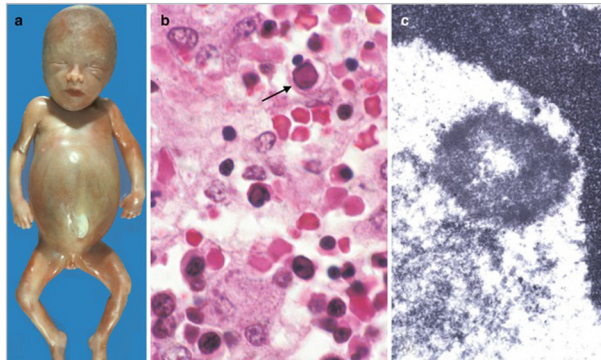


Enteroviruses: Rare Cause of Neonatal Acute Liver Failure

Acute liver failure (ALF) in neonates is a severe condition with a high mortality rate up to 70%. It has been reported that human enterovirus (HEV) infections in newborns are related with myocarditis, meningoencephalitis and in rare cases, ALF with a fulminant course.

The present study conducted by Bersani I, Auriti C, Piersigilli F, *et al.* published in *The Journal of Maternal-Fetal & Neonatal Medicine*, used institutional clinical database to enrol cases of neonatal-onset ALF and their history and clinical data were obtained by medical record revision. In addition, infants with ALF underwent viral testing by nested real-time PCR (nRT-PCR).

The results revealed that five cases of neonatal ALF due to HEV among ten infants were identified in the 2004-2018 period. Out of these, mothers of three neo-



nates reported an episode of mild fever and diarrhea during the last trimester of gestation, suggestive of fetal-maternal transmission. All of the children with HEV caused ALF were late pre-term infants (32-36 weeks). Two infants out of five died as a result of ALF whereas the other three survived with full normalization of

liver function. The causative agents were coxsackie B serotypes 3 in four neonates while in the fifth case had echovirus serotype 11.

Thus, it can be concluded that although human enterovirus (HEV) are a rare cause of ALF in neonates, HEV testing should be meticulously conducted in these cases for an appropriate diagnosis and treatment plan.

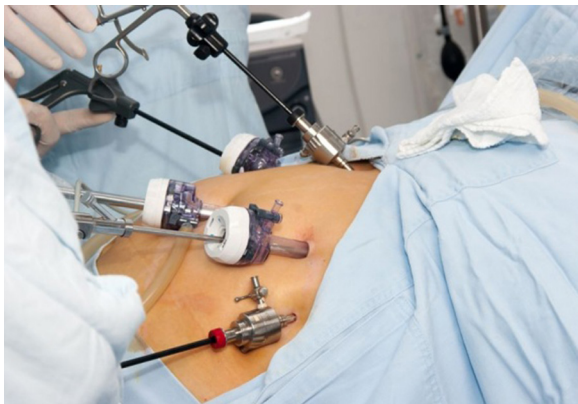
Bariatric Surgery Improves Cardiovascular Outcomes in Hypertensive Patients

Researchers from the Örebro University in Sweden said that in morbidly obese patients with hypertension, bariatric surgery improved cardiovascular outcomes and reduced all-cause mortality, suggesting it should be considered as a treatment option for this group.

Erik Stenberg, MD, PhD, of Örebro University and colleagues analyzed data on 11,863 patients from national registries, including the Swedish National Patient Register and the Swedish Prescribed Drug Register. All of these patients were morbidly obese and had pharmacologically treated hypertension, and they all underwent bariatric surgery. Among these patients followed for approximately 5 years, those who underwent bariatric surgery had a 27% risk reduction for major adverse cardiac events (HR 0.73, 95% CI 0.64-0.84, $P < 0.001$) compared to matched controls who did not have surgery, after adjusting for comorbidities and other factors, said researchers.

The research is reported online in *PLOS Medicine*. Stenberg's team said that the surgery group had lower risk for acute coronary syndrome events (HR 0.52, 95% CI 0.41-0.66, $P < 0.001$) and showed a trend toward lower risk for cerebrovascular events (HR 0.81, 95% CI 0.63-1.01, $P = 0.060$). The surgery group also had lower risk for all-cause mortality (HR 0.84, 95% CI 0.73-0.97, $P = 0.017$) but no significant risk reduction in cardiovascular mortality (HR 0.94, 95% CI 0.71-1.25, $P = 0.682$), the study found.

