001$ both for increasing intravenous fluid volume and increasing body weight (χ^2 test for trend).

Trials BioMed Central

Intravenous fluid restriction after major abdominal surgery: a randomized blinded clinical trial
Hester Vermeulen*[1], Jan Hofland[†2], Dink A Legemate[†3] and Dirk T Ubbink[†1,3]
Published: 7 July 2009

Restrictive Fluid Management in postoperative period

Table 3: Intention to treat analysis of the primary and secondary endpoints

	Standard (n=32)	Restricted (n=30)	Absolute Risk Reduction
	2.5 L/day		1.5 L/day
Postoperative hospital stay (days), mean (SD)	12.3 (12.7)	8.3 (4.5)	
Median (IQR)	9.0 (6.8–11.3)	7.0 (6.0–9.8)	0.049*
SECONDARY ENDPOINTS			
Postoperative complications	23	13	0.360 (0.133 to 0.588)
- Major complications	12	5	0.244 (0.028 to 0.460)
- Death	1	0	
- Cardiac	2	0	
- Leakage of anastomosis	6	1	0.135 (-0.011 to 0.282)
- Re-admission	3	4	
- Minor complications	11	8	0.117 (-0.112 to 0.345)
- Wound infection	5	1	
- Wound dehiscence	1	0	
- Infection	0	1	
- Respiratory	1	0	
- Bleeding	1	3	
- Thromboembolism	1	0	
- Miscellaneous	2	3	

N=62

NNH: 4

Colloids in the Perioperative Setting: A Canadian Utilization Study

Davy Cheng, MD, MSc, Sylvain Balisle, MD, Mitch Giffin, MD, Keyvan Karkouti, MD, MSc, Janet Martin, PharmD for the Canadian Research into Colloids Collaboration (CRIC)

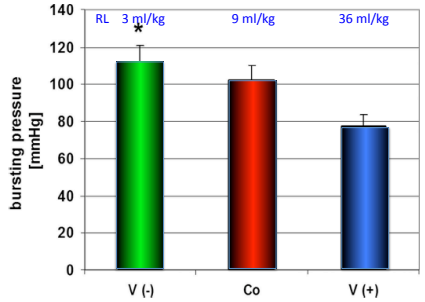
Mean Fluid Volume Administered

Agent	Institution 1	Institution 2	Institution 3	Institution 4	Mean	p
Crystalloid ≤ POD 0, mL)	4946	4497	4723	4716	4720	<0.001
Crystalloid ≤ POD 1, mL	7831	6420	6909	6645	6954	<0.001
HES 264/0.45 POD 0, mL	429	350	458	408	410	0.04
HES 264/0.45 ≤ POD 1, mL	492	409	473	452	456	0.2
ALB 5% ≤ POD 0, mL	27	83	0	97	52	<0.001
ALB 5% ≤ POD 1, mL	42	106	0	157	77	<0.001
ALB 25% ≤ POD 0, mL	16	31	1	13	16	0.3
ALB 25% ≤ POD 1, mL	45	34	3	21	26	0.06

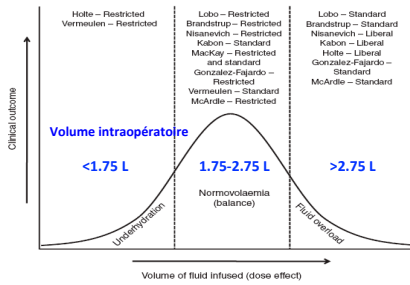
Impact of Different Crystalloid Volume Regimes on Intestinal Anastomotic Stability

(*Ann Surg* 2009;249: 181–185)

Goran Marjanovic, MD, Christian Villain,* Eva Juettner, MD,† Axel zur Hausen, MD, PhD,† Jens Hoeppner, MD, Ulrich Theodor Hopt, MD,* Oliver Drognitz, MD,* and Robert Obermaier, MD**



Symposium 3: Death by drowning
A meta-analysis of randomised controlled trials of intravenous fluid therapy in major elective open abdominal surgery: getting the balance right



Proceedings of the Nutrition Society (2010), 69, 488–498

Symposium 3: Death by drowning
A meta-analysis of randomised controlled trials of intravenous fluid therapy in major elective open abdominal surgery: getting the balance right

Study or subgroup	Fluid balance Events	Total	Fluid imbalance Events	Total	Weight	Risk ratio M-H, Random, 95% CI
Lobo (2002)	1	10	7	10	2·4%	0·14 (0·02, 0·96)
Brandstrup (2003)	28	69	44	72	33·9%	0·66 (0·47, 0·93)
Kabon (2005)	17	124	19	129	17·6%	0·93 (0·51, 1·71)
Nisanevich (2005)	13	74	23	77	17·8%	0·59 (0·32, 1·07)
Gonzalez-Fajardo (2009)	0	20	4	20	1·1%	0·11 (0·01, 1·94)
Vermeulen (2009)	13	32	23	30	24·8%	0·53 (0·33, 0·84)
McArdle (2009)	1	10	7	11	2·4%	0·16 (0·02, 1·06)
Total (95% CI)		**339**		**349**	**100·0%**	**0·59 (0·44, 0·81)**
Total events	73		127			

