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LETTERS TO THE EDITORS

How should we implement the recommendations of the Acute Cardiovascular Care Association in intensive cardiac care units in France?

Comment peut-on adapter en France les recommandations européennes sur les unités de soins intensifs cardiologiques ?

Keywords Intensive cardiac care; Guidelines; Organization
Mots clés Soins intensifs cardiologiques ; Réseau ; Circuit patient ; Maladie coronaire ; Arythmie ; Insuffisance cardiaque

Background

Recently, the Acute Cardiovascular Care Association (ACCA) published an important position paper on intensive cardiac care units (ICCUs), entitled ''ICCUs: An update on their definition, structure, organization and function'' [1]. This work is of particular importance as limited data is available and few guidelines have focused on ICCUs (especially on their organization and networks) until now. As healthcare system organization is heterogenous throughout Europe, it is likely that the organization of ICCUs in Europe varies substantially between countries and regions, which might affect the care of the patient with an acute cardiovascular condition. The French acute cardiovascular care group recently published the most extensive study on the topic, presenting a nationwide exhaustive description of ICCUs in France in 2014 [2,3]. For the first time in our country, the activity of all 277 ICCUs was studied, including predictive factors for mortality, impact of the disease, hospitalization duration and importance of centre size.

The aim of this comment is:

- to summarize the main points briefly;
- to consider the applicability of the main concepts in our country, present specific difficulties from a French perspective and highlight aspects of the document that are probably irrelevant in France;
- to emphasize the need for innovative improvements, as suggested by the ACCA. Our specific comments and propositions are presented in italics.

Evolution of ICCUs

ICCUs have evolved considerably over the past 15 years. Indeed, traditional ICCUs—whose main purpose was the management of acute myocardial infarction from thrombolysis to complications—have disappeared. The type of patients has changed considerably: first, the duration of hospitalization for myocardial infarction has diminished greatly due in part to reduced complications; secondly, because techniques have evolved considerably, with the explosion of interventional rhythmology, valvuloplasty and the increasing use of life support devices that now offer patients a future, when previously there was none; finally, because, with the aging of the population in general — and patients with cardiac conditions in particular — the prevalence of heart failure and major complications and co-morbidities (MCC) has increased considerably. Hence, ICCUs now face a wide variety of patients, ranging from those with MCC with low cardiac severity to those requiring external life support, and they need to adapt to these new challenges. Stratification of pathologies into risk and levels of care aims to achieve more efficient allocation of resources and improvements in outcome, including mortality rates and lengths of hospital stay.

General organization of ICCUs

The ICCU definition has not changed, as it is a geographically individualized structure dedicated to the management and treatment of patients with critical cardiovascular disease. ICCUs should have specific staff under the responsibility of a cardiologist who is appropriately trained in acute cardiac care.

In France, this suggests the need for postgraduate certification or training for cardiologists in charge of ICCUs. Several certificates are available in this field in France. Physicians should also be encouraged to follow the certification programmes provided by the ACCA at European level when in charge of high-level ICCUs. This applies to nurses too, but specific training is not available until now in our country, to our knowledge. It appears mandatory that in each French ICCU, patients are cared for by a dedicated trained nursing team, under the coordination of the cardiovascular intensivist. To that end, a dedicated programme for nurses could be developed, probably at the national level.

Following the recommendation of the ACCA, we propose that the ICCU Group of the French Society of Cardiology

Abbreviations: ACCA, Acute Cardiovascular Care Association; CCU, critical care unit; ICCU, intensive cardiac care unit; MCC, major complications and co-morbidities.

Table 1 Major personal and technical requirements at each level.

	Level I	Level II	Level III
Invasive monitoring	No	Yes	Yes
On-site coronary angioplasty	No	Yes	Yes
Mechanical ventilation, ECLS	No	Waiting transfer	Yes
Beds/nurses	Four	Two to three	One to two
On duty	Cardiologist or physician with intensive care training	Cardiologist	Cardiologist/ critical care

ECLS: extracorporeal life support.