More patients in the surgery group discontinued hypertensive medication in the 2 to 4 years after surgery (30.7% vs 9.2% in the control group, $P < 0.001$), suggesting their hypertension was in remis-



sion, the researchers said. However, the study did not include actual blood pressure measurements, which was a main limitation, they added.

The main outcome was a major adverse cardiac event. Secondary outcomes were specific cardiac events, including a first episode of

acute coronary syndrome or stroke, as well as cardiac-specific and all-cause mortality. The researchers used Cox regression and Poisson regression analyses, adjusted for comorbidities including dyslipidemia, diabetes, and chronic obstructive pulmonary disease. They also adjusted for age, sex, surgical

method, and duration of hypertension.

In addition to the lack of blood pressure measurements, limitations of the study included a lack of data on BMI and smoking history in the control group, the researchers noted.

First-of-its-Kind Automated Insulin Delivery and Monitoring System for Use in Pediatric Patients

The U.S. Food and Drug Administration recently approved the MiniMed 770G System, a hybrid closed loop diabetes management device that is intended to automatically monitor glucose (sugar) and provide appropriate basal insulin doses with little or no input from the users or their caregivers for use by individuals aged 2 to 6 with type 1 diabetes. The 770G System is a first-of-a-kind device for patients aged 2 to 6 years. It is the first legally marketed device that can automatically adjust insulin delivery based on continuous glucose monitor values for this patient population.

Patients with Type 1 diabetes, or their caregivers, must consistently monitor their glucose levels throughout the day and inject insulin with a syringe, pen or pump to maintain adequate glucose levels in order to avoid becoming hyperglycemic (high glucose levels) or hypoglycemic (low glucose levels).

The MiniMed 770G System, a bluetooth-enabled version of the previously approved MiniMed 670G System (with other modifications), is a hybrid closed loop system that works by measuring glucose levels in the body every five minutes and automatically adjusting insulin delivery by either administering or withholding insulin. The system includes: a sensor that attaches to the body to measure glucose levels under the skin; an insulin pump strapped to the body; and an infusion patch connected to the pump with a catheter that delivers insulin. While the device automatically adjusts insulin levels, users need to manually request insulin doses to counter carbohydrate consumption at mealtime.

The FDA evaluated data from a clinical trial that included 46 children aged 2 to 6 years old with type 1 diabetes. Study participants wore the device for approximately three months to evaluate the performance



of the device during both the at-home periods, as well as a hotel period, to stress the system with sustained daily exercise. That study found no serious adverse events and that the device is safe for use. Data from that study was used to help support the expanded indication for patients 2 to 6 years old.

Risks associated with use of the system may include hypoglycemia, hyperglycemia, as well as skin irritation or redness around the device's infusion patch. As part of this approval, the FDA is requiring the device manufacturer to conduct a post-market study to evaluate device performance in real-world settings in

children between the ages of 2 and 6.

This device is not approved for use in children younger than 2 years old and in individuals who require less than eight units of insulin per day.

The approval of the MiniMed 770G hybrid closed loop system was granted to Medtronic.

Saliva Test to Diagnose Heart Attack

According to preliminary research presented recently at ESC Congress 2020, a saliva test could fast track heart attack diagnosis.

This innovative technique requires patients to spit into a tube and provides results in 10 minutes, compared to at least one hour for the standard blood test.

The purpose of the study was to see if cardiac troponin could be detected in the saliva of patients with heart muscle injury. Saliva samples underwent a unique processing procedure to remove highly abundant proteins. A total of 32 patients with heart muscle injury (i.e. they had a positive cardiac troponin blood test) and 13 healthy volunteers were requested to provide saliva samples by spitting into a collecting tube.



Then, half of each sample was processed, and the other half remained in its natural state.

The researchers then tested the processed and unprocessed saliva samples for cardiac troponin.

“Since no test has been developed for use on saliva, we had to use commercially available tests intended for whole blood, plasma, or serum, and adjust them for saliva examination,” said study author Dr. Roi Westreich of Soroka University Medical Centre, Beer Sheva, Israel.

For patients, the researchers compared the results from the saliva samples (processed and unprocessed) with the blood samples. There was strong agreement between the blood findings and the processed saliva, but not saliva in its natural state. Some 84% of the processed saliva samples tested positive for troponin, compared to just 6% of the unprocessed saliva.

Among healthy participants, no cardiac troponin was detected in the processed and unprocessed saliva samples.

