Neurosonology in Critical Care

Monitoring the Neurological Impact of the Critical Pathology

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Re: ESNCH endorsement of the NESSC Course

Dear Professor Rodriguez,

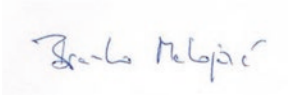
It is our pleasure to inform you, as the President and the Secretary General of the European Society of Neurosonology and Cerebral Hemodynamics (ESNCH), that the course "NEUROSONOLOGY IN CRITICAL CARE(NESCC): Monitoring the Neurological Impact of the Critical Pathology" meets the requirements for ESNCH endorsement.

Please include the ESNCH logo and link to the ESNCH website (http://www.esnch.org) on printed and electronic materials related to the Course.

With best wishes

Claudio Baracchini, MD, PhD, FESO
President of the ESNCH

Branko Malojcic, MD, PhD, FESO
ESNCH Secretary



Zagreb, 19. 12. 2018.

Foreword

Transcranial Doppler, including TCD flow imaging modalities, allows us to access detailed information on the hemodynamics of the cerebral circulation. TCD was first introduced in neuro-critical care to monitor vasospasm in patients after subarachnoid hemorrhage. Since the 1980's, we have witnessed a remarkable widening of its range of applications. This book is a substantial documentation of this development, describing a true multidisciplinary approach to using TCD (and extracranial Doppler) as a tool to improve neuro-critical care for a broad range of trauma and diseases.

The book illustrates convincingly a paradigm change in how TCD is used in investigational studies as well as in clinical practice. Ultrasound Doppler used to be a relatively simple diagnostic handheld tool where the verdict was based on the measured velocities, the pulsatility, and eventual spectral broadening signaling disturbed flow. What led to a shift in paradigm is one of the most important advantages of TCD – the presence of the cranium (really!). In spite of its propensity to dampen the ultrasound and make signal acquisition a bit more difficult, the cranium provides an ideal platform for mounting monitoring TCD probes. And this monitoring can go on and on, and even be aided by robotic technology in an ambulatory setting without somebody there to keep that probe aimed right on its target.

So, early on, TCD invaded the territory of physiologists and pathophysiologists. This invasion of course met resistance, if not outright attempts to condemn TCD to the scrapheap of bad science: *"Therefore, the slopes that Aaslid et al. calculated have nothing to do with the rate of autoregulation of the cerebral vascular bed." (Editorial, Stroke Jan. 1989).* Hundreds of dynamic autoregulation studies later, the facts speak for themselves. And the cerebral autoregulation in the non-anesthetized human is indeed an almost incredibly fast mechanism—contrary to the much slower response as measured in anesthetized cats by physiologists in the pre-TCD era.

There is still a lot to be learned about the cerebral circulation. TCD is a convenient non-invasive tool on this journey. It provides a lot of complex data that must

be analyzed and understood. Particularly encouraging has been the way pioneering neuro-anesthesiologists have embraced the methodology. It speaks for the usefulness of this window on the cerebral circulation.

Rune Aaslid
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Bern, Switzerland
November 2020

Acknowledgments

A book such as this could only be developed through the commitment and humble dedication of a group of exceptional professionals, who, through their handwriting, their sacrifice, the academic love for sharing, and the time dedicated, have honored each of its pages. I would like to thank my colleagues and editors for their belief and their magnificent work. Thanks go to ESNCH for their support and confidence in this project. I would like to thank Springer for believing in us and for their professionalism in this work. I would also like to thank Prof. Rune Aaslid for his contribution and trust. Last but not least, my greatest thanks go to my wife, my son and my parents for their love and constant encouragement; without them, nothing would have been possible. And to my parents, the cornerstone of my essence and existence.

Camilo N. Rodríguez

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Part III Neurosonology: Neurocritical Care Patient

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Part I
Neurocritical Care: Concepts to Review

Chapter 1
Neurocritical Patient in ICU: An Humanized View of Our Medical Care as a Gold Standard

Gabriel Heras La Calle and José Manuel Velasco Bueno

Key Points

1. You only have to walk through the door of a hospital to realize the discomfort of patients, families, and professionals.
2. To humanize is not "goodism": it is to promote professional excellence with the necessary human and technological means and attitudes. And this also requires economic investment.
3. When different personal, group, and organizational factors come together, personal wear and tear is very considerable, and the well-known burnout syndrome can appear. Recently, a 54% burnout rate has been published among intensivists in the United States.
4. So, how to humanize the medical care of the neurocritical patient? Well, that, dear reader, depends on you.

