L'ETO

UNE TECHNIQUE INDISPENSABLE EN REANIMATION

Antoine Vieillard-Baron, Boulogne

3 QUESTIONS

- 1- L'ETO est elle faisable par un réanimateur?
- 2- L'ETO est elle bien tolérée?
- 3- L'ETO est elle supérieure à l'ETT?

I

FAISABILITE

ESICM 2002

Echocardiography in ICU in Europe

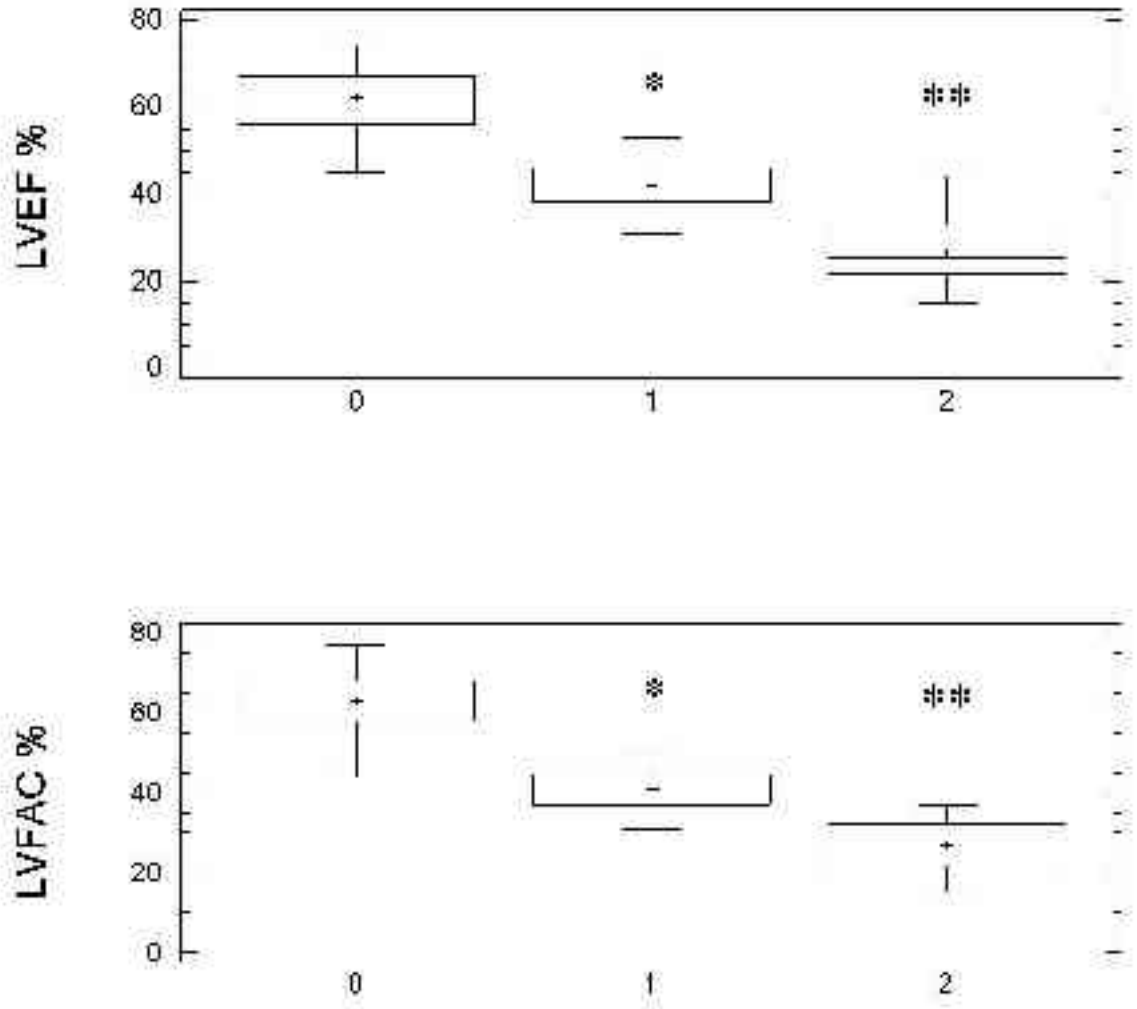
- 144 European ICUs
- Type : medical and surgical (63%), surgical (22%), medical ICUs (9%), pediatric(6%)
- Permanent access to echocardiography : 66%
- Echo machine in the ICU : 49%
- TEE performed in 82% of ICUs
  - < 10 exams / week in 48% of cases
    > 20 exams/ week in 9% of cases

