

INTERET DE L'ECHOCARDIOGRAPHIE EN REANIMATION

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ECHOCARDIOGRAPHY

“A FUNCTIONAL HEMODYNAMIC MONITORING”

- **Examen non invasif**
 - “provide a highly detailed, real-time examination of cardiac anatomy and function... at bedside”.
 - » Feigenbaum, circulation 1996
- **Valeur diagnostique**
 - IRA, ICA, douleur thoracique
- **Valeur thérapeutique**
 - besoins en remplissage, adaptation des amines dans le choc septique, réglage du ventilateur dans le SDRA.....

Transthoracic Echocardiography To Identify or Exclude Cardiac Cause of Shock*

Joseph et al. Chest 2005

Table 2—Detection of Cardiac Cause of Shock by Echocardiography*

Variables	Final (Clinical) Diagnosis of Cardiac Cause of Shock	
	Present (n = 63)	Absent (n = 37)
Echo positive for cardiac cause (n = 64)	62	2
Echo negative for cardiac cause (n = 35)	1	35

Table 3—Change in Management After TTE

Change in Management	No. of Patients
Medical therapy	29
Surgery	19
Pericardiocentesis	4
Aortic balloon pump	3
Thrombolysis	2
Angioplasty	1

I

EVALUER LES BESOINS EN REMPLISSAGE

J. Boldt
M. Lenz
B. Künle
M. Papsdorf

Volume replacement strategies on intensive care units: results from a postal survey

ICM 1998

Table 4 What are your indicators for volume replacement (diagnostic tools)? (*CVP* central venous pressure, *PCWP* pulmonary capillary wedge pressure, *COP* colloid osmotic pressure, *SvO₂* mixed venous oxygen saturation, *pHi* gastric intramucosal pH, *TEE* transesophageal echocardiography, *ITBV* intrathoracic blood volume)

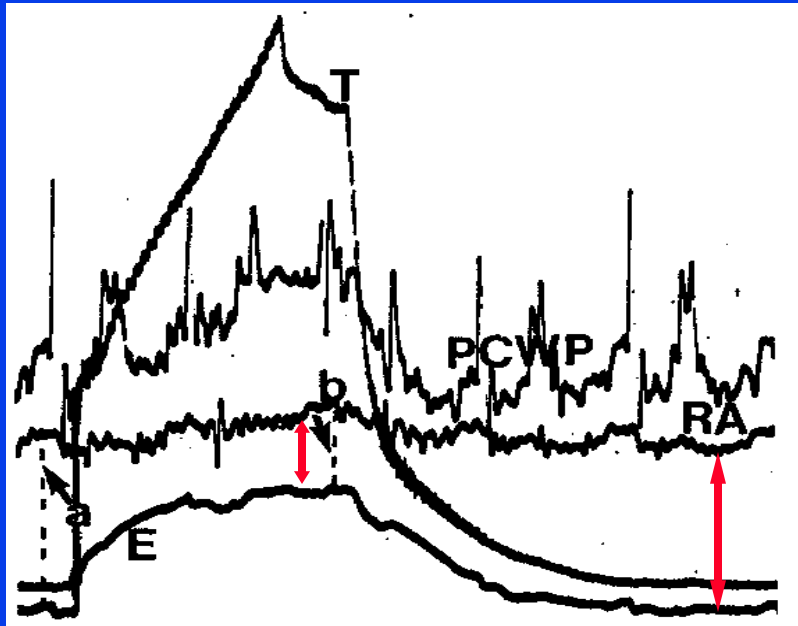
"Tool"	No. (%) of ICUs ^{a,b}
Clinical experience	215 (75.1)
CVP	267 (93.3)
PCWP	167 (58.3)
Miscellaneous	158 (55.2)
Specified	95 (33.2)
Blood pressure	64 (22.3)
COP	7 (2.4)
TEE	5 (1.7)
"Shock index"	4 (1.4)
"Swing" in blood pressure	3 (1)
SvO ₂	3 (1)
ITBV	2 (0.7)
pHi	1 (0.3)

^a Multiple answers (combinations) were given

^b Percentages based on 286 responders



« L'analyse de la variabilité respiratoire du diamètre de la VCS en ETO ainsi que l'analyse de la variabilité respiratoire du volume d'éjection VG par échocardiographie ou Doppler œsophagien sont un indice prédictif de la réponse au remplissage »