Dr. Westreich said: “This early work shows the presence of cardiac troponin in the saliva of patients with myocardial injury. Further research is needed to determine how long troponin stays in the saliva after a heart attack.”

Link between Seizures during Menstrual Cycle and Drug-Resistant Epilepsy

According to a Rutgers co-authored study, more frequent seizures during the menstrual cycle in women with genetic generalized epilepsy have been linked for the first time to drug-resistant epilepsy, when anti-seizure medications don’t work.

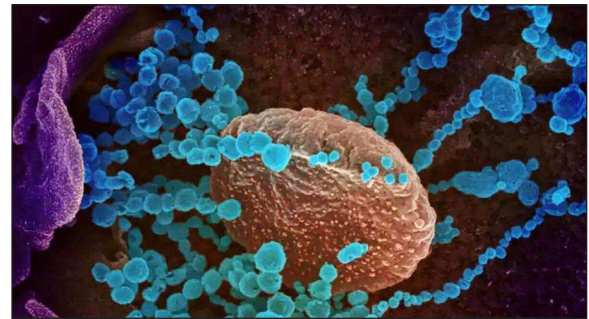
Women with a form of genetic generalized epilepsy called catamenial epilepsy—when seizure frequency increases during their menstrual cycle—were nearly four times more likely to have drug-resistant epilepsy than women who experience no changes in frequency, according to the study in the journal *Neurology*. This association was found in two independent samples.

“Typically, genetic generalized epilepsy is thought to respond better to anti-seizure medications than focal epilepsy. However, previous studies suggest a minority of individuals, between 18 percent and 36 percent, with genetic generalized epilepsy do not respond well to these medications,” said senior author Gary A. Heiman, an associate professor in the Department of Genetics in the School of Arts and Sciences at Rutgers University-New Brunswick.

In generalized epilepsy, seizures begin on both sides of the brain, while focal epilepsy seizures start in only one part of the brain.

The study included 589 patients with or without drug-resistant genetic generalized epilepsy at Columbia Comprehensive Epilepsy Center and 66 patients at Yale Comprehensive Epilepsy Center. The goal was to develop and validate a model for predicting generalized epilepsy that resists drug treatment.

“Women whose seizures increase during their menstrual cycle and have drug-resistant genetic generalized epilepsy may represent a homogeneous group with a specific cause,” Heiman said. “Genetic and treatment studies of these women could uncover the reason, and tailored treatment could be developed. Although our study sample is one of the largest to date and found in two independent samples, further investigation using larger sample sizes is required.”



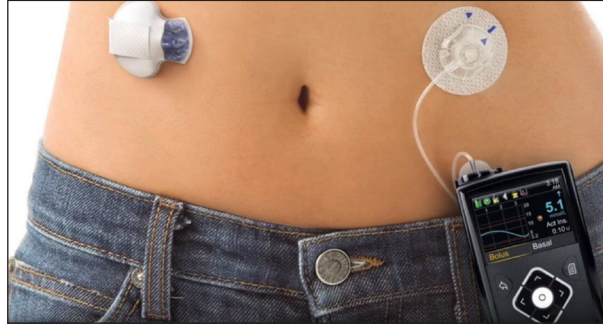
Study Reveals Efficiency of Artificial Pancreas in Type 1 Diabetic Children

Researchers at the University of Virginia Center for Diabetes Technology developed artificial pancreas that safely and effectively manages blood sugar levels in children aged between 6 and 13 with Type 1 diabetes, a national clinical trial has found. Data from this and

other studies has prompted the U.S. Food and Drug Administration to approve the device for use by children ages 6 and older.

The Control-IQ system, manufactured by Tandem Diabetes Care, is an “all-in-one” diabetes management device that automat-

ically monitors and regulates blood glucose. The artificial pancreas system has an insulin pump that is programmed with advanced control algorithms based on a mathematical model using the person's glucose monitoring information to automatically adjust the insulin dose as needed.



cial pancreas, while nighttime control was 26 percentage points higher. Nighttime control is particularly important, as severe, unchecked hypoglycemia (very low blood-glucose levels) can lead to seizure, coma or even death. The study is published in *New England Journal of Medicine*.

The randomized clinical trial enrolled 101 children ages 6 to 13 at four U.S. sites (UVA, Stanford, Yale and the University of Colorado) and assigned them to either the experimental group, which used the artificial pancreas system, or to the control group, which used a standard continuous glucose monitor and separate insulin pump. Check-ins and data collection were conducted every other week for four

months. To provide the best possible real-life test of the artificial pancreas, study participants were instructed to continue their typical daily routines.

