



## EDITORIAL

### Towards the future in pediatric intensive care<sup>☆</sup>

### Hacia el futuro en cuidados intensivos pediátricos

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Even today, in 2011, pediatric intensive care medicine can be regarded as a “new” specialty with a promising future. No more than three decades have passed from the start of the development of specific techniques for vital signs support and control in children and the establishment of differentiated wards for such patients, to structuring of the discipline as such. However, in this period of time there has been a biotechnological revolution of such magnitude that pediatric intensive care has largely experienced a change in its concepts; new methodologies have been adopted; and those who work in this field must constantly keep themselves abreast of the new developments.

Good examples of these changes are the increase in number, and especially in the quality of the care units dedicated to critically ill children; the typification of techniques and systems conceived for pediatric patients; the growth in contrasted literature; the inclusion in the new training plans of topics dedicated to vital emergency care in pediatrics; and the quality and quantity of specific training programs in pediatric intensive care.

There is a clear symbiosis between adult and pediatric intensive care. Pediatric Intensive Care Units (PICUs) have progressively absorbed the experience of adult ICUs, modifying and adapting protocols, adjusting techniques and designing materials appropriate for the broad range of ages, sizes and weights found in the pediatric population. However, it presently can also be affirmed that through “our children”, adult ICUs have developed new and improved ventilation techniques such as the use of high-frequency ventilation; noninvasive techniques for monitoring gases

and pressures (trans-fontanelle intracranial pressure, facilitating the development of optic fiber sensors); new drug formulations such as exogenous surfactant.

In pediatric intensive care medicine, the predominance of infectious and metabolic diseases (dehydration), acute cardiological and respiratory disorders, and general, cardiovascular and neurological pediatric surgery postoperative care, etc., has given way to disorders demanding more complex patient care such as severe head injuries, solid organ transplants, and alterations secondary to immune suppression.<sup>1</sup> This situation is illustrated in the articles on head injuries that the group of the Maternal-Children’s University Hospital Complex in Las Palmas de Gran Canaria (Canary Islands, Spain) have published in this number of *MEDICINA INTENSIVA*.<sup>2,3</sup>

At present, with the disappearance of many of the above-mentioned illnesses and the improvements in primary care, the criteria for the hospital admission of pediatric patients in general and for admission to the PICU have changed completely, with new demands for the care of critically ill children.

Care activities with children amenable to intensive care entails a series of aspects: (a) integral clinical assessment of the patient, viewing the case as a whole rather than as the failure of a given organ; (b) application of a series of specific diagnostic and therapeutic techniques and procedures to define the acute problem involved, its repercussions, and to adopt the opportune management measures; and (c) continuity in the follow-up of the disease process, since the course of the condition varies constantly, and adequate adaptation of the therapeutic norms represents a systematic task in the PICU. All these aspects cause the medical professionals to need profound pediatric knowledge and to master a series of technological skills, with the capacity to observe, and the ability to take urgent decisions.

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In the future, further advances will be needed in relation to “non-invasiveness”, both as regards the monitoring techniques and in reference to treatment, with a view to reducing the complications inherent to invasive procedures. In this sense, the current development of hemodynamic and brain function monitorization is very promising.

In order to guarantee good performance in pediatric intensive care, it will become increasingly important to consider clinical aspects (number of patients, type of illness, technique performed, etc.) and administrative parameters in order to confirm a good cost/benefit ratio (occupation index, mean stay, patient/bed rotation, etc.). The pediatric intensivist is aware that PICUs must be made increasingly more effective in these terms.<sup>4</sup>

Quality is not a fashion, as is said nowadays in somewhat pejorative terms. It is also an ethical imperative, since it is not enough to offer services: needs must also be satisfied. The quality of care is usually measured in terms of only one of its dimensions: scientific–technical quality. However, this restricted conception of quality fails to contemplate other important variables such as accessibility, opportunity, adequacy, efficiency and, above all, psychosocial aspects of the care of critically ill children, which must be taken into account from more holistic perspective.<sup>4–6</sup>

The pediatric intensivist cannot neglect understanding the pediatric patient as a concrete individual belonging to a family and to a social group, i.e., as a “historical subject” in the individual and social sense. As far as possible, it is necessary to promote the humanization of intensive care in children, with a view to countering the cold environment inherent to PICUs, associated to technological development. Parent collaboration increasingly should be encouraged, allowing their free entry to the PICU and their cooperation in minor activities which may implicate them as far as possible in the care of their child.<sup>7,8</sup>