ESICM 2002

Who performs echo examinations in ICUs ?

	TTE	TEE
Cardiologist	54%	46%
Intensivist	59%	39%

DES OBJECTIFS SIMPLES



II

TOLERANCE

Table 4—*Contraindications to TEE Examination*

Absolute contraindications
Esophageal pathology
Stricture
Mass or tumor
Diverticulum
Mallory-Weiss tear
Dysphagia or odynophagia not previously evaluated
Cervical spine instability
Relative contraindications
Esophageal varices
Recent esophageal or gastric surgery
Oropharyngeal carcinoma
Upper GI bleeding
Severe cervical arthritis
Atlantoaxial disease

Beaulieu et al. Chest 2005

Complications de l'ETO

- **Ambulatoire :**
  - Mortalité : 0,0098 (10218 patients, Daniel Circulation 1991)-0,026 (3827 patients, Seward JASE 1992)

- **Perforation oesophagienne : quelques cas (2 Amiens) entre des mains expertes.**

  - Complications majeures : bronchospasme, tachycardie ventriculaire, insuffisance cardiaque : 0,2% (Seward JASE 1992;5:288) à 0,5 (Khandheria JACC 1991)
  - Complications mineures : 2,7% (Seward JASE 1992;5:288)

The use and safety of transoesophageal echocardiography in the general ICU – a minireview

E. Heidemann[1], C. Schelenz[1], F. Kara[1], K. Chatzinikolaou[2] and K. Reinhart[1]
[1]Department of Anaesthesiology and Intensive Care Medicine, University Hospital, Friedrich-Schiller-University, Jena, Jena, Germany, and [2]Department of Intensive Care, Hippocration General Hospital, Thessaloniki, Greece

Acta Anaesthesiologica Scandinavia 2004

Complications of TEE in the ICU (21 studies with $n = 2508$ examinations).

Category	Details	n
Airway	Displacement of tracheostomy tube (1), pulmonary aspiration during tracheal intubation before TEE (1)	2
Ventilation	Respiratory failure (1), transient hypoxia (4)	5
Circulation	Hypotension (15), hypertension (4), increase in pulmonary artery pressure (1)	20
Arrhythmias	Atrial flutter, – fibrillation (5), VES (1)	6
Cardiac arrest	Circumstances not further specified (1), due to abruptly discontinued inotropic support but successful resuscitation– not related to TEE study (1)	2
Seizures	Grand mal seizure (1)	1
Vomitus	(1)	1
Coughing	(7)	7
Oropharyngeal mucosal lesions	Superficial mucous lesion (1), self-terminating oral blood suffusion (16), oropharyngeal bleeding (1)	17
Removal of feeding tubes	Unintentional dislodgement of nasogastric or nasojejunal feeding tubes (21)	20
	Total	81 (3.5%)
	Excluding complications related to tube dislodgement	61 (2.6%)

In a total of 2,508 TEE in the ICU 81 (3.5%) complications were described. If the dislodgement of feeding tubes is excluded because the relevance is debatable and it remains unclear whether it has been systematically noted 61 (2.6%) complications occurred.