The study found that the artificial pancreas did a better job keeping the children's blood glucose in the target range: The average percentage of time in the target range during the day was 7 percentage points higher using the artifi-

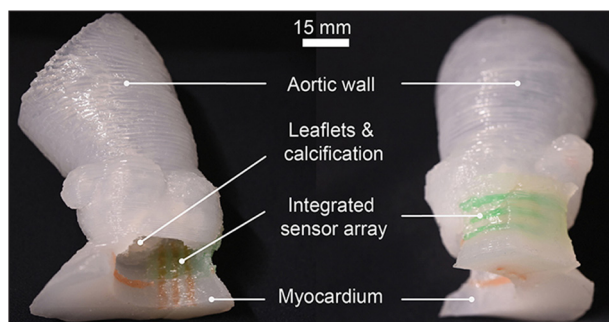
The average amount of time overall where participants' blood-glucose levels were within the target range was 11 percentage points higher than in the control group, which equals 2.6 more hours per day in range. No cases of severe hypoglycemia or diabetic ketoacidosis (a complication caused by very high blood-glucose levels) occurred during the study.

3D Printed Aortic Heart Valves for Minimally Invasive Cardiac Procedures

Researchers at the University of Minnesota, with help from Medtronic, have developed a way of 3D printing mimics of aortic heart valves and nearby anatomy which are so perfect that they reportedly look and feel just like the real things. These structures are actually printed based on CT scans of actual patients, so they nearly perfectly resemble the shapes of the tissues they are made to copy.

During the printing process, these models of aortic root structures, which include the valves and moving leaflets, are embedded with 3D printed sensor arrays that can measure the pressure at various points in the model and help guide actual procedures, including choosing the right tools and their sizes in advance.

The new models are made using novel silicone-based inks that were developed to nearly exactly reproduce physical properties of heart, valve, and vessel tissues. These inks require special 3D printers, but the inks are versatile enough to be able to copy the softness of valve leaflets with attached calcifications at the same time.



Breakthrough in Skin Wound Care with Novel Alkaline Hydrogel

Led by undergraduate student Ryota Teshima, researchers from Tokyo University of Science, Japan, have developed a groundbreaking novel material with possible applications in wound healing. Now, in a new study, published in *Polymers for Advanced Technologies*.

This research has revealed that hydrogel is exceptionally useful for achieving an optimal physiological environment around a wound to promote the growth of new cells given its molecular structure. Hydrogels are three-dimensionally cross-linked networks of polymers that can absorb more than 95% of their volume in water. Hydrogels with natural polymers have excellent compatibility with the biological conditions of our skin and tissues (referred to as biocompatibility), can absorb fluids from the

wound, and continuously provide moisture into the wound, creating a highly suitable environment for the wound to heal.

One such natural polymer that is used in hydrogels for wound dressing is alginate, a carbohydrate derived from seaweed, and therefore, abundantly available. Alginate gels are very easy to prepare, but gelation occurs quickly, making it difficult to control the gelation time. Although methods to achieve this control have previously been reported, ensuring short gelation time while maintaining transparency results in hydrogels with a slightly acidic (4-6) or neutral pH. Slightly acidic conditions were, until recently, believed to be beneficial for wound healing, but newer research has found that a slightly alkaline pH (8-8.5) is better for promoting the growth of skin healing cells such as fibroblasts and keratinocytes.

Their method involves mixing calcium carbonate



and potassium alginate, and then adding carbonated water to this mixture and letting the gelation (gel formation) process take place. In this method, the pH of the gel shifts to alkaline because the carbon dioxide volatilizes after gelation. This also ensures transparency of the gel, which in turn allows the visual assessment of wounds and helps in easily ascertaining the progress of healing. Also, re-

gardless of the amounts of ingredients used, the resultant hydrogels have extremely high water content—up to 99%.

When the team placed their hydrogel in physiological saline solution, it passed the test for another critical requisite for a wound dressing: the potential to absorb exudates from the wound. And while the hydrogel did become structurally weak and could not be lifted with tweezers after a week of immersion, it retained its shape.

COVID-19: A Multi-Organ Metabolic Disease

Researchers from Murdoch University in Australia and the University of Cambridge in the UK have developed a predictive metabolic model for COVID-19 infection that shows multi-organ effects of the disease.

