



SPECIAL ARTICLE

“Do not do” recommendations of the working groups of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC) for the management of critically ill patients[☆]



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Abstract The project “Commitment to Quality of Scientific Societies”, promoted since 2013 by the Spanish Ministry of Health, seeks to reduce unnecessary health interventions that have not proved effective, have little or doubtful effectiveness, or are not cost-effective. The

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◇ En el [Annex 1](#) se relacionan los autores que han participado.

Recommendations;
Intensive care unit

objective is to establish the “do not do” recommendations for the management of critically ill patients. A panel of experts from the 13 working groups (WGs) of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC) was selected and nominated by virtue of clinical expertise and/or scientific experience to carry out the recommendations. Available scientific literature in the management of adult critically ill patients from 2000 to 2017 was extracted. The clinical evidence was discussed and summarized by the experts in the course of consensus finding of each WG and was finally approved by the WGs after an extensive internal review process carried out during the first semester of 2017. A total of 65 recommendations were developed, of which five corresponded to each of the 13 WGs. These recommendations are based on the opinion of experts and scientific knowledge and aim to reduce those treatments or procedures that do not add value to the care process, avoid the exposure of critical patients to potential risks, and improve the adequacy of health resources.

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PALABRAS CLAVE

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Recomendaciones de “no hacer” en el tratamiento de los pacientes críticos de los grupos de trabajo de la Sociedad Española de Medicina Intensiva, Crítica y Unidades Coronarias (SEMICYUC)

Resumen El proyecto denominado «Compromiso por la calidad de las sociedades científicas» impulsado desde el año 2013 por el Ministerio de Sanidad, Servicios Sociales e Igualdad tiene como objetivo disminuir las intervenciones sanitarias innecesarias que no han demostrado eficacia, tienen escasa o dudosa efectividad o no son eficientes. El objetivo de este trabajo es elaborar las recomendaciones de «qué no hacer» seleccionadas para el tratamiento de los pacientes críticos. Se designó un panel de expertos de los 13 grupos de trabajo (GT) de la Sociedad Española de Medicina Intensiva, Crítica y Unidades Coronarias (SEMICYUC), elegido por su experiencia clínica o científica para la realización de las recomendaciones. Se analizó la literatura publicada entre los años 2000 y 2017 sobre diferentes cuestiones asociadas a los pacientes críticos. En reuniones de cada GT, los expertos debatieron las propuestas y sintetizaron las conclusiones, que fueron finalmente aprobadas por los GT después de un amplio proceso de revisión interna, realizado durante el primer semestre de 2017. Finalmente, se elaboraron un total de 65 recomendaciones, 5 por cada uno de los 13 GT. Estas recomendaciones se basan en la opinión de expertos y en el conocimiento científico, y pretenden reducir aquellos tratamientos o procedimientos que no aporten valor al proceso asistencial, evitar la exposición de los pacientes críticos a potenciales riesgos y mejorar la adecuación de los recursos sanitarios.

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Introduction

The recommendations made by scientific societies seek to reduce variability in patient management and contribute to the standardization of care. With this purpose, the Spanish Society of Critical and Intensive Care Medicine and Coronary Units (*Sociedad Española de Medicina Intensiva, Críticos y Unidades Coronarias* [SEMICYUC]) recently published a total of 65 recommendations of great relevance in the daily care of patients admitted to the intensive care unit.¹ On the one hand, the level of evidence on which certain clinical decisions in intensive care medicine are based is variable. Our interventions are not always supported by the best scientific evidence due, among other factors, to the difficulties facing research in the critical patient.² A number of studies have estimated that one-quarter of the interventions in medicine offer no benefit for patients and may even harm them.^{3,4} Projects have been developed at international level that

promote the application of “do not do” recommendations with the aim of improving healthcare.⁵ Different Spanish scientific societies participated in the project “Quality commitment of the scientific societies in Spain”, promoted by the Spanish Ministry of Health in the year 2013 to reduce the number of unnecessary interventions.⁶ That document defined a series of “do not do” recommendations based on the best available evidence. Just as important as applying diagnostic or therapeutic procedures based on scientific evidence in the critical patient is knowing those practices which are considered to be unnecessary either because they afford no benefit or because they may even prove harmful for the patient. The SEMICYUC, through its 13 working groups (WGs), has worked on the development of a series of recommendations based on the “do not do” model with the purpose of reducing unnecessary healthcare interventions that have not demonstrated efficacy, contribute no value to the patient care process, are of scant

or questionable effectiveness, or are not cost-effective. Such recommendations seek to avoid critical patient exposure to potential risks and improve healthcare resource utilization.

Methodology of the recommendations

Conformation of the group

In December 2016, the expanded Management Board of the SEMICYUC, with the presence of the coordinators of the WGs, decided to carry out this project with the purpose of defining and developing 65 recommendations (5 for each of the 13 WGs) of special interest in relation to daily clinical practice. Eight experts were chosen (F.J.G.d.M., F.G., A.E., P.M.V., J.F.F.O., J.C.L., J.M.P.V., and M.A.B.S.) with the role of adapting the style of the recommendations to the established standards. Each WG formed ad hoc working teams to produce the recommendations.

Search of the biomedical literature and development of the recommendations

A literature search was conducted for the development of these recommendations. We analyzed meta-analyses, randomized clinical and observational studies, systematic reviews and updates referred to critical patients in MEDLINE, EMBASE reviews, and the Cochrane Database of Systematic Reviews from the year 2000 to June 2017, as well as the opinions of the experts in each WG. Each WG established five "do not do" recommendations of great clinical relevance for the management of critical patients. The initial text and "do not do" recommendations were forwarded to the intensivists pertaining to the respective WGs in order to reach consensus in the different WG meetings. Based on their contributions and the common positioning established in the meeting of the WGs, the final recommendations of the document were defined on occasion of the National Congress of the SEMICYUC 2017. The Drafting Committee performed the final review of the document.

Results

The "do not do" recommendations for the management of critical patients, developed by the respective WGs of the SEMICYUC, are described below.

Bioethics working group

Recommendation 1: Do not decide limitation of life support treatment without full evaluation of the clinical situation, prognosis, and patient values

Limitation of life support treatment (LLST) is a good clinical practice; maintaining futile treatments is not ethical and constitutes therapeutic obstinacy. Such practices therefore must be known to the patients and their relatives and must be explicitly reflected in the case history.

Decisions referred to LLST must be prudent and preferentially established on the basis of team consensus, being

based upon the clinical situation, treatment response, prognosis, and values of the patient.

It is not advisable to make LLST decisions under conditions of uncertainty, and such decisions moreover should not be made by a single individual but with the participation of the implicated nursing staff and other specialists. In cases of doubt or disagreement within the health-care team, the pertinent Ethics Committees are to be consulted.^{7,8}

Recommendation 2: Palliative care should not be regarded as foreign to intensive care

Classically, intensive care and palliative care may have been regarded as two entirely opposite disciplines. This concept has been obviated by modern medicine however, and end of life care is presently common in the Department of Intensive Care Medicine. Consequently, LLST decisions should not be made without the existence of a palliative care plan designed to improve patient well being, facilitate symptoms control and family accompaniment, and offer spiritual support based on the patient beliefs and values.^{9,10}

Recommendation 3: Do not treat the critical patient without his/her consent or without consulting the living will in cases of disability

Informed consent is based upon the principle of patient autonomy. Diagnostic procedures and treatments therefore should not be implemented without obtaining the required consent.

