PRISE EN CHARGE HEMODYNAMIQUE AU COURS DU SDRA PAR ECHOCARDIOGRAPHIE

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I

POURQUOI S'INTERESSER A L'HEMODYNAMIQUE DANS LE SDRA?

PubMed: 1993-2003

- "ARDS and mechanical ventilation": 1852 références
- "ARDS and PEEP": 773 références
- "ARDS and tidal volume": 393 références

- "ARDS and Swan Ganz": 12 références
- "ARDS and echocardiography": 14 références

FREQUENCE DE L'INSUFFISANCE CIRCULATOIRE

- 401 SDRA pendant la durée de l'étude
  - 53% avec une insuffisance circulatoire associée
  - 26% dans un contexte de sepsis sévère ou de choc septique

ALIVE study, ICM 2003

IMPACT PRONOSTIC DE L'INSUFFISANCE CIRCULATOIRE

- 150 SDRA
  - Oct 1993 à Dec 2001
- Ventilation protectrice
  - VT 8-9 ml/kg
  - PEEP 7 cmH_2O
  - FR 15-16/mn
  - Pplateau 25 cmH_2O

Table 4. Influence on mortality of the grade of circulatory failure (CF) at admission

CF Grade	n	Predicted Mortality, %	Observed Mortality, %	SMR
0	39	33	5	0.15
1	33	50	12	0.24
2	16	55	31	0.56
3	62	85	74	0.87

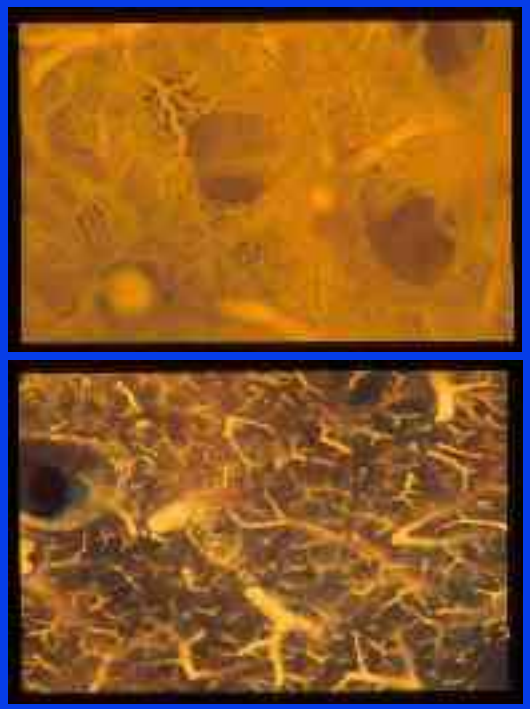
SMR, standard mortality ratio. Observed mortality is the actual mortality; predicted mortality is obtained by Simplified Acute Physiologic Scale II (see METHODS).

Chi square test for observed mortality: $p = .0000$.

Page CCM 2003

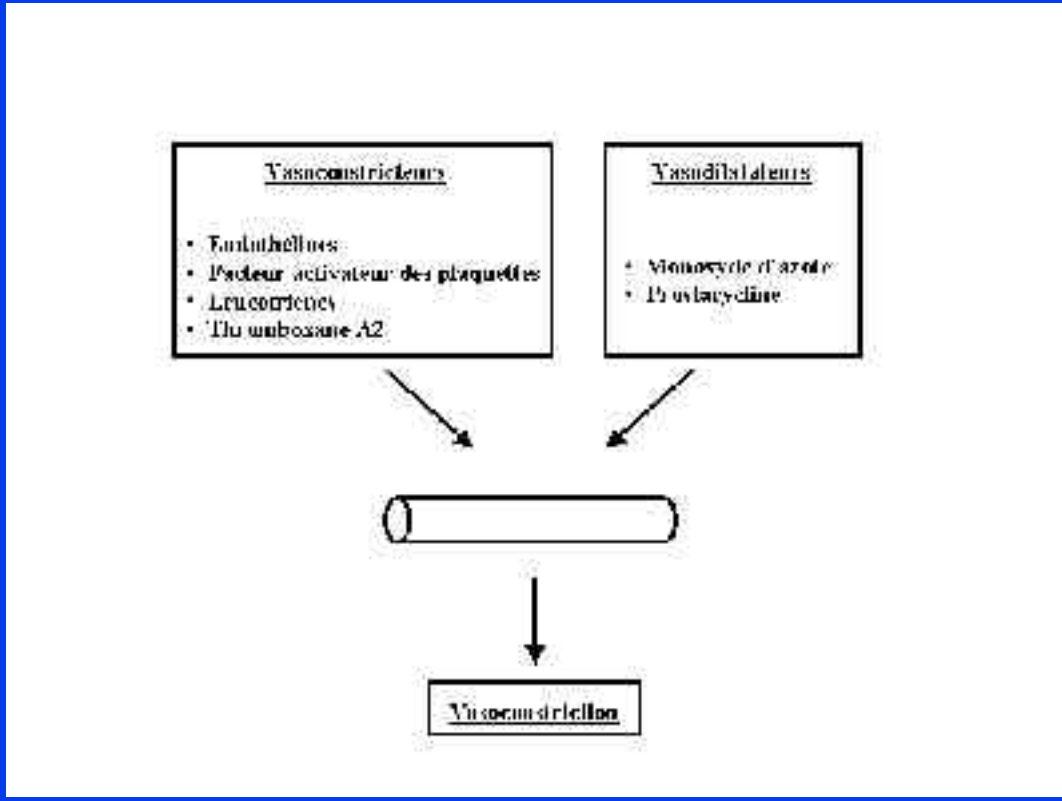
EFFET DU SDRA SUR LA CIRCULATION PULMONAIRE