Antoine Vieillard-Baron
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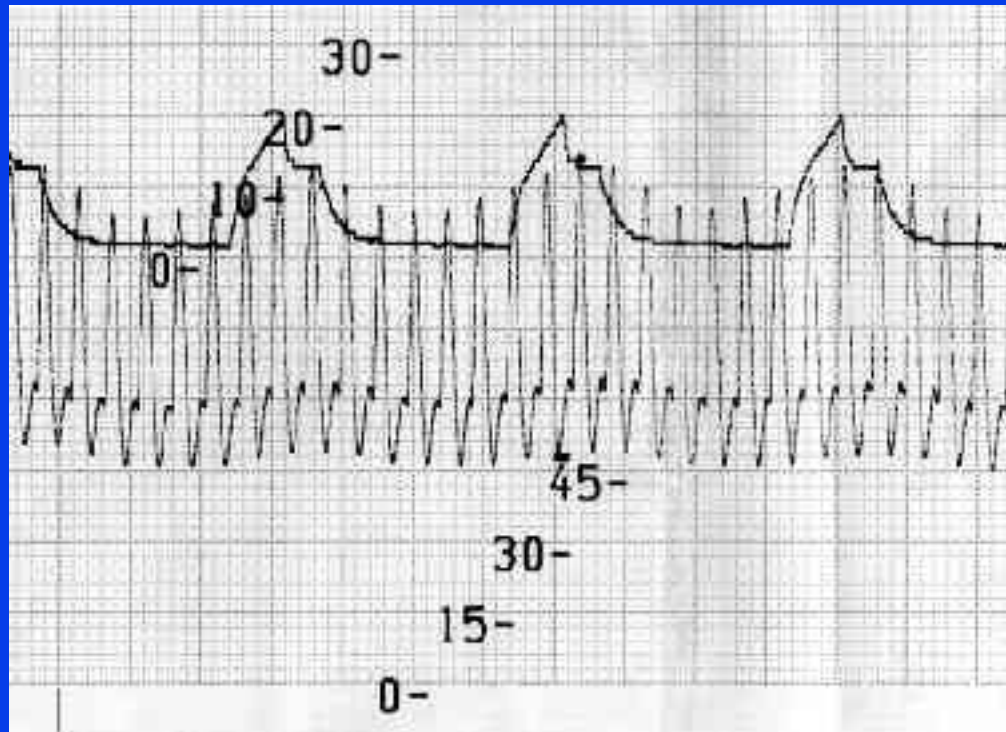
**Superior vena caval collapsibility as a gauge
 of volume status in ventilated septic patients**

ICM 2004



- **Homme, 29 ans, intoxication polymédicamenteuse**
 - ALI, pneumopathie d'inhalation
 - Sepsis
- **VAC**
 - 8 ml/kg, PEEP 5, PP 23
- **Insuffisance circulatoire aiguë**
 - NA 2 mg/h IVSE
 - PAS 110 mmHg
 - Tachycardie (FC 120/mn)

ΔPP 11%





Etat basal
CI = 2,5 l/min/m²



Après remplissage
CI = 4,9 l/min/m²

=> Diminution Fc
Arrêt NA

II

**DIAGNOSTIQUER UN OAP
CARDIOGENIQUE OU
LESIONNEL**

BEN...S (H 22 ans)

**Hospitalisé pour diarrhée fébrile
(Salmonellose)**

Hypotension artérielle

=> remplissage vasculaire

**=> œdème aigu du poumon
IOT/VAC**

OAP hémodynamique ou lésionnel ?



1- OAP cardiogénique

2- OAP lésionnel



1- OAP cardiogénique

2- OAP lésionnel



Myocardite
OAP cardiogénique



Choc septique
OAP lésionnel

III

ADAPTER LES AMINES DANS LE CHOC SEPTIQUE

Clinical Commentary

Hemodynamic Instability in Sepsis Bedside Assessment by Doppler Echocardiography

Antoine Vieillard-Baron, Sebastien Prin, Karim Chergui, Olivier Dubourg, and François Jardin

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AJRCCM 2003; 168: 1270-1276

- **Femme, 66 ans**
 - Lymphome B à grandes cellules (BOM dans le service)
- **Choc septique**
 - E Coli
 - Point de départ urinaire
- **IRA**
 - Rx Thorax subnormale
 - VAC
 - PaO₂ 133 mmHg, FiO₂ 0,5
 - PaCO₂ 30 mmHg
- **ICA**
 - HypoTA
 - pH 7,07
 - BE -10