In cases of patient impossibility to make decisions, the living will should be consulted and respected.

Informed consent should not be regarded as a mere bureaucratic process. Healthcare professionals must ensure its correct implementation, considering the clinical situation of the patient and identifying his/her representatives if patient personal consent is not possible. Informed consent is to be obtained in an adequate environment, supplying true and comprehensible information, and offering the possibility of free revocation at any time.

The inclusion of patients in research studies must be made with their consent or that of their representatives in the event of disability.^{11,12}

Recommendation 4: Do not suspend life support measures in brain death without offering the possibility of donation

Organ and tissue donation is a right of all people and should be offered to patients in end-of-life care. This offer is not exclusive for patients in brain death but is extendible to LLST decisions and must be made independent of the transplant coordinator of the center.¹³

In the case of patients admitted to the ICU with the sole purpose of organ donation, the patient relatives must be informed truthfully in order to avoid creating false expectations.

Recommendation 5: The protection of intimacy must be remembered as essential for the dignity of the patient
Humanizing critical patient care must include the availability of a proprietary space for the patient. In this respect,

structural changes are to be promoted, contemplating individual rooms with mechanisms to protect patient intimacy when needed.

Healthcare professionals must focus special attention on creating an adequate environment during the visits, patient transfer outside the ICU, and in situations of mourning, ensuring protection of patient intimacy at all times.¹⁰

In relation to information, clinical data on the patients must not be disclosed without their prior explicit consent.¹⁴

Cardiological intensive care and cardiopulmonary resuscitation working group

Recommendation 1: Do not delay the indication of mechanical circulatory assist measures in patients with cardiogenic shock not controllable with vasoactive agents

Inotropic drugs and vasopressors are indicated for improving the hemodynamic parameters in situations of cardiogenic shock, though their potential harmful effects require their use at the lowest possible dose and for the shortest possible period of time. When the use of such agents proves unable to optimize hemodynamics or perfusion, mechanical circulatory assist should not be delayed if the patient is a candidate for such measures.¹⁵ Consideration is required of the possibility of early referral to a reference center if the necessary technique is not available. Certain aspects referred to the choice of device, the patient characteristics, or the impact upon mortality are subject to controversy. Nevertheless, early mechanical circulatory assist must be contemplated in order to avoid progression to established organ damage, as this would make such assist measures futile and could lead to the death of the patient.¹⁶

Recommendation 2: Do not indicate amines for normalizing isolated hemodynamic parameters without taking into account the clinical situation of the patient and the signs of low cardiac output or postoperative vasoplegia

Postoperative low cardiac output syndrome can be defined as a cardiac index of $<2.2 \text{ l/min/m}^2$ accompanied by clinical evidence of hypoperfusion (oliguria, central venous saturation $<60\%$, or lactate $>3 \text{ mmol/l}$ without relative hypovolemia). Early amine use is a key step for avoiding progression to multiorgan dysfunction. However, the use of these drugs is not without deleterious effects such as increased myocardial oxygen consumption, associated to increased mortality. The choice of inotropic drug or vasopressor must be based on knowledge of the pathophysiological context of the patient and the mechanisms of action of the different drugs.¹⁷ The indication of amine use must not be based only on hemodynamic parameters but should also consider the clinical situation, with the objective of normalizing tissue hypoperfusion.¹⁸

Recommendation 3: Do not use pulmonary artery catheterization to monitor all cases of acute heart failure or cardiogenic shock

Invasive hemodynamic monitoring should be limited to situations where we require definition of the diagnosis, as well

as to patients with shock refractory to the initial management measures, with a view to facilitating clinical and treatment decisions. Indiscriminate use of the pulmonary artery catheter not only affords no benefit, but can also produce further complications.¹⁶ It may be of benefit in selected cases where careful and advanced management is required involving the continuous measurement of pulmonary pressures, right cavity pressures, or mixed venous saturation values under conditions of refractory shock and in patients with right ventricular dysfunction.¹⁹

Recommendation 4: Do not prescribe provisional pacemakers in all patients with bradyarrhythmias

The decision to implant a provisional pacemaker should be individualized according to the characteristics of each patient, and such devices should not be used on a systematic basis. A provisional pacemaker is indicated in bradyarrhythmias or tachyarrhythmias that prove refractory to conservative management (e.g., chronotropic drugs), or in the event of patient hemodynamic or clinical instability. Temporary transvenous cardiac pacing is associated with complications—some of which may prove fatal. Patients with symptomatic bradyarrhythmias are to remain monitored.²⁰

Since placement of a percutaneous provisional pacemaker is not without risk; adequate training in the technique is needed in order to avoid complications. Ultrasound is advised as guidance during implantation (venous access localization and advancement of the electrocatheter), with echocardiographic evaluation prior to indicating a permanent pacemaker.²¹ If the patient carrying a provisional pacemaker is seen to be eligible for a permanent pacemaker, implantation should be performed with the least delay possible.

Recommendation 5: Do not suspend thoracic compression in cardiopulmonary resuscitation except in predetermined interventions

The latest guides on cardiopulmonary resuscitation continue to emphasize the importance of quality cardiac massage, with minimum interruption of thoracic compression during any advanced life support intervention. For performing defibrillation, compression should be interrupted for $<5 \text{ s}$ (continue compression while the defibrillator is loading), and for rhythm analysis interruption should be for $<10 \text{ s}$.²² Teamwork involving all the ICU staff members is crucial for replacing the resuscitating professional regularly (maximum every 2 min), in order to ensure the continuity of quality compression and to minimize the time without cardiac massage.²³

Nephrological intensive care working group

Recommendation 1: In no case should dopamine at renal doses be used for the prevention or treatment of acute renal dysfunction

The use of dopamine at renal doses ($<5 \mu\text{g/kg/min}$) has not demonstrated efficacy in preventing or treating acute renal dysfunction (ARD).^{24,25} There is sufficient evidence that dopamine exerts deleterious effects and can induce gastrointestinal, endocrine, immunological, and respiratory

alterations in the critical patient.²⁶ Because of its capacity to increase free water elimination, the administration of this drug on a ‘‘compassionate basis’’ could be considered in situations requiring a negative water balance when clearance techniques are not applicable.