III

EFFICACITE

EFFICACITE DIAGNOSTIQUE

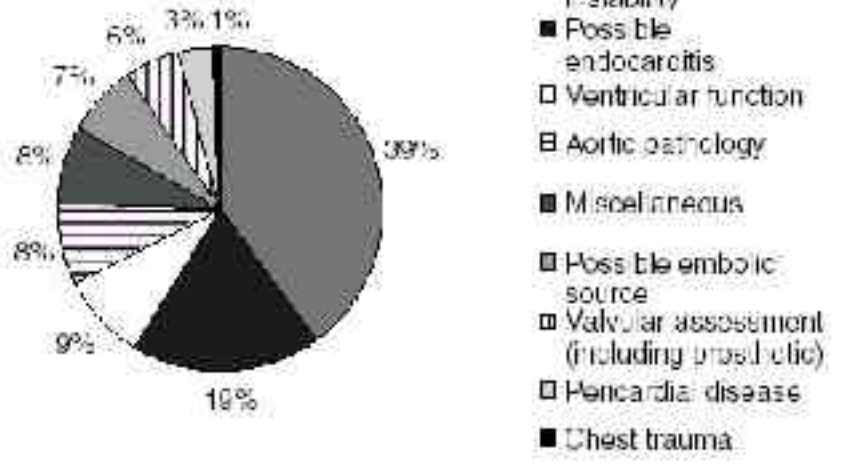


Fig. 1. Indications for performing a TEE for 2508 studies in an ICU.

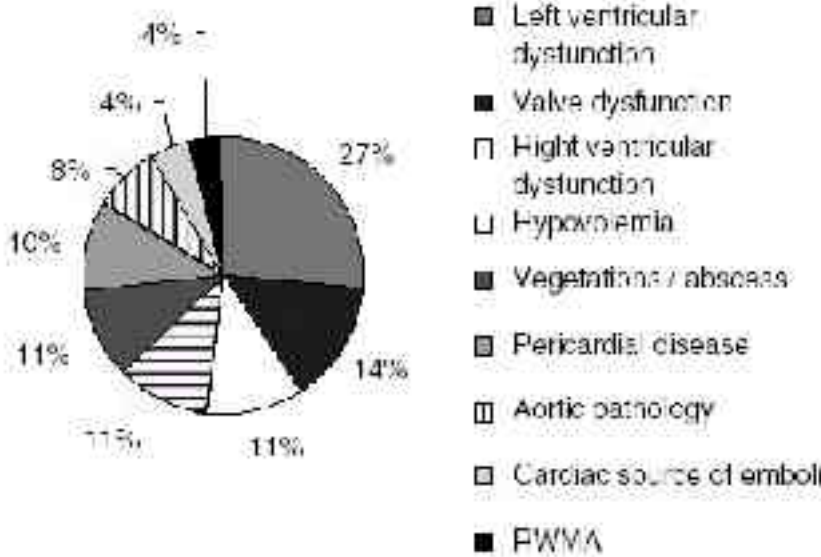


Fig. 2. Diagnosis established by TEE in the ICU based on 2508 studies.

Huttemann et al. Acta Anaesthesiologica Scandinavia 2004

EFFICACITE THERAPEUTIQUE

Auteurs (années)	Patients (n)	Impact thérapeutique (%)
Oh (1990)	51	24
Vignon (1994)	96	44
Heidenreich (1995)	61	68
Poelaert (1995)	108	43
Sohn (1995)	124	52
Slama (1996)	61	20
Colreavy (2002)	255	34

Transthoracic Echocardiography Is Not Cost-Effective in Critically Ill Surgical Patients

[Original Articles]

Cook, Charles H. MD, FACS; Praba, Anant C. MD; Beery, Paul R. MD; Martin, Larry C. MD, FACS

J Trauma 2002

173 TTE chez 166 pts (78% en VM)
38,2% de TTE jugées anatomiquement de qualité insuffisante
43 ETO durant la période de l'étude: seulement 4% d'échec, pas de complication

Table 2 Demographic Data for Patients Undergoing TTE, Grouped by Technical Adequacy

