

neonatal INTENSIVE CARE

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NEONATAL INTENSIVE CARE NEWS



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New NeoSmile Plus Temperature Probe Cover Available

Neotech Products announces the NeoSmile Plus Temperature Probe Cover is now available. Unlike our original NeoSmile that uses hydrocolloid for long-lasting adhesion, NeoSmile Plus features a silicone gel base. The unique, skin friendly gel allows for the temp prob cover to be repositioned with ease. “Ever since being introduced to silicone adhesives we searched for the right product to implement it. We knew that temp probe covers could be a challenge, but wanted to bring something unique to the market. We started to work with silicone adhesives for this, thus resulting in the creation of the NeoSmile Plus,” said Sara Dimmitt, Manager of Business Development. The new NeoSmile Plus is a skin friendly option that can be moved or adjusted as needed. Yet, it securely holds the probe in place for reliable readings. The reflective

foil cover helps protect the temperature probe from ambient and radiant heat in an incubator, and the foam layer provides added insulation. Various test users stated: “Easier to move; a more accurate reading than our current product.” “Sticks better than our old one and it’s smaller.” “I like the thin, low profile.” “Very impressed with this product.”

Maternal COVID Antibodies Cross Placenta, Detected in Newborns

Antibodies against SARS-CoV-2 cross the placenta during pregnancy and are detectable in most newborns born to mothers who had COVID-19 during pregnancy, according to findings from a study presented at the virtual Society for Maternal-Fetal Medicine (SMFM) 2021 Annual Pregnancy Meeting. “I think the most striking finding is that we noticed a high degree of neutralizing response to

natural infection even among asymptomatic infection, but of course a higher degree was seen in those with symptomatic infection,” Naima Joseph, MD, MPH, of the Emory University School of Medicine, Atlanta, Georgia, said. “Our data demonstrate maternal capacity to mount an appropriate and robust immune response,” and maternal protective immunity lasted at least 28 days after infection, Joseph said. “Also, we noted higher neonatal cord blood titers in moms with higher titers, which suggests a relationship, but we need to better understand how transplacental transfer occurs as well as establish neonatal correlates of protection in order to see if and how maternal immunity may also benefit neonates.” The researchers analyzed the amount of immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies in maternal and cord blood samples prospectively collected at delivery from women who tested positive for COVID-19 at any time while pregnant. They used enzyme-linked immunosorbent assay to assess for antibodies for the receptor binding domain of the SARS-CoV-2 spike protein. The 32 pairs of mothers and infants in the study were predominantly non-Hispanic Black (72%) and Hispanic (25%), and 84% used Medicaid as their payer. Most of the mothers (72%) had at least one comorbidity, most commonly obesity, hypertension, and asthma or pulmonary disease. Just over half the women (53%) were symptomatic while they were infected, and 88% were ill with COVID-19 during the third trimester. The average time from infection to delivery was 28 days. All the mothers had IgG antibodies, 94% had IgM antibodies, and 94% had neutralizing antibodies against SARS-CoV-2. Among the cord blood samples, 91% had IgG antibodies, 9% had IgM antibodies, and 25% had neutralizing antibodies. “It’s reassuring that so far, the physiological response is exactly what we expected it to be,” Judette Louis, MD, MPH, an associate professor of ob/gyn and the ob/gyn department chair at the University of South Florida, Tampa, Florida, said. “It’s what we would expect, but it’s always helpful to



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¹ Castillo A et al. Prevention of Retinopathy of Prematurity in Preterm Infants through Changes in Clinical Practice and SpO₂ Technology. *Acta Paediatr.* 2011;100(2):188-92. ² Chow et al. Can changes in clinical practice decrease the incidence of severe retinopathy of prematurity in very low birth weight infants? *Pediatrics.* 2003;111(2):339-345. ³ de-Wahl Granelli A et al. Impact of pulse oximetry screening on the detection of duct dependent congenital heart disease: a Swedish prospective screening study in 39,821 newborns. *BMJ.* 2009;8:338. ⁴ Ewer AK et al. NIHR Health Technology Assessment Programme: Executive Summaries. 2012.

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have more data to support that. Otherwise, you're extrapolating from what you know from other conditions," said Louis, who moderated the oral abstracts session. Symptomatic infection was associated with significantly higher IgG titers than asymptomatic infection ($P = .03$), but no correlation was seen for IgM or neutralizing antibodies. In addition, although mothers who delivered more than 28 days after their infection had higher IgG titers ($P = .05$), no differences existed in IgM or neutralizing response.