Recommendation 2: In no case should furosemide at renal doses be used for the prevention or treatment of ARD

Furosemide is not useful for the prevention or treatment of ARD.^{27,28} Although some animal models of ARD have indicated that diuretics may minimize renal damage, this has not been demonstrated in clinical studies. Indeed, furosemide has even been reported to have possible harmful effects upon the evolution of ARD.²⁹ The diuretic response to furosemide for fluid control may be contemplated in cases of ARD requiring a negative water balance when clearance techniques are not applicable.³⁰

Recommendation 3: Do not rule out ARD in critical patients with risk factors and normal blood creatinine values without prior confirmation with measured clearance

The correct stratification of ARD requires diagnostic tools that are easy to use, precise, and useful at the patient bedside.³¹ In critical patients (unstable renal conditions), we should not rely on the plasma levels of molecules that may vary in concentration as a result not only of changes in their renal clearance but also of changes in their production. It is therefore not advisable to depend solely on the creatinine values in blood to discard ARD, particularly in those patients with risk factors for developing ARD (use of radiological contrast media, postoperative period of major surgery, sepsis, severe pancreatitis, shock, etc.) or with comorbidities (heart failure, diabetes, chronic kidney disease, etc.).^{32,33} In these cases, we should confirm renal function through measured clearance and recommend calculation of the glomerular filtration rate via creatinine clearance in 2 h, since it is simple and reliable.³⁴

Recommendation 4: In no case should radiological explorations with hyperosmolar contrast media be used
Radiological contrast-induced nephrotoxicity is a frequent cause of ARD. The use of such media has been associated to increased patient morbidity–mortality and a prolongation of stay. The use of non-ionic (hypo- and isosmolar) contrast media is associated with a significant decrease in toxicity versus the use of ionic (hyperosmolar) contrast media. As a result, there is presently no reason for using these latter contrast media.^{35,36} The main risk factor for the development of nephrotoxicity is pre-existing renal failure. Correct hydration has been shown to reduce contrast-mediated nephrotoxicity—the recommendation being to administer 0.9% saline solution 1 ml/kg/h during the 12 h before and after the procedure.³⁷

Recommendation 5: Do not use nephrotoxic agents in critical patients that have recovered from ARD, except when absolutely necessary

The duration of ARD is variable (normally 7–21 days) and strongly dependent upon the intensity and duration

of the initial ischemic episode, the presence of new recurrent ischemic events, or the continued use of nephrotoxic treatments.³⁸ Most patients with ARD recover renal function; however, many individuals, including those with previously normal renal function, do not return to basal renal function levels.³⁹ Many studies have demonstrated an increased risk of chronification among patients that have recovered from ARD. Even small and acute serum creatinine increments of as little as 0.3 mg/dl have been associated to short- and long-term elevations in patient mortality.⁴⁰ It is therefore essential to be extremely careful with the maintenance of renal function in this particularly vulnerable period.

Infectious diseases and sepsis working group

Recommendation 1: Do not use dopamine in the resuscitation of patients with septic shock

The use of dopamine as a vasoactive and inotropic agent in the resuscitation of septic shock patients has been associated with an increase in the number of side effects—fundamentally arrhythmias—compared with the use of noradrenalin.⁴¹ De Backer et al. randomized over 1500 patients with shock of different origins to dopamine or noradrenalin in resuscitation. Although no differences in terms of survival were observed, dobutamine was associated to a significant increase in the number of arrhythmias. Posteriorly, the same investigators published a meta-analysis involving 2768 septic shock patients in which dobutamine was seen to be correlated to a poorer prognosis. More recently, a meta-analysis comprising 15 comparative studies of dopamine versus noradrenalin, with a total of over 800 patients, documented an absolute decrease of 11% in mortality risk after 28 days with the use of noradrenalin.⁴²

Recommendation 2: Do not use synthetic colloids in the resuscitation of septic patients

Different randomized studies and meta-analyses have shown that colloid versus crystalloid use in critical patients, in general, and in septic patients, in particular, is associated to an increased need for extrarenal filtration (ERF) techniques and to a poorer patient prognosis. Perner et al. evaluated the use of 6% hydroxyethyl-starch (HES) versus Ringer acetate in 804 patients with severe sepsis and septic shock. Resuscitation with HES was seen to be associated to increased mortality after 90 days, as well as to a greater use of ERF.⁴³ The Crystalloids versus HES trial (CHEST), comparing 6% HES 140/0.4 versus 0.9% saline solution in 7000 patients, found no differences in mortality after 90 days, though an increased use of ERF was noted in the patients receiving HES.⁴⁴ At present, both the European Medicines Agency and the United States Food and Drug Administration (FDA) recommend the avoidance of HES in patients admitted to the ICU, particularly septic patients.

Recommendation 3: Do not modify the initial antimicrobial loading dose in septic patients even in the presence of renal dysfunction

The initial antimicrobial (vancomycin, azoles, aminoglycosides, etc.) loading dose should not be lowered in septic patients with renal dysfunction. In the case of amikacin,

efficacy requires a maximum plasma concentration (C_{max}) above the minimum inhibitory concentration (MIC) of the bacterium treated in order to secure C_{max}/MIC 8–10. The obtainment of this initial C_{max} is independent of the renal function of the patient; creatinine clearance should be used only to modulate the subsequent drug doses. The pharmacokinetics (PK) of amikacin is often altered in the critical patient, causing the amikacin loading dose (15 mg/kg) to be insufficient in the vast majority of cases. As a result, at present, the recommended initial dose is 20–30 mg/kg. However, such dosing may result in a minimum plasma concentration (C_{min}) $> 5 \mu\text{g/ml}$, with the consequent risk of nephrotoxicity.⁴⁵ The presence of a body mass index (BMI) $< 25 \text{ kg/m}^2$, liver cirrhosis, and a positive water balance after 24 h (for each 250 ml increase) were identified as independent risk factors for not reaching the PK objective.⁴⁶ Monitoring the levels of antimicrobials with a narrow therapeutic margin may be useful for avoiding overdose.

Recommendation 4: Do not maintain the use of invasive devices when these are not needed

The incorporation of preventive strategies to clinical practice in the context of an integral safety program has been shown to be useful for reducing the infection rates associated with the use of devices. These programs propose the adoption of a series of measures grouped into “bundles” during the insertion and maintenance of invasive devices. Periodic and ideally daily evaluation is advised of the need for such devices in order to reduce exposure to risk in those cases where they are not strictly necessary.⁴⁷ The incorporation of algorithms with objective criteria that evaluate the need for the device within the patient safety plan may prove useful for reducing the number of days of device utilization per patient.⁴⁸

Recommendation 5: Do not administer broad-spectrum or restricted use antibiotics when de-escalation is possible

The current paradigm of antimicrobial therapy in critical patients is to start with broad-spectrum antibiotic treatment, followed by de-escalation conditioned to the microbiological results obtained. There is no uniform definition of antimicrobial de-escalation. According to different studies, it may be taken to represent a decrease in spectrum or in the number of antimicrobials used, or may correspond to a reduction of the duration of treatment or to the combination of different options.⁴⁹ Although a number of studies have found this strategy to be safe even in septic shock patients, a recent systematic review of the literature has evidenced an increased use of de-escalation in patients with improvement of the severity scores, and in those subjected to broad-spectrum therapy, with no apparent impact upon the total duration of antimicrobial treatment.⁵⁰ On the other hand, although the use of antimicrobials has been associated to the appearance of resistant strains at individual and environmental level, the current evidence is unable to establish the effect of de-escalation upon the appearance of resistances to antimicrobial agents. Further information is needed in order to confirm the effect of the strategy upon the clinical outcome.