	TTE Success	TTE Failure	p Value
Total patients	107	66	
Mean age (y)	56.0	61.2	0.20
Mean weight (kg)	80.1	85.5	0.15
Mechanical ventilation	77	52	0.31
Mean PCWP (mm Hg)	22.3	21.7	0.66
Mean CO (L/min)	6.4	7.6	0.26
Mean EF (%)	56.0	55.2	0.74
Mean creatinine (mg/dL)	1.06	1.59	0.74
Mean total bilirubin (mg/dL)	3.12	2.21	0.26
With inotrope	70	40	0.52
With vasopressor	67	41	0.95

TTE, transthoracic echocardiography; TEE, transesophageal echocardiography; PEEP, positive end-expiratory pressure; PCWP, pulmonary capillary wedge pressure; CO, cardiac output; EF, ejection fraction.

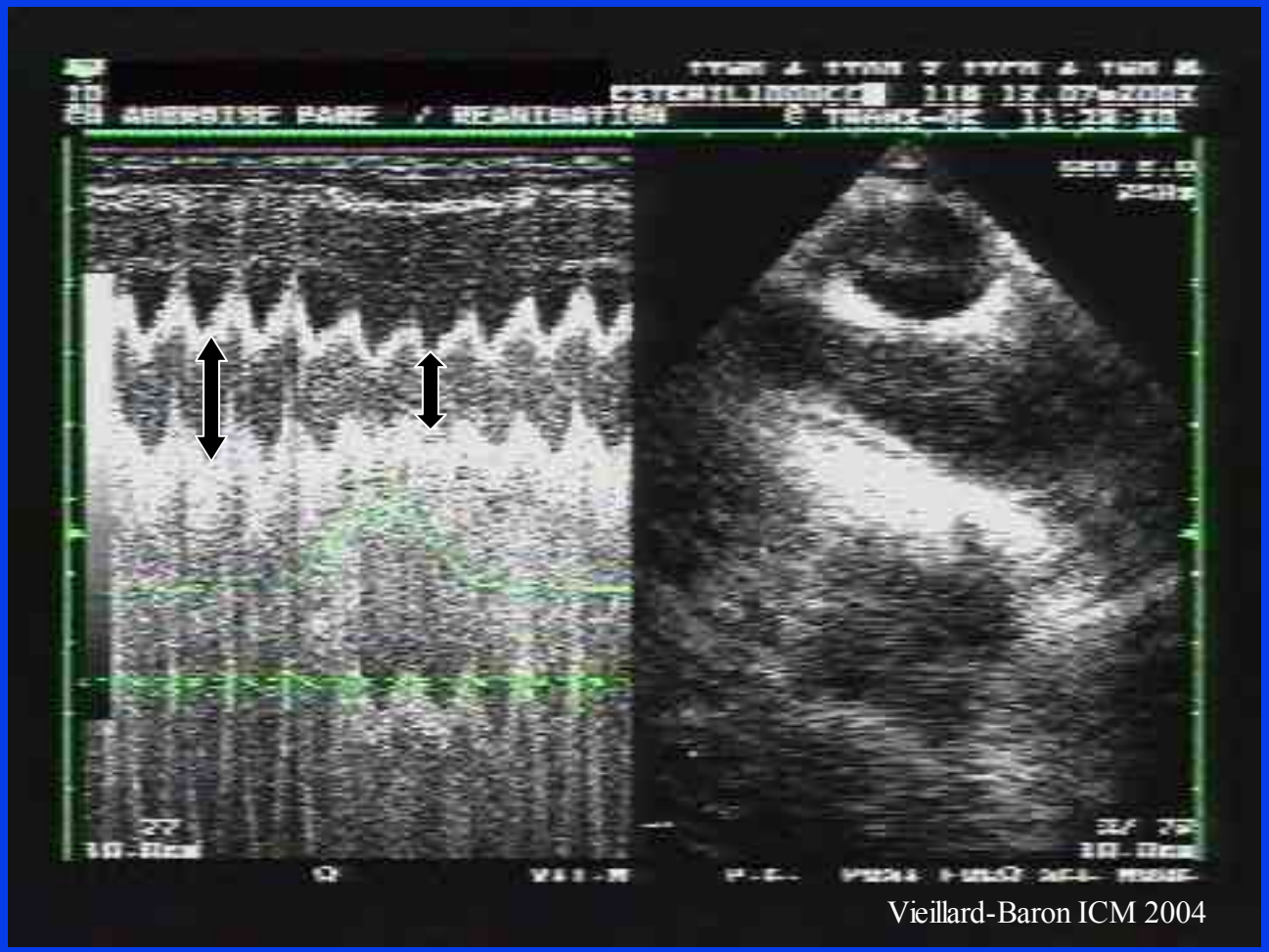
Table 3 Subset Analysis of Demographic Data for Patients Undergoing TTE

