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HOW CRITICAL IS EARLY INITIATION OF EXTRACORPOREAL MEMBRANE OXYGENATION FOR RESCUE SUPPORT IN SEVERE REFRACTORY CARDIOGENIC SHOCK?

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INTRODUCTION. Severe refractory cardiogenic shock (SRCS) carries an almost 100% mortality rate despite high-dose inotropics and intra-aortic balloon pump (IABP). Urgent veno-arterial extracorporeal membrane oxygenation (VA-ECMO) can be considered for cardiac support in SRCS, yet indication, optimal timing and predictors of successful VA-ECMO therapy remain to be established.

METHODS. VA-ECMO support was performed in the cardio-thoracic intensive care unit in mechanically ventilated patients with SRCS (n = 29, 20 male, age 61 ± 11 years), mainly via femoral vascular access (n = 25), and combined with IABP (n = 19). SRCS was due to ischemic (n = 11) and non-ischemic (n = 3) cardiomyopathy (CMP) or after cardiac surgery (CS, n = 15).

RESULTS. VA-ECMO was technically accomplished in all patients with a mean duration of 3.4 (1–13) days. At hospital discharge and after a follow-up period of 18 (4–36) months, survival was comparable in CMP (36%) and CS (33%) patients. Importantly, survival was related to early initiation of VA-ECMO (<8 h after onset of complaints) in CMP patients: 100% survival in non-ischemic CMP versus 50% in ischemic CMP. Late initiation of VA-ECMO (>8 h) was associated with death in all CMP patients, independent of infarct size (p = ns) and metabolic compromise (pH, lactate; p = ns). Complications, although generally minor and non-limiting, were: insertion site bleeding (n = 10), sepsis (n = 4), cerebral (n = 2), and lower limb ischemia (n = 2). In CS patients, survival was not predictable by analysis of metabolic derangements (pH, lactate; ns), perfusion and ischemic times during surgery.

CONCLUSIONS. In SRCS, VA-ECMO cardiac support provides substantial survival benefit, especially in patients with non-ischemic cardiomyopathy. However, early initiation, i.e., <8 h after onset of complaints, seems decisive for optimal short- and long-term outcome.

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CARDIOGENIC AND SEPTIC SHOCK PROFILES EVALUATION WITH A PULMONARY CATHETER

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INTRODUCTION. Despite advances in understanding the pathogenesis and therapy of circulatory shock, clinical evaluation and empirical treatment of such critically ill patients is difficult, especially when patients are already receiving vasoactive agents [1].

OBJECTIVES. To evaluate and compare the "haemodynamic profiles" found in cardiogenic and septic shock patients with the pulmonary catheter in a general intensive care unit (ICU).

METHODS. We conducted a retrospective study, enrolling patients admitted in the ICU since January 2008 to March 2011, with the diagnosis of cardiogenic and septic shock, monitored by VigilanceÒ, with the Edwards Swan Ganz CCO_{mb}V ref 774HF75 catheterÒ. We collected and analysed the following parameters: age, length of stay (LOS), SAPSII score, SOFA score and ICU mortality. The hemodynamic profiles were established by mean arterial pressure (MAP), cardiac index (CI), stroke volume index (SVI), pulmonary capillary wedge pressure (PCWP), central venous pressure (CVP), left ventricular work index (LVWI) and systemic vascular resistance index (SVRI). The data are showed as mean ± standard deviation. We compared the two different shock diagnostic groups of patients using the student *t* test and Mann–Whitney test.

RESULTS. We analysed 756 hemodynamic data evaluated during 72 h, related to 36 patients that fulfil all the inclusion criteria: 27 had septic shock and 9 cardiogenic shock. Total mortality in ICU was 47.2 (17)%.

Difference between cardiogenic and septic shock

	Cardio genic shock	Septic shock	p
Age	45 ± 13	68 ± 9	<0.0001
SAPSII	60 ± 15	51 ± 17	0.2
SOFA	10 ± 3	9 ± 3	0.2
LOS	9 ± 6	15 ± 14	0.1
Mortality	56%	44%	<0.0001
MAP	81 ± 16	79 ± 14	0.5
CI	3.4+1.4	3.4 ± 1.2	0.9
SVI	35 ± 17	35 ± 12	0.9
PCWP	18+9	14 ± 5	0.03
CVP	12 ± 8	10 ± 4	0.2
LVWI	29.2+15	31 ± 12	0.5
SVRI	1856 ± 884	1836 ± 793	0.9
Norepinephrine	0.7+0.6	1.7 ± 1	0.02

CONCLUSIONS. We did not find any specific hemodynamic pattern, differentiating cardiogenic and septic shock. This could be due to the beginning of vasoactive drugs perfusion before starting monitorization. The unique significant variable found was wedge pressure values. Mortality was higher in cardiogenic shock.