Heterogeneity: Tau² = 0·04; Chi² = 8·14, D.F. = 6 (P < 0·23); I² = 26%
Test for overall effect: Z = 3·36 (P = 0·0008)

Risk ratio M-H, Random, 95% CI: 0·01, 0·1, 1, 10, 100 — Fluid balance / Fluid imbalance

Complication

-41%*

Study or subgroup	Fluid balance Mean	SD	Total	Fluid imbalance Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI
Lobo (2002)	6·1	0·99	10	10·2	3·55	10	18·1%	−4·10 (−6·38, −1·82)
Brandstrup (2003)	10·8	7·53	69	12·1	10·9	72	16·6%	1·30 (−4·38, 1·78)
Kabon (2005)	7·3	4	124	7	5·4	129	19·7%	0·30 (−0·87, 1·47)
Gonzalez-Fajardo (2009)	8·4	1·39	20	12·4	7·95	20	15·6%	−4·00 (−7·54, −0·46)
Vermeulen (2009)	8·3	4·5	32	12·3	12·7	30	13·1%	−4·00 (−8·80, 0·80)
McArdle (2009)	7·8	0·64	10	16	4·8	11	17·0%	−8·20 (−11·06, −5·34)
Total (95% CI)			**265**			**272**	**100·0%**	**−3·44 (−6·33, −0·541)**

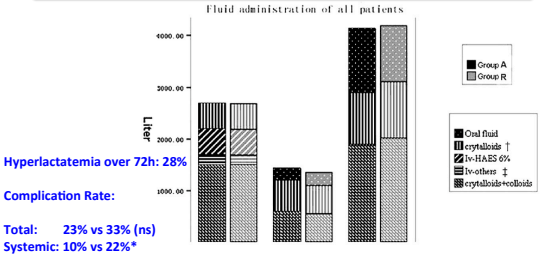
Heterogeneity: Tau² = 10·72; Chi² = 37·86, D.F. = 5 (P < 0·00001); I² = 87%
Test for overall effect: Z = 2·33 (P = 0·02)

Mean difference IV, Random, 95% CI: −10, −5, 0, 5, 10 — Fluid balance / Fluid imbalance

LOS (days)

-3.44*

Restricted peri-operative fluid administration adjusted by serum lactate level improved outcome after major elective surgery for gastrointestinal malignancy



Hyperlactatemia over 72h: 28%

Complication Rate:

Total: 23% vs 33% (ns)
Systemic: 10% vs 22%*

N=214

(Surgery 2010;147:542-52.)

Restricted peri-operative fluid administration adjusted by serum lactate level improved outcome after major elective surgery for gastrointestinal malignancy

64%

Table IV. Number of patients with complications

	Total patients			Patients with supplementary fluid infusion		
	Group A (n = 109)	Group R (n = 105)	P value	Group A (n = 31)	Group R (n = 27)	P value
Overall complications*	25	35	.090	14	23	.013
Major complications†	12	18	.308	5	12	.018
Minor complications†	16	22	.230	12	16	.118
Systemic complications†	11	23	.023	6	17	.001
Local complications†	19	22	.513	11	15	.125

*Number of patients with 1 or more complications.
†Number in subgroups does not add up to the number of overall complications because some patients had more than 1 complication.

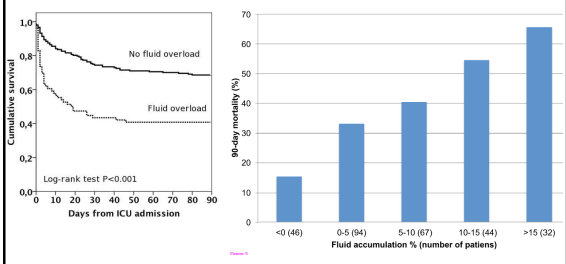
Complication Rate: **45%*** **85%**

N=214

(Surgery 2010;147:542-52.)

Fluid overload is associated with an increased risk for 90-day mortality in critically ill patients with renal replacement therapy: data from the prospective FINNAKI study

Critical Care 2012, **16**:R197 doi:10.1186/cc11682



Fluid overload is associated with an increased risk for 90-day mortality in critically ill patients with renal replacement therapy: data from the prospective FINNAKI study

Critical Care 2012, **16**:R197 doi:10.1186/cc11682

Table 4. Factors associated with 90-day mortality in logistic regression.[a,b]

	Odds ratio (95% confidence interval)	P value
SAPS II score without age points /point	1.048 (1.024-1.074)	<0.001
Age (years) /year	1.046 (1.019-1.074)	0.001
Non-renal SOFA score[c] /point	1.218 (1.075-1.380)	0.002
Presence of fluid overload	2.626 (1.301-5.299)	0.007

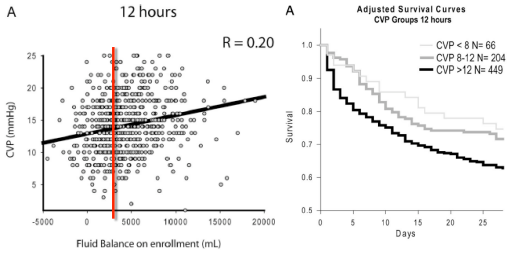
SAPS; Simplified Acute Physiology Score, SOFA; Sequential Organ Failure Assessment.

