Artificial Pancreas: Pilot test

Almost a century after the discovery of insulin, NHS England has started a pilot test to check the effectiveness of a newer technology – "artificial pancreas" in achieving better control of blood sugar levels in patients with type 1 diabetes. In this technology, a sensor placed under the skin continuously monitor the blood glucose level and readings are sent to an automated insulin pump which calculates and delivers the amount of insulin required. Patient or caregiver can monitor these reading on their smartphones and can also enter the amount of carbohydrates taken during the meals. This whole system work in a closed loop, thus it is also known as 'hybrid closed loop technology'. Use of this technology eliminates the need of finger prick tests to check the blood glucose levels and the continuous monitoring can help in preventing the life-threatening episodes of hyper- or hypoglycemia. This will help in achieving a good control of blood glucose levels, thus improving the quality of life as well as reducing the long-term complications in people with type 1 diabetes, especially in the young children.

In this pilot study, NHS England distributed this 'technology' to 1000 persons suffering with type 1 diabetes including ~200 children to document its effectiveness and safety in the real-world. The data generated from this pilot study will be considered by National Institute for Health and Care Excellence in recommending the wider use of this technology in UK. Wider availability of this technology will change the long term outcome of the 537 million adults, and 1.2 million children and adolescents living with the type 1 diabetes globally at present. (*BMJ 1 April, 2022*)

Human Genome Sequence

Human Genome Sequence project was one of the most fascinating, ambitious and world's largest collaborative research work. At the completion of Human Genome Project in April, 200,3 more than the 99 percent of the euchromatic region of the human genome was sequenced with less than 400 gaps. Heterochromatic regions, which are found in the centromeres and telomeres were not sequenced in this project. Recently a group of researchers, known as the Telomere to Telomere (T2T) consortium, have published the complete, gapless 3.055 billion base pair sequence of human genome covering all chromosomes except Y. The T2T consortium has discovered more than 2 million additional variants in the human genome, this will add significantly to the existing knowledge about the segregation and division of chromosomes during the cell cycle. It will also provide a comprehensive knowledge about the variations in the human genome and its role in the development of certain diseases.
(*Science 31 March, 2022*)

Nafcillin for Empiric Therapy of Late Onset Sepsis

Increasing antimicrobial resistance is a topic of global concern. In order to prevent the further worsening of the situation, many institutions are running the Antimicrobial Stewardship Program across the world. In 2014, under the Neonatal Antimicrobial Stewardship Program, United States, nafcillin was recommended over vancomycin for empirical treatment of infants admitted in NICUs with possible late-onset sepsis (LOS) without a history of methicillin-resistant *Staphylococcus aureus* colonization or infection. The need for this recommendation arose from the concerns that widespread vancomycin use could lead to resistance in gram-positive bacteria causing LOS, including coagulase-negative staphylococci (CoNS). In a recently published paper, the authors have retrospectively analyzed the safety and efficacy of Nafcillin for empiric therapy of late onset sepsis in 3 NICUs located in Ohio, US. Authors have assessed the duration of blood culture positivity, recurrence of infection with the same previously identified pathogen in the 14 days after discontinuation of antibiotic therapy and mortality among 366 infants admitted with possible LOS. Results showed that empirical vancomycin was used in 84% (2013-2014) and 25% (2017-2019) infants before and after the implemen-tation of the Neonatal Antimicrobial Stewardship program respectively showing a 70% reduction. There was no difference in the recorded duration of blood culture positivity and infant mortality (9% vs 10%; OR 0.97, 95% CI 0.40-2.34) before and after the implementation of the vancomycin reduction guidelines. Authors concluded that nafcillin is a safe alternative to vancomycin for empirical treatment of possible late onset sepsis in NICU infants who do not have history of methicillin-resistant *S aureus* infection or colonization. (*Pediatrics 5 April, 2022*)

Exposure to Light During Sleep Affects the Cardiometabolic Health

Human circadian cycle is of 24-hours and primarily responds to the light and dark exposure patterns. With the global industrialization exposure to the artificial light, especially during the night, is increasing. Various studies have shown that the night time exposure to the artificial lights is deleterious for the human health. Researchers in USA studied the effect of exposure to the moderate ambient lighting (100 lx) during the night time sleep on the cardiovascular function compared to sleeping a dimly lit (< 3 lx) room. This was a parallel group study design involving 20 young adults [10 in each age, sex, body mass index (BMI) and race matched group]. Results showed increased insulin resistance in morning (higher fasting HOMA-IR and lower Matsuda index from the OGTT) in participants sleeping in the lighted room light compared to those sleeping in dim light condition though melatonin levels were similar in both groups. Participants sleeping in the lighted room were found to have higher heart rate and lower heart rate variability during sleep in comparison to dim light condition group. Authors thus concluded that night time light exposure during sleep can affect the cardiometabolic function, especially in those living in the modern cities where indoor and outdoor night time light exposure is common. This finding is worrisome in view of the increasing incidence of cardiovascular events in those living in the modern cities.
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