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Letter to the Editor

Precision medicine: a master stroke

Sir,

Precision medicine is an idea of customization of health facilities as per the needs and demands of individual patient. Precise medicine leads to customized therapy to patients according to genetic profile because this provides information regarding susceptibility to disease and likelihood of response to treatment. It tends to use genetic information of a person to diagnose or treat their disease with sharing of this knowledge to establish a composite record which can be utilized in order to make available superior treatment to other patients also. Precision Medicine is going to be future of medicine. It collaborates technology, basic medical science and clinical records in order to throw lights on the aetio-pathogenesis of disease establish new target based therapy and eventually work for betterment of mankind.

In usual means the word precision indicates degree of correctness. In the extensive field of Medicine, the precision is an absolute requirement in every step of patient care. In the wide horizon of Medicine, the diseases can primarily be divided into communicable and non-communicable. As we are aware that in the diagnosis, treatment and monitoring of communicable diseases, we have achieved a reasonably good place in delivering health care whereas in non-communicable diseases same status is lacking virtually involving each and every aspect of disease from diagnosis to ultimate outcome of disease. In bitter words, despite daunting efforts the outcome of these illnesses remains unsatisfactory and challenging. Since these illnesses are multi-factorial in origin involving genetic, environmental, social and other untold factors, we need to pay attention to those more aggressively. To address these issues and in search of cure with the hope of providing patients customized healthcare, a multi-disciplinary approach the concept of "Precision Medicine" is coming up. Being holistic approach it involves wide variety of fields working as a coalition such as molecular biology, physicians, pharmaceutical industry, electronic data sharing etc. A similar looking term, "Personalized Medicine", which is defined as "the tailoring of medical treatment to the individual characteristics of each patient to classify individuals into subpopulations that differ in their susceptibility to a particular disease or their response to a specific treatment".[1] Precision medicine will be helpful in implementing personalized medicine. Another significant element of precision medicine is Pharmacogenomics. Pharmacogenomics applies information derived from human genome to predict effects of drugs. By pharmacogenomics tools we are now able to discover of variation in DNA sequence (SNPs,), understanding the clinical impact of sequence variation which will affect pharmacokinetics and pharmacodynamics of drugs. The coalition of personalized medicine, precision medicine and pharmacogenomics will ensure greater efficacy in attaining desirable drug effects at reasonable cost, avoiding adverse side effects.

The scope of Precision Medicine is huge, primarily involves non-communicable diseases like diabetes mellitus, cancer, Alzheimer's disease, cardiovascular disorders etc. This concept primarily expects more accuracy in the diagnosis and more effective & precise use of medicines. These different domains will work in order to improve knowledge of patho-physiology of disease and to develop individualized treatment regimens. Routinely during clinical trials the pharmacogenetic data is not included and inter-individual variation is a relatively ignored and one size fits all principle is followed, which also fails to exploit the information of genetic data, to take care of this shortcoming is also a fundamental goal of precision medicine. In association with pharmaceutical industry along with geneticists, to look for different combinations of drugs based on molecular characteristics of disease, to get rid of resistance which limits effectiveness of drugs, response monitoring of treatment and eventually, it will lead to more effective treatment and will build a more comprehensive scientific knowledge which are to be generated in future and implementation of precision medicine into practice.

To predict such variables observational pilot studies are a nice tool. In an observational study, without altering due health care process, we collect molecular and other patient-specific data from individuals. With the help of observational studies we will be able to develop hypotheses, that which type of treatment is effective in which sort of patients and group them as per the clinical response and molecular profile. Practically relevant genotype-phenotype interactions have been found during observational studies.[2] The concept is to create a large database of volunteers from different regions regarding their genetics (molecular make up of disease) and other biological information (clinical information). This

database will depend on clinicians who need to contribute samples and data without compromising patient's privacy, which can be used by basic scientists, and the researchers need to respond back accordingly. So it's a bilateral dialogue where the flow of information can go either way. On the basis of this, new insights into disease patho-physiology will be uncovered. Classically the diseases are described on the basis of their signs and symptoms, by using such database the disease may be defined by their molecular and environmental factors.[2] Ultimately the crux is to develop a research methodology which is based on open data sharing using sophisticated techniques for the betterment of mankind.

Currently we are living in the era of evidence based medicine and, in the future we will be moving to precision medicine where the treatment protocol will be customized according to patients. This is the ultimate aim and it is never going to be easy, albeit it is going to be one of the toughest job in history medical sciences to create such a huge database because it not only requires expertise of persons from wide variety of fields but also requires ample of time, finance and patient willingness to share his/her medical information. Two points are worth noting first, difficulties are many and second, every hurdle is surmountable. Since it's a very ambitious strategy and a lot of expectations are quite obvious. Considering the challenges, we must be rational with them. Precision Medicine is the future but it will require much time, expertise and devotion to come in practice.

Conclusively, it must be able to deliver the appropriate treatment with minimal adverse reactions. This initiative if successful is going to revolutionize the field of medicine, and who knows we may be able to cure the incurables.

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