[a]Only variables with a $P < 0.01$ are presented in the table. Non-significant variables: time from ICU admission to RRT initiation, initial RRT modality, urine output on the day of RRT initiation, colloid use prior to RRT initiation, presence of severe sepsis, lactate, base excess, and plasma creatinine at RRT initiation. [b]Number of patients included in the last step of the model 277. [c]on day of renal replacement therapy initiation.

Fluid resuscitation in septic shock: A positive fluid balance and elevated central venous pressure are associated with increased mortality*

Crit Care Med 2011 Vol. 39, No. 2

John H. Boyd, MD, FRCP(C); Jason Forbes, MD; Taka-aki Nakada, MD, PhD; Keith R. Walley, MD, FRCP(C); James A. Russell, MD, FRCP(C)



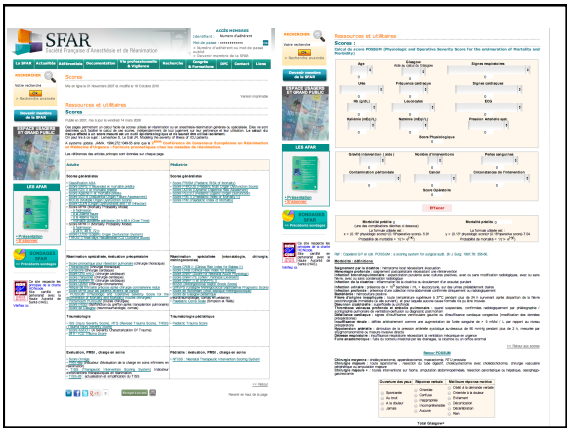
N=778

GDFT

Approches: évaluation dynamique de la courbe de Starling

- Proactive Doppler oesophagien
- Réactive précoce «Fluid responsiveness»
- Réactive tardive Approche «classique»

- Question plutôt de timing que de volume

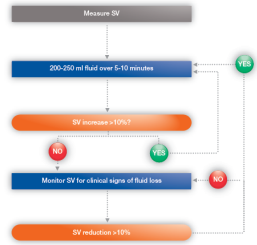


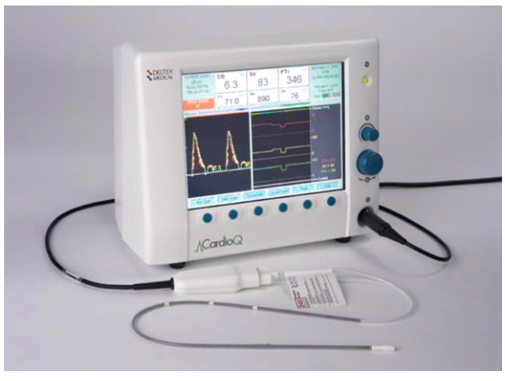
Approche Proactive

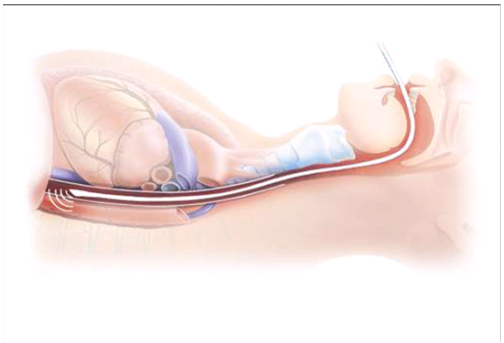
NHS-NICE/Kuper Protocol[4-13]

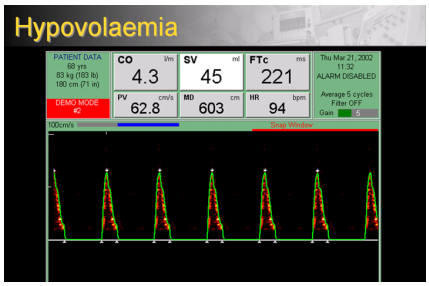
OVERVIEW

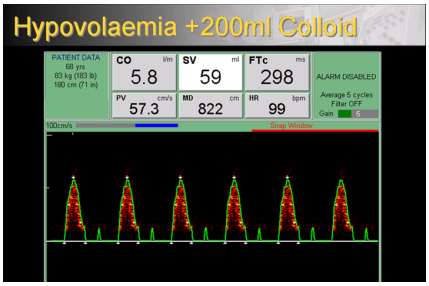
Study Design	Quality improvement program (before-after comparison)
Patient Population	Undergoing emergency and elective abdominal, orthopedic, gynecologic, urologic, and vascular surgery
Inclusion Criteria	Three cohorts of patients aged ≤60, 61-71, and ≥71 years with ASA >I
Target Parameters	Stroke Volume
Intervention	Fluid
Primary Outcomes	3.7-day decrease in hospital length of stay (25%)