- **Destruction circulation pulmonaire**



W Zapol

- **Remodelage vasculaire pulmonaire**

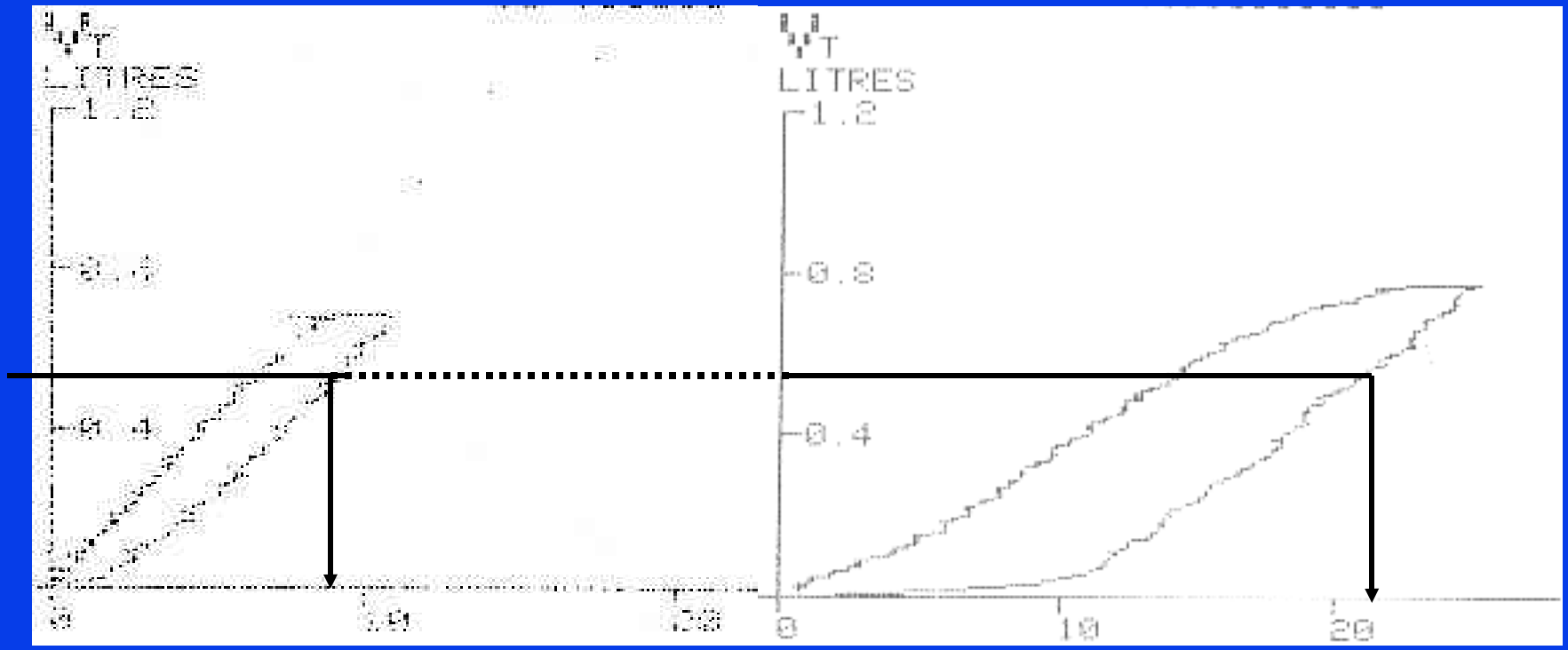


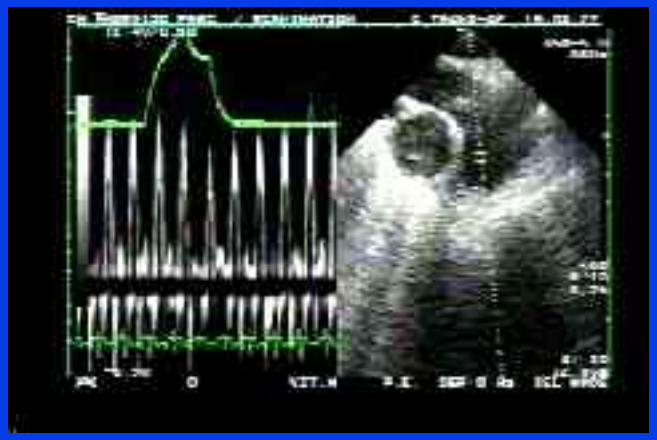
Leeman Réanimation 2004

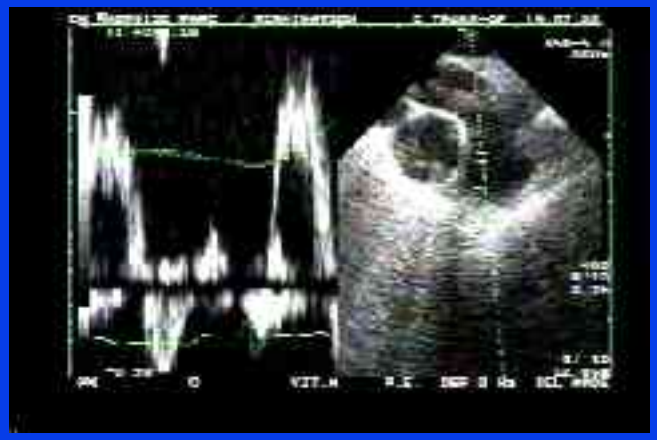
EFFET DE LA VENTILATION SUR LA CIRCULATION PULMONAIRE

JF 22 ans
Coma (intoxication)
Pas de complication respiratoire

JF 22 ans
Coma (intoxication)
SDRA (inhalation)