(Société Française de Cardiologie) provides a specific core curriculum for acute cardiovascular care. This could largely be built on that provided by the ACCA and the curriculum of the French university diploma in intensive cardiac care. Better coordination between the education programmes currently available is desirable, and a national programme is an important aim. This programme could rely partly on tele-expertise and new teaching tools (videos, etc.), and could be proposed to other French-speaking countries with similar health systems.

ICCUs are part of a complex network

Obviously, ICCUs are at the interface of other structures, such as emergency services, critical care units (CCUs), cardiac surgery and palliative care units. Therefore, it is crucial to establish well-defined transfer protocols, in order to shorten delays and standardize procedures between centres for many acute conditions, not just acute coronary syndromes. There should be well-established networking and protocols regarding the clinical conditions requiring transfer, transfer modalities, treatment protocols etc., but also information about bed availability and practical solutions to financial concerns. In other words, the text makes general recommendations, but also advocates solutions that are useful for daily practice. Telemedicine and tele-expertise could also be valuable tools. The coordinators of ICCUs have the task of establishing and following the operating conventions in all peripheral units.

From our perspective, an important first step would be to identify specialists in all the subspecialties that are useful for our patients, with a special interest in ICCUs. The second step, depending on local constraints and facilities, would be to work with the support of regulatory actors to build a structured network between ICCUs, including the units that correspond most frequently (i.e. emergency departments, CCUs and cardiac surgery).

Three ICCU levels

The cornerstone of the position paper is to define clearly three different levels of ICCUs. This classification is naturally rather arbitrary, but its main aim is to stratify the various levels of technical capabilities in relation to the specific functions of the different ICCUs, and to propose adaptations in terms of staffing, equipment, networks and connections.

Schematically, the first level (Level I) is equipped and organized to manage patients who cannot remain hospitalized in traditional units because of the risk inherent in their pathology and the need for specific expertise or treatments requiring specific follow-up or rapid adaptation. These units are not designed to support patients who may require invasive care (invasive monitoring, temporary pacemaker, emergency coronary angioplasty, circulatory assistance, etc.).

Level II includes patients requiring higher levels of treatment and follow-up (e.g. invasive monitoring or first-stage life-support devices, as well as pericardial puncture, life-threatening rhythm disturbance management, etc.) with a 24-hour coronary angioplasty unit.

Level III focuses on patients with vital distress, and appears to be very similar to medical CCUs. Typical patients in these units have cardiogenic shock requiring technical care, i.e. mechanical ventilation and/or external mechanical assistance or transplantation. Table 1 details the major personal and technical requirements at each level.

In the French setting, Level I units are likely to be in small or medium-sized hospital structures that do not necessarily have an on-site coronary catheterization laboratory, and can serve as a regional or local receptor for mid-severe patients. Level II ICCUs correspond to the conventional ''ICCUs'' of university, general public or big private centres, with 24/7 coronary angioplasty activity and the ability to manage patients with haemodynamic failure.

Is it necessary to formally separate Level I and Level II units in France? Probably yes, because these units now have different functions. The exact role of each unit needs to be clearly defined as a guarantee of quality of care. It is mandatory to formalize exchanges between the different levels of ICCUs to avoid mismanagement of critical patients. However, Level I ICCUs can be considered as first-line ICCUs, and acute cardiac patients may worsen very rapidly; there is then a risk of mismanagement if the first-line ICCU does not have experience in managing severe patients.

We think that it is relevant to have and identify Level I ICCUs in France. These units should have some kind of critical care backup on the same site, and a clearly identified agreement for the transfer of patients to Level II or III ICCUs.

Level II ICCUs are the most common ICCUs in France. It is important to remember that the staffing level recommended previously was actually one nurse for four patients.

We think that, depending on the mean turnover, the nursing staff must follow ACCA recommendations, with one nurse for two to three patients. Because of the complexity

of monitoring devices and pathology, at least 50% of the nurses need to be dedicated to the ICCU.