Evaluation of research methodology and technologies working group

Recommendation 1: Do not resort to data obtained from clinical information systems for secondary use (investigation or clinical management) without first confirming their quality

The secondary utilization of data obtained from the electronic case history (ECH) is becoming a widespread practice and allows us to monitor our activity, assess consistency with scientific evidence, and evaluate the impact of the actions taken. Such use is also promising for research and innovation. Nevertheless, adequate methodology must be applied to assess the quality of such information. This requires data verification and validation in terms of integrity and accuracy.

Adequate systematization of the terminology and the evaluation of data quality allows us to transform the information contained in the ECH into a common data model for clinical management, benchmarking, and network researching in an efficient manner for critical care professionals.⁵¹ It is necessary to use the same definitions, train the staff involved, and audit both information entry to the ECH and its subsequent extraction and analysis.⁵²

Recommendation 2: Do not acquire healthcare technology without first consulting independent sources assessing their effectiveness, safety, and cost–benefit relationship

In relation to healthcare intervention cost–efficacy analyses, the type and amount of resources consumed are typically evaluated, though without examining the impact in terms of outcomes (quality, value). Cost-effectiveness studies based on applied trials sometimes do not generate sufficient evidence for managers or process supervisors to be able to make decisions in concrete settings.⁵³ As a result of this, the decisions may be more motivated by legal or budget concerns, without considering safety and the impact upon outcomes. In order for such an evaluation to be made, in addition to considering the scientific evidence, based on standardized and transparent methods, we must also consider local aspects⁵⁴ (organizational, professional training, case-mixes, etc.). Consequently, healthcare technology should not be acquired without first consulting independent sources assessing their effectiveness, safety, and cost–benefit relationship.

Recommendation 3: Do not compile research data without a prior rigorous methodological design

The project and methodology underlying all human studies must be clearly described in the research protocol.⁵⁵ Furthermore, the study must arise from an adequate literature review and needs to have a well-defined series of objectives.^{56,57} Likewise, data recording is to comply with the established legal requirements. If these conditions are not met, the results will be of questionable scientific validity, and conduction of the study therefore would not be justified.

The drawing of conclusions from a study that has not been adequately designed can give rise to changes in clinical practice that will not benefit patients.

Recommendation 4: Do not validate discordant or extreme monitoring data in the case history without first examining their congruency with the clinical situation of the patient

Monitoring systems often generate wrong readings caused by artifacts or application errors. It is common to observe discordant or extreme data that might not be congruent with the clinical situation of the patient.⁵⁸ Blind validation after automated acquisition in an ECH, or data copy from a history in paper format without due checking is to be avoided, since wrong clinical decisions may result, as well as error in the records used for research purposes—with the consequent alteration of results. Quality and veracity of the data contained in the case history, whether electronic or otherwise, are essential requirements that must be demanded. In this regard, clinical information systems (CISs) should be equipped with filtering and editing mechanisms in order to ensure that these requirements are effectively met.⁵⁹

Recommendation 5: Do not incorporate a CIS without first establishing a team to evaluate its characteristics and plan the electronic data needs of the Department

CISs in the ICU are a useful tool for managing the information generated. Their incorporation and correct operation require a series of solid bases, however^{59,60}: (1) definition of the basal status of the information systems and technologies available in the Department, working areas to undergo electronic conversion, the information we wish to handle, and the final objectives and expectations referred to acceptance on the part of the users; (2) creation of a multidisciplinary team with healthcare professionals and technical staff; (3) delimitation of the competences of both groups, with definition of the clinical and technical leaders and underscoring the importance of the system administrator; (4) adequate training in the use of the system and assessment of its impact upon working habits; (5) evaluation of system integration with the devices of the ICU and the rest of corporate applications; and (6) exploration of relationships with the supplying company to ensure a sustainable maintenance plan.

Acute respiratory failure working group

Recommendation 1: Do not maintain arterial oxygen saturation levels of over 95% in the critical patient or pO₂ value above 100 mmHg, except in special clinical situations

Recent observational studies underscore that critical patients are treated with excessive FiO₂ and are hyperoxic during prolonged periods. In humans, it has been demonstrated that hyperoxia can cause direct pulmonary toxicity with interstitial fibrosis, atelectasis, and tracheobronchitis. Furthermore, a direct relationship has been observed between hyperoxia and increased mortality, and a conservative and patient-individualized oxygen therapy strategy has been shown to be feasible and safe and is associated to less organ dysfunction and a greater decrease in lactate levels.^{61,62}

Recommendation 2: Do not use synchronized intermittent mandatory ventilation as a method for weaning from mechanical ventilation

Weaning from mechanical ventilation is based on the daily identification of those patients who can successfully perform a spontaneous breathing test. Practically one-half of such patients can be extubated (simple weaning).

Approximately 45% of all patients require progressive weaning from mechanical ventilation and this can be done by means of a T-tube, continuous positive airway pressure (CPAP), synchronized intermittent mandatory ventilation (SIMV), and pressure support.

Different studies have found that SIMV can prolong weaning more than other methods; it is therefore not advised as a method for weaning from mechanical ventilation.^{63,64}

Recommendation 3: Do not use noninvasive mechanical ventilation in patients with severe hypoxemia if there is other organ failure and monitoring to confirm success is not performed

The use of noninvasive mechanical ventilation (NIMV) in patients with moderate to severe acute respiratory distress syndrome (ARDS), or in the presence of other organ failure such as metabolic acidosis or shock, is associated with a high risk of failure. Its use should be limited to mild and to selected cases of moderate ARDS. In these situations, careful evaluation of the risk–benefit ratio of delaying intubation and invasive mechanical ventilation (IMV) is required.⁶⁵ Once started, signs predictive of NIMV failure risk are to be monitored: vital signs (respiratory frequency, systolic blood pressure, heart rate, Glasgow Coma Score), and gases. An increase or no improvement in respiratory frequency or no improvement or worsening of PaO₂/FiO₂ after 1 h of NIMV is indicative of treatment failure, and we must switch to tracheal intubation and IMV, since a delay in starting the latter increases patient mortality.⁶⁶

Recommendation 4: In the absence of tissue hypoperfusion, do not use a liberal fluid resuscitation strategy in patients with ARDS

The pathophysiological mechanisms of ARDS include the alteration of pulmonary vascular permeability, favoring liquid transudation toward the alveolar space.