$$Accm = Vmax / Tacc$$

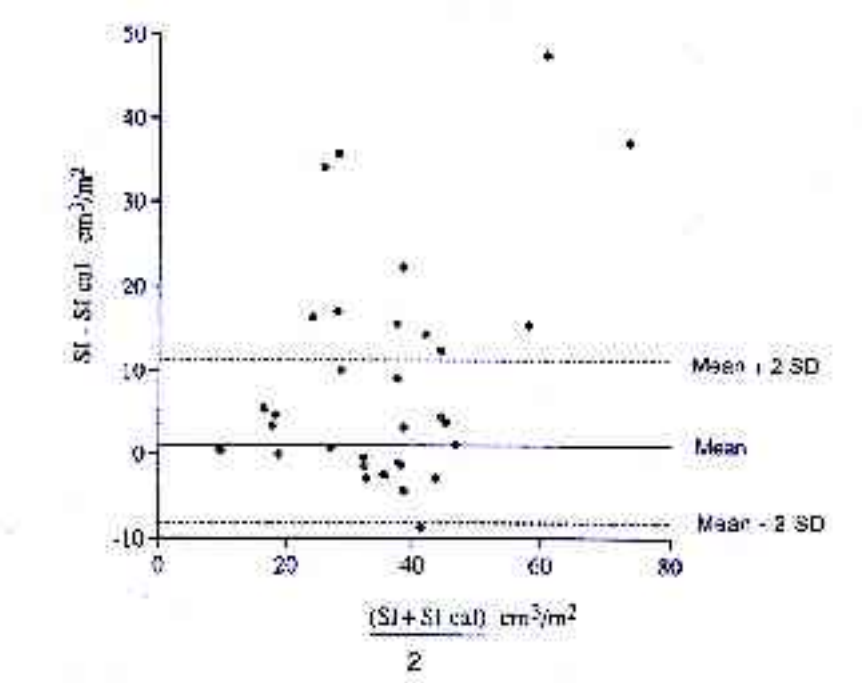
Variations de l'accélération moyenne du flux artériel pulmonaire sous ventilation assistée

Vieillard-Baron J Appl Physiol 1999

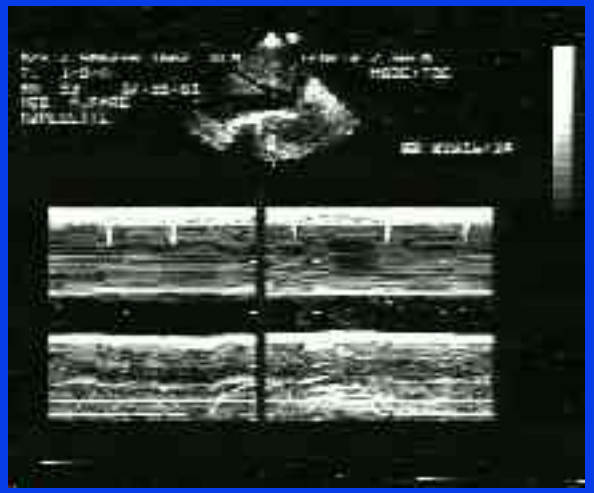
II

POURQUOI AVOIR ABANDONNE LE CATHETERISME ARTERIEL PULMONAIRE DEPUIS 1990?

LA MESURE DU DEBIT CARDIAQUE EST INEXACTE



Jardin ICM 1994



Jullien Chest

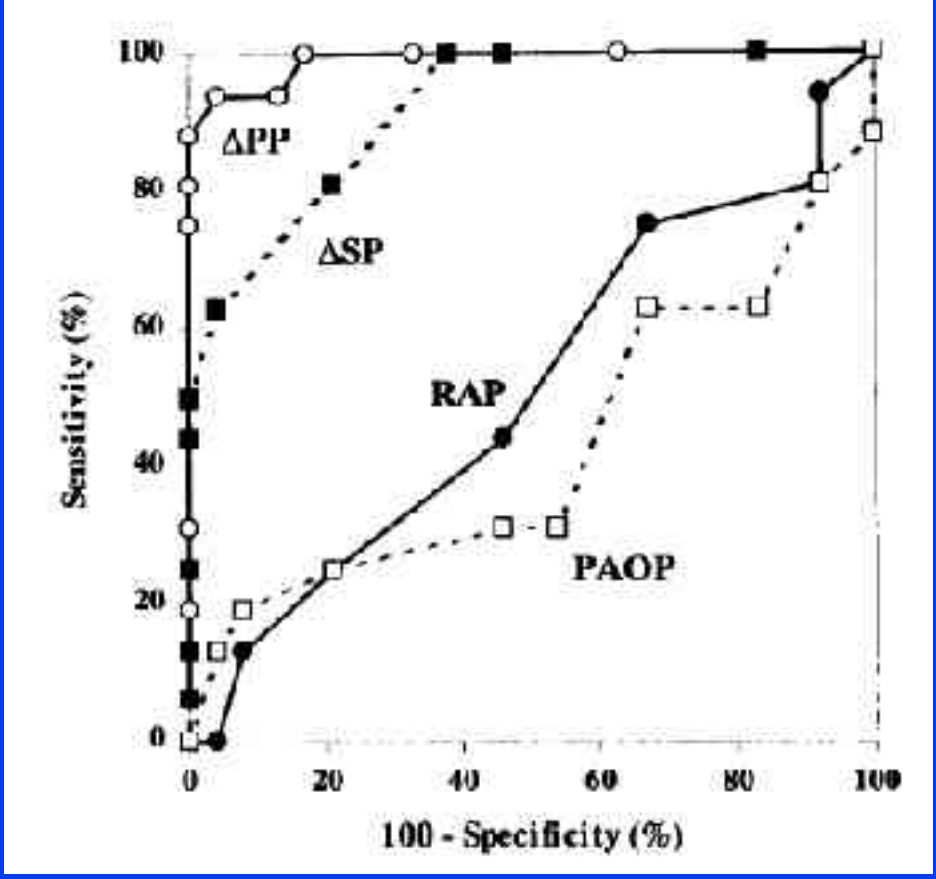
IL S'AGIT D'UN OAP A PVP BASSE QUELQUE SOIT LA FONCTION SYSTOLIQUE VG

21 CHOCS SEPTIQUES ALI/ARDS

	N = 6 Day 1	N = 15
	Group 1	Group 2
RAP (mm Hg)	11 ± 3	9 ± 4
MPAP (mm Hg)	24 ± 6	25 ± 5
WP (mm Hg)	11 ± 4	11 ± 5

