United journal of Internal Medicine

Short Communication

Predictive, Preventive and Precision Medicine: The Future of Healthcare

Gundu H R Rao*

Director Thrombosis Research, Lillehei Heart Institute, University of Minnesota, USA

Volume 1 Issue 1 - 2018
Received Date: 19 Sep 2018
Accepted Date: 20 Oct 2018
Published Date: 25 Oct 2018

1. Short Comunaction

Medical field is rapidly undergoing, a paradigm shift in the way the future healthcare will be delivered. The million -dollar question is, are we ready to embrace these changes? Are our medical colleges, and various medical departments ready to accept, learn new things, assimilate, and develop integrated healthcare? We keep hearing discussions about a new systems approach, to disease diagnosis and management, "Predictive, Preventive, and Personalized or Precision Medicine." It sounds very impressive, high-powered, and doable. How do we go about incorporating these buzz words, into a real-time practice of medicine? What we are talking about is, development of capacity to predict the early onset of a disease, or a risk factor or clusters of risk factors, for a disease, develop appropriate preventive strategies, and integrate available technologies, to deliver a personalized, precision medicine. In the next few paragraphs, let discuss this integrated approach to health care, using the metabolic disease epidemic as an example.

Metabolic diseases such as oxidative stress, chronic and acute inflammation, altered hemodynamics, hypertension, excess weight, obesity, endothelial dysfunction (hardening of the arteries), type-2 diabetes, and vascular diseases, have reached epidemic proportions worldwide [1-7]. Despite the decline observed in the deaths related to cardiovascular diseases (CVDs), in some of the industrialized nations, CVD remains, the number one killer in all regions of the world. Metabolic diseases are chronic, multifactorial diseases, and all of the risks that we have mentioned earlier work in concert, to promote a chain of events, leading to acute vascular events like heart attacks and stroke. We and other experts feel, that early detection of the observed metabolic risks and robust management of the observed risks, is the best choice and probably only choice, we have at the time of this writing. However, there is a great excitement about the promises and opportunities, presented by the rapid progress made by the emerging medical innovations and technologies.

On the 20th of January 2015 President Barack Obama announced during the State of the Union address, "Tonight, I'm launching a new Precision Medicine Initiative, to bring us closer to curing diseases like cancers and diabetes-and to give all of us access, to the personalized information we need, to keep ourselves and our families healthier." Of course, the President has a strong conviction in what scientific research can deliver and the great potential that exists, if we can just put together such a program [8]. What exactly is this new initiative? This initiative has two main goals: a near-term focus on cancers and long-term aim, to generate knowledge applicable to the whole range of health and disease. Towards achieving this end, Dr Francis Collins, the Director of the prestigious National Institute of Health, USA, envisages assembling over time, a longitudinal "cohort" of 1 million or more Americans, who volunteer to participate in research. Participants are expected to give consent for extensive characterization of biologic specimens, behavioral data, all linked to their electronic health records. He further states, that qualified researchers from any organizations will, with appropriate protection, have access to the cohort's

Corresponding Author (s): *Gundu H R Rao, Director Thrombosis Research, Lillehei Heart Institute, University of Minnesota, USA, E-mail: gundurao9@gmail.com*

Citation: Gundu H R Rao, Predictive, Preventive and Precision Medicine: The Future of Healthcare. United United journal of Internal Medicine. 2018; 1(1): 1-3.

data. Does it sound like a fishing expedition to you?

Since we are discussing metabolic diseases as an example, let us see how such studies can be applied to genomics of obesity and type-2 diabetes. Genome-wide association studies have become a common method, for the discovery of gene-disease relationships [9]. From 2007 to 2015, genome-wide association studies (GWAS), has resulted in the discover of 260 genetic loci associated with obesity and diabetes. Experts argue, that GWAS are expensive, and that GWAS-derived single nucleotide polymorphisms explain only a fraction of the heritability for complex traits. In the literature, there are arguments for pro and con, of GWAS studies and their immediate utility [10].When it comes to the early diagnosis for type-2diabetes, Wurtz and associates have demonstrated, that branched-chain and aromatic free amino acids in the plasma, are predictors of future diabetes and insulin resistance in the young [11]. In a recent study, Japanese researchers tracked 27,000 non-diabetic adults between 2005 - 2016, and found, that increased fasting glucose, higher body mass index, and impaired insulin sensitivity, were detectable up to 10 years before the diagnosis of diabetes as well as pre diabetes. They presented their work at this Year's European Association for the Study of Diabetes (EASD) Annual Meetings in Berlin, Germany (Oct 2018). They concluded their presentation, "As the majority of people with type-2 diabetes go through the stage of pre diabetes, our findings suggest that elevated metabolic markers for diabetes are detectable more than 20 years before its diagnosis."

