NEWS IN BRIEF

The Internet of Things and Nano Things

For some years now, we have been hearing about the Internet of Things (IoT). But it appears that now the Internet of Nano Things (IoNT) is all set to create a paradigm shift in the practice of medicine. IoT is a network of ordinary objects including physical devices, vehicles, buildings and other items – embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange information. IoT is built from inexpensive microsensors and microprocessors, and is rapidly expanding the online universe from computers and mobile gadgets to ordinary pieces of the physical world – thermostats, cars and door locks. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure. These items, especially those monitored and controlled by artificial intelligence systems, can endow ordinary things with amazing capabilities. For example, an implanted heart monitor that calls the doctor if the organ shows signs of failing. It is prophesied that by 2025, the largest percentage of the IoT incomes will go to healthcare.

IoNT goes even further. Scientists have now created nano sensors which can recognize specific chemical targets at the cellular level. They can then store and transmit this information to external sensing device. Their size helps them collate information from a million different points which can be integrated to generate incredibly detailed maps. Several classes of medical nanorobots such as respirocytes, clottocytes, vasculoids, and microbivores have been designed currently. They could perform a variety of biophysical clean-up, maintenance, and augmentation functions in the body. Nanosensors that can detect and quantify biological substances in body fluids can lead to early detection of cancer cells and environmental pollutants.

Controversial issues will include privacy, immune reactions to these nano devices and unwelcome surveillance. But one awaits the brave new world of computer–human interface with a mixture of trepidation and awe. (*Scientific American 23 June 2016*)

Steroids in Tubercular Meningitis

A recent Cochrane review of 9 trials (1337 participants) evaluated the role of steroids in tubercular meningitis. At follow-up from 3 to 18 months, steroids reduced deaths by almost one-quarter (RR 0.75, 95% CI 0.65 to 0.87). There was no difference between groups in the incidence of adverse events, which included gastrointestinal bleeding, invasive bacterial infections, hyperglycemia and liver dysfunction. It appears that there might be a slight increase in disability among participants receiving corticosteroids, but this increase is counteracted by the beneficial effects on mortality. There was insufficient data to say whether it benefits patients with HIV.

An article in the Lancet has discussed this review as well as other interventions which are being considered to reduce morbidity in tuberculous meningitis. It appears that susceptibility to immunomodulatory corticosteroid therapy could be genetically determined by a single nucleotide polymorphism regulating the *LTA4H* (leukotriene A4 hydrolase) promoter. There may also be a potential role for anti-VEGF drugs such as the anti-VEGF antibody bevacizumab and low dose thalidomide in management of tuberculous meningitis. Low dose thalidomide has been successfully used to manage selected children with intractable tuberculomata, persistent optic neuritis, and cerebral tuberculous abscesses. A study of aspirin in adults found significantly fewer strokes in patients with tuberculous meningitis receiving aspirin compared with placebo, but a trial in children produced equivocal results. (*The Lancet 2016; 387;2585-7*)

New WHO Guidelines for Multi-drug Resistant Tuberculosis

Long durations of therapy and poor diagnostic tools for drug resistance have long bedeviled appropriate therapy in multi-drug resistant (MDR) tuberculosis. The new WHO guidelines purport to address these vexing problems. Conventional therapy for MDR TB takes 18-24 months with a paltry 50% response rates. The newer regimen can be wrapped up in 9-12 months with a substantially reduced total cost of $1000. The protocol called the Bangladesh regimen is based on studies involving 1200 patients with uncomplicated MDR-TB in 10 countries. It is recommended for patients who have not been exposed to second line drugs like fluoroquinolones or injectables, and are not resistant to them. The WHO has recommended early diagnosis using the novel diagnostic test – MTBDRsl. This is a DNA-based test that identifies genetic mutations in MDR-TB strains, making them resistant to fluoroquinolones and injectable second-line TB drugs. Test results are available in 24-48 hours a vast improvement over the currently required 3 months.

The recommendations highlight the advantages of the new regimen (4-6 months of kanamycin acid, moxi-floxacin, protionamide, clofazimine, pyrazinamide and high-dose isoniazid and ethambutol followed by 5 months of moxifloxacin, clofazimine, pyrazinamide, and ethambutol). (*http://www.who.int/tb/MDRTBguidelines 2016.pdf; The Lancet 18 June 2016*).

Gouri Rao Passi
gouripassi@hotmail.com