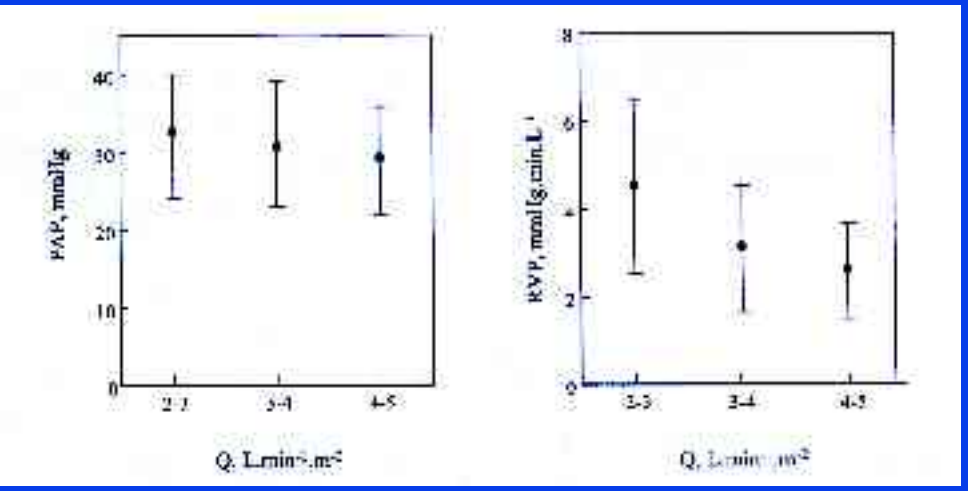
Jardin CCM 1990

LES PRESSIONS NE PERMETTENT PAS DE DECIDER D'UN REMPLISSAGE



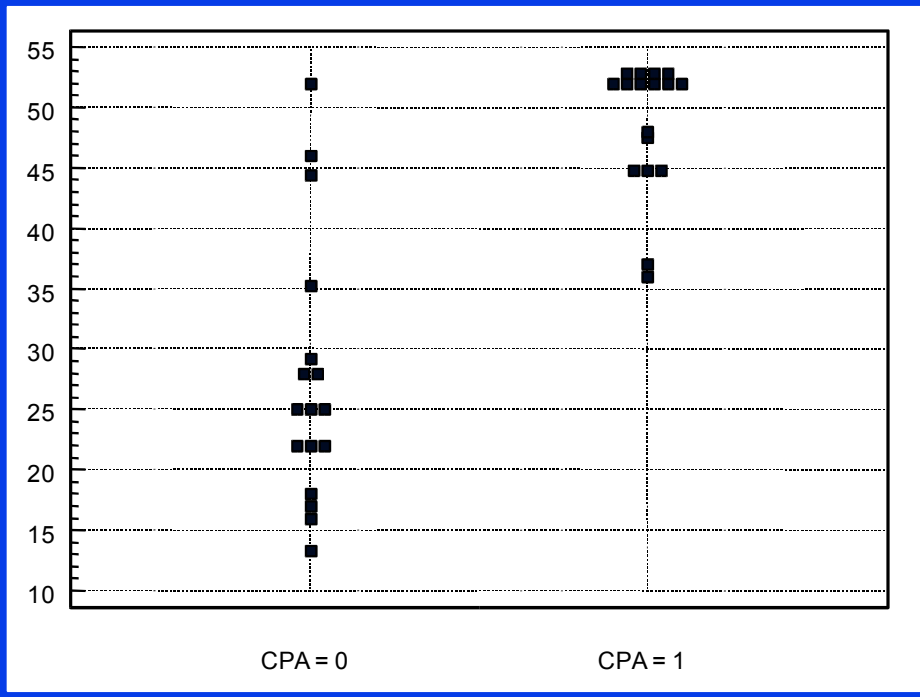
Michard AJRCCM 2000

L'ETAT DE LA CIRCULATION PULMONAIRE ET SES CONSEQUENCES NE SONT PAS EVALUABLES



Zapol N Engl J Med 1977

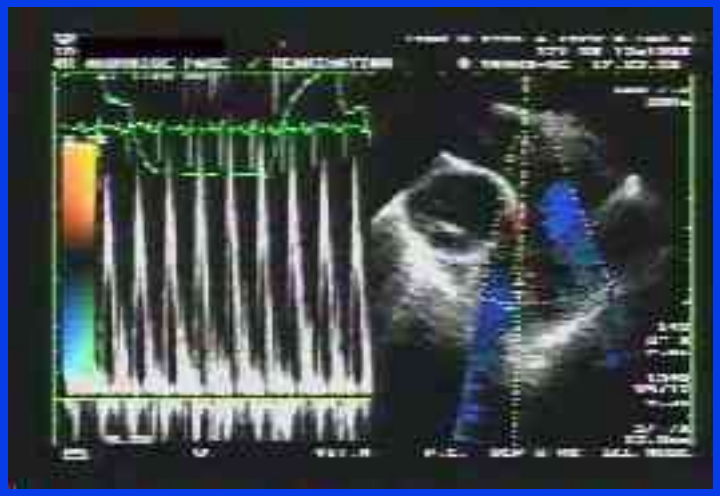
PAPS (mmHg)