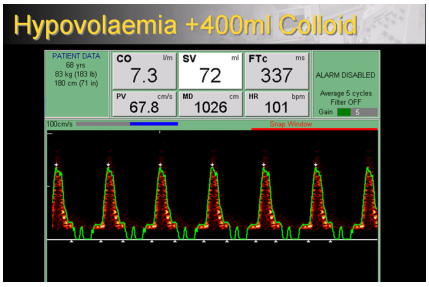








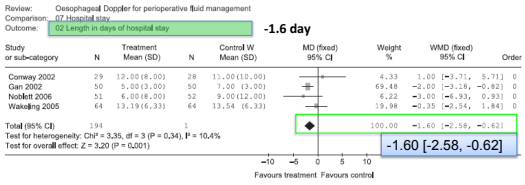




Systematic review of the literature for the use of oesophageal Doppler monitor for fluid replacement in major abdominal surgery

S. M. Abbas[1] and A. G. Hill[2]

Anaesthesia, 2008, **63**, pages 44-51



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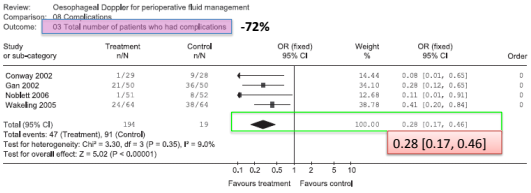

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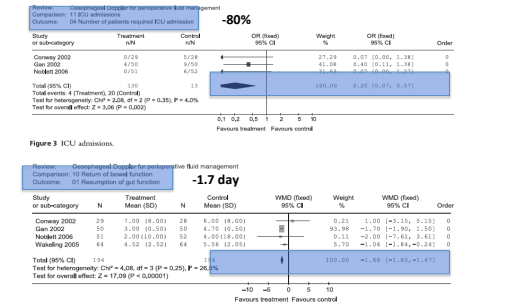


Figure 3 ICU admissions.

Approche Réactive Précoce

Benes Protocol[1]

OVERVIEW

Study Design Randomized controlled trial

Patient Population Undergoing elective abdominal surgery >2 h with expected blood loss >1000 ml

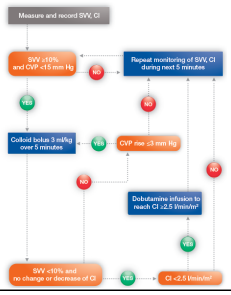
Inclusion Criteria One or more of the following: Ischemic heart disease or severe heart dysfunction, moderate to severe chronic obstructive pulmonary disease, aged 70+, ASA III or more

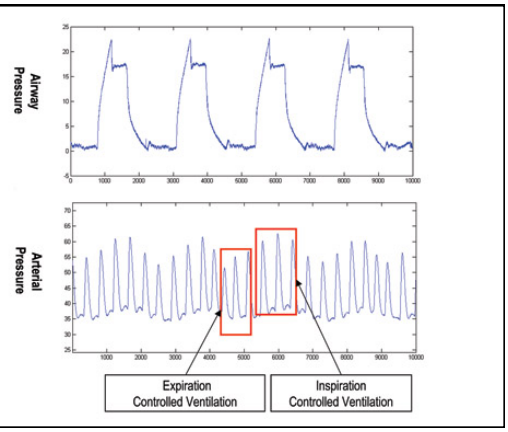
Target Parameters Central Venous Pressure, Stroke Volume Variation, Cardiac Index

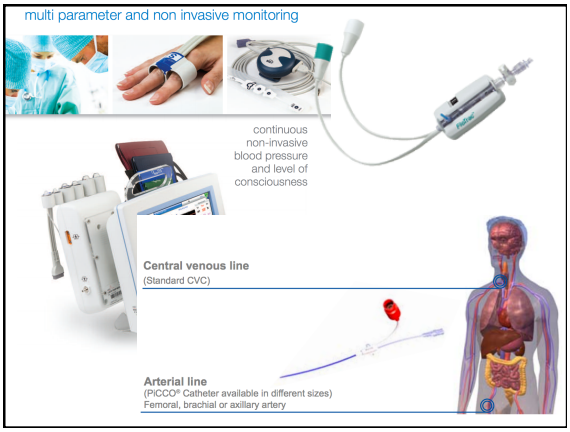
Intervention Fluid (Colloid), Dobutamine