The liberal administration of fluid therapy in patients with ARDS is associated to an increase in morbidity in the form of days on mechanical ventilation and ICU stay. It is therefore advisable to limit its administration in patients without evidence of hypoperfusion, and it is essential to monitor fluid therapy in hemodynamically unstable patients and try to prevent a positive balance with the aim of avoiding its deleterious effects.^{67,68}

Recommendation 5: Do not consider extracorporeal membrane oxygenation in acute respiratory failure unless mechanical ventilation and positive end-expiratory pressure level are optimized, and the response to prone decubitus is tested

The mortality rate in severe acute respiratory failure, and more specifically in severe ARDS, is high. One of the main reasons for this is the persistence of refractory hypoxemia despite mechanical ventilation following the current

international recommendations (tidal volume 6 ml/kg ideal weight, use of adequate positive end-expiratory pressure (PEEP), prone decubitus, and the early administration of neuromuscular relaxants). Extracorporeal membrane oxygenation (ECMO) has been proposed as rescue and supportive therapy until lung function recovers, though it is not without potentially serious complications. Thus, due to its complexity and high risk of complications, the risk–benefit ratio of ECMO must be evaluated before use, and the technique should not be considered before having optimized all those strategies which to date have been shown to significantly improve patient mortality and with a lower incidence of complications.⁶⁹

Metabolism and nutrition working group

Recommendation 1: Do not delay the start of enteral nutrition in patients hemodynamically stable after shock resuscitation with fluids and at least one vasopressor or inotropic drug

Enteral nutrition (EN) could favor intestinal ischemia if started in unstable patients receiving high-dose vasopressor medication. Vasopressors cause the shunting of blood flow from the intestine and peripheral organs to the central circulation. Under these circumstances, intestinal hypoperfusion and the increase in oxygen demand in the splanchnic region at the start of nutrition could favor intestinal ischemia. Nevertheless, it is estimated that only 1% of all critical patients develop some degree of mesenteric ischemia, with no evidence of a causal relationship among shock, vasopressor use, and EN.⁷⁰ On the other hand, the benefits of early EN in patients treated with vasopressor drugs have been demonstrated in clinical studies and include a lowering of in-hospital mortality.⁷¹

In patients administered low or decreasing doses of vasopressor agents (noradrenalin 0.1–0.2 µg/kg/min), an EN tolerance test should be attempted, with close monitoring of possible signs of digestive intolerance or hemodynamic instability.⁷²

Recommendation 2: Do not delay or interrupt enteral nutrition simply because the patient is in prone decubitus

Prone decubitus is a maneuver often used in patients with severe hypoxemia in order to improve the pulmonary ventilation–perfusion ratio. There is a belief that it probably results in greater intolerance to EN. Deep sedation and muscle relaxation have a negative impact upon gastric emptying and intestinal motility, thereby limiting adequate administration of the necessary nutrients. However, the degree of intolerance is independent of the patient position (prone or supine decubitus),⁷³ and EN in prone decubitus is possible, safe, and is not associated to an increase in gastrointestinal complications (increased gastric residue, vomiting), or to a decrease in the administered nutrient volume.⁷⁴ Raising the patient headrest >25°; the early introduction of EN; and the use of prokinetic agents offer benefits in that they improve tolerance in prone decubitus.⁷⁵

Recommendation 3: Do not start artificial nutritional support without first evaluating the possible development or refeeding syndrome and taking the measures required to avoid it

Refeeding syndrome (RS) develops as a result of the reintroduction of complete nutritional support (oral, enteral, or parenteral) in malnourished patients or patients at risk and can prove fatal if not suspected and adequately treated.⁷⁶

The syndrome is characterized by water–electrolyte alterations (mainly hypophosphatemia), vitamin deficiencies, arrhythmias, heart and respiratory failure, renal failure, hemolytic anemia, thrombocytopenia, seizures, and coma, among other disturbances. In the case of a patient with risk factors for RS (alcoholism, prolonged fasting, scant food intake in the week before admission to the ICU, weight loss, denutrition, BMI <18 or >40 kg/m²), we should correct the ion deficiencies before starting artificial nutrition, administer thiamine via the intravenous route, and start nutritional support at 50% of the calculated level, followed by gradual increments. Ion monitoring is indicated (mainly phosphate, potassium, and magnesium) initially every 24–48 h until stabilization is achieved.⁷⁷

Recommendation 4: Do not limit protein support in critical patients at risk of denutrition and ARD to control uremic syndrome and delay ERF techniques

In critical patients, an insufficient supply of calories and proteins in combination with a hypercatabolic state result in important loss of muscle mass and consequently a poor clinical course. Prospective observational studies have shown a greater protein supply in patients admitted to medical–surgical ICUs to be associated with fewer complications, shorter stays, and lesser mortality.⁷⁸

Randomized clinical trials reflect greater chances for survival among anuric patients in the ICU when administered a protein supply of >2 g/kg/day, with stabilization of the nitrogen balance.⁷⁹ If the patients are subjected to ERF, the administered amounts may be even greater, as recommended in the recent guides of the American Society for Parenteral and Enteral Nutrition.⁸⁰

Recommendation 5: Do not wait to detect water–air sounds to start enteral nutrition if the latter is considered indicated

Between 30 and 68% of all critical patients suffer gastrointestinal alterations with difficulties for correct EN administration and require close monitoring once EN has started. Gastrointestinal dysfunction is related to mucosal integrity, contractility alterations, and absorption problems.⁸¹

Abdominal auscultation of water–air sounds should be performed in all four quadrants, spending 5 min in each quadrant if no sounds are initially detected, and prior to abdominal palpation. Patients with absent or diminished sounds suffer increased mortality.⁸² However, not being able to detect intestinal sounds before starting EN is considered to be a safe and effective practice, since such sounds are an expression of intestinal contractility, not of absorption and barrier function.⁸⁰

Neurointensive care and trauma working group

Recommendation 1: Do not administer high-dose methylprednisolone in patients with traumatic acute spinal cord injury on a routine basis

The use of corticosteroids in traumatic acute spinal cord injury has been implemented following the protocols of the National Acute Spinal Cord Injury Study. However, methodological reviews and subsequent studies have been unable to firmly corroborate the benefits of their generalized use.⁸³

The administration of corticosteroids based on their action upon secondary tissue damage should be evaluated on an individualized basis according to the characteristics of the patient and intercurrent disease, in view of the possible side effects.⁸⁴ There is no evidence that corticosteroids are of benefit in patients with complete spinal cord injuries and such treatment therefore should not be prescribed.

In patients with non-stabilized traumatic acute spinal cord injury or with neurological deterioration, the administration of corticosteroids should comprise short cycles, with due consideration of the possible side effects in all cases.⁸⁴

Recommendation 2: Do not administer hypotonic solutions to neurocritical patients

The management of fluid therapy is one of the key elements in the treatment of neurocritical patients. The fluid volumes used, as well as their composition and tonicity, are crucial factors in the management of these patients. The blood–brain barrier allows the passage of free water but not of electrolytes. In this regard, the use of hypotonic solutions may favor the passage of water without solutes across the blood–brain barrier, thereby contributing to the development of brain edema. Under normal conditions, the endothelial cells and neurons exert compensating responses that avoid the generation of brain edema. These mechanisms are altered in the neurocritical patient, however.