Vieillard-Baron CCM 2001

III

EVALUATION DE LA FONCTION VD PAR ECHOCARDIOGRAPHIE



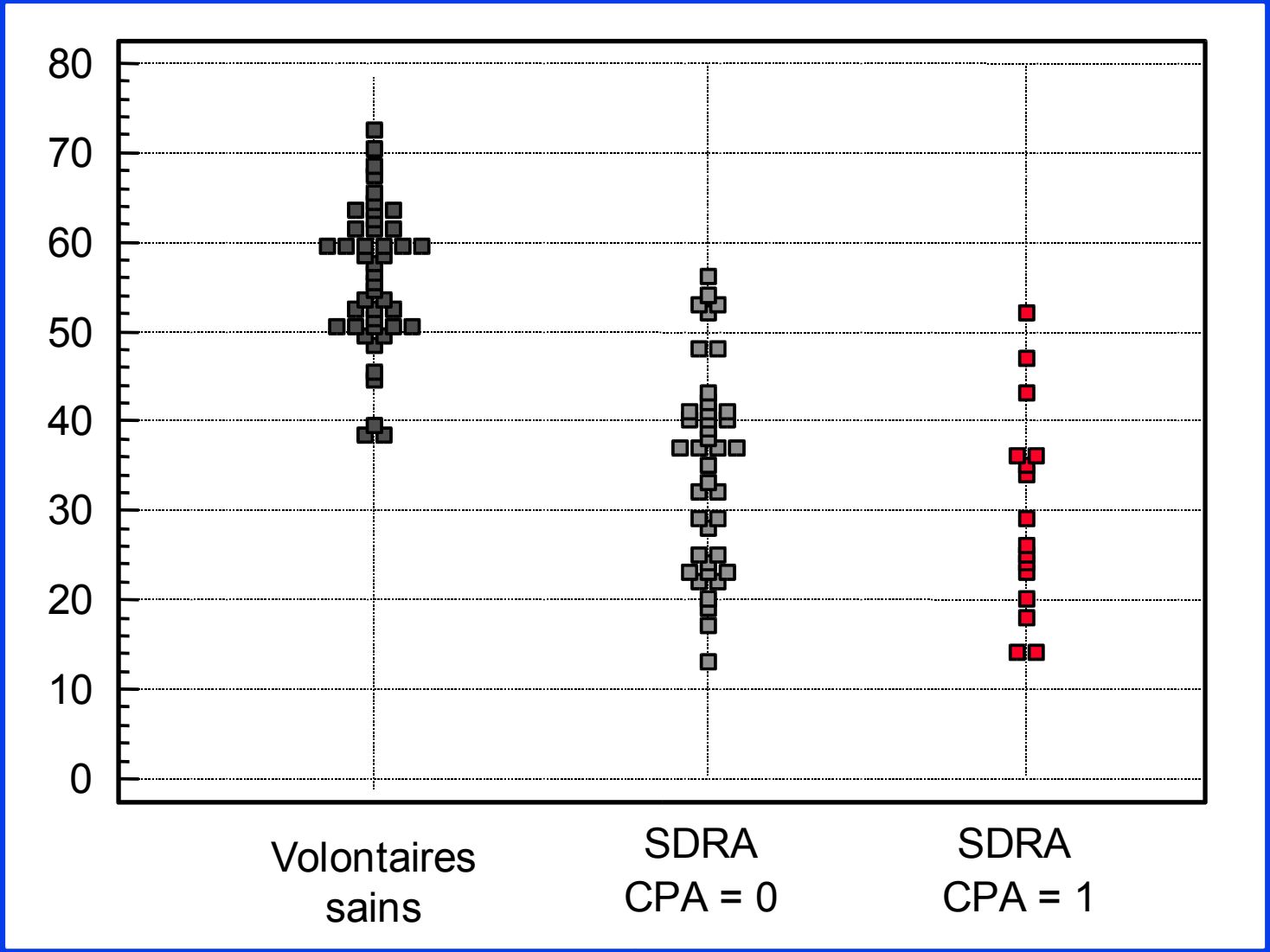
ETUDE ETO J3

75 SDRA (1996-2001)

	Gr I (56 patients) pas de CPA (75 %)	Gr II (19 patients) CPA (25 %)	
VTDVG	60 ± 16	50 ± 15*	(cm^3/m^2)
FC	96 ± 19	112 ± 16*	(bt/mn)
IS (Dop.)	32± 9	25 ± 9*	(cm^3/m^2)
IC	3.1 ±0.9	2.7 ± 0.9	($l/mn/m^2$)
E/A mit	1.3 ± 0.4	0.8 ± 0.2*	

Vieillard-Baron CCM 2001

%


80
70
60
50
40
30
20
10
0
Volontaires sains
SDRA CPA = 0
SDRA CPA = 1

PRONOSTIC

- 23 patients, ETT (CCM, 1985)
  - PP: 39 ± 4 cmH_2O
- CPA: 14/23 (61%)
- Mortalité: 8/14
  - 57%* vs 33%
- CPA sévère: 5/23 (22%)
  - mortalité: 5/5 (100%)

- 75 patients, ETO (CCM, 2001)
  - PP 24 ± 5 cmH_2O
- CPA: 19/75 (25%)*
- Mortalité: 6/19
  - 32% vs 32%
- CPA sévère: 4/75 (5%)*
  - mortalité: 1/4 (25%)*

cpa	2,11	[1,10 - 4,03]	0,02
SAPS II	1,02	[1,01 - 1,04]	< 0,01
ODIN	1,35	[1,01 - 1,82]	< 0,05
PaO_2 / F_iO_2	0,99	[0,98 - 1,01]	0,60
Lactate	1,07	[0,97 - 1,18]	0,16

Richard SRLF 2004

QUELLE STRATEGIE VENTILATOIRE?