ETO J1



1- Remplissage

2- Inotrope

3- Vasoconstricteur

4- Rien

NA 7 mg/h
Normalisation TA
pH 7,43
BE -2



- J 3
- Nouvelle dégradation hémodynamique

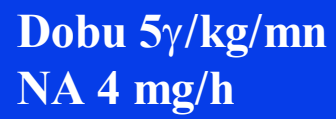


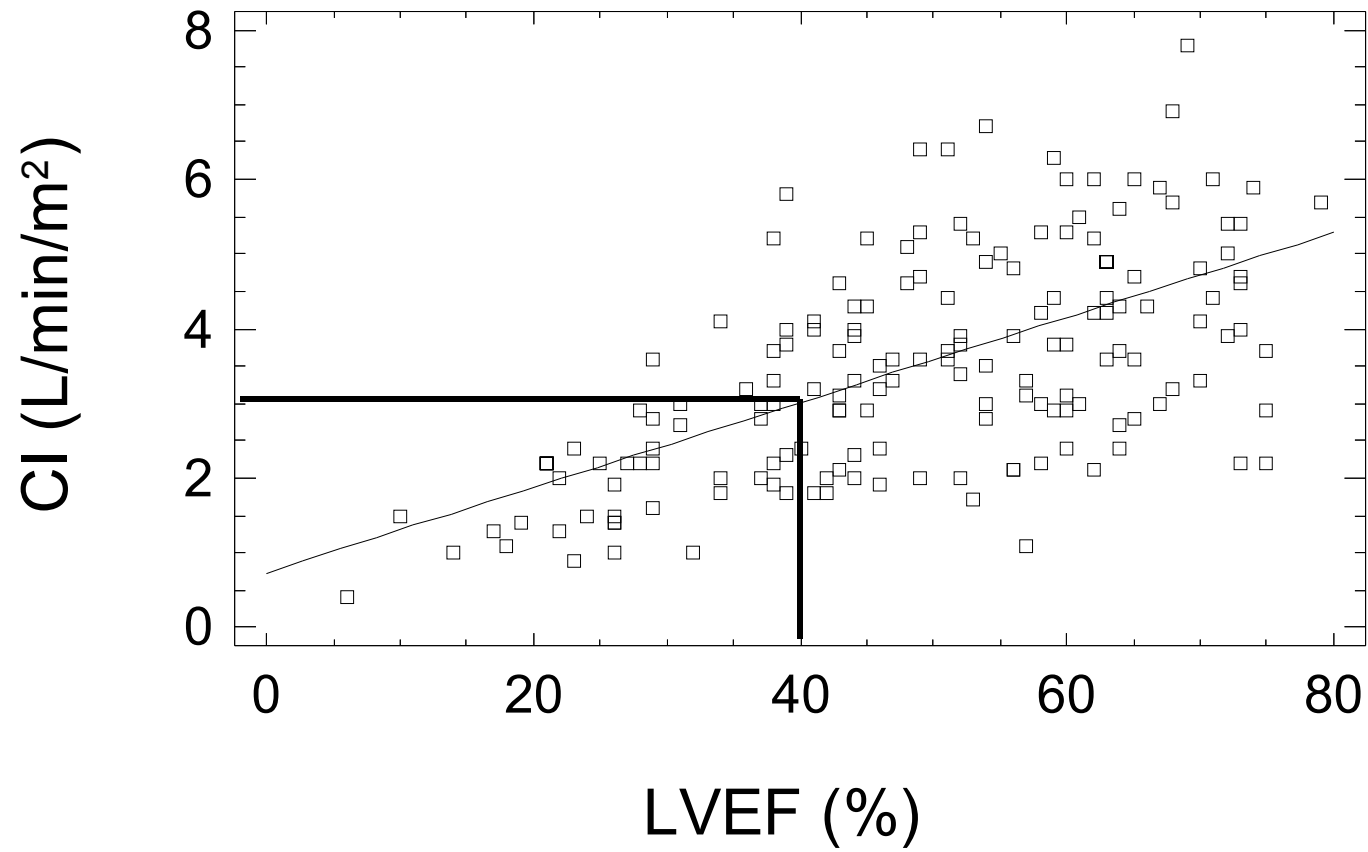
1- Remplissage

2- Inotrope

3- Vasoconstricteur

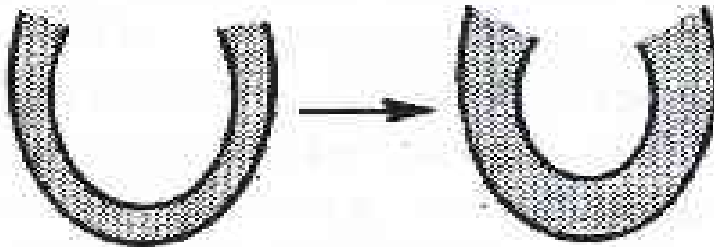
4- Rien





EARLY PRELOAD ADAPTATION

Early phase of septic shock



LVEDV = 200 ml

LVESV = 150 ml

SV = 50 ml

EF = 200 ml - 150 ml / 200 ml = 25%

Recovery of septic shock



LVEDV = 100 ml

LVESV = 50 ml

SV = 50 ml

EF = 100 ml - 50 ml / 100 ml = 50%

	LVEDV (cm ³ /m ²)	LVESV (cm ³ /m ²)