The researchers collected blood plasma specimens from a group of COVID-19 positive patients.

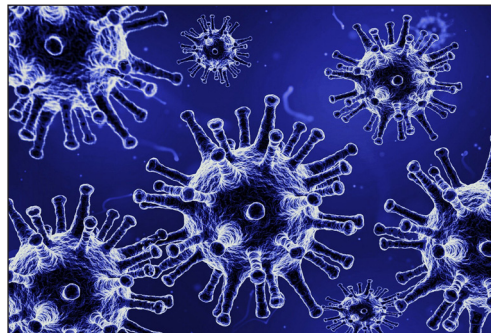
They matched them with the samples of a control group of healthy age and body mass matched participants to determine the key metabolic differences between the groups.

The samples revealed a profound biological fingerprint of the disease that includes elements of liver dysfunction, dyslipidaemia, diabetes, and coronary heart disease risk, the researchers said.

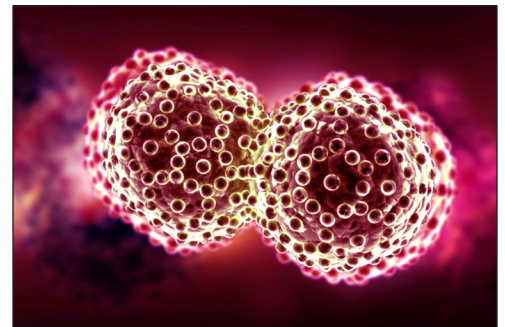
These have all been found to be related to the long-term effects in patients that were affected by the original SARS virus, they said.

According to the researchers, these fingerprints mark systemic changes in biochemistry and are irrespective of the time of collection during the active disease process and independent of the overall severity of respiratory symptoms.

The researchers said these emergent pathologies need to be managed at the same time as the acute respiratory problems to optimise patient recovery.



Patients with Multiple Sclerosis Less Prone to Cancer



Mahsa Ghajarzadeh, M.D., M.P.H., from the Tehran University of Medical Sciences in Iran, and colleagues examined the pooled risk for cancer in patients with MS. Data were included from five articles that met the inclusion criteria.

According to a systematic review and meta-analysis published in *Autoimmunity Reviews*, the risk for cancer is reduced among pa-

tients with multiple sclerosis (MS). The researchers found that in the included articles, the risk ratio was estimated between 0.7 and 1.67,

with the pooled risk ratio estimated at 0.83. In two studies, the pooled prevalence of breast cancer was 2 percent; in two studies, the pooled

prevalence of digestive cancer was 2 percent; and in two studies, the pooled prevalence of skin cancer was 1 percent.

Cost-Effective Open Heart Surgeries Tracking Device

Scientists of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) in Kerala have developed a cost effective palm size blood flow meter. India is currently fully dependent on imported blood flow meters to precisely measure blood flow rates – a critical parameter to measure the outcome of open heart surgeries. However, this becomes expensive with each unit costing upto Rs 25 lakh to 30 lakh and can be afforded only by very few super speciality hospitals in India. The research team at the city based SCTIMST has developed the palm size device that measures the flow rate of blood using a novel magnetic method and a signal conditioning technique, a press release from the institute said.

“The device has a mechanism to produce a magnetic field, an electronic measurement system and a disposable biocompatible tube fitted with electrodes which are kept over the magnetic field. When



blood passes through the tube under the influence of this magnetic field, a voltage is generated across the electrodes which is proportional to the rate of blood flow. The novel method of generation of the magnetic field and detection of the voltage gives the device better accuracy of measurements”, the released added. The technical know-how of this portable battery device, which can be operated with battery has been transferred to EnProducts, a Kochi based company, for commercial production. Its novel concept can reduce the cost of produc-

tion of the device considerably to few thousands of Rupees, it said. In addition to its application in bypass surgery, this device can be used for measuring flow of conductive fluids for various industrial applications.

The device developed by the engineering team, comprising Sarath S Nair, Vinod Kumar V, Sreedevi V and Nagesh DS of the Department of Medical Devices Engineering in Biomedical Technology Wing, has undergone laboratory tests and pre-clinical animal evaluations and has all the essential features to perform the necessary functions. It is compliant with national and international standards and guidelines and is manufactured using components sourced from established supply chains within the country, the release said. The Institute has applied for a patent and published two scientific papers based on this technology, as reported in PTI.