New Tool Helps Predict Preterm Birth, Neonatal Problems

Progesterone metabolites in plasma coupled with patient factors can help identify pregnant women at risk for preterm delivery and neonatal morbidity, researchers report. This research "breaks new ground," by demonstrating that 11-deoxycorticosterone (DOC) and 16-alpha-hydroxyprogesterone (16-alpha-OHP) in plasma can predict the extent of preterm delivery-associated neonatal morbidity and length of neonatal hospitalization when measured early in pregnancy, Dr. Avinash Patil of the University of Arizona College of Medicine in Phoenix said. "Previously, much of the research in obstetrics focused purely on predicting gestational age at delivery as a surrogate (estimate) for neonatal outcomes," he said. "The findings of this research are particularly applicable to value-based healthcare models, which are increasingly prevalent for maternity care. The ability to screen a population

of pregnancies and identify those at risk for poor neonatal outcomes can decrease healthcare costs while improving the health of newborns." An imbalance of progesterone metabolism has been linked to an increased risk of preterm delivery. In a prior study, Dr Patil and his colleagues found that DOC and 16-alpha-OHP, when measured during the late first trimester/early second trimester, can predict a woman's risk for spontaneous preterm delivery prior to 32 weeks. In the new study in PLOS ONE, they set out to determine if obstetric and demographic variables known during the pregnancy, when combined with these steroid-metabolite biomarkers obtained early in pregnancy, could predict the risk of preterm-delivery-associated neonatal morbidity in a low-risk population of pregnant women. The researchers quantified the two progesterone metabolites using mass spectroscopy from plasma of 58 pregnant women collected in the late first trimester or early second trimester. They combined the steroid-level data with patient demographic and obstetric history data in multivariable logistic regression models. Forty of the pregnant women delivered preterm (<37 weeks) and 18 delivered at term (greater than or equal to 37 weeks). Ten women had elevated Hassan scores of 2 or higher, with the remaining 48 had scores of zero to one. Women delivering babies with an elevated Hassan score of two to four were more likely to have a higher BMI and deliver at a lower gestational age than peers delivering babies with a low Hassan score. Neonates with an elevated Hassan score were born at a lower

gestational age and birthweight, were more likely to receive antenatal corticosteroids, have a lower five-minute Apgar score, and require resuscitative measures at birth compared to babies with a low Hassan score. The final neonatal morbidity model, which incorporated antenatal corticosteroid exposure and fetal sex, was able to predict high morbidity (a Hassan scale score of 2 or higher) with an area under the ROC curve (AUROC) of 0.975, with an optimal sensitivity of 90% and specificity of 96%. The final model characteristics included a positive predictive value (PPV) of 0.82 and negative predictive value (NPV) of 0.98. With the addition of the two biomarkers to the final model, the positive likelihood ratio for neonatal morbidity as measured with a Hassan Score of two to four was 21.6 (95% confidence interval, 5.48 to 85.21) for women with a positive test result. Newborns of women who screened positive with the model had significantly longer median length of hospital stays compared with newborns of women who screened negative (53 days vs. 4.5 days; $P=0.0017$). The researchers caution that this “discovery work and findings need to be validated in an independent cohort before we can fully implicate the changes in these biomarkers with preterm birth and neonatal morbidity.” “The test is not yet clinic ready,” Dr Patil said. “Steps that remain include validation of the results and meeting federal guidelines for development of new tests. The biomarkers in the study are very promising,

so we are pushing forward to accomplish these milestones and make a new test reality.

New Ventilator Launched for Adult and Pediatric Patients

Getinge has launched **Servo-air**, a high-performing ventilator intended for adult and pediatric patients in the United States. Servo-air includes both Invasive and Non-Invasive (NIV) ventilation modes, with Getinge’s unique High Flow Therapy and Servo Compass options. Designed for mobility, Servo-air does not require wall-gas and utilizes “hot-swappable” battery technology to switch power sources without restarting the unit. The included software modes allow clinicians to adapt and personalize ventilation to the patient and situation. The COVID-19 health crisis has underscored the need for personalized ventilation for critically ill patients. As the number of coronavirus cases in the US increased, the demand for and pressure on the availability of ventilation machines was highlighted. That demand, coupled with the emergence of pop-up hospitals to treat the influx of patients, has made portable, easy to operate ventilators an increasingly important requirement. “At the start of the COVID-19 pandemic, Getinge responded by increasing our ventilator production by 160% to help offset the rapidly growing need for these machines. We are proud to introduce our latest model, which will create flexibility for hospitals, easy transportation for pop-