Vieillard-Baron, Jardin Current Opinion in Critical Care 2003

Predictors of ACP

23 ARDS 1985

Jardin CCM 1985

75 ARDS 1996-2001

Vieillard-Baron CCM 2001

	No ACP (65)	ACP (33)	univariate	multivariate
Age	52 ± 17	48 ± 16	NS	
IGS II	54 ± 17	51 ± 13	NS	
PaO_2/FIO_2 (mmHg)	131 ± 53	104 ± 31	0.005	NS
$PaCO_2$ (mmHg)	45 ± 10	45 ± 13	NS	
TV (ml/kg)	9.3 ± 2.3	10.7 ± 2.8	0.1	NS
Crs (ml/cm H_2O)	38 ± 8	31 ± 7	0.0000	NS
Plateau (cm H_2O)	25 ± 7	37 ± 12	0.0000	0.04
PEEP(cm H_2O)	6 ± 4	10 ± 4	0.0000	NS

ADAPTER LA PP

400 x 25 PEEP 5
PP 33

SAP 92 mmHg

350 x 25 PEEP 5
PP 26

SAP 123 mmHg

ADAPTER LE NIVEAU PEEP

16H30
PEEP 5 PP 27

IS_{VD} 23 ml/m²
PAS 135 mmHg
FC 100/mn

16H35
PEEP 14 PP 27

IS_{VD} 12 ml/m²
PAS 115 mmHg
