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Editorials

Advancements in genomic medicine and the need for updated regional clinical practice guidelines in the field of hepatology

Early this year, Foerster F et al. published an article describing the common grounds and regional differences for the management of hepatocellular carcinoma by comparing the updated versions of the clinical practice guidelines (CPG) of the American, European, and Asian-Pacific Associations for the Study of the Liver (AASLD, EASL, APASL). What is most interesting about this comparison is that it also highlights other CPG that make appropriate recommendations for regional populations, for example, as how Chinese hepatologists manage this disease [1]. Such differences may not be only related to the availability of the medical treatments, but also with the genetic and environmental factors implicitly involved in the development of liver disease in any given population. These observations stir up the need for the hepatology societies worldwide to document the actual deviations from the international consensus in their regional guidelines [1]. This relevance of regional CPG, how they are created and validated has been discussed previously [2]. In alignment with this trend, Annals of Hepatology (AoH) recently published the CPG of the Latin American Association for the Study of the Liver (ALEH) [Asociación Latinoamericana para el Estudio del Hígado] for the management of alcohol-related liver disease in which the differences in alcoholic beverages and genetic variability that affect alcohol intake worldwide were documented [3]. However, further regional guidelines are warranted in Mexico and other Latin American countries whether it be for the use of antivirals for hepatitis B and C or non-prescription drugs [4]. Unfortunately, due to the lack of reliable national research studies, there is a tendency to adopt the international CPG assuming that the recommendations will apply in the countries of origin. However, it is known that the genetic and cultural backgrounds differ among the Americas. The lack of regional CPG is a serious handicap challenging doctors in their daily medical practice, the national medical societies, and the healthcare systems.

The increased amount of biomedical knowledge that has been generated in the last 30 years due to the advances in science, technology, and interdisciplinary interactions has a significant impact when it comes to updating CPG. In the field of medicine, a definite milestone was the discovery of the structure of the DNA molecule that marked the pathway for the development of recombinant DNA techniques and in vitro amplification of DNA using different PCR techniques. Researchers were enabled to study superior eukaryotic genomes and integrate the knowledge previously obtained from the fields of biochemistry, cell biology, and immunology. With these new advancements, a paradigm shift occurs in the field of medicine -Genomic Medicine- that incorporates novel molecular biology testing to the standard diagnostic algorithm as well as increasing the understanding of the underlying physiopathological mechanisms of human diseases and its implications in clinical practice. During this stage, academic departments specialized in molecular biology in medicine emerged within the hospital areas, as well as the production of academic books and scientific journals related to molecular biology applied to the clinic [5]. Parallel to these events was the implementation of more rapid and efficient nucleic acid sequencing techniques that culminated in 2003 with the completion of the first blueprint of the human genome, a hallmark between the pre and post-genomic stages [6].

Although the complete sequencing of the human genome was a great achievement, more was still to come with the upgrading of the sequencing techniques towards a revolutionized era of high-throughput technologies such as new generation sequencing (NGS). With NGS, the cost and time to create robust human genome or exome datasets are highly reduced compared to earlier stages. Alongside, the large-scale study of transcriptomes, proteomes, and metabolomes has created the “Big Data” for the omics sciences- genomics, transcriptomics, proteomics, and metabolomics-, respectively. The enormous amount of “Big Data” could be chaos if not for the emergence of other sciences to order, classify, and correlate these databases. Bioinformatics and data mining together with computational engineering is working to integrate and provide us with new automated electronic applications to guide clinical decision-making processes in a variety of medical specialties [7–9]. Given these extraordinary advancements, we can differentiate at this time, the before and after, in the field of medicine with favorable implications for the patient.

Furthermore, these new database modalities are showing us the differences between peoples’ gene-environment interactions that influence the development and severity of diseases. It also tells us the importance of evaluating factors that are specific for each population, such as food habits, culture, religion, and emotions [10]. They will also give us a higher precision for the management of infectious-contagious diseases where virus genetic variability and regional risk factor epidemiology mark the difference between the development and severity of the disease as well as the response to specific treatments.

To date, the goal of genomic medicine has been to prevent chronic diseases, detecting and reversing them at the early stages of chronicity [11–13]. This current knowledge takes us to the next

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stage in medicine that impacts healthcare systems, diagnostics and disease prevention. In the field of hepatology, the integration of the advancements mentioned above will aid in the eradication of viral hepatitis and in the prevention of alcoholic liver disease, fatty liver or non-alcoholic steatohepatitis. Therefore, in the light of these new developments, updated regional CPG need to consider the local differences in the genetic and environmental characteristics of the target population that influence the natural history and clinical outcomes of disease. For example, the complex demography of the Latin American countries is marked by the co-existence of heterogenic populations comprised of the admixture of Amerindian, African, and Caucasian ancestries considered Mestizos and a significant number of Amerindian and Afro-descendant subpopulations. In conjunction with the genetic heterogeneity of this population, modifiable lifestyle factors such as diet that play an important role in the prevention and treatment of liver diseases will be required to be approached differently by culture [14]. In perspective, genome-based nutrition guidelines [15] tailored according to the target population will soon arise from these "Big Data" modalities and will be used to prevent or revert nutrition-related chronic diseases.

Annals of Hepatology strives to disseminate the best regional and worldwide advancements in the field by providing the medical community with the most updated information available. Therefore, in this issue, we will include in the Instructions for the Authors, a set of recommendations for the publication of Clinical Practice Guidelines, Consensus and Position papers for those who wish to submit them to Annals of Hepatology.

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