The feelings of the family largely vary from feelings of acceptance of the disease to rejection. Under these circumstances, it is very common for families to develop their own defense mechanisms, holding on to aspects of information which they view as positive. Following the provision of exhaustive information regarding a critically ill child, it is relatively common for parents to retain the most positive aspect of the information received, or to focus on some other secondary and irrelevant aspect in the serious context of the patient condition, but which nevertheless holds reason for hope in their minds. Inter-relation with the families requires increasingly optimized communication skills and techniques.<sup>7,8</sup>

Defining terminal conditions in intensive care is often extremely difficult, since it means that we are relatively certain that the patient will not recover. In the case of the PICU, this issue is much more complicated, since children have a great capacity to recover, and the course of pediatric illnesses often proves surprising—both as regards the prognosis of survival and as refers to the potential sequelae. With some frequency, aggressive treatments are not suspended until death is imminent, out of fear of classifying a potentially healable patient as a terminal case. In this way, treatment may be extended beyond all reasonable hope. It is therefore necessary to continue working to define reliable criteria for the limitation of therapeutic effort.<sup>9–12</sup>

The death of a child is clearly a great trauma for the family. However, it is less often recognized that the death of a child can also be a shock for those professionals in charge of caring for the patient. Even more significant is the impact which these professionals accumulate as a result of successive pediatric patient deaths. In this context, the prevention and treatment of healthcare professional “burnout” are essential in order to uphold the quality and outcomes of patient care, and to avoid abandonment of work on the part of current or future pediatric intensivists.<sup>13,14</sup>

Although the title of specialist in pediatric intensive care medicine is not a priority aspiration at the present time, since it offers no special advantages for pediatric professionals by exclusively tying them to a particularly hard discipline with a limited field of intervention, work in the PICUs should be regulated through professional titles granted by academic and government institutions. This will serve both to ensure minimum standards of care and to delimit the areas of intervention and promote development and teaching of the specialty—as well as protect the titled professionals from possible practice-related lawsuits. In the United States, pediatric intensive care is regarded as a subspecialty, recognized by the American Board of Medical Specialties, and is characterized by great clinical and academic vitality. In Spain, the *Asociación Española de Pediatría* (AEP) (Spanish Society of Pediatrics) and the *Sociedad Española de Medicina Intensiva y Unidades Coronarias* (SEMICYUC) (Spanish Society of Intensive Care Medicine and Coronary Units) are working to make it possible for accrediting professionals to receive the government recognition needed to develop the specialty and avoid the existing vacuum in this area—with due respect for the basic title (Pediatrics).

Regarding teaching of the management of clinical situations, patient safety is one of the main concerns of healthcare systems. Among the recommendations for improving such safety, mention must be made of the creation of work team training programs involving medical simulations. These are defined as situations or places created to allow a group of people to experience the representation of a real event, with the purpose of practicing, learning, evaluating or understanding human actions or systems. This must be the way to gain skills in serious and infrequent situations, without harm for the patient.<sup>15</sup>

Multicenter clinical trials have been shown to be very useful for defining therapeutic efficacy in low prevalence diseases, and should continue to be promoted in order to further knowledge.

Special attention is focussed on the definition of nosocomial infection preventive factors, and new increasingly contrasted and simplified diagnostic and therapeutic protocols are being promoted, based on scientific evidence.<sup>16,17</sup>

Achieving improved intensive care in turn results in improved survival among children suffering chronic conditions amenable to mechanical assistance of organ function—with the consequent blocking of bed vacancies. In this context, our care must be extended to the out-hospital setting. We effectively have “technology dependent” pediatric patients requiring a multidiscipline approach comprising bio-psychological care for the children and their families; family training and acceptance; the corresponding technical assistance; and the required nutritional support and pharmacological support, with a direct and immediate

connection to the hospital. Considerable and very favorable experience has already been gained in this field. Integration of these children within the family nucleus is very satisfactory, both physically and psychologically, for both the patients and their relatives—with improved quality of life and a lessened social burden. In turn, our care units obtain benefits in the form of the optimization of resources, with a lesser psychological burden for the professionals, and finally the administration derives a lesser cost burden.<sup>18</sup>

A brief mention must also be made of our human capital. In effect, our knowledge, adequate data interpretation, and effective treatment interventions would be of no help without our human resources. In this sense, our nursing staff members are a key factor. Specialization in this healthcare sector will be a crucial element for advancing in pediatric intensive care.

Thus, optimization in the obtainment of data can be seen in the future of pediatric intensive care. Less invasiveness and increased effectiveness the idea is to think more about of the child than the disease itself. The aim will be to apply scientifically correct and contrasted treatments. Multicenter protocols will be developed to correlate experiences and reduce the margins of error. The patient and family must receive an adequate environment, modifying that of the intensive care unit proper, readapting our classical schemes of rigorous coded circulation, and opening our units to parents and relatives who as a result of their proximity can better understand the problems of their critically ill child and our efforts to offer the best possible care. Lastly, patient safety will be guaranteed through teaching in simulated settings and virtual reality environments. In sum, we will strive to be as human as we are scientists and technicians.