Excess weight and obesity also are accompanied, by the early markers of Oxidative stress and chromic or acute inflammation. Screening for such early biomarkers, will provide an opportunity for the clinician, to develop early prediction capabilities. Based on the results of such studies, appropriate preventive strategies can be developed. This is where, the importance of personalized medicine comes to play an important role. We have articulated in our earlier articles on this topic, that we can use a variety of emerging technologies, and develop an integrated diagnostic platform for early diagnosis of the metabolic risks, and tailor or customize a treatment protocol, that is personalized and use emerging non-invasive technologies, to monitor the progress or the regression of the disease itself or the biomarkers that promote the disease progression [12-14]. Now that we have briefly discussed the theme of our editorial, **"Predictive, Preventive and Precision Medicine: The future of healthcare,"** we would like to express our view point, as to how this can be accomplished. The Rasmussen Center for the Prevention of Cardiovascular Disease at the University of Minnesota, under the leadership of Professor Jay Cohn has been, for the last 18 years, performing a noninvasive cardiovascular evaluation, in individuals with no history of cardiovascular disease. In this one hour, ten-point noninvasive diagnostic tests provide a comprehensive assessment of the severity of functional and structural abnormalities, in the small arteries and the left ventricle, the target organs for the most cardiovascular events [15].

Finally, the fact that the stakeholders in this very important area of integrative healthcare are organizing the 2nd international conference on Predictive, Preventive and Personalized Medicine, this year indicates, that there is an ongoing debate, to develop such an integrated platform. Having said that, who will develop this integrative approach to healthcare? How do we educate all the stakeholders, in these emerging medical innovations and integrated applications? Can we develop multidisciplinary projects at the Academia, and scientific research institutions, to work on such projects? Will the National Institutes of Health, which is ready to invest over a billion dollars on its precision medicine project, invest in the development of these integrative approaches, at the various Academic Institutions? I for one believe, that this will be the way the future healthcare will go. As an Emeritus Professor of the Laboratory Medicine and Pathology (LMP), at the University of Minnesota, I feel confident that cooperative efforts between the LMP and Departments of Medicine, could easily put together such platforms, which will provide a working model for the development of, "Predictive, Preventive and Personalized Medicine" in the near future.

References

1. Rao GHR. Prevention of reversal of cardiometabolic diseases. J Clin Prevent Cardiol. 2018; 7 (1); 22-28.

2. Rao GHR. Novel sub-groups of adult onset diabetes and its clinical complications. Editorial. Endocrinol. & Daib Care. 2018; 1.1:11-12.

3. Rao GHR. Reduction and reversal or prevention of type- diabetes mellitus. Editorial. Arch Endocrinol. & Diab. Care. 2018.

4. Rao GHR. Cardiometabolic diseases: A global perspective. J of Cardiovasc Ther. 2018.

5. Rao GHR. Management of Excess weight and Obesity: A global perspective. Interven. Obes. & Diab. 2018; 1 (5): 000523.

6. Rao GHR. Global economic burden of preventable diseases: Diabetes Mellitus. Arch. Endocrinol. & Daib Care. 2018; 3:136-138.

7. Rao GHR:Obesity epidemic: A global perspective. Interven. Obes. Diab. DOI:10.31031/IOD. 2018; 02: 000528.

8. Collins FS: A New Initiative on Precision Medicine. N Engl. J. Med. 2015; 372:793-795.

9. Cirilo E, Kutmon M, Hernandez MG. From SNPs to pathways: Biological interpretation of type-2 diabetes (T2DM) genome wide association study (GWAS) results. PLOS One. 2018.

10. Meyre D. Give GWAS a chance. Diabetes. 2017; 66 (11); 2741-2742.

11. Wurtz P, Soininen P, Kangas AJ. Branched-chain and aromatic amino acids are predictor of insulin resistance in young adults. Daib. Care. 2013; 36 (3): 648-655.

12. Rao GHR. Predictive and preventive health care: Integration of emerging technologies. Point of view. J. Clin Res in Daib. & Endocrinol. 2018.

13. Rao GHR. Diagnosis of early risks, management of risks, and reduction of vascular disease. J Clin Card. & Diagn. 2018; 1 (1):1-11.

14. Rao GHR. Integrative approach to the management of cardiometabolic diseases. J. Cardiol. and Cardiovasc Sci. 2018; 2 (3): 37-42.

15. Cohn JN. Cardiovascular Disease Progression: A target for Therapy. The Am. J of Med. 2018; 131(10); 1170-1173.