1988-1989: 21 patients	73 ± 20	29 ± 10
1993-1994: 32 patients	66 ± 18	26 ± 18
1989-1993: 90 patients	69 ± 24	36 ± 20
1997-1999: 40 patients	61 ± 17	22 ± 8

IV

**PRENDRE EN CHARGE
LE CPA**

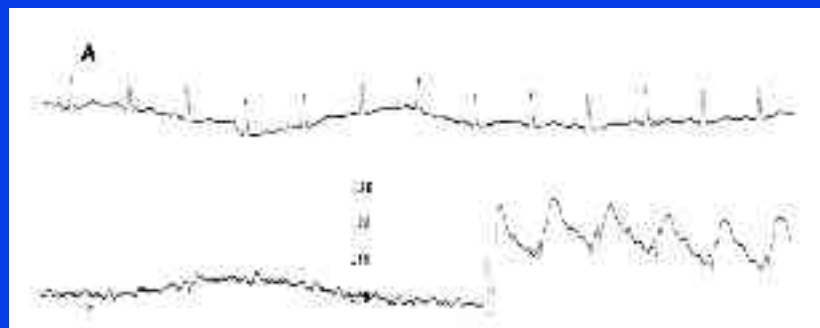
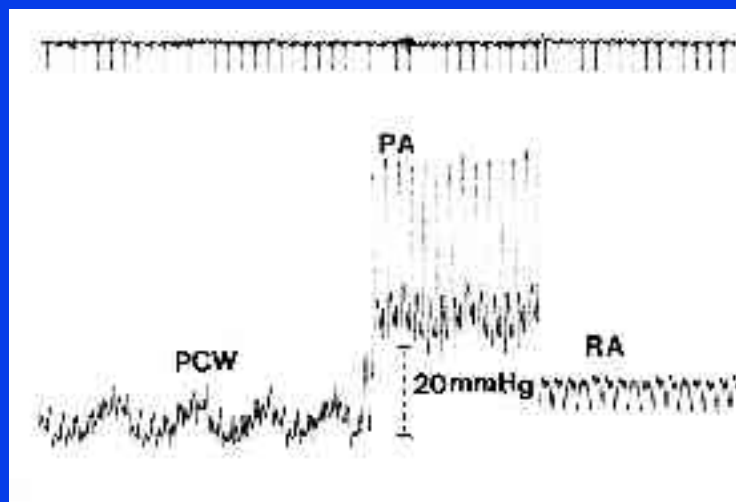
Clinical Commentary

Echo-Doppler Demonstration of Acute Cor Pulmonale at the Bedside in the Medical Intensive Care Unit

Antoine Vieillard-Baron, Sebastien Prin, Karim Chergui, Olivier Dubourg, and François Jardin

Medical Intensive Care Unit, and Department of Cardiology, University Hospital Ambroise Paré, Assistance Publique Hôpitaux de Paris, Boulogne, France