Different observational and experimental studies have associated the use of hypotonic solutions to poorer clinical outcomes (increased intracranial pressure and mortality) in neurocritical patients.^{85,86}

Recommendation 3: Do not use prophylactic hypothermia as a measure to improve the prognosis of severe traumatic brain injury patients with diffuse brain damage

There is strong and growing interest in the use of hypothermia as a strategy for reducing brain tissue damage associated to traumatic brain injury (TBI). This technique has been adopted as a prophylactic and therapeutic measure and has been the subject of many studies. The quality of the evidence is low, however, due to the fact that the findings have been inconsistent. The studies differ in terms of the target temperature, the duration of hypothermia, and the rewarming rate.¹ The clinical trials published over the last 6 years, specifically the NABISH II, BHYPO, and EuroTherm3235 studies, found moderate hypothermia to be associated to worsening of the

neurological condition and to increased mortality compared with normothermia strategies. As a result, prophylactic hypothermia for improving the prognosis of patients with severe TBI and diffuse brain damage is currently not recommended.^{87,88}

Recommendation 4: Do not use hyperventilation in severe TBI patients without evidence of brain herniation

Severe TBI is characterized by an inflammatory response with changes in blood flow of the brain secondary to loss of its self-regulating capacity, resulting in a direct relationship between cerebral blood flow and the mean arterial blood pressure. Hypoperfusion and secondary global and regional ischemia manifest in the first 72 h.

Hyperventilation gives rise to cerebral vasoconstriction with a decrease in blood flow and a rise in the oxygen extraction fraction. These changes deplete the physiological reserves and compromise oxidative metabolism, with an increase in ischemic areas.⁸⁹ Such changes are usually underestimated by the conventional monitoring techniques and represent a mechanism of avoidable damage following TBI.

It is therefore advisable to avoid hyperventilation, ensuring normocapnia (36–40 mmHg) in patients with severe TBI. Hyperventilation is only recommended as a temporary measure in the presence of evidence of herniation and with the use of multimodal monitoring techniques.⁸⁸

Recommendation 5: Do not administer antiepileptic drugs in patients with recent stroke who have not suffered seizures

Seizure episodes following cerebrovascular accidents are an important clinical problem and can be associated to poor clinical/neurological outcomes.⁹⁰

The low frequency of such episodes and the potential adverse effects of antiepileptic drugs—including interactions with antiplatelet agents and oral anticoagulants—do not warrant their systematic use. Furthermore, there is not enough evidence supporting the use of antiepileptic drugs for the primary prevention of seizures after a cerebrovascular accident. The clinical guides contemplate the management of seizures once these have occurred, and in this context antiseizure therapy is indeed advised.⁹¹

Planning, organization, and management working group

Recommendation 1: Do not suspend scheduled surgeries due to a lack of beds in the Department of Intensive Care Medicine

The suspension of surgical operations due to a lack of available beds in the Department of Intensive Care Medicine (DICM)⁹² for the postoperative control of high-risk surgeries or patient comorbidities requiring the reservation of an ICU bed^{93,94} can pose a risk for the patient, lessen patient and family satisfaction, and increase both the stay and the economical costs.⁹⁵

Recommendation 2: Do not decide early or unscheduled discharge from the Department of Intensive Care Medicine

The limited number of beds in the DICM and the increase in number of critical patients cause some patients to be discharged early or in an unscheduled manner.⁹⁶

Early or unscheduled discharge is associated to an increase in adverse effects, readmissions, stays, costs, and in-hospital mortality.^{97–100}

Rapid response teams or follow-up of these patients by intensivists could lessen the associated negative impact.

Recommendation 3: Do not allow delays in the discharge of critical patients meeting clinical criteria for transfer to a conventional ward

A delay in moving patients who have passed the critical phase of their disease to the conventional ward is associated to inadequate cost increments and reduces the number of beds available for new admissions.¹⁰¹

Furthermore, it can increase patient morbidity and complicate relations with the family.¹⁰²

Adequate management of beds and early scheduling of discharge help reduce delays in discharge.¹⁰³

Recommendation 4: Do not delay the admission of a critical patient to the Department of Intensive Care Medicine

Delays in admitting a critical patient to the DICM is associated to increased morbidity–mortality, as well as to greater economical costs.^{104–106} Such delays are usually related to a lack of available beds in the DICM. Delay is defined as the interval between the indication of admission by a DICM physician and actual patient admission to the DICM. It includes delays referred to post-scheduled surgery patients.¹⁰⁷ In any case, the intensivist must assist the patient independent of where he or she is located.¹⁰⁸

Recommendation 5: A physical presence intensivist should be available 24 h a day in the Department of Intensive Care Medicine

A physically present intensivist available 24 h a day in the DICM guarantees quality care and the safety of the patients in the hospital, reducing stay and mortality among the critically ill.^{109,110}

Sedation, analgesia, and delirium working group

Recommendation 1: Do not start patient sedation until correct and adequate analgesia has been achieved as determined by validated scales

The current clinical recommendations seek to prioritize analgesia in the critical patient. It is advisable to maintain adequate patient analgesia as determined by the most commonly used scales such as the Pain Indicating Behavior Scale (*Escala de Conductas Indicadoras de Dolor* [ESCID]), the Behavioral Pain Scale (BPS), or the Critical Care Pain Observation Tool (CPOT), before starting the perfusion of sedatives. Such strategies lessen the need for sedation, help keep the patient calm and cooperative, facilitate adaptation to the ventilator, and shorten both the time on mechanical ventilation and the duration of stay in the ICU.^{111,112}

Opposite strategies, in which patients are sedated without correct analgesia, favor stress and discomfort, increase respirator adaptation problems, and over the middle to long-term prolong ICU stay and favor delirium and post-traumatic stress.

Recommendation 2: Do not maintain deep sedation in the absence of severe respiratory distress, intracranial hypertension, active status epilepticus, or neuromuscular block

The international clinical practice guides referred to the sedation of critical patients recommend that when sedation proves necessary, it initially should be as mild as possible. Deep sedation is only justified in very concrete situations (e.g., severe respiratory distress, intracranial hypertension, active status epilepticus, or neuromuscular block), and for the briefest time possible. A mild sedation strategy allows for earlier weaning from ventilation, shortens the duration of mechanical ventilation, and both ICU and hospital stay, reduces the incidence and duration of delirium, and allows early patient mobilization and rehabilitation. Deep sedation, even in early stages of admission to the ICU, is independently associated to increased mortality.¹¹³ If deep sedation is not justified, patients admitted to the ICU should be maintained with a Richmond agitation and sedation scale (RASS) score of 0/–1,¹¹⁴ or with a Riker sedation-agitation score of 3–4.

Recommendation 3: Do not sedate without individualized and therapeutic objectives adapted to the clinical situation, using validated scales, and transmit the information to the professionals involved in patient care

A clear definition of the individualized objectives of sedation, with frequent adaptation of these objectives to the changing situation of the critical patient, is recommended by the international analgesia-sedation guides. The specific objectives are to be adequately documented and transmitted to the healthcare professionals in charge of caring for the patient. In turn, the use of validated sedation scales allows definition of the current sedation status of the patient with a view to introducing adjustments in the event therapeutic interventions are decided. The documentation of sedation status should be made at least once every 4 h, or every time there is a significant clinical change.¹¹⁴ Action plans or protocols should be established to allow dynamic adjustment of the drug doses to ensure the required sedation levels. The objectives are to be re-evaluated periodically and jointly. Adequate monitoring of patient sedation allows a shortening of mechanical ventilation and ICU stay and reduces the number of nosocomial infectious complications.¹¹⁵

Recommendation 4: Do not use only pharmacological measures for treating and preventing delirium, and avoid benzodiazepines and mechanical restraints

There are a number of risk factors for delirium. The non-modifiable risk factors reflect patient predisposition to delirium, though the modifiable risk factors (fever, hypoxia, water–electrolyte or acid–base alterations, and the use of “delirium-prone” drugs such as benzodiazepines) should be

quickly corrected.¹¹⁶ Benzodiazepines should not be used to treat delirium, except in alcoholic withdrawal syndrome. Non-pharmacological treatments should receive priority for both the prevention and treatment of delirium: rehabilitation, reorientation, facilitation of nighttime rest, cognitive stimulation, and family accompaniment.¹¹⁴

Recommendation 5: Do not indicate prolonged neuromuscular block before ensuring deep sedation (RASS –4/–5) and adequate analgesia

Neuromuscular blockers in continuous perfusion should not be prescribed without due justification and adequate sedation and analgesia must be ensured before and during such treatment, with the purpose of maintaining deep sedation. The parameters derived from the frontal electroencephalogram, such as the bispectral index (BIS), the Patient State Index, the Narcotrend Index or entropy, are of help in monitoring the depth of sedation.