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STO_2 CHANGES AFTER TRANSFUSION OF PACKED RED BLOOD CELLS IN CRITICAL CARE PATIENTS

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INTRODUCTION. Perioperative transfusion in cardiac surgery is associated with increased and mortality. Fluid replacement is frequently required in response to hemodynamic instability or the SIRS seen after cardiopulmonary bypass. Haemoglobin level decreased until transfusion is prescribed, without any massive bleeding. Noninvasive measures of StO_2 was used to monitor thenar tissue oxygenation and its variability according to the patient status, before and after transfusion. Many studies have demonstrated that StO_2 correlates with either mixed or central venous oxygen saturation.

OBJECTIVES. Monitor the variations of StO_2 before and after transfusion, and its correlation between mixed central venous oxygen saturation.

METHODS. Prospective, observational study in post-operative cardiac surgery patients that were transfused, not in hemorrhagic shock. StO_2 was continuously monitored associated with dynamic measures and blood tests were done according to the protocol of the department.

RESULTS. 42 patients with a median age of 7 0 years, IGS II of 46 [18], and euroscore of 12.8% [19]. Surgery went from aortic valve replacement 66.7%, CABG 28.6%, both 26.2%, aortic dissection 14.3%, redux 9.5%. Mains results are shown in the table.

	Before transfusion	After transfusion	*p*
StO_2% (baseline)	81 ± 7	83 ± 6	0.3
StO_2 Peak	90 ± 7	93 ± 4	0.01
StO_2 deoxygenation slope	−10.7 ± 3.6	−12.6 ± 4.6	0.1
StO_2 reoxygenation slope	2.0 ± 0.9	3.0 ± 1.5	0.001
THI	10.7 ± 3.0	11.5 ± 2.7	0.2
ScVO2%	61.6 ± 8.5	66.2 ± 9.7	0.001
p(a–v)CO2 (mmHg)	7.0 ± 4.0	6.8 ± 2.6	0.7
Lactate (mmol/l)	1.9 ± 1.2	1.8 ± 0.9	0.4
pH	7.36 ± 0.1	7.35 ± 0.1	0.9

CONCLUSIONS. In this study no change was observed in basic continuous StO_2 monitoring before and after transfusion. However, dynamic measurements are well correlated with improved $ScvO_2$, without changes in usually modified parameters of tissue hypoperfusion. StO_2 and its dynamic measures could be an early monitoring tool for tissue oxygenation.

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THE ABILITY OF STROKE VOLUME VARIATION OBTAINED WITH ARTERIAL WAVEFORM ANALYSIS TO PREDICT FLUID RESPONSIVENESS IN A SPONTANEOUSLY BREATHING PATIENT

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INTRODUCTION. Stroke volume variation (SVV) is regarded as a good predictor of intravascular depression[1], but it can only be adopted in cases of patients who are supported by a positive pressure controlled ventilator. In a spontaneously breathing patient, previous studies have not supported the use of SVV, due to the irregular nature of rate and tidal volumes.

OBJECTIVES. The goal of this study is to assess the usefulness of SVV monitoring in patients not only under mechanical ventilation but also with spontaneous breathing.

METHODS. SVV was measured in 69 consecutive patients in the ICU (47 mechanical respiratory support, 22 spontaneously breathing) after a transthoracic esophagectomy. Arterial pressure monitoring via a radial artery catheter was connected to the FloTrac sensor, and SVV was calculated by arterial waveform analysis on the Vigileo Monitor (Edwards Lifesciences, Tokyo, Japan). When SVV values increased above 15%, we regarded the trend as a suggestive change. A patient with systolic arterial pressure (SAP) of <80 mmHg was defined as hypotensive, and fluid resuscitation was required. Volume challenge was performed using 250 ml of 5% plasma protein fraction over 1 h. Patients with an increase of SAP more than 80 mmHg were considered as responders to the fluid challenge.

RESULTS. A possible hypotension occurring within 12 h after surgery appeared in 57% of mechanical respiratory supported patients (M-group) and 41% of spontaneously breathing patients (S-group). Sensitivity and Specificity for predicting possible hypotension using a trend of SVV were 88 and 87% in the M-group, and 56 and 100% in the S-group, respectively. Volume responsiveness after fluid resuscitation in a patient who had an upward trend of SVV showed a sensitivity of 92% and a specificity of 67% in the M-group. In the S-group, the volume responsiveness of the SVV indicated a sensitivity and specificity of 100%.

CONCLUSIONS. Even in a patient with spontaneous breathing after transthoracic esophagectomy, SVV trends closely related with possible hypotension, and predicted fluid responsiveness.

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