FC 121/mn

16H45
PEEP 5 PP 27

IS_{VD} 23 ml/m²
PAS 130 mmHg
FC 110/mn

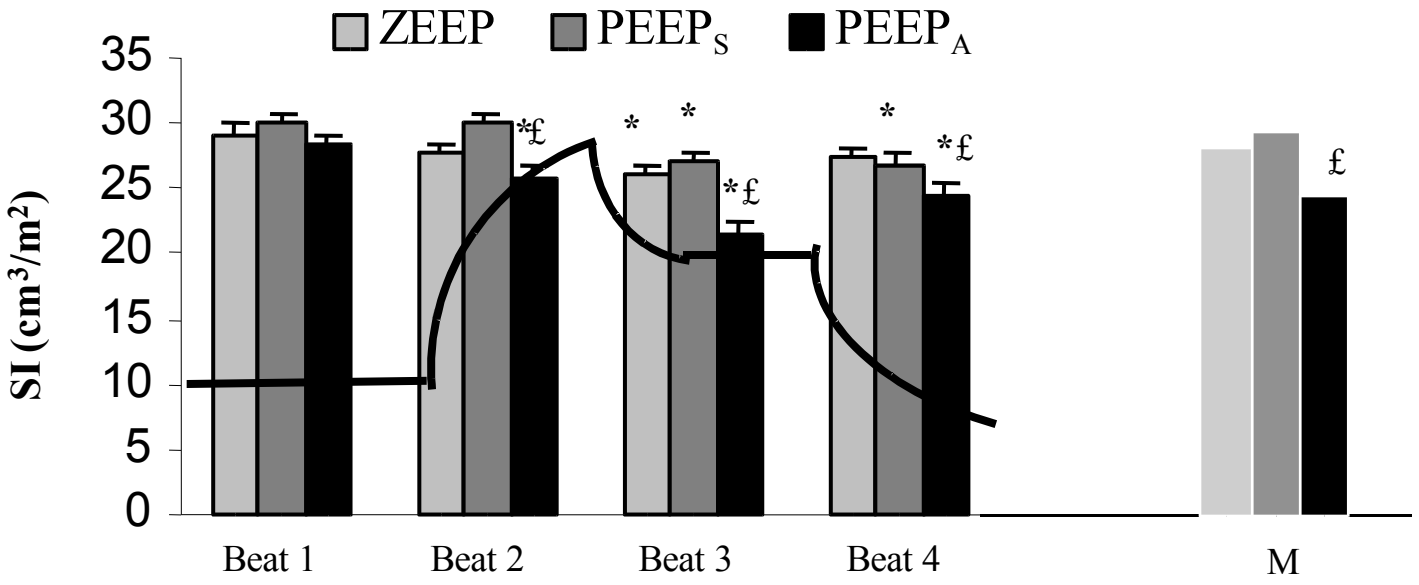
* beat 3 versus 1

£ $PEEP_A$ versus ZEEP et $PEEP_S$

Plateau 18±8, ZEEP

Plateau 21±6, $PEEP_S$ 6±3

Plateau 30 ± 8, $PEEP_A$ 13±4



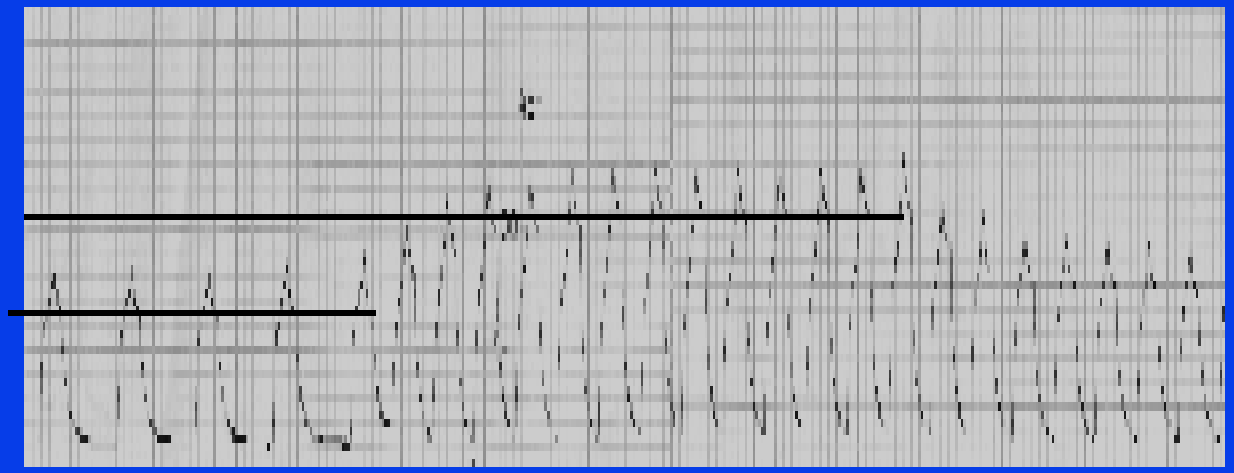
ZEEP **$PEEP_S$** **$PEEP_A$**

ZEEP

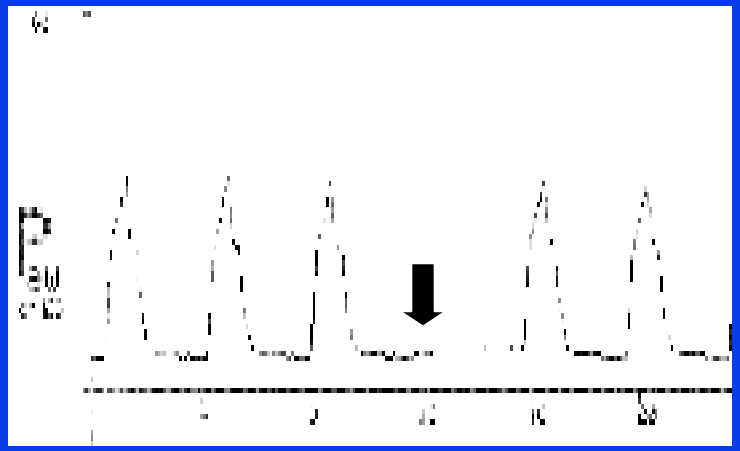
PEEP 15

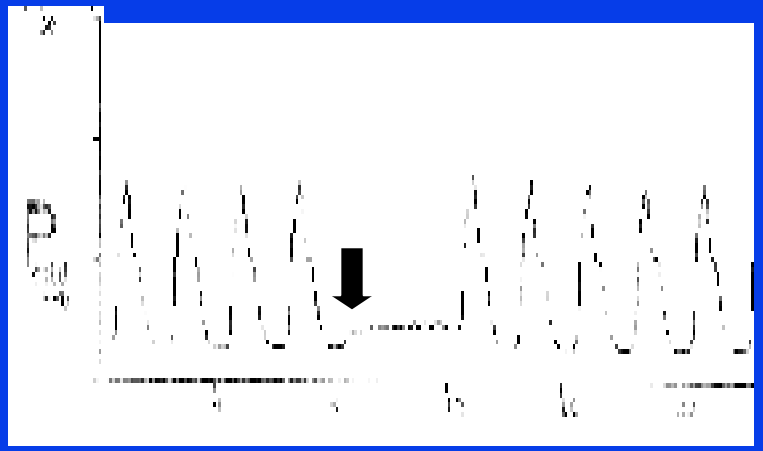
Rouby CCM 2004

ATTENTION A LA PEEPi



600*15 600*30 450*30





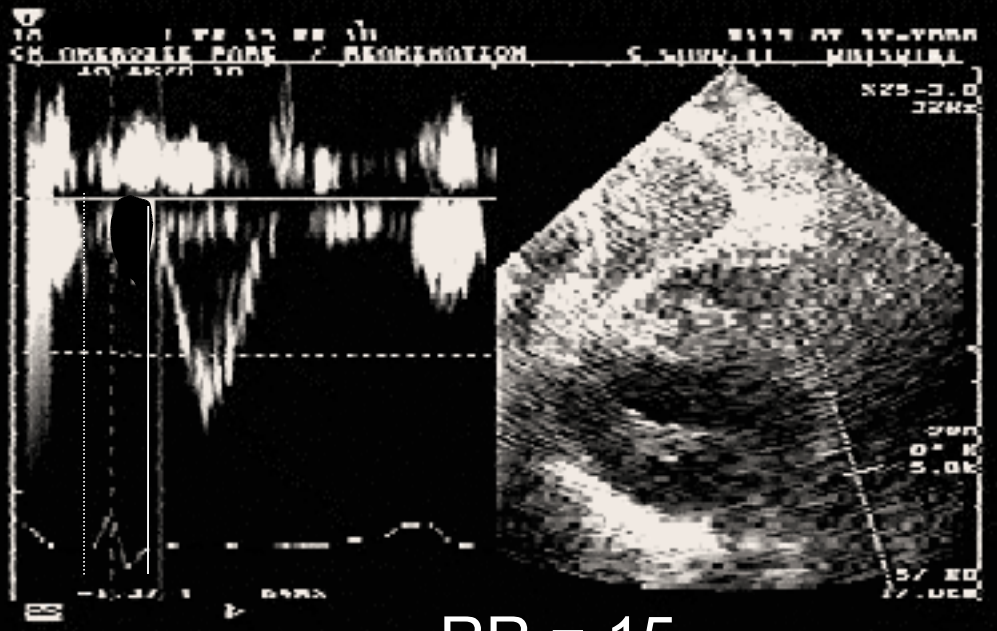
Vieillard-Baron CCM 2002

Table 4. Comparison between Doppler hemodynamic measurements obtained with a respiratory rate (RR) of 15 breaths/min (RR 15) and a respiratory rate of 30 breaths/min (RR 30)