up treatment centers and personalization in patient treatment,” said Eric Honroth, President, Getinge North America. Servo-air will provide clinicians with a much-needed, mobile additional option. The high-performing ventilator is turbine-driven, which can be transferred intra-hospital with the patient, allowing the continuation of life-saving ventilatory support without having to switch devices. Servo-air also operates with intuitive start-up and personalization of settings. Additionally, the Servo Compass interface provides continuous monitoring and tools for supporting critical lung-protective strategies. As the patient’s condition improves, Servo-air’s Automode switches between controlled and supported ventilation depending on patient effort, providing a smoother patient transition to spontaneous breathing with less staff intervention, which is safe for the patient and is less burden on the medical center. For more than 50 years, Getinge has produced high-acuity ventilators such as the Servo-u and Servo-n, and technologies that help neonates and adults breathe including NAVA and NIV. Servo-air is a high acuity, versatile, intuitive and powerful ventilator that supports the needs of critically-ill patients.

Labor Induction at 39 Weeks May Improve Neonatal Outcomes

Labor induction at 39 weeks instead of 41 weeks may have a positive impact on neonatal outcomes, Aaron B. Caughey, MD, PhD, said at the 2020 virtual meeting of the American College of Obstetricians and Gynecologists. For much of the 20th century, term gestation has been defined as 37 weeks and beyond, said Caughey, of Oregon Health & Science University, Portland. He noted several studies showing a U-shaped distribution in neonatal outcomes during the period from 37 weeks to 41 weeks for some outcomes, including Apgar scores. However, respiratory outcomes in a study from 2008 showed an increase, with meconium stained amniotic fluid increasing from 2.27% at 37 weeks to 10.33% at 41 weeks, and meconium aspiration increasing from 0.07% at 37 weeks to 0.27% at 41 weeks. The study “that really got everyone’s attention” in terms of neonatal outcomes was published in 2009 in the *New England Journal of Medicine*. The cohort study included 24,077 elective cesarean deliveries between 37 and 42 weeks and reviewed a range of neonatal outcomes based on gestational



Photo by Sharon McCutcheon on Unsplash

age. The rate of any adverse outcome decreased from 37 weeks to 39 weeks, “but then started going back up again,” Caughey said. He reviewed data from another study that factored in stillbirth and the risk of expectant management based on gestational age. A composite risk of perinatal death with expectant management was 15.4 deaths per 10,000 cases at 37 weeks and 39 weeks, but increased to 19.9 at 42 weeks. “The morbidity appears to have a U-shaped distribution and the mortality seems to favor delivery at 39 weeks,” he said. When it comes to induction of labor, medically indicated vs. nonmedically indicated does matter, Caughey said. Factors not considered a medical indication include impending macrosomia, increased risk for developing preeclampsia or intrauterine growth retardation, and a favorable cervix, he noted. “For indicated induction of labor, the risks and benefits of induction of labor vs. expectant management have been considered and weighed in by the field of experts that care for pregnant women,” he said. With nonmedically indicated induction, experts “either decided that risks and benefits don’t favor induction of labor, or we haven’t come down hard on what the protocol might be. “It is important to consider the risks and benefits,” said Caughey. The factors you want to include are neonatal outcomes, maternal preferences, and doctor preferences. However, “we want to be thoughtful about this intervention,” because of the association of higher costs and increased risk of cesarean with induction of labor. As for timing of induction of labor, certain conditions favoring early-term induction include preeclampsia and gestational hypertension, chronic hypertension, diabetes, intrauterine growth restriction, nonreassuring fetal testing, cholestasis, placenta previa or accreta, and twins. As for late-term induction of labor, “at 41 weeks it is pretty clear that neonatal outcomes would be improved by delivery,” he said. Historically, clinicians have raised concerns about the increased risk of cesarean delivery following induction of labor, but this risk has not been borne out in recent studies. Caughey said. However, in the findings from the ARRIVE trial, a large study of 6,106 women who were randomized to induction or labor or expectant management at 39 weeks, “they found a reduction in their risk of cesarean delivery compared to expectant management (18.6% vs. 22.2%).



Photo by Sharon McCutcheon on Unsplash

Rates of preeclampsia also were lower among induced women, while rate of chorioamnionitis, postpartum hemorrhage, and intensive care were similar between the groups. The researchers did not find significant differences in perinatal outcomes.