Control of the depth of neuromuscular block with train of four (TOF) stimulation together with clinical assessment and daily evaluation of the need to maintain neuromuscular block are useful for avoiding unnecessary overdose.^{117,118}

Toxicology working group

Recommendation 1: Do not allow missing or incorrect registry of any acute intoxication episode and its treatment

Documentation should include the cause of intoxication, the healthcare interval, the general and specific toxicological treatments provided, and serial records of the basic vital signs (respiratory frequency, heart rate, systolic blood pressure, pulsioximetry, temperature), as well as monitoring of the patient level of consciousness (evolution of the Glasgow Coma Score). The correct, systematic, and repeated recording of this information will help define the prognosis of severe intoxication patients, as well as the suitability of the adopted measures in relation to the care times. This type of protocol will allow application of the severity scales best suited to each patient. Deficiencies in these records are directly related to deficiencies in patient care. The lack of systematic and routine compilation of the relevant data referred to the management of acute intoxication cases is inadmissible, in the same way as in any other seriously or potentially seriously ill patient.^{119,120}

Recommendation 2: Do not administer thiamine to patients with acute alcohol intoxication in the absence of a history of chronic alcohol abuse or severe denutrition

The use of thiamine in acute alcohol intoxication is justified following the administration of glucose saline solution in patients with a clear history of chronic alcohol abuse or evident signs of nutritional deficiencies, with the purpose of avoiding Wernicke encephalopathy.

Thiamine is not the antidote in cases of acute intoxication, and the established recommendations do not include thiamine in the basic repertoire of antidotes for use in intoxicated patients.¹²¹

Recommendation 3: Do not rule out the suspicion of other concomitant causes underlying diminished level of consciousness in cases of acute intoxication

Diminished consciousness is one of the most frequent clinical presentations in cases of acute intoxication. In some cases, intoxication is the result of more than one substance. The clinical condition of the patient makes it difficult to compile a detailed history. Consequently, in all cases of acute intoxication, we must discard other causes that can produce diminished consciousness (infections, bleeding, ischemia, metabolic alterations, trauma, etc.), and which may require urgent treatment.^{122,123}

Recommendation 4: Do not administer flumazenil in patients at high risk of seizures or arrhythmias

Intoxication due to benzodiazepines is the most common drug overdose in the ICU and is habitually associated to the intake of other substances. Flumazenil is a benzodiazepine antagonist that competitively binds to the GABA receptors, reverting the effect of the drug. After decades of use, an increased risk of seizures and arrhythmias has been observed, however. As a result, flumazenil should be avoided in the following risk groups: patients intoxicated as a result of the combined ingestion of high-dose tricyclic antidepressants or other drugs that lower the seizure threshold or increase the risk of arrhythmias; the presence of QT elongation on the electrocardiographic tracing; or patients with a history of epilepsy.^{124,125}

Recommendation 5: The treatment of paracetamol intoxication should not be assessed on the basis of the plasma drug levels recorded <4 h after intake, since patient severity cannot be adequately assessed

The quantification and interpretation of plasma paracetamol levels is the only guide for assessment and treatment with the specific antidote, *N*-acetylcysteine.

The excellent correlation between plasma paracetamol concentration according to the time elapsed from toxic intake and the probability of hepatotoxicity has made it possible to establish the Rumack and Matthew nomogram, which is very useful for establishing the indication and dose of the antidote of the drug. In order for the result to be applicable for this purpose, however, the blood sample must be collected from 4 h after toxic intake. Levels determined before this time are not valid, since the plasma peak concentration has not been reached yet.¹²⁶

Transfusion and blood products working group

Recommendation 1: Do not perform routine blood tests. Testing should be done only in specific clinical situations, and collecting the minimum blood volume necessary
In many cases, blood tests are requested on a routine basis, with no objective indication and without the results implying any new therapeutic decisions.¹²⁷

It has been clearly demonstrated that the daily blood volume drawn is one of the main factors underlying anemia in the critical patient. This in turn can increase the transfusion requirements, with a consequent increase in risks and costs.¹²⁸

Recommendation 2: Do not transfuse packed red blood cells to critical patients that are hemodynamically stable, without bleeding and without organ dysfunction, in the presence of a hemoglobin concentration of >7 g/dl
There is no evidence that a restrictive transfusion strategy (hemoglobin [Hb] < 7 g/dl) increases patient morbidity or mortality after 30 days compared with a liberal transfusion strategy (Hb < 9 g/dl) in most critical patients. A single unit should be administered each time, followed by re-evaluation, to secure a hemoglobin concentration of 7–9 g/dl.¹²⁹

Further studies are needed to establish the transfusion threshold in patients with active ischemic heart disease, acute brain injury, or cancer.

In gastrointestinal cancer and heart surgery, in bleeding patients, cases of sepsis or acute myocardial infarction, the existing studies indicate a more liberal threshold (Hb < 9–10 g/dl).¹³⁰

Recommendation 3: Do not use fresh frozen plasma to restore the fibrinogen levels in bleeding patients

This recommendation is warranted by the essential need to reduce unnecessary transfusions, particularly of fresh frozen plasma (FFP). Transfusion should be limited to fixed doses with other blood components, in the absence of point of care coagulation testing, since the units contain only 2 g of fibrinogen per liter, and hemostasis is critically dependent upon this factor as a substrate for clot formation and as a ligand needed for platelet aggregation. Hypofibrinogenemia is common in coagulopathy associated to bleeding, and in these patients fibrinogen concentrate should be used.^{86,131}

Recommendation 4: Do not use FFP to revert anticoagulation with vitamin K antagonists in patients presenting severe bleeding or in need of urgent surgery

It is not advisable to use FFP for the reversal of anticoagulation produced by vitamin K antagonists (warfarin or acenocoumarol) in patients with severe or critical bleeding, or who require urgent surgery. Prothrombin complex concentrate should be used instead in such cases.^{132,133}

Recommendation 5: Do not perform prophylactic platelet transfusion in non-thrombocytopenic antiplatelet-treated patients, individuals with non-surgical cerebral hemorrhage, or patients scheduled for heart surgery

Depending on the time elapsed and the drug used, the transfused platelets will acquire the same defect as the circulating platelets exposed to antiplatelet treatment. The dysfunction produced by aspirin is easier to correct with platelet transfusion than that caused by clopidogrel or ticagrelor.

