

## Emergency departments: realistic view of acute heart failure?

ALEXANDRE MEBAZAA<sup>1</sup>, REDA SALEM<sup>2</sup>

<sup>1</sup>University Paris 7 Denis Diderot; Department of Anesthesiology and Critical Care Medicine, Lariboisière Hospital, AP-HP, Paris, France. <sup>2</sup>Department of Anesthesiology and Critical Care, Hospital Geral de Santo António, Porto, Portugal.

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The European Society of Cardiology and the European Society of Intensive Care have classified patients with acute cardiac insufficiency into six categories<sup>1</sup>: 1) acute hypertensive cardiac insufficiency in which the signs and symptoms of cardiac insufficiency are accompanied by high blood pressure values and a relatively preserved left ventricular function; 2) pulmonary oedema, verified by chest radiography, characterised by orthopnoea, crackling and basal oxygen saturation usually less than 90%; 3) acute decompensated cardiac insufficiency, mainly as a consequence of acute decompensation of chronic cardiac insufficiency; 4) cardiogenic shock, defined by evidence of tissuer hypoperfusion secondary to persistent cardiac failure on correction of preload, with systolic blood pressure (SBP) less than 90 mmHg or a mean fall in blood pressure (BP) greater than 30 mmHg, diminished urine output and cardiac frequency of 60 beats per minute; 5) cardiac failure due to high output, and 6) right cardiac insufficiency characterised by an increase in venous capillary pressure and hepatomegaly.

From the perspective of the emergency departments (ED), a slightly modified classification has been proposed based on SBP values at the time of arrival to the ED and is supported by two large clinical trials, the ERICA and the OPTIMIZE-HF. The French trial, ERICA, studied 581 patients who were admitted to intensive care or coronary units from EDs<sup>2</sup>. It was demonstrated that the 4-week mortality of patients with a SBP greater than 160 mmHg at the time of arrival at the ED was lower than in patients with a SBP lower than this value (7% vs.

17%, respectively,  $p = 0.03$ )<sup>2</sup>. These differences in mortality remained at similar levels after one year of follow up. The OPTIMIZE-HF trial carried out in the United States included 48,612 patients and confirmed the above findings<sup>3</sup>. The patients were categorised into different quartiles according to the SBP presented at their arrival to the ED: SBP < 120 mmHg; SBP between 120 and 139 mmHg; SBP from 140 to 161 mmHg and SBP > 161 mmHg. The highest SBP values were invariably associated with greater and more preserved left ventricular ejection fractions in addition to lower intrahospital mortality: 1.7% (if SBP > 161 mmHg) versus 7.2% (if SBP < 120 mmHg).

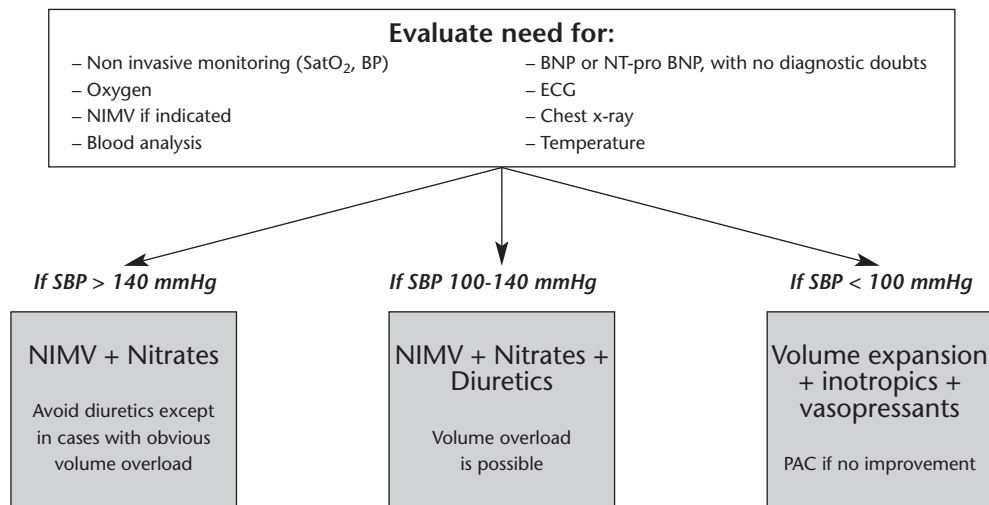
Consequently, the word "cardiac" in the term "acute cardiac insufficiency" is somewhat confusing. Many young physicians continue to think that during any episode of acute cardiac insufficiency the heart, and particularly, left ventricular function, is depressed. At present, it is known that this is not true, especially when referring to patients attending the ED<sup>2,3</sup>. Indeed, more than 20% of the acute cardiac insufficiencies in these patients is associated with high BP values and preserved left ventricular function. Similar results have also been demonstrated in a Spanish study carried out by Pere Llorens et al<sup>4</sup>. In their study the clinical profile of 1,017 patients who attended the ED of 10 Spanish hospitals did not substantially differ from that reported in other European studies. Thus, more than 20% of the patients undergoing echocardiography had preserved systolic function. On the other hand, many cardiologists working in day units or hospitals specialised in

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**CORRESPONDENCE:** Alexandre Mebazaa, MD, PhD. University Paris 7 Denis Diderot; AP-HP. Department of Anesthesiology and Critical Care Medicine, Lariboisière Hospital. 2, Rue Ambroise Paré. 75010 Paris, Francia. E-mail: alexandre.mebazaa@lrh.aphp.fr

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**Figure 1.** Therapeutic algorithm for acute cardiac syndromes. This algorithm should be applied in the first minutes following the arrival of the patient. SatO<sub>2</sub>: oxygen saturation; BP: blood pressure; ECG: electrocardiogram; SBP: systolic blood pressure; PAC: pulmonary artery catheter; NIMV: non invasive mechanical ventilation.

cardiac insufficiency usually admit patients with decompensated chronic cardiac failure accompanied by a long history of depression of the left ventricle ejection fraction.

Few physicians probably usually see patients with all the previously mentioned categories. Acute cardiac insufficiency with arterial hypertension and pulmonary oedema is seen and is mainly attended in the ED while chronic decompensated cardiac insufficiency with normal BP values is usually attended in day units or hospitals for cardiac insufficiency and cases of cardiogenic shock and right ventricular insufficiency are attended in intensive or coronary care units. Following this concept, the experts of both continents, the Europeans and North Americans, have proposed a treatment algorithm for all these patients based on SBP values at the time of arrival to the ED<sup>5</sup>. In addition, this algorithm insists on the need for early treatment of any patient with cardiac insufficiency and advocates generous use of non invasive mechanical ventilation which, in the study by Pere Llorens et al. was not always used as indicated<sup>4</sup>.

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