Ventilation Technology Breaks Ground for Adults and Premature Babies

Born 12 weeks too early with a 50/50 chance at survival, Sabina Checketts has grown up to become a neonatal doctor herself, using new therapies and sophisticated technology to improve outcomes for premature babies. One such technique called NAVA, invented by Getinge, utilizes sensors to help babies on ventilators breathe more easily and naturally—and it’s increasingly being used on adults. And a new randomized study shows that NAVA can significantly shorten the time on the ventilator. Thirty-three years after her early birth, Checketts now works as a neonatal doctor in London. The ventilator that helped Checketts survive was

a far cry from what she sees today when she treats premature babies. “We’ve gone from a mode of ventilation where you were breathing for the baby to one now where we can breathe with the baby as well,” she says. As vulnerable premature babies fight to stay alive one of the most critical issues is something most people never think twice about—breathing. A pivotal advance in neonatal medicine - and one that has a major impact in adult critical care—has been the development of better ventilators. One ventilation technique that breathes with the patient is called Neurally Adjusted Ventilatory Assist, or NAVA, developed by Getinge, a global leader in intensive care technology for both infants and adults. In most intensive care units 20% of patients consume 80% of ventilation resources, which may lead to increased complications and unwanted outcomes. NAVA, is also approved for adults, and the features that make the technique successful for neonates, translates well to adult patients. “NAVA is a way to do a little better job,” says Sherry



Photo by Aditya Romansa on Unsplash

Courtney, a director of clinical research in neonatology, who has worked with premature babies since the 1980's. "The diaphragm is a muscle. When it contracts, we're going to breathe. When it relaxes, we're going to exhale. So, NAVA senses the breathing using a catheter that goes down into the stomach and rests close to the diaphragm." Electrodes on the catheter sense contractions in the diaphragm, resulting in an almost instantaneous signal that the patient wants to breathe. Synchronously, the ventilator supplies air. And when the electrodes sense the end of diaphragmatic contractions, the ventilator allows exhalation. "NAVA just provides a little support, depending on the breath the patient can be breathing as the patient wishes," says Courtney. Adults on ventilators generally start with a functioning diaphragm, but it will quickly become weaker if a machine breathes for them for too long. Getting Medical Director Miray Kärnekull says that advanced ventilator technologies, like NAVA, are used regularly in adult patients in Europe to keep patients' diaphragm muscles active. And in a very recent multicenter randomized controlled trial, results showed that patients with acute respiratory failure on NAVA spent significantly less time on the ventilator and experienced less extubation failure compared to conventional lung-protective mechanical ventilation. "In addition to helping maintain the diaphragm's tone, the synchrony of a NAVA ventilator means

patients don't fight against the ventilator," Miray Kärnekull continues. "To prevent that, adults usually need to be sedated. With NAVA, doctors can reduce sedatives, allowing for earlier weaning with fewer complications ... It's really a groundbreaking technology", says Kärnekull. "NAVA gives the clinician a way to personalize not only the ventilation, but also the weaning process for adult patients." These exciting advances have allowed physicians like Checketts to celebrate even more success stories. Checketts decided to become a doctor at early age, when her mother routinely pointed out a man walking down the street on his way to the hospital and said, "That's the doctor who saved your life." That experience motivates her to be a positive force in the families of the babies she treats. "When I talk to parents about the fact that I was premature, there's always a sense of surprise, I think a little bit even shock, you know. Oh, oh, and you're a doctor," Checketts says. "I think it's a nice way to say to them that prematurity shouldn't be a limit on what a child can do. I mean, the advances we've made in even just the last 10, 15, 20 years mean the outcomes are much better than they used to be. And seeing me, who developed before that, as a newborn doctor, I give them a sense of hope and possibility, I think."

Device Maker Adds to its Team

Mercury Medical, a medical device manufacturer focused on airway and respiratory healthcare markets, announces

the appointment of Raymond L Mundy to the newly created position, Executive Vice President, Sales and Marketing. Mundy will be responsible for the continued sales growth of Mercury's products throughout the United States and the global marketplace. "We are excited to have Ray join the company at a time when, more than ever, the treatment of respiratory disease demands innovative new products and solutions. Ray is a 17-year veteran in our industry, with a diverse clinical and commercial background bringing a wealth of sales and operations expertise to our Company," said CEO, John Gargaro, MD. Mundy joins Mercury from Medtronic plc including companies that were subsequently acquired by the firm, such as Covidien during his tenure. "I am very pleased to be joining Mercury Medical as their new Executive Vice President of Sales and Marketing. The opportunities that exist both at the company and the markets they serve are tremendous. There has never been a more critical time to ensure access to Mercury's respiratory and airway management technologies," said Mundy. Mercury Medical is a global provider of airway and respiratory medical device systems for healthcare providers bringing a legacy of innovation, high quality lower cost solutions, and better patient outcomes. The company distributes its products into 58 countries, into critical care, neonatal, anesthesia and EMS markets.