

Perinatal pathology: the role of the clinical pathological dialogue in problem solving

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Proceedings

Proceedings of the International Course on Perinatal Pathology
(part of the 10th International Workshop on Neonatology · October 22nd-25th, 2014)

Cagliari (Italy) · October 25th, 2014

The role of the clinical pathological dialogue in problem solving

Guest Editors: Gavino Faa, Vassilios Fanos, Peter Van Eyken

*“Do not try to satisfy your vanity by
teaching a great many things.
Awaken people’s curiosity.
It is enough to open minds;
do not overload them.”
Anatole France*

Keywords

Perinatal pathology, problem solving, neonatologist, pathologist.

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How to cite

Faa G, Fanos V, Van Eyken P. Perinatal pathology: the role of the clinical pathological dialogue in problem solving. J Pediatr Neonat Individual Med. 2014;3(2):e030252. doi: 10.7363/030252.

Every journey, every adventure has a beginning. The beginning of this adventure goes back to about four years ago, to February of 2010, when one of us (V.F.) participated as a speaker at a meeting in Cambridge [1]. An Israeli colleague showed him a sentence from the Talmud, “God first created medicine and then the diseases.” A few months later, a second congress at New Paltz, NY (USA) left a permanent sign: it was the 11th International Workshop on Developmental Nephrology. Genetic Programming and the Kidney: Progenitors, Signaling and Morphogenesis in Health and Disease [2]. It was a meeting of initiates with fewer than a hundred researchers from all over the world on an extremely precise subject, in appearance detached from all reality, with Zebrafish and an enormous traffic of mediators and nephrons.

On his return to Cagliari, there followed a lively debate between the neonatologist and the anatomopathologist (G.F.) on this specific subject and, more in general, on the possibility of a further clinical and pathological interconnection in our reality, with international bridges towards scientific schools of excellence (P.V.E.).

These two meetings changed “epigenetically” the trajectory of our research, our assistance and our teaching. We first focused our attention on the kidney and later on all the other organs. We understood the need to further develop our knowledge on what takes place in the fetus and the first thousand days of life from conception, since this period represents a window of vulnerability (and eventually opportunity) with repercussions on an individual’s entire life. “The womb may be more important than the home” wrote prophetically David Barker [3]. The concept of Perinatal Programming (or the Developmental Origins of Health and Disease) is still very little known with respect to its real importance [4-6]. Suffice it to say that specialists who treat adults still do not ask their patients an essential question: how much did you weigh at birth?

Finally, interesting, if not intriguing aspects have emerged concerning the essential mechanisms in fetal life for the morpho-functional growth of the embryo and tumoral processes. The metabolic pathways may be the same [7]. If the organism has been able to shut down a metabolic pathway during its development, why could it not be the same for tumors?

The training (the two meetings) truly changed us (change is the real objective of all training) and

the result has been a series of events that have led to mutual professional growth, to a constant and profound dialogue in an attempt to understand the causes of a death of a newborn, to the reading of innumerable articles, to the vision together of many slides and also to the publication of a vast number of articles and two books [8, 9]. This is the third volume, a cooperative effort of Cagliari and Lovanio which caused a domino effect that brought in neonatologists, obstetricians, fetal medicine specialists, pharmacologists, cardiologists, surgeons and laboratory specialists of many other schools and departments: Göteborg, London, Pisa, Verona, Bari, Rome, Naples, Novara and San Gavino Monreale, with an intersectorial, interdisciplinary and interactive approach.

Asphyxia, respiratory distress syndrome, sepsis, multi-organ failure (MOF), cerebral ischemia and neuroprotection, necrotizing enteritis, biliary and renal pathology (including congenital nephrotic syndrome), injury caused by drugs, cardiac decompensation, placental pathology, neonatal issues in mothers with tumor: these are the topics debated, in the true sense of the word, by clinicians and pathologists.

Pathologists and clinicians come together and exchange views, they instil in one another doubts, they break down barriers and ten of them find themselves engaged in a lively debate around a microscope on a subject for too long and inappropriately neglected: the neonate.

The organism does not have much imagination, although this does not appear to be the case. What changes extraordinarily is the scenario of the pathological “representation” in the different organs and tracts, but the fundamental mechanism at the base is quite simple: cell hypodysplasia, reduction of the arborization of various structures within the parenchymas (for example, cerebral connectome, bronchial tree, ureteric bud and so on), reduction of arborization of the vascular tree [10]. Moreover, in some pathologies (e.g. MOF) the pathophysiology is surprisingly the same in the neonate and the adult. The in-depth study, first on the kidney, has led to unexpected hypotheses [11, 12].

Different disciplines deal for example with immunohistochemistry and metabolomics [13, 14], with the processing of thousands of data in search of something that cannot be found with the classic criteria of anamnesis, objective examination, laboratory tests and imaging. Big data and information science promise to change

the world [15]. To come to grips with the extreme biological complexity of our organism and each of our organs, the completeness of enormous amounts of data is of extraordinary value if assessed holistically with the “omic” disciplines: in ancient Greek “oma” is a suffix meaning “all”. Aristotle said, “The whole is not the sum of its parts”. We say, together with Henrik Kacser, “If you want to understand the whole you must study the whole” [16]. Among the five great ideas in medicine: genome, cell, energy, evolution and systems biology, the latter truly represents the possibility of understanding our extraordinary interindividual variability [11, 14].

At our disposal today, with “omics” and namely metabolomics, we do not have only enormous amounts of data, but also hefty algorithms that allow us to solve a problem in times that are thousands of times faster than the systems now in use.

The new technologies and their application do not diminish the role of physicians: on the contrary, they represent a formidable instrument for extending their diagnostic potential and make possible 5-P medicine: personalized, prospective, predictive, preventive, participatory.

Thus, each neonatal autopsy becomes a “scientific experiment”, unique and unrepeatable, to understand what has taken place and explain to parents the causes of the loss of their most precious and irreplaceable possession. It is not rare for the causes, even for the most discerning pathologist, to be unclear, or totally clear or immediately clear. In the discussion, we start from darkness and then, as the great Professor Desmet says, “In the darkness a match lights for a few seconds, and one must be clever to remember everything and store in the memory what has been seen and thought”. It is the dialogue that helps us to grow at all times. With us, our young colleagues are growing: they are the enthusiastic companions of this interdisciplinary, intersectorial and interactive journey [17], projected towards the future [18, 19].

Every journey, every adventure, has a beginning. This volume is a further step forward. We do not know what the goal will be or if it will ever be reached, but the journey, even when over rough ground and exhausting, is in any case a value.

Declaration of interest

The Authors declare that there is no conflict of interest.

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