The existing scientific evidence weighs against prophylactic platelet transfusion in non-thrombocytopenic antiplatelet-treated patients, individuals scheduled for heart surgery, or patients with nonsurgical, spontaneous, or traumatic cerebral hemorrhage. In this latter case, no benefit is afforded in terms of hematoma volume control, mortality, or disability after 6 months when compared to

standard treatment. In contrast, prophylactic transfusion is advised in patients requiring neurosurgical manipulation.¹³⁴

Platelet transfusion in non-thrombocytopenic antiplatelet-treated patients is not necessary for most of the techniques performed in the ICU and is only recommended when highly complex surgery is required.¹³⁵

Transplant working group

Recommendation 1: Do not discard a possible organ or tissue donor without a justified and documented cause, following systematic and exhaustive evaluation

The evaluation of organ or tissue donors is an essential element of the donation and transplant process. The decision whether an organ or tissue can be transplanted, without causing damage to the recipient, is based on a series of clinical, laboratory test, morphological, and functional data. This information allows evaluation of the risks and benefits, which is essential in order to be able to transplant.

The donor screening criteria have changed significantly in the last decades as a result of the cumulative experience gained. Accordingly, organs and tissues that are not suitable for certain recipients may be of benefit to others—a situation that makes it difficult to know where the absolute limits lie. As a result, evaluation of the organ and tissue donor is a complex task that requires the active participation and leadership of the medical transplant coordinator, before discarding a possible organ or tissue donor without an objectively documented reason.^{136,137}

Recommendation 2: Do not regard the Department of Intensive Care Medicine as the only donor generating unit

Donation should form an integral part of end-of-life care. This circumstance has led to a change in the sequence of steps taken, by offering the possibility of admission to the Department of Intensive Care Medicine for donation purposes in the case of patients with a poor short-term prognosis secondary to catastrophic brain damage, and who are not considered amenable to treatment (as such treatment would be regarded as futile), but which could evolve toward brain death and become organ donors provided adequate life support measures are started or maintained.¹³⁸

The detection of these possible donors should form part of the care activities of all the implicated professionals—not only of the intensivists or the transplant coordinator. Forty-one percent of all possible donors die outside the Department of Intensive Care Medicine, fundamentally in the hospital ward and in the emergency room. The Department of Intensive Care Medicine therefore should not be regarded as the only donor generating unit.¹³⁹

Recommendation 3: Do not discard a possible lung donor only on the grounds of PaO₂/FiO₂ < 300 mmHg, if recruitment maneuvering with high PEEP has not been previously performed

Supine decubitus, which is usual in the critically ill, unless indicated otherwise, is accompanied by posterior lung field atelectasis if the patient is not mobilized for a prolonged period of time.

The PaO₂/FiO₂ ratio is commonly used to accept or reject a lung donor. However, this pulmonary blood gas evaluation in a multiorgan donor should be made after alveolar recruitment maneuvering, the use of protective ventilation for at least 2 h (tidal volume 6 ml/kg, PEEP 8–10 cmH₂O), and the clearing of lung secretions (if any) by means of bronchoscopy. Likewise, if lung edema is suspected, the donor should receive diuretics.

These measures have been shown to increase PaO₂/FiO₂ by around 100–120 mmHg in <3 h of treatment, with excellent results in terms of post-transplant survival. Therefore, recruitment maneuvering is essential before discarding a donor on the basis of PaO₂/FiO₂ < 300 mmHg.^{140,141}

Recommendation 4: Do not discard a possible heart donor only on the grounds of left ventricular ejection fraction <45% if optimum hemodynamic and metabolic management has not been previously performed

The evaluation of possible heart donors is based on echocardiography: segmental contractility alterations or a left ventricular ejection fraction (LVEF) of <45% are indicative of non-optimum conditions for transplantation.

The adrenergic, inflammatory, and hormonal response secondary to brain death can have important hemodynamic repercussions and even cause cardiac functional alterations that are reversible provided optimum hemodynamic and metabolic management is ensured.

Evaluation of the heart must be made under conditions of euvolemia, with the minimum vasoconstrictor and inotropic drug dose needed to maintain afterload and cardiac output. Hormonal resuscitation (corticosteroids, vasopressin, and thyroid hormone) cannot be recommended, since there are no conclusive studies in this regard. However, its use in patients with hemodynamic instability or high vasopressor needs may prove useful.

Consequently, it is not possible to discard a possible heart donor on the grounds of left ventricular ejection fraction <45% if optimum hemodynamic and metabolic resuscitation has not been previously performed.^{137,142}

Recommendation 5: Do not consider the option of controlled non-heart beating donation if the decision to limit life support treatment has not been previously made

The physician in charge of the patient is obliged to assess the withdrawal of life support measures when these are considered futile, thereby avoiding therapeutic obstinacy. The decision must always be made in accordance with an existing protocol on the LLST.¹⁰

Posteriorly, and with no relation to the previous decision, the transplant coordinator must evaluate the possibility of early death and the existence of possible contraindications to donation. If donation proves possible, a request for organ donation is mandatory, as well as the guarantee of patient right to donation if donation was his or her desire.

Non-heart beating donation is not to be considered if LLST has not been previously decided.¹⁴³

Discussion

The ‘‘do not do’’ recommendations in the management of critical patients developed by the working groups of the SEMICYUC are based on disadvised practices regarded as the most relevant to the daily management of patients admitted to the ICU. These recommendations propose the suspension, reduction, or obviation (at least on a routine basis) of practices that afford no benefit due to a lack of evidence supporting their use or indication. Likewise, the incorporation of these ‘‘do not do’’ recommendations in clinical practice may have a beneficial effect upon patient safety under the principle of ‘‘*primum non nocere*’’, avoiding potential harm caused by medical interventions that are inefficient or unnecessary, and hence promoting responsible healthcare resource utilization.

The scientific evidence supporting some of the ‘‘do not do’’ recommendations is limited—a fact that poses a limitation to the present document. It is very likely that other aspects will require renewed evaluation in future for inclusion in the priority list of ‘‘do not do’’ recommendations in the management of critical patients. The monitoring of adherence, degree of satisfaction, diffusion, and impact of these recommendations should be evaluated on an independent basis in future studies. On the other hand, and on an operative basis, only five recommendations per working group were selected—a fact that required prioritization of those recommendations which were considered most important and visible by the document coordinating team. In this regard, bias may have been introduced in drafting the manuscript. Likewise, the results of future clinical investigations may offer new evidence establishing the lack of benefit of current policies and giving rise to the incorporation and update of new ‘‘do not do’’ recommendations.

In conclusion, the ‘‘do not do’’ recommendations developed by the SEMICYUC hope to become a useful tool for reducing practices that are disadvised due to a lack of efficacy, failure to offer value to the healthcare process, and are of little or doubtful effectiveness particularly if they may compromise the safety of the critical patient.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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