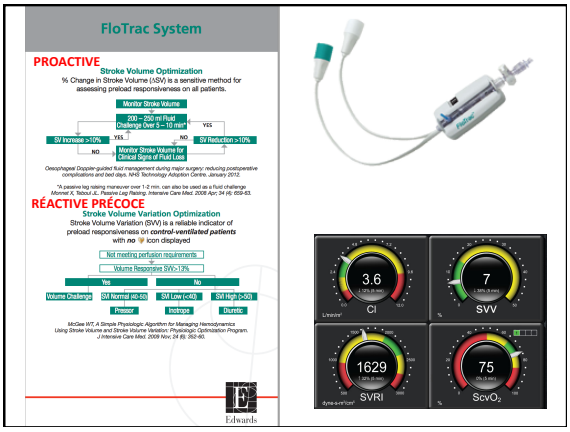
Primary Outcomes Decrease in 30-day postoperative complications (56%), decrease in hospital length of stay (10%)

N=120









Pré-requis

- Monitorage invasif de la tension artérielle
- Accès veineux central
- Rythme cardiaque régulier
- Ventilation contrôlée à 7-8 ml/kg
- Thorax fermé, compliance respiratoire
- Absence d'hémorragie active

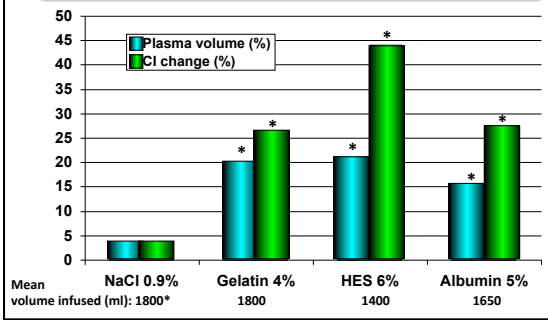
- État de pré-charge dépendance si variation de la pression systolique ou du volume d'éjection de plus de 12% (9%-12% zone grise)

Limitations

- Sous estimation du VÉ pour le doppler oesophagien
- Positionnement sensible
- Sensibilité aux modifications des résistances vasculaires périphériques
- Latence pour l'estimation du facteur K
- Calibration
- En situation clinique, les mesures ne sont pas «interchangeables» avec les mesures thermodilution
- Versus thermodilution: 25-30% d'erreur, concordance 80-95%

Cardiac response is greater for colloid than saline fluid loading after cardiac or vascular surgery

Intensive Care Med (2006) 32:1030–1038



Meta-Analysis GDT

Author	Year	Nb Studies	Nb patients	Main conclusion
Kern	2002	21	2341	Reduction in mortality if started early
Poeze	2005	21	4175	Decreased mortality in high-risk surgery
Giglio	2009	16	3410	Reduced rate of minor and major gastro-intestinal complications
Rahbari	2009	9	971	GDT and restriction decrease morbidity CRS
Brienza	2009	20	4220	GDT decreases risk of renal failure after surgery
Dalfino	2011	26	4188	GDT decreases incidence of postop infections
Gurgel	2011	32	5056	Decreased morbidity and mortality in high-risk surgical patients
Hamilton	2011	29	4805	Decreased morbidity and mortality in moderate and high-risk surgical patients
Corcoran	2012	23	3861	GDT and restriction reduce complications and length of hospital stay

Association of Hydroxyethyl Starch Administration With Mortality and Acute Kidney Injury in Critically Ill Patients Requiring Volume Resuscitation
A Systematic Review and Meta-analysis

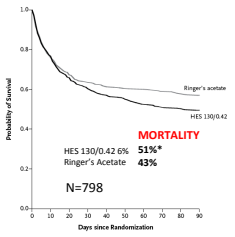
JAMA, February 20, 2013—Vol 309, No. 7

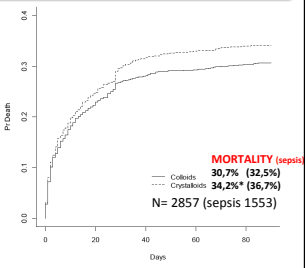
MORTALITY	HES (%)	Crystalloid, others colloids (%)	Effect estimate (RR)
ICU population N= 10290	22,6%*	21,2%	1.09 (1.02, 1.17)
Sepsis N= 4142	33,8%*	31,5%	1.10 (1.01, 1.20)

N=10290

Hydroxyethyl Starch 130/0.42 versus Ringer's Acetate in Severe Sepsis

Effects of Fluid Resuscitation With Colloids vs Crystalloids on Mortality in Critically Ill Patients Presenting With Hypovolemic Shock
The CRISTAL Randomized Trial





N ENGL J MED 367;2 NEJM.ORG JULY 12, 2012

JAMA. doi:10.1001/jama.2013.280502
Published online October 9, 2013.