	TTE Success	TTE Failure	p Value
>10% weight gain	28 of 97	27 of 53	0.007
PEEP >15 cm H_2O	11 of 77	16 of 52	0.024
With chest tube	5 of 107	11 of 66	0.008

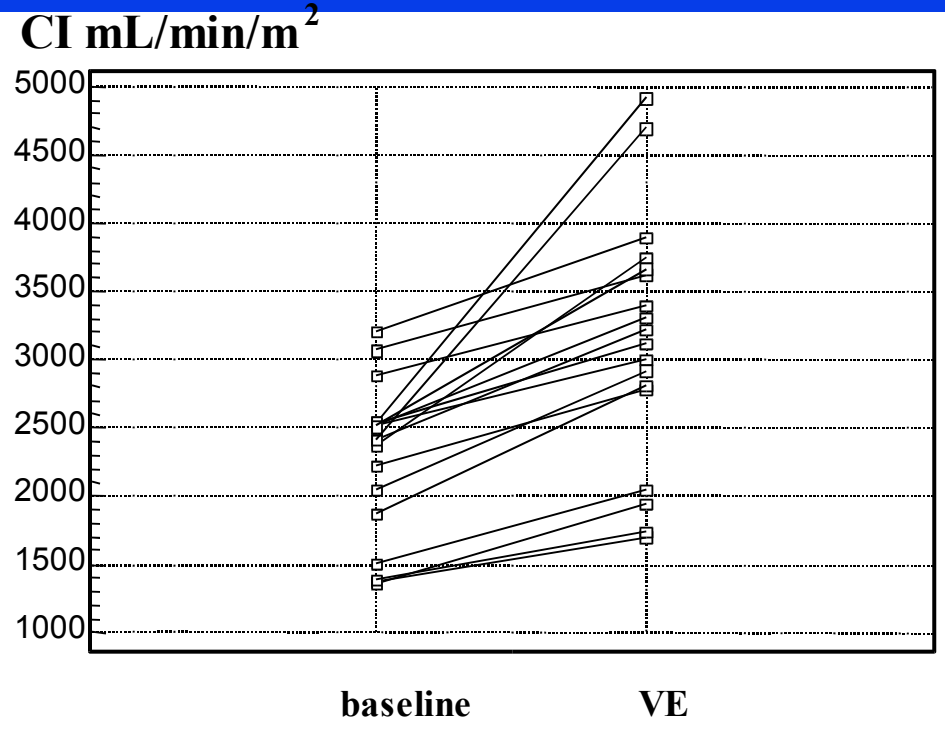
TTE, transthoracic echocardiography; TEE, transesophageal echocardiography; PEEP, positive end-expiratory pressure.