Liver Biochemical Abnormalities Found in Adolescents with Turner Syndrome

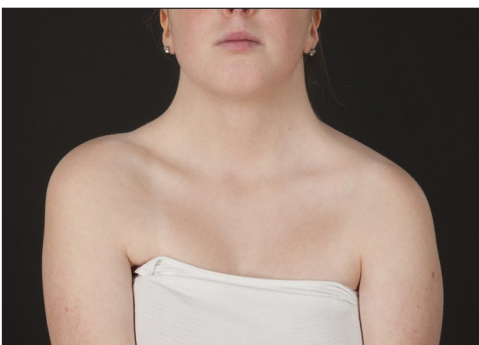
Malgorzata Wójcik and investigators from Jagiellonian University Medical College, Pediatric Institute conducted a trial to examine the occurrence of abnormal LFTs in children and adolescents

with TS. It has been observed that elevated liver function tests (LFTs) is a common finding in adult patients with Turner syndrome (TS). However, these data are lacking in children and adolescents.

They also assessed the effects of increased body mass index (BMI) and sex hormone replacement therapy (HRT) on LFTs.

The study enrolled 100 adolescent girls with TS who were receiving recombinant human growth hormone therapy. Among the total adolescents treated with HRT, increased LFTs were found in 34% of the patients. However, no higher relative risk of increased LFTs was found in obese in contrast to normal weight adolescents. Moreover, LFT frequency remained static in the subsequent years of follow-up.

Thus, elevated LFTs are prevalent in children and adolescents with TS. Moreover, obesity and HRT do not augment the risk of elevated LFTs.





Persistence of Infectious COVID-19 in Gut for Weeks

Researchers from Chinese University of Hong Kong have detected active and prolonged infection of SARS-CoV-2 virus in the gastrointestinal (GI) tracts of people with confirmed COVID-19. Stool tests were positive among people with no GI symptoms, and in some cases up to 6 days after nasopharyngeal swabs yielded negative results.

The small pilot study suggests a quiescent but active infection in the gut. Stool testing revealed genomic evidence of active infection in seven of the 15 participants tested in one of two hospitals in Hong Kong.

They found active and prolonged SARS-CoV-2 infection in the stool of patients with COVID-19, even after recovery, suggesting that coronavirus could remain in the gut of asymptomatic carriers.

“Due to the potential threat of fecal-oral transmission, it is important to maintain long-term coronavirus and health surveillance,” said Ng, Associate Director of the Centre for Gut Microbiota Research at the Chinese University of Hong Kong (CUHK).

The prospective, observational study was published in *Gut*.

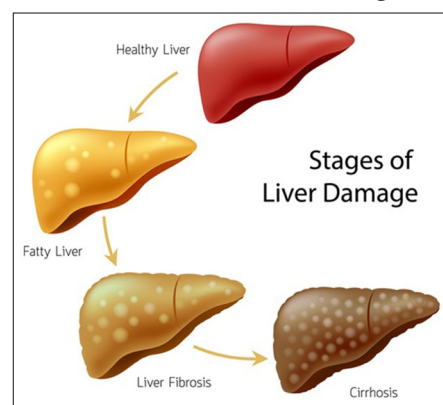
Elastography Technique and Transient Elastography for Liver Fibrosis in Children

It has been observed that non-alcoholic fatty liver disease (NAFLD) is the most frequently encountered chronic condition in developed countries among various obesity-related complications. NAFLD can advance into nonalcoholic steatohepatitis (NASH) with further liver fibrosis, cirrhosis, neoplasia or organ failure. Although hepatic biopsy is the gold-standard for the diagnosis of hepatic fibrosis, its role is still limited in children because it is an invasive method. Currently, non-invasive methods employed for the assessment of liver fibrosis are two dimensional shear wave elastography (2D SWE) technique and transient elastography (TE).

The present study conducted by Mărginean CO, Meliț LE, Ghiga DV, Săsăran MO aimed to evaluate liver stiffness values in children with obesity in contrast to healthy children on 2D-SWE and TE, considering different laboratory parameters. The investigators included 287 children aged between 3 and 18 years, categorized according to the body mass index (BMI) into two groups: the study group - 77 children with obesity; and control group - 210 children with normal weight. Both groups underwent anamnesis, clinical examination, laboratory parameters, ultrasound exam, and elastography.