05/07/13 Les solutions d'hydroxyéthylamidons ne doivent pas être administrées aux malades en phase critique - Rappels et avis - Site Web Canadiens en santé

Gouvernement du Canada / Government of Canada — Canada

Canadiens en santé

Accueil > Rappels et avis

> Contracte > Imprimer > Taille du texte

Les solutions d'hydroxyéthylamidons ne doivent pas être administrées aux malades en phase critique

Rapport d'incident

Date de début :	24 juin 2013
Date d'affichage :	24 juin 2013
Type de communication :	Mise à jour
Sous-catégorie :	Médicaments
Source :	Santé Canada
Problème :	Renseignements importants en matière d'innocuité
Public :	Grand public
Numéro d'identification :	RA-34299

▪ Problème ▪ Renseignements aux médias ▪ Renseignements au public

Problème

Santé Canada et les fabricants d'expanseurs du volume sanguin contenant les solutions d'hydroxyéthylamidons (HEA) déconseillent l'utilisation de ces produits chez les malades en phase critique souffrant de certains problèmes de santé.

Les solutions d'HEA sont utilisées pour remplacer le sang perdu chez les malades en phase critique qui accusent une baisse soudaine de leur tension artérielle (par exemple, à la suite d'une intervention chirurgicale).

Les solutions d'HEA ne doivent pas être administrés aux :

- patients atteints de septicémie (complication grave pouvant survenir à la suite d'une infection),
- patients atteints d'une maladie hépatique grave,
- certains types de patients atteints d'une altération de la fonction rénale.

En résumé

Restriction cristalloïdes

- Morbidité: -43%
- Séjour: -2.0 jours

Optimisation du VÉ avec des colloïdes

- Morbidité: -72%
- Séjour: -1.6 jour
- Mortalité >20%: -80%

Restrictive strategy of intra-operative fluid maintenance during optimization of oxygen delivery decreases major complications after high-risk surgery.

Critical Care 2011, **15**:R226 doi:10.1186/cc10466

- RCT, admission aux SI après chirurgies majeures et dysfonctions d'organes préopératoires (n=88)
- LR 12 ml/kg/h versus 4 ml/kg/h
- Approche fluid challenge (avec gélatine)
- DO2 > 600 ml/min/m2 avec dobutamine
- Aux SI: LR 1.5 ml/kg/h plus algorithme pendant 8 heures

Restrictive strategy of intra-operative fluid maintenance during optimization of oxygen delivery decreases major complications after high-risk surgery.

Critical Care 2011, **15**:R226 doi:10.1186/cc10466

	Conventional group	Restrictive group
Number of patients	43	45
Male (%)	24 (55.8)	21 (47.0)
Age, mean (SD)	68.6 ± 7.3	69.2 ± 9.0
Cancer	29 (67.4)	33 (73.3)
Risk scoring (points), median [15%-75%]	4 [3-4]	3 [3-4]
P- POSSUM physiologic score	24 [20-27]	22 [18-27]
P- POSSUM operative score	15 [11-17]	15 [14-15]
Predicted morbidity rate	61.5 [52.7-82.3]	61.7 [45.7-82.4]
Predicted mortality rate	14.6 [11.2-38.2]	14.5 [9.1-28.9]
Clinical predictors		
Age > 60 years-old (%)	38 (88.3)	40 (88.8)
Arterial hypertension (Difficult controlling)	27 (62.7)	27 (60.0)
COPD	4 (9.3)	4 (8.8)
Diabetes	4 (9.3)	4 (8.8)
EKG alterations	4 (9.3)	4 (8.8)
Previous AMI	1 (2.3)	3 (6.6)
Previous CVA	2 (4.6)	0 (0)
Type of surgery		
Colorectal	30 (69.7)	38 (84.4)
Vascular	10 (23.2)	4 (8.8)
Orthopedic	2 (4.6)	2 (4.4)
Other	1 (2.3)	1 (2.2)

Restrictive strategy of intra-operative fluid maintenance during optimization of oxygen delivery decreases major complications after high-risk surgery.

Critical Care 2011, **15**:R226 doi:10.1186/cc10466

Group	Conventional	Restrictive
Intraoperatively		
Operation time (min)	228 ± 53	250 ± 60
Crystalloid, mL	4335 ± 1546	2301± 1064**
Colloid, mL	915 ± 559	1216 ± 814*
Fluid-challenged patients, n (%)	42 (97.7)	44 (97.7)
Number of fluid challenges per patient	2.4	3.1
Number of positive fluid challenges, n (%)	61 (58.6)	93 (65.0)
Transfused patients (RBC), n (%)	18 (41.8)	19 (42.2)
Red blood cells, units	1.8 ± 0.4	1.9 ± 0.9
Dobutamine doses, µg/kg/min	12.3 ± 7.3	10.9 ± 5.9
Achievers	26 (60.4)	18 (40.0)
Postoperatively		
Crystalloid, mL	1296 ± 1114	1145± 680
Colloid, mL	1321 ± 595	1210 ± 700
Transfused patients (RBC), n (%)	10 (23.2)	11 (24.4)
Red blood cells, units	1.7 ± 0.7	1.5 ± 0.5

Restrictive strategy of intra-operative fluid maintenance during optimization of oxygen delivery decreases major complications after high-risk surgery.