UN PARAMETRE INDISPENSABLE: L'ETUDE DE LA VCS

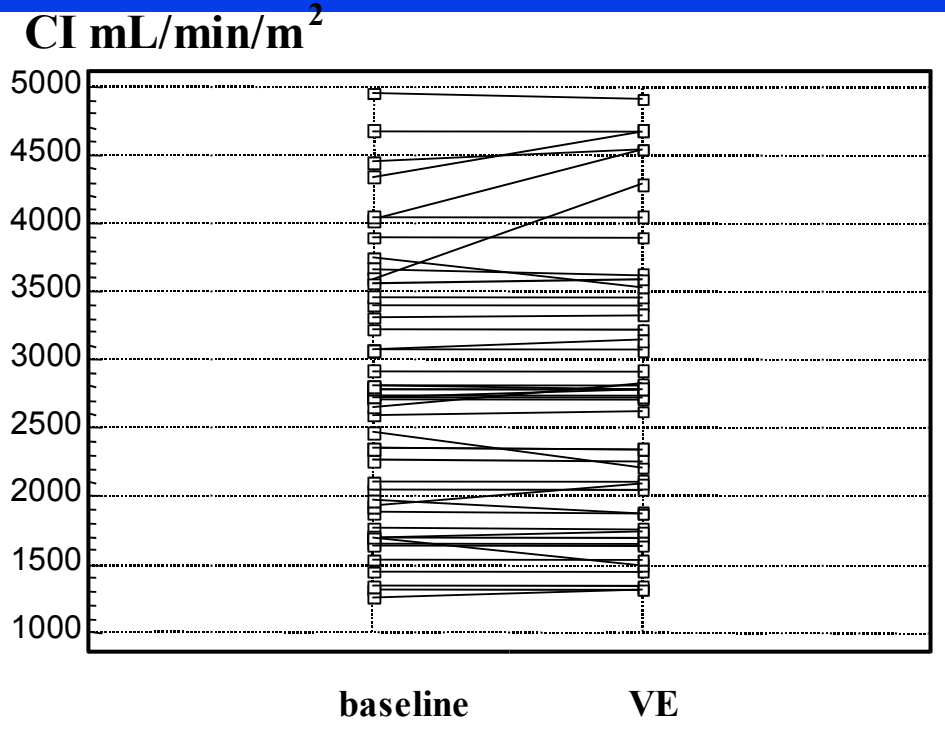
Index de collapsibilité VCS = D_{max} - D_{min} / D_{max}



Vieillard-Baron ICM 2004



SVC collapsibility > 36%



SVC collapsibility ≤ 36%

Table 4 Summary of Costs for Three Echocardiographic Strategies Used to Evaluate Critically Ill Surgical Patients[a]

	Scenario 1	Scenario 2	Scenario 3
TTE cost per patient			
Facility fee ($)	430.77	430.77	430.77
Professional fee ($)	169.20	169.20	169.20
Patients (n)	173	0	104
Total TTE costs ($)	103,794.91	0	62,396.88
TEE cost per patient			
Facility fee ($)	450.35	450.35	450.35
Professional fee ($)	226.80	226.80	226.80
Patients (n)	65	173	100 TTE failures 31 Primary TEE 69
Total TEE costs ($)	44,691.00	117,146.95	67,715.00
Total cost ($)	148,485.71	117,146.95	130,111.88
Overall cost per patient ($)	856.30	677.15	752.09

TTE, transthoracic echocardiography; TEE, transesophageal echocardiography.

[a] Scenario 1 patients all have TTE as a screen, with TEE used in those with failed studies. Scenario 2 patients have TEE alone. In scenario 3, low-risk patients undergo TTE, whereas high-risk patients undergo TEE. Low-risk patients who fail TTE subsequently receive TEE in scenario 3. The number of patients (n) represents the number of subjects in the study.

Cook et al. J Trauma 2002

CONCLUSION

- 1- L'ETO est elle faisable par un réanimateur?

  OUI

- 2- L'ETO est elle bien tolérée?

  BIEN SÛR

- 3- L'ETO est elle supérieure à l'ETT?

  TRES LARGEMENT

HOPITAL AP, REANIMATION

- Janvier 2005 à septembre 2005
  - 500 échocardiographies
    - » 234 ETO chez 25% des malades
      - 2,6 ETO/malades
    - » 266 ETT chez 39% des malades