## References

1. Lopez Herce J, Sancho M, Martino JM. Informe de la Sociedad Española de cuidados intensivos pediátricos. Distribución de los cuidados intensivos en España. *Ann Esp Pediatr*. 1999;50:14–6.
2. López Álvarez JM, Valerón Lemaun ME, Pérez Quevedo O, Limiñana Cañal JM, Jiménez Bravo de Laguna A, Consuegra Llapurt E, et al. Traumatismo craneoencefálico pediátrico grave (I). *Epidemiología, clínica y evolución. Med Intens*. 2011;35:326–31.
3. López Álvarez JM, Valerón Lemaun ME, Pérez Quevedo O, Limiñana Cañal JM, Jiménez Bravo de Laguna O, Consuegra Llapurt E, et al. Traumatismo craneoencefálico pediátrico grave (II): factores relacionados con la morbilidad y mortalidad. *Med Intens*. 2011;35:332–8.
4. García S, Ruza F. Aspectos económicos en CIP. In: Ruza F, editor. *Cuidados Intensivos Pediátricos*. 3rd ed. Madrid: Norma-Capitel; 2003.
5. Mencía Bartolomé S, Lopez Herce Cid J, Carrillo Álvarez A, Bustinza Arriortúa A, Moral Torrero R, Sancho Pérez L, et al. Evaluación de un programa de formación en cuidados intensivos pediátricos para residentes de pediatría. *Ann Pediatr (Barc)*. 2010;73:5–11.
6. Mata Zubillaga D, López de Armentía SL, Rodríguez Lage C, Álvaro Iglesias E. Adecuación de las prescripciones farmacéuticas en una unidad de cuidados intensivos neonatales. *Ann Pediatr*. 2009;71:201–8.
7. Bartel DA, Engler AJ, Natale JE, Misra V, Lewin AB, Joseph JG. Working with families of suddenly and critically ill children: physician experiences. *Arch Pediatr Adolesc Med*. 2000;154:1127–33.
8. Gilmer MJ. Pediatric palliative care: a family-centered model for critical care. *Crit Care Nurs Clin North Am*. 2002;14:207–14.
9. Casanueva Mateos L, Ruiz López P, Sánchez Díaz JI, Ramos Casado MV, Belda Hofheinz S, Llorente de la Fuente A, et al. Cuidados al final de la vida en la unidad de cuidados intensivos pediátrica. Revisión bibliográfica. *Ann Pediatr (Barc)*. 2005;63:152–9.
10. Levy M. End-of-life care in the intensive care unit: can we do better? *Crit Care Med*. 2001;29 Suppl:N56–61.
11. Martino Alba R, Casado Flores J, Ruiz Díaz MA. Actitudes y necesidades de los intensivistas pediátricos ante la muerte de sus pacientes. *Ann Pediatr*. 2007;66:351–6.
12. Palomeque Rico A. Cuidados intensivos y cuidados paliativos. *Ann Pediatr (Barc)*. 2005;62:409–11.
13. Ullrich CK, Maye OH. Fatiga por compasión del personal de los cuidados intensivos pediátricos. *Pediatr Clin North Am*. 2007;54:1005–26.
14. Bustinza Arriortúa A, López-Herce Cid J, Carrilla Álvarez A, Vigil Escribano MD, De Lucas García N, Panadero Carcavilla E. Situación de burnout de los intensivistas pediátricos españoles. *Ann Pediatr*. 2000;52:418–23.
15. Gonzalez JM, Chaves J, Ocete E, Calvo C. Nuevas metodologías en el entrenamiento de emergencias pediátricas: simulación médica aplicada a pediatría. *Ann Pediatr*. 2008;68:612–20.
16. Jordan García I, Bustinza Arriortúa A, Concha Torre JA, Gil Antón J, De Carlos Vicente JC, Téllez González C. Estudio Multicéntrico nacional sobre las infecciones nosocomiales en UCIP. *Ann Pediatr*. 2011, doi:10.1016/j.anpedi.2010.09.010.
17. Flores-González JC, Hernández-González A, Rodríguez-López C, Roldán-Cano V, Rubio-Quiñones F, Quintero-Otero S, et al. Infección nosocomial del tracto urinario en niños críticos. *Med Intens*. 2011;35:339–43.
18. De Oliveira Rios dos Santos MH, Redondo Collazo L, Oreiro Vilacoba MD, Rodríguez Núñez A. Ventilación domiciliar invasiiva. Perspectiva de los padres. *Ann Pediatr*. 2007;67:613–4.