Critical Care 2011, **15**:R226 doi:10.1186/cc10466

Table 5. Major complications in conventional and restrictive groups.

	Conventional	Restrictive	
	43	45	
Cardiovascular complications			
Atrial fibrillation	2 (4.6)	1 (2.2)	
Hypertensive crisis	4 (9.3)	0 (0)	
Pulmonary thromboembolism	0 (0)	1 (2.2)	
Total	6 (13.9)	2 (4.4)	
Tissue-healing complications			
Evisceration	2 (4.6)	0 (0)	
Anastomotic leak	2 (4.6)	1 (2.4)	
Total	4 (9.3)	1 (2.4)	
Infectious complications			
Nosocomial pneumonia	4 (9.3)	6 (13.3)	
Occult septic shock	1 (2.3)	0 (0)	
Peritonitis	2 (4.6)	0 (0)	
Blood stream infection	0 (0)	1 (2.2)	
Wound abscess	2 (4.6)	0 (0)	
Total	9	7	
Other complications			
Extubation failure	1 (2.3)	0 (0)	
Renal dysfunction	1 (2.3)	0 (0)	
Gastrointestinal dysfunction	3 (6.9)	1 (2.2)	**Anticipé**
Total	5	1	
Total number of major complications	24	11	
Number of patients with complications	18 (41.8)	9 (20.0)*	**61.5%**
Number of complications per patient	0.55	0.24	
Outcomes			
LOS in the ICU, median, [IQ]	2.0 [1.0-4.0]	2.0 [2.0-5.0]	
LOS in the hospital, median [IQ]	6.0 [4.0-9.0]	6.0 [4-10]	
30-day mortality rate	2 (4.6)	0 (0)	**14.5%**
60-day mortality rate	3 (6.9)	1 (2.2)	

Les approches liquidiennes périopératoires ciblées

- Restriction liquidienne en cristalloïdes (≈20-30 ml/kg)
- Éviter les solutions riches en chlore
- Identification et correction précoce du déficit intravasculaire pour chirurgies ou patients à risques modérés: RÉACTIVE PRÉCOCE
- Pour la population chirurgicale à haut risque: maintien optimisé du volume d'éjection avec des colloïdes (HES ou gélatines): PROACTIVE

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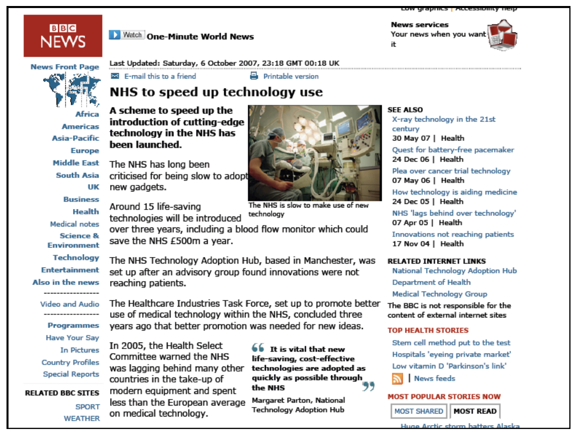
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NHS to speed up technology use

A scheme to speed up the introduction of cutting-edge technology in the NHS has been launched.

The NHS has long been criticised for being slow to adopt new gadgets.

The NHS is slow to make use of new technology

Around 15 life-saving technologies will be introduced over three years, including a blood flow monitor which could save the NHS £500m a year.

The NHS Technology Adoption Hub, based in Manchester, was set up after an advisory group found innovations were not reaching patients.

The Healthcare Industries Task Force, set up to promote better use of medical technology within the NHS, concluded three years ago that better promotion was needed for new ideas.

In 2005, the Health Select Committee warned the NHS was lagging behind many other countries in the take-up of modern equipment and spent less than the European average on medical technology.

"It is vital that new life-saving, cost-effective technologies are adopted as quickly as possible through the NHS"
Margaret Parton, National Technology Adoption Hub

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SFAR
Société Française d'Anesthésie et de Réanimation

Stratégie du remplissage vasculaire périopératoire

Guidelines for perioperative haemodynamic optimization

Validation par le conseil d'administration de la Sfar du 19 octobre 2012.
En collaboration avec l'Adarpef

B. Vallet[a,*], Y. Blanloeil[b], B. Cholley[c], G. Orliaguet[d], S. Pierre[e], B. Tavernier[f]

Rational fluid management: dissecting facts from fiction

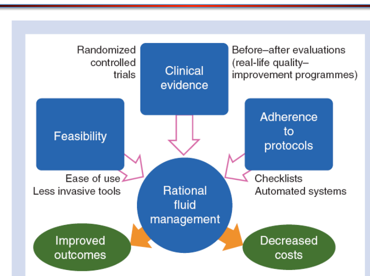


Fig 1 Towards rational perioperative fluid management.