A question arises for Level III ICCUs, which undeniably require a larger staff, with a patient profile very similar to CCUs. It is difficult to imagine a single Level III ICCU being in charge of all cardiology patients, so a Level III ICCU is likely to be backed by a separate Level II ICCU on site. The question of the level of integration of Level III ICCUs into specialized CCUs for better cost-effectiveness is crucial. It is important to remember that the cardiology specialty requires specific skills (e.g. high-level cardiac echography, transoesophageal echocardiography, coronary expertise, complex antithrombotic and antiarrhythmic treatment and pericardiocentesis).

We think that specific Level III ICCUs are probably necessary in very large hospitals, as a hub for a large regional network of Level II ICCUs. In other places, Level III ICCUs can probably be mixed with CCUs, but it is mandatory that management of cardiac patients can be assured by one or several certified cardiologists, with appropriate staff and technology, and the cardiologist a statutory member of the CCU. Agreements must be drawn up with the cardiac surgery unit and vascular surgery unit.

It is important to remember that the recommendations propose that Level I, Level II and Level III patients can be distributed within the same geographical unit. This is probably conceivable in some units in large hospitals, with a sufficient number of beds. Such a strategy can be problematic in terms of quantifying the staff needed at each moment, which depends on the relative number of patients at each level; it appears possible in France, but must be proposed and organized by the medical team in charge of the ICCU.

Regional networks

A regional network is also mandatory for acute cardiac care, and can help to optimize resources and patient care. Two formulae are proposed:

- for each 100,000 inhabitants, four to five ICCU beds;
- for each 100,000 visits per year to the internal emergency department, 10 ICCU beds.

This suggestion could help to better organize distribution at the regional level, and reconsider the ratios depending on how situations evolve (e.g. variations in populations or in the activity of centres that had bed numbers determined several decades previously). We believe that, although obviously questionable, the recommendation to reconsider the current facilities of a given centre is of great value. Staff in ICCUs carry a particularly heavy burden and are at risk of burnout. Many new activities are emerging, such as the management of transcatheter aortic valve implantation, with high turnover and new skills to develop. It is our responsibility to explain new constraints to our regulatory authorities, and to propose adaptations based on the European recommendations. Other factors can be considered more accurately, such as the total number of beds dedicated to acute care, previous occupancy of wards and ICCUs and refusals. It is also very important to take into consideration several important metrics, such as the mean time to reach a centre with 24/24 coronary angioplasty. Indeed, in 2018, it is mandatory that all patients throughout France who experience an acute myocardial infarction can reach an angioplasty centre with an appropriate ICCU securely in less than 120 minutes.

Conclusions

This document is important, as it provides objective data to improve the standard of care for patients admitted to ICCUs, focusing on the organizational perspective, but also on the minimal resources required in terms of staff and equipment. This could help the whole community working in ICCUs to improve our units, in terms of better patient management and staff conditions.

Disclosure of interest

The authors declare that they have no competing interest.

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François Roubille[a,b], Eric Bonnefoy[c], Etienne Puymirat[d], Meyer Elbaz[e], Patrick Henry[f,*], on behalf of the USIC Group (Emergency and Acute Cardiovascular Care group), a member of the Société française de cardiologie, the Acute Cardiovascular Care Association, the European Society of Cardiology

[a] *Cardiology Department, University Hospital of Montpellier, 34295 Montpellier, France*
[b] *PhyMedExp, University of Montpellier, Inserm U1046, CNRS UMR9214, 34295 Montpellier, France*
[c] *Department of Intensive Care, Cardiology Unit, Université Lyon 1, UMR5558, Hospices Civils de Lyon, 69500 Bron, France*
[d] *Cardiology Department, Hôpital Européen Georges-Pompidou, AP—HP, 75015 Paris, France*
[e] *Cardiology Department, Rangueil University Hospital, 31400 Toulouse, France*
[f] *Cardiology Department, Inserm U942, Lariboisière Hospital, AP—HP, Paris Diderot University, 75010 Paris, France*

[*] Corresponding author. Cardiology Department, Hôpital Lariboisière, 2, rue Ambroise-Paré, 75010 Paris, France.
E-mail address: patrick.henry@aphp.fr (P. Henry)

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