

FUTURE OF MEDICAL SCIENCES: MEDICAL FUTUROLOGY

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When we observe the rapid development in technology it is often questioned what will be the future of medicine/ the medical sciences? We have to guess wildly and widely the future but be realistic let us start with infrastructure .When I was medical student, our hospital was just two floor building and today I am my working place is 10 floor building and our grand children will be studying in 30 floor sky scrapper. And due increase population, increase survival opportunity and city based global trend , hospital ward will be like 2 tire or 3 tire train coaches. Telemedicine will be hugely popular increase availability of IT technology and improve people perception of such techniques. All the medical colleges will be connected for telemedicine by satellite.It is also expected without bias that India will be super power in the world . The speed of internet will be not less than 3/4-G to 7-G.More than 80% population will be using Smart Phone .Stem cell technology will be the pioneer mode of therapy. There will be no card or any type of ID card except Biometric Card. And the Biometric techniques will be expanded and will not be limited to thumb, figure or hand but it will cornea, tongue and many more. Ambulances will be automatic without driver including public transport . Human head transplant will be possible. There will be no difference between, Ear, Eye, tongue as a special individual organs but it will be inter changeable at higher neural level .Blood tests and collection of blood will be a obsolete method of laboratory test. Saliva, Urine , tears will be enough to measure various biomedical parameters .Biomarkers of cancer will be detectable in saliva and urine and help in very early preclinical diagnosis .So Man get rid of prostate cancer & Women get rid of Breast cancer. A Patch on tongue will be enough for treatment of obesity. Early Diagnosis and preventive medicine will be key branch of medical sciences .Angioplasty will be routine in 104 years old people.

In next 20 years the Memory transplant will be possible. Skin or body part will act as mobile transmitter and receiver. Medical social network expand beyond our imagination and google will be the supportive professors. emedical goggle will come in action. Drug therapy will be Personalise on genome based and mainly Preventive one. Self measuring of various data will be limited to BP/sugar but will expand beyond.Surgical care will be taken by Robots. Robotics Hand will do all major surgery and quality neuro surgery will be significantly improved .Robo – sapien – will be total wireless and controlled by cell phone devises.Robotics based Simulation and Digital Reconstruction will be the key method of medical learning teaching method.with the availability of 3 D Xerox techniques dissection and human bone and bodies will be dream. More real virtual near real Virtual - Simulation is the target of incoming decades and they will serve as real humans. There will not be different machines for X ray -CT- MRI- Angio but One machine alone will do CT- MRI- Angio altogether if needed and create 3 D Digital Reconstruction .and help in neuro and other complicated surgery. Mind reading,Genetic Profile will be possible in near decades. LIC-Premium will be calculated on genome profile.

Intra operative radio therapy will give more hope for cancer. Neurosurgery will be the treatment for uncontrolled diabetes ,High BP, and obesity. Deep Brain Stimulation treatment will be available for- depression- obesity .Computer /mobile -Brain network will help house visit

,Hospital care and laboratory. Mobile Phone will help to monitor in ICU parameters i.e. ECG ,EEG ,respiration including X-ray other digital images. Cough in Phone will help to diagnose Tuberculosis , Pneumonia and cancer.

Stimulation of CNS during anticipation of movement will help to control the movements of not only body but also wheel chair ,car and so on....Neural impulses of motor thought will help Biomechanical limbs and Neuro prosthetics to move desired target and the prosthesis work like virtual organs. Scientist have already succeeded in primates to create wire brain spinal interface to help paraplegic patients and spinal cord injuries. Walking movement made possible by using signal from motor cortex(pill size electrode is implanted in motor cortex to record the electrical impulses) which trigger coordinated electrical stimulation of spinal cord and spinal nerves for normal locomotion . Thus scientists and bio engineers have already succeeded reestablishment of brain spinal cord communication. Intrauterine surgery i.e. removing meningomyelocele will be possible .

ECG and some similar apps have been already approved by the US -FDA for consumers and medical professionals will be validated in many more other clinical utilities. The apps' data are immediately analyzed, graphed, displayed on-screen updated, stored and shared to patients, doctors and consultants . The patient's phone will send pre-recorded data of ECG with interpretation to the doctor. Leadless ECG will change technique of Holter monitoring method radically . A simple ECG patch will record ECG / arrhythmia for 24 hour a day and with needful signals the data will be available to remotely located physician or cardiologist for diagnosis and management including wireless hemodynamic monitoring. Artificial Pacemaker of future generation will be wireless. This type of wireless technology will give new hopes of management of disorders of heart and brain. Smart phones will enable the video consultation though the method is waiting for approval. But the telemedicine has already given huge advantages of expertise advise at remote area. Sonography and Echocardiography will be available in the form of pocket devises.

Using wearable wireless sensors, one will use Smartphone to generate own medical data, including measuring blood-oxygen and glucose levels, blood-pressure and heart rhythm....etc. wearable necklaces will monitor heart function and check the amount of fluid in the lungs. Wearable contact lenses that will track glucose levels or intra ocular pressure. Wearable head bands that will capture EEG wave and will be used for diagnosis of epilepsy and can be used for therapeutic purpose for biofeedback methods of treatment. Wearable socks and shoes will help to analyze the human gait too for neurological disorders for diagnosis and drug monitoring .Smartphone sensors will be able to monitor exposure to radiation, air pollution or pesticides level in environment. Smartphone attachments will soon enable us to perform an array of laboratory tests via phone i.e. blood electrolytes; liver; kidney and thyroid function; analysis of breath, sweat and urine-all will be checked with small fluid samples that plug directly into smartphones. Medical college will replace the old stethoscope to smart stethoscope where the mp4 supported tool will make heart audible to all medical students and hearing impaired physicians with additional benefit of phonocardiography i.e. visible Korotkow', and heart sounds

on C.R.O. screen . It won't be long before one can take a smartphone X-ray selfie to diagnose a bone fracture send to a doctor for advice and opinion for further management.

In the next decade nano sensors which will be embedded in the bloodstream will be available. These microscopic sensors within the body can float in blood or be fixed to a micro stent in a tiny blood vessel. Nano medicine will be available in near future for cardiac and cancer care top delivery target treatment . One will also be able to keep blood under constant surveillance for the first appearance of cancer ,autoimmune attacks or vital organ damages i.e. myocardial ischemia/ infarction ,cerebro vascular diseases or tiny cracks in artery walls. People are more willing to disclose their inner thoughts to a computer avatar or "Virtual Human" than a real one. Virtual psychiatrists will provide a new approach to mental health by analysing the thoughts.

With all these new tools, it is no surprise that we are talking about possibility of "doctor less" medicine. Patient will continue to turn to doctors chiefly treatment, guidance, wisdom, experience, empathy and human touch and counselling.

Digital avatars won't replace physicians: one will still be seeing doctors, but the relationship will ultimately be radically altered. Digital/computer algorithm will the diagnosis and will give guideline to the patients management.

Chief reference:

I Lecture by Dr. Gopinath consultant Neurologist at AMA Ahmedabad

II Lectures delivered during JIC 2017