British Journal of Anaesthesia **108** (3): 369–71 (2012)
doi:10.1093/bja/aer511

Rational fluid management: dissecting facts from fiction

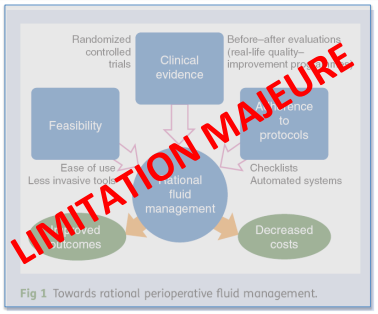
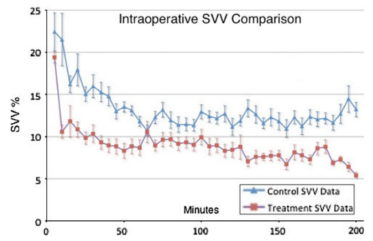


Fig 1 Towards rational perioperative fluid management.

British Journal of Anaesthesia **108** (3): 369–71 (2012)
doi:10.1093/bja/aer511

Outcome impact of goal directed fluid therapy during high risk abdominal surgery in low to moderate risk patients: a randomized controlled trial



J Clin Monit Comput
DOI 10.1007/s10877-012-9422-5

ESTABLISHED IN 1812 JUNE 30, 2011 VOL. 364 NO. 26

Mortality after Fluid Bolus in African Children with Severe Infection

- RCT, sans aveugle, 6 centres africains
- Stratum A: enfants **sans** hypotension sévère (Tas <70 mmHg)
- Ratio 1:1:1, pas de bolus versus NS (40 ml/kg) versus albumine 5% (40 ml/kg) en 1 heure
- Stratum B: enfants **avec** hypotension sévère
- Ratio 1:1,(60 ml/kg) NS versus albumine 5%
- Le groupe pas de bolus développant une hypotension sévère devenait un groupe NS

Outcome impact of goal directed fluid therapy during high risk abdominal surgery in low to moderate risk patients: a randomized controlled trial

Table 4 Data are presented as median differences in hospital outcome measures

Outcome characteristics	GDT (N = 18)	Control (N = 20)	*p* value
Length of stay days	5.0 (3.75–8.25)	7.5 (5.25–10.75)	0.04
POD of return of GI function days	3.0 (2–4)	4.0 (3.25–6)	0.004
POD started on soft diet days	4.0 (2.75–4)	5.0 (4–7)	0.004
Quality of recovery score POD 2 (max = 18)	16.0 (14.75–17)	15.0 (14–15.75)	0.05
Quality of recovery score POD 4 (max = 18)	18.0 (17–18)	16.5 (15–18)	0.03

p values determined by two-tailed Mann–Whitney analysis and values are expressed as median (25–75 % interquartile range). Outcome variables were all significantly better in the GDT group

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Mortality after Fluid Bolus in African Children with Severe Infection

- Enfants de 60 jours à 12 ans
- État fébrile sévère, coma, détresse respiratoire, altération perfusion périphérique, tachycardie >140/min
- Exclusions: malnutrition sévère, gastroentérite, trauma, chirurgie, brûlés

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Mortality after Fluid Bolus in African Children with Severe Infection

- Outcome primaire: mortalité 48 heures
- Outcomes secondaires: mortalité J28, séquelles neurologiques (4 et 24 semaines), hypotension durant 48 h, complications de la ressuscitation (œdème pulmonaire, HTIC, allergie sévère)
- Stratum A: 3141
- Stratum B: 29

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Mortality after Fluid Bolus in African Children with Severe Infection

- Début 2011, le DMC recommande l'arrêt de l'étude car un excès de mortalité est observé

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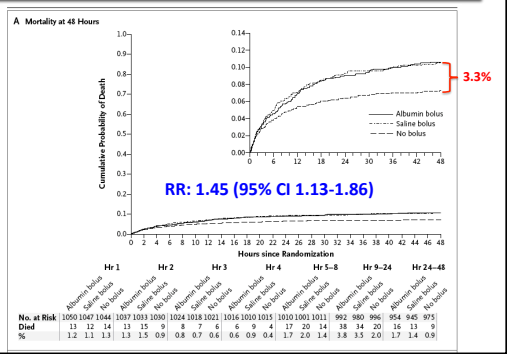
Mortality after Fluid Bolus in African Children with Severe Infection



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Mortality after Fluid Bolus in African Children with Severe Infection

- Hypothèses: la vasoconstriction de tissus non vitaux est un mécanisme de protection efficace et sa disparition rapide par l'administration de bolus importants est délétère.
- Le choc froid est la manifestation d'une dysfonction cardiaque (systolique/ diastolique) détériorée par le remplissage incontrôlé
- En majorité, les décès survenaient suite à un collapsus cardiovasculaire