1.1 Introduction: What Do We Call the Humanization of Health Care?

Of all the professions, health care should be a paradigm of human treatment par excellence. Those of us who choose to serve others in the worst moments of their

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lives, when illness is present, should be worthy of the admiration and respect from the rest of the society. But… Aren't we human beings who are posing the prospect of the humanization of our care?

Obviously we are, although for many reasons we have been able to put excellence in treatment to one side. One only has to walk through the door of a hospital to realize the discomfort of patients, families, and professionals.

Scientific development has contributed to a notable improvement in health outcomes, thanks to technological innovation, the strengthening of research, and the objectification of decision-making. Thus, in the last 50 years, survival rates and life expectancy have been improved.

But perhaps health care has focused on solving problems called diseases rather than on the expression of these diseases in people. Technological euphoria has been able to make us lose the true focus of our human condition, which is fallible, finite, and deadly.

On the other hand, we are part of a complex socio-health world in which relationships are established between people with different roles and interests: patients, families, and professionals. These relationships are affected by different factors: high care burden, job cuts, lack of means, and little margin of error, factors that can lead to depersonalized care and generate a poor experience for users of the system. The depersonalization of professionals, together with emotional fatigue and low personal fulfilment, constitutes the so-called burnout syndrome, a real epidemic that many scientific societies are beginning to echo and to which solutions must be found.

How can we not talk about humanizing health care?

For the experts in this ancestral subject, to humanize means "to refer to man in everything that is done to promote and protect health, to cure illnesses, to guarantee an environment that favors a healthy and harmonious life on a physical, emotional, social and spiritual level. To speak of humanization calls for the intrinsic dignity of every human being and the rights that derive from it. And this makes it a necessity of vital importance and transcendence" [1].

The affective-effective model inspired by the thought and values of Albert Jovell [2]: "It is the way to care for and cure the patient as a person, based on scientific evidence, incorporating the dimension of the patient's dignity and humanity, establishing care based on trust and empathy, and contributing to their well-being and the best possible health outcomes."

In recent years, different projects at the local and international level have made the humanization of health care a new discipline, as has happened with patients' safety, for example. This is an absolutely transversal issue that is of social interest and crosses the barriers of hospitals and health centers: patients, families, and professionals together with managers and health authorities are considering re-designing health systems and focusing them on the main actors [3]. Taking care of all the parties who live together in the health system on a daily basis is a necessity; we would say almost a matter of survival and the way to building excellent health. To do so, we believe that it is necessary to listen to and attend to the particular problems of each actor, to respond to their needs, and to understand that the balance depends on the well-being of all those involved, and that it is everyone's responsibility as well.

Therefore, and by way of summary, we could point out that:

1. Humanizing health care means transforming hospitals into friendlier and more human-centered places, regardless of their role.
2. To humanize is to seek excellent care, and also to understand and accept that we professionals are fallible, vulnerable, and have the right to express our emotions.
3. To humanize is to become aware of oneself: it is an important personal commitment to improve reality, our relationships, and the environment from each person: it is humanized from the inside out.
4. Humanizing means personalizing care by listening to what patients and families need, not what we think they need, and turning this into a clinical process where attitude is fundamental. Healthcare systems will be humanized when they are at the service of all people.
5. To humanize is not to "appear good": it is to promote professional excellence with the necessary human and technological means and attitudes. And this also requires economic investment.

And the key to this, on which to focus the meaning of humanizing health care, is to recover the meaning of people's true dignity.

1.2 How Is Critical Care Humanized?

In February 2014, the project HU-CI was born in Spain [4]: the international research project for humanizing intensive care. Through the creation of a multidisciplinary group of people, made up of patients, families, and health professionals (doctors, nurses, assistants, psychologists, etc.) and non-health professionals (architects, computer scientists, designers, and teachers), an international and collaborative research group was set up based on the following premises, with the aim of redesigning health care [5].

After listening to thousands of opinions collected through the project HU-CI blog and cocreated by all the main actors, the eight research lines of the project were defined [6] (Fig. 1.1). Through the network research, we intend to evaluate different areas and carry out the implementation of the corresponding improvement actions.

1.2.1 Open-Door ICU: Presence and Participation of Family Members in ICU

The policy of family visits to ICU patients has historically followed a restrictive model [7] due to different factors:

- False beliefs
- Customs