

Editorial

Truth is a Corrected Error¹

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Beginning in this issue is a three-part series by Dr A. Robertson on “Historical Errors in Neonatology” covering two centuries of modern newborn medicine from circa 1885 to now. During that time, we went from horse carriage to automobile, from hot air balloon to jet airplanes, from gunpowder to atomic bomb and from reading by the candle to the computer. Moderately populated nations became a multitude of people exploding the borders thanks to progress in hygiene and preventive care. Infant mortality markedly decreased in the developed world, allowing further refinements in neonatal care to be given to the smallest and sickest. The development of advanced care support for newborn infants led by scientific advances in all areas of medicine has not only generated impressive results in the treatment of sick premature infants but also well-intentioned significant missteps. Any new health care application nowadays may have implication for millions because one collective error may clone very fast due to the electronic transmission of knowledge.

HISTORIANS AND THE NEWBORN

Midwives, then physicians, and among them obstetricians, have been taking care of newborns for ages. Special interest for the newborn infant emerged in Europe in 1883 with Tarnier and the incubator; Budin and the well-baby clinics; Lister and Pasteur² and with the understanding of infections. The experimental period, which led to significant progress, can be traced to President Kennedy’s premature infant whose tragic ending stimulated intense research in the field of fetal and neonatal medicine. Officially, Neonatology was recognized as a special branch of Pediatrics in the United States in 1975. With the accumulation of knowledge, came the need to retrace the walk of the pioneers of newborn medicine. Pediatric historians have recently been accepted as researchers in scientific national meetings because of the influence of Dr Joseph Butterfield.³ They used to be relegated to the dusty corners of silent libraries. Why? Historians are not simple reporters of the past or collectors of old

documents. They search to understand human intellectual motivations, which leads to the process of discovery and progress. We may get lessons from history or even stimulation to go forward. The work of the historians includes also keeping a registry of our acts, so that we may avoid repeating errors of judgment. The historian frees us for the future, clears the table, and opens the field for new ideas and findings and also for potential errors.

The historians of Neonatology have all been experienced practitioners of the discipline and are trying to understand how we have reached a knowledge constantly renewed. William Silverman,⁴ Thomas Cone,⁵ Jeffrey Baker,⁶ Murdina Desmond,⁷ and others are trying to figure out the pathways of medical intelligence, not just for the fun of it, but to show that medical science is an uncertain walk sustained by the crutches of standard deviation.

Dr Robertson made a list of these errors, but he only gives us the facts. We have to draw our own conclusions. Some of us were enthusiastic participants in these monumental errors.

The errors in Neonatology cohabit after all very well with observation, creativity, risk taking, judgment, epidemiology, statistics, experimentation, and ethics.

DEFINITION OF ERRORS

From the Latin, *erro* has two meanings: (1) to walk adventurously and take the wrong way; and (2) action of the **mind**, which holds for true what is false (or the inverse).

The error could be acute, punctual in the sense of the administration of the wrong dose of a medication from an individual physician to an individual patient with an immediate or delayed toxic effect. The error could stem from a scientific authority in a field of medicine to a group of physicians (small or big) propagating a scientific concept having beneficial potential. Because physicians in general have more than one patient, the resulting deleterious effect may reach a multitude. The effect may not be immediately apparent, especially if the patients are treated in different hospitals or in different parts of the country. Patient epidemiological studies are able, with time, to find the thread and determine the cause of the error. The resulting faulty action(s) could be nil or could be destructive and even lethal at the level of the individual, group or society. A wide array of consequences may ensue.

Ultimately, errors are not pure evil. We progress by trial and error. If the human mind would not commit any errors, it would be a machine unable to think. The word error implicates adventure, experiment, and discovery. Did the discoverers of the world made no

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errors? They did a lot of them and some frequently lethal. The human species progressed. No errors, no adventure, no progress. Errors are an integral part of human thinking and creativity. Frequently, we are missing the background knowledge; thus, we experiment. The problem is that there is a big difference between an experiment in a test tube and an experiment in a human. No healthy individual wants to be the casualty of an experimental error. The medical researcher is more and more confronted with ethical issues, because the implications of the research may be social, political, financial, and legal. Nowadays, the trials are much bigger than they were in the past; and the errors may also be proportional to the number of participants.

THE RISK TAKERS

Without taking risk, there is no creativity and no progress. The problem is that the risk takers are disguised gamblers. With few exceptions, they gamble with lives of others. Trials on animals, to alleviate this problem, are becoming more difficult because they are subjected to stringent ethical rules of the treatment of animals. The results from experimentation on fetal and neonatal animals may not be extrapolated to humans. Data obtained from adult humans cannot be extrapolated to newborns and fetuses without taking significant risk. Nowadays, internal hospital review boards, the Federal Drug Administration, the National Institute of Health, the Center for Diseases Control, the American Academy of Pediatrics, the Committee on Fetus and Newborn in liaison with other medical associations play significant roles in providing safeguards for the public and more specifically the newborn and the mother. These organizations may also have the potential to slow down or halt any incentive to progress by placing many hurdles on creative thinking.

THE ROLE OF THE NEWBORN IN SOCIETY

Phenomena of society like industry, war, colonization, human resources, financial resources, immigration, science, microbiology, and psychology have played a significant role in the shaping of the healthcare system.

Scientific medicine appeared at the end of the 19th century and developed parallel to industry. The newborn in the middle of the nineteenth century was produced in numbers because its survival, as well as the survival of the mother, was uncertain. Progressively, it became apparent that the newborn had potential as a worker, taxpayer, and soldier and became an individual worthy of support. The industry was producing for the masses and the masses needed

collective health care to maintain the industry. The masters of industry influenced the governments to maintain and increase manpower. The problem was solved in part in the United States by intensive immigration, whereas in Europe, improvement of perinatal care and schooling systems underwent intense activation. Statistics and epidemiology were born at that time. Physicians started to collect data with pencil and paper. One century later, ferro-magnetic support is replacing paper, in other words, the massive amount of data is stored on computer.

An intense medicalization of perinatal medicine was achieved to the detriment of the midwife judged too poorly educated to approach scientifically the sick newborn.⁸

The borders of viability have been progressively pushed back into the second trimester of pregnancy, leading to higher success in survival but also generating significant morbidities directly connected to extreme immaturity. The costs of advancing technology have been spiraling due to intense investments in the U.S. in neonatal intensive care. European countries have made the choice, since the end of World War II, to optimize fetal outcome by supporting a systematic primary approach of prenatal care with systems of Universal health Insurance. In the United States, maternal-infant care is haphazardously supported by a mosaic of heterogeneous insurances, public and private, each with their extremely complex maze of rules. Great attention is provided to the catastrophic condition of a mother and her newborn and superb care is available. We have pushed the limits of viability to palliate an insufficient preventive and supportive system in the area of maternal and child health. The mother and her fetus with no threatening disease requiring hospitalization is lost in the bureaucracy of managed care and may not get the superb attention she deserves. That may be the major error of our times.

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