AJRCCM 2002; 166: 1310-1319

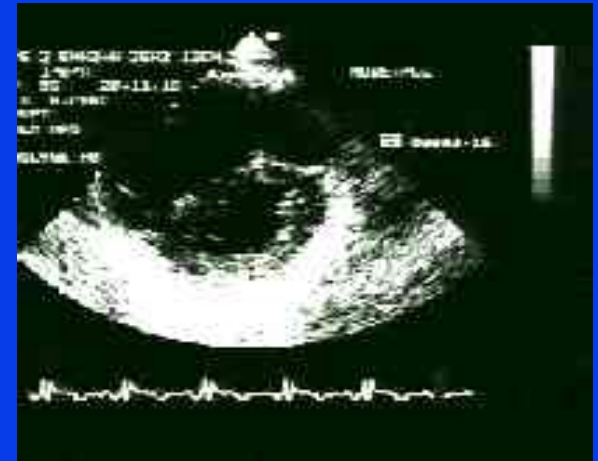


BLO...E

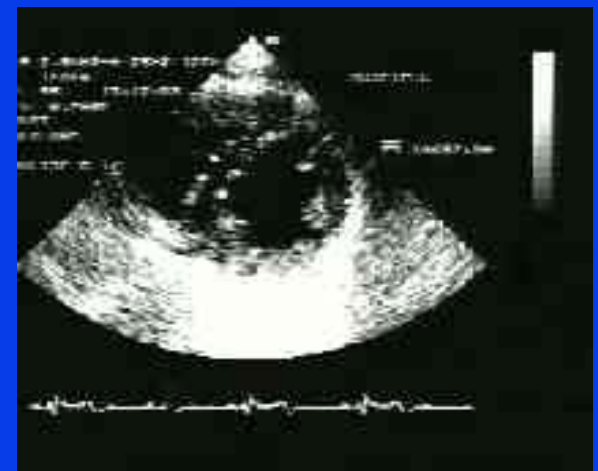
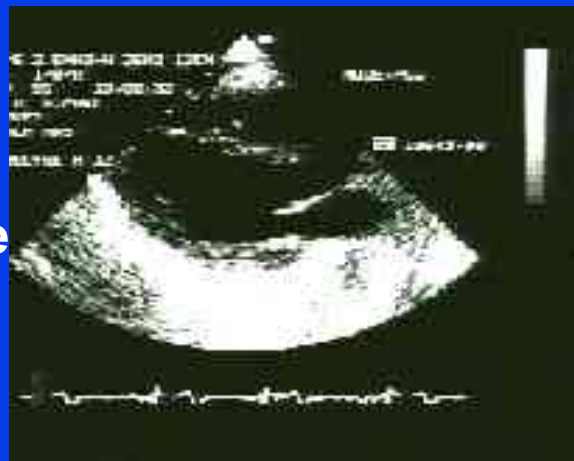
F 21 ans (appendicectomie 10 jours avant)