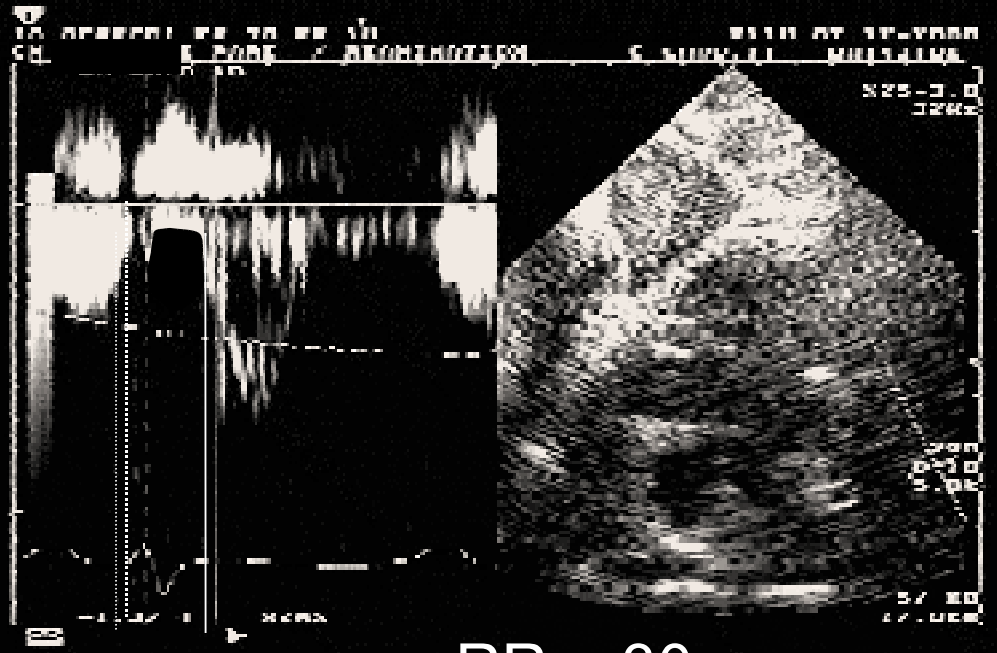
	RR 15	RR 30
ICT, msec	46 ± 18	60 ± 18[a]
FP, msec	234 ± 36	230 ± 35[b]
V_{MAX}, m/sec	0.88 ± 0.20	0.79 ± 0.17[a]
PA_{VTI}, cm	12.9 ± 2.3	11.6 ± 2.6[a]
IVC diam, mm	18 ± 5	21 ± 5[a]
HR, beats/min	115 ± 11	115 ± 11
SI, cm^3/m^2	29 ± 5	26 ± 5[a]
CI, $L/min/m^2$	3.3 ± 0.7	2.9 ± 0.6[a]

ICT, isovolumic contraction time; FP, flow period; V_{MAX}, peak velocity; PA_{VTI}, pulmonary artery velocity-time integral; IVC diam, inferior vena caval diameter; HR, heart rate; SI, stroke index; CI, cardiac index.

[a] $p < .05$; [b] NS, not significant. Values are mean ± SD.

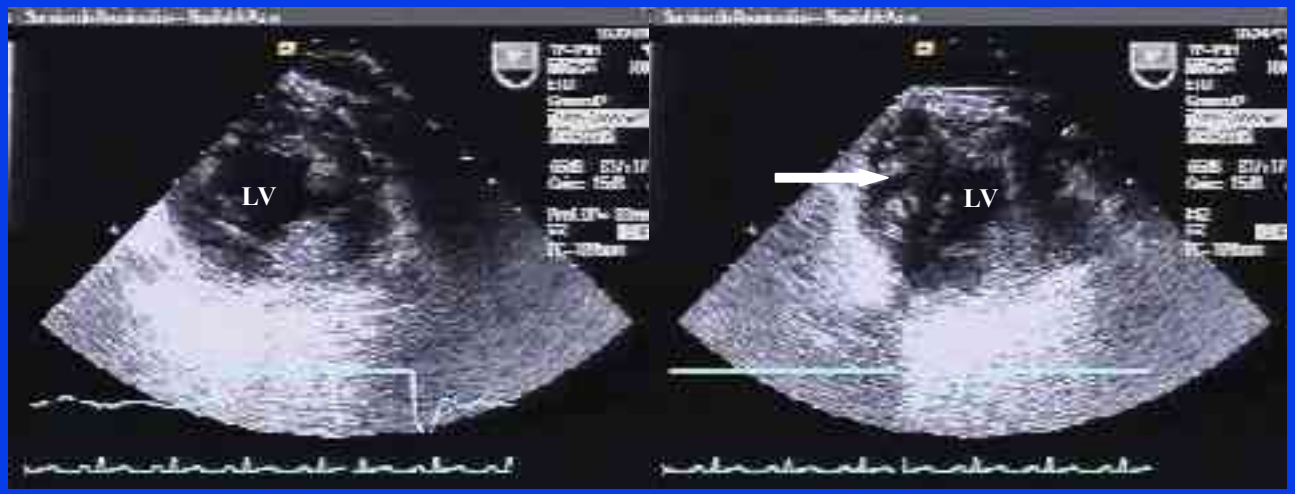


RR = 15



RR = 30

EVITER LES MANŒUVRES DE RECRUTEMENT



A B

QUEL STRATEGIE HEMODYNAMIQUE?

Option 1
NA

J1 VS

J1 VAC
PP 16

J1 VAC
PP 16
NA

FIN