The results divulged that children with obesity had higher levels of platelets, aspartate aminotransferase (AST), alanine aminotransferase (ALT) and AST/ALT ratio (AAR) than those of controls. Evidence of no remarkable differences was reported for AST to platelet ratio index (APRI) between the two groups. However, APRI value was higher in children with obesity. Furthermore, significant increase in values of liver stiffness was found in children with obesity on both 2D-SWE and TE. Additionally, the velocity values measured by 2D-SWE were also significantly raised in obese children.

Thus, based on the significant higher values of platelets, transaminases, AAR, and liver stiffness in obese children, it can be assumed that both 2D-SWE and TE can serve as beneficial non-invasive diagnostic tools for liver impairment associated to pediatric obesity.



Portable Device to Diagnose Coronavirus in 30 Minutes

Scientists from the US have developed a prototype of a rapid COVID-19 test using a simple-to-use portable instrument for reading the results with a smartphone in 30 minutes.

According to the study, published in the journal *PNAS*, the new technology may help overcome bottlenecks in supplies and laboratory personnel which have led to long waiting times for COVID-19 test results in several parts of the world amidst the ongoing pandemic.

In one of the common methods to test for the novel coronavirus SARS-CoV-2, healthcare workers take a sample from patients with a long naso-

pharyngeal swab, which is put into a substance called viral transport media, and send to a lab for extracting, isolating, and multiplying the viral genetic material, the scientists said.

This viral RNA multiplication process, called RT-PCR, requires several temperature fluctuation cycles, specialised equipment, and trained personnel, said Brain Cunningham, a co-author of the study.

In the current research, the scientists used a simpler process to analyse the viral transport media, called LAMP, which bypasses the RNA extraction and purification steps.

“LAMP only needs one temperature i.e. 65°C.”, said Anurup Ganguli, the first author of the study. “Also, LAMP works more robustly than PCR, especially when there are contaminants in the test sample. We can just briefly heat the sample, break open the virus, and detect the genetic sequence that specifically identifies SARS-CoV-2,” Ganguli said.



When the researchers compared the LAMP assay with PCR, they found the results were in agreement, following which they documented the sensitivity and specificity of the LAMP test.

The scientists then incorporated the assay onto a small 3D-printed cartridge that has two input slots for syringes -- one for the sample-containing viral transport media, one for the LAMP chemicals.

Once the two syringe components are injected, they react within the cartridge, the study noted.

According to the researchers, the cartridge can be inserted into a hand-held portable instrument with a heating chamber, which heats the cartridge to 65 degrees Celsius for the duration of the reaction, and a smartphone cradle is in place for reading the results.

In approximately 30 minutes, a positive result will emit fluorescent light, they said.

First Ever Treatment for Fainting

Researchers from the Faint and Fall Programme, Istituto Auxologico, Milan, Italy reported the first effective therapy, and presented the research at ESC Congress 2020.

The BIOSync CLS study examined whether a pacemaker could prevent unpredictable fainting caused by missed heart beats. Patients with this particular cause of fainting were identified using tilt testing. This involves lying on a table that is slowly tilted upward to simulate standing up. Blood pressure and heart rate are monitored during the examination.

The study included 128 patients aged 40 and above who had fainted at least twice in the previous year with no warning signs. A tilt test showed that fainting was caused by missed heart beats.

All study participants received a pacemaker—but they were randomly allocated to having the pacemaker switched on (pacing group) or switched off (control group). They were then followed-up for fainting episodes.

During a median follow-up of 11.2 months, more than half of patients (53%) in the control group fainted compared to just 16% in the pacing group. This translated into a 77% lower risk of fainting in the pacing group.

The researchers estimated that at two years, two-thirds (68%) of the control group would have a fainting episode compared to one-fifth (22%) of the pacing group. A pacemaker would provide a 77% rela-

tive risk reduction of fainting over two years and a 46% absolute risk reduction.

Just over two patients (2.2) would need to receive a pacemaker to prevent fainting. Put another way, if 11 patients received a pacemaker, fainting could be avoided in five patients.

Implanting the pacemaker caused minor adverse events in five patients (4%) such as lead-related complications.

Professor Brignole, principal investigator of the study said that their study shows that pacing can be an effective treatment for selected people with unpredictable fainting episodes. Tilt testing is a simple and non-invasive way to identify people who could benefit. We hope this new treatment option will enable these patients to resume a normal life without fear of blackouts.

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