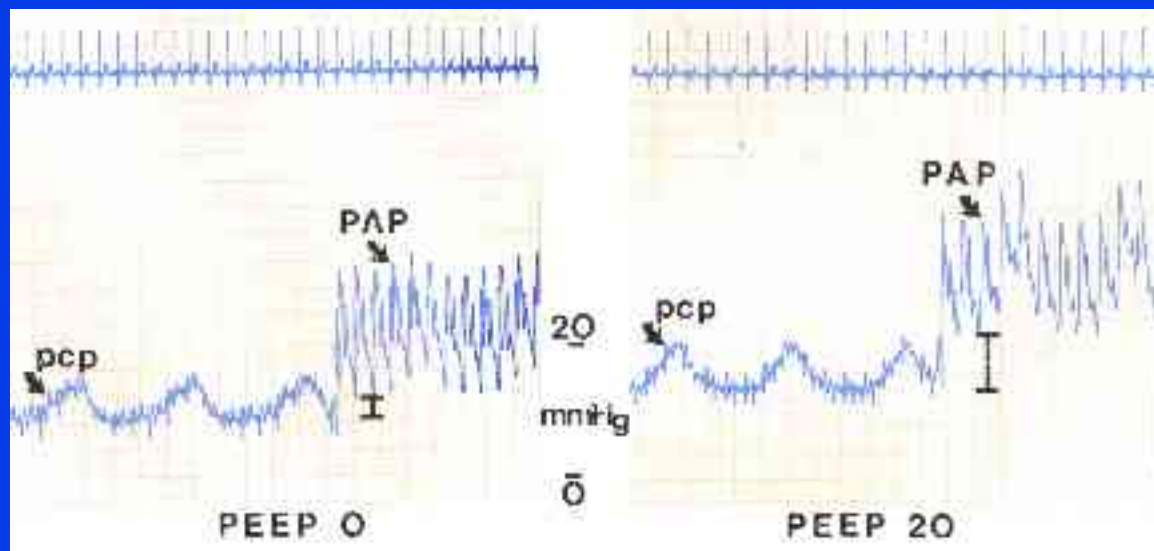
Insuffisance circulatoire

Avant fibrinolyse



12 H après fibrinolyse





V

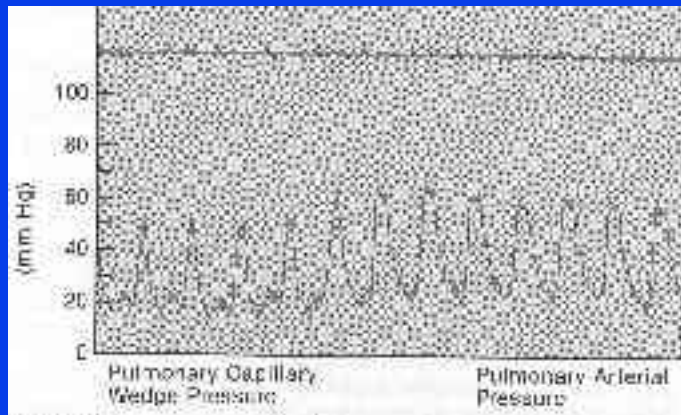
**PRENDRE EN CHARGE UNE
DOULEUR THORACIQUE**

- **Mill... 37 ans**

- **IDM inférieur**



- **OAP nécessitant la mise sous VAC**
» **ETO**

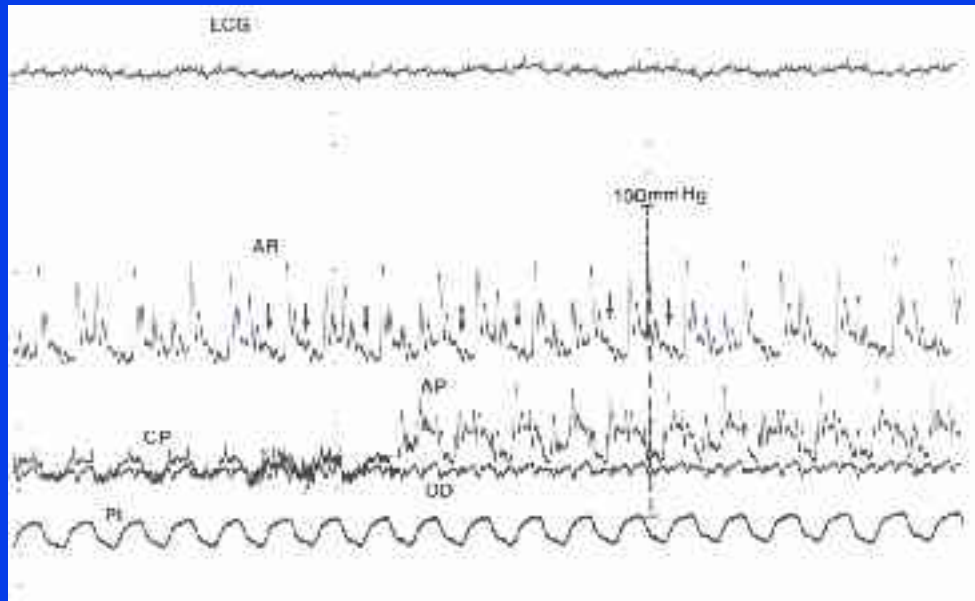


From Braunwald



VI

**DIAGNOSTIQUER ET PRENDRE
EN CHARGE UNE TAMPONNADE**



Diastolic collapse of the right ventricle with cardiac tamponade: an echocardiographic study.

Armstrong WF, Scholt DF, Helper DJ, Dillon JC, Feigenbaum H.

Circulation 1982; 65: 1491-1496





Practice Guidelines for Perioperative Transesophageal Echocardiography: A Report by the American Society of Anesthesiologists and the Society of Cardiovascular

Anesthesiology 1996; 84: 986-1006

Intraoperative evaluation of acute, persistent, and life-threatening hemodynamic disturbances in which ventricular function and its determinants are uncertain and have not responded to treatment

Intraoperative use in valve repair

Intraoperative use in congenital heart surgery for most lesions requiring cardiopulmonary bypass

Intraoperative use in repair of hypertrophic obstructive cardiomyopathy

Intraoperative use for endocarditis when preoperative testing was inadequate or extension of infection to perivalvular tissue is suspected

Preoperative use in unstable patients with suspected thoracic aortic aneurysms, dissection, or disruption who need to be evaluated quickly

Intraoperative assessment of aortic valve function in repair of aortic dissections with possible aortic valve involvement

Intraoperative evaluation of pericardial window procedures