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Volume VI, 2022

Healthcare technology for a better tomorrow

Quality Assurance
Need to have a
Quality Management System
and not just Quality control in Lab

Technology Trends
Challenges and Advancements
in Anesthesia Field

Latest Innovations
Mindray Launches the BC-700 Series,
a Compact, Integrated CBC &
ESR Hematology Analyzer

How
IT can compliment & transform
Healthcare landscape?

Dr. Sandeep Dewan
Critical Care Medicine, ECMO
Director & HOD
Fortis Memorial Research Institute

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ADVANCING HEALTHCARE FOR ALL

Dear Patrons,

We are extremely delighted to share another issue of our Inhouse magazine MindFocus and I hope you find the content interesting and inspiring. We are also glad to see that as the economy slowly returning to its usual, Mindray continues to remain strong. I would like to express my gratitude to all the customers and business partners for your continued trust & support and help has risen to the COVID challenge with courage and innovation.

The year 2022 is believed to bring in greater changes to many industries, including the healthcare sector. Demands for better healthcare advancement in the pandemic called for more transformations and breakthroughs for achieving a new level of operational efficiency and optimized workflow. Health information technology and automation are among the most prominent topics in the industry to cope with the overwhelming pressure. On the other hand, intelligent and automated applications could further release caregivers from complicated manual procedures and focus more on their expertise.

Recently in the Indian market, we have launched some of our most innovative products like the M-Connect IT Solution that connects patients, health providers, varying bedside devices, and healthcare systems and offers access to patient data anytime at anywhere for greater visibility and streamlined workflows.

Another recent addition to Mindray India's product portfolio is the BC-700 series hematology analyzers that incorporate both CBC and ESR analysis in one test. It is the first all-in-one hematology solution in the world that combines 5-part differential with ESR analysis, an important test to reveal inflammatory activities in the body that traditionally performed on an independent analyzer. This series is designed to empower medium-volume laboratories with advanced diagnostics technologies that are applied in premium products. With the belief of every test matter, Mindray is constantly transforming advanced technology into a wide range of reliable diagnostics solutions covering hematology, biochemistry, and chemiluminescence immunoassay in India.

Many elements of business were challenged during pandemic, and we maintained customer communication, engagement and the direct response through our digital presence. We are still actively present on social media platforms. Our website is engaging; our social media pages on Facebook, YouTube, and LinkedIn have become strong for customer connectivity. Maintaining customer connections virtually have provided many benefits and we appreciate your support more than ever. Mindray India will continue to support healthcare professionals by providing essential products and services.

At Mindray, our value of innovation lies in providing better and the most adequate medical solutions that helps healthcare professionals achieving better results. Together, we are moving forward to satisfy our endless imagination about a better life in the future.

Adhering to the vision of "better healthcare for all", Mindray is pleased to continue bringing more innovative medical solutions to meet the diverse needs of all customers. We assure you that we will continue to remain the trusted partners in building a Healthier Bharat.

Stay healthy and stay safe !

Dean Zhang
Managing Director,
Mindray Medical India Pvt. Ltd.

Dr. Sandeep Dewan

Director & HOD
Critical Care Medicine,
ECMO
Fortis Memorial Research Institute,
Gurugram

How IT can compliment & transform Healthcare landscape?

Q1. WHAT ARE THE MAJOR CHALLENGES OF CRITICAL CARE AS A DOMAIN IN INDIA? WHAT ARE THOSE EFFECTIVE WAYS THIS SUPPLY DEMAND GAP CAN BE ADDRESSED?

Critical care medicine has come a long way in this country. Every day new critical care units are opening up. The single most challenge, which is becoming an impediment for good critical care delivery to the patients, is the lack of trained critical care doctors and nurses. This situation is further compounded in tier two, tier three cities. Another challenge is the lack of standards of critical care units in our country.

Anybody can put up ICUs equipment in any area and label it as a critical care unit. While we have standards for labs and blood banks, but not for ICU, which is such an important area of the hospital. But emerging healthcare companies like Mindray, which has a global and Pan India presence have a huge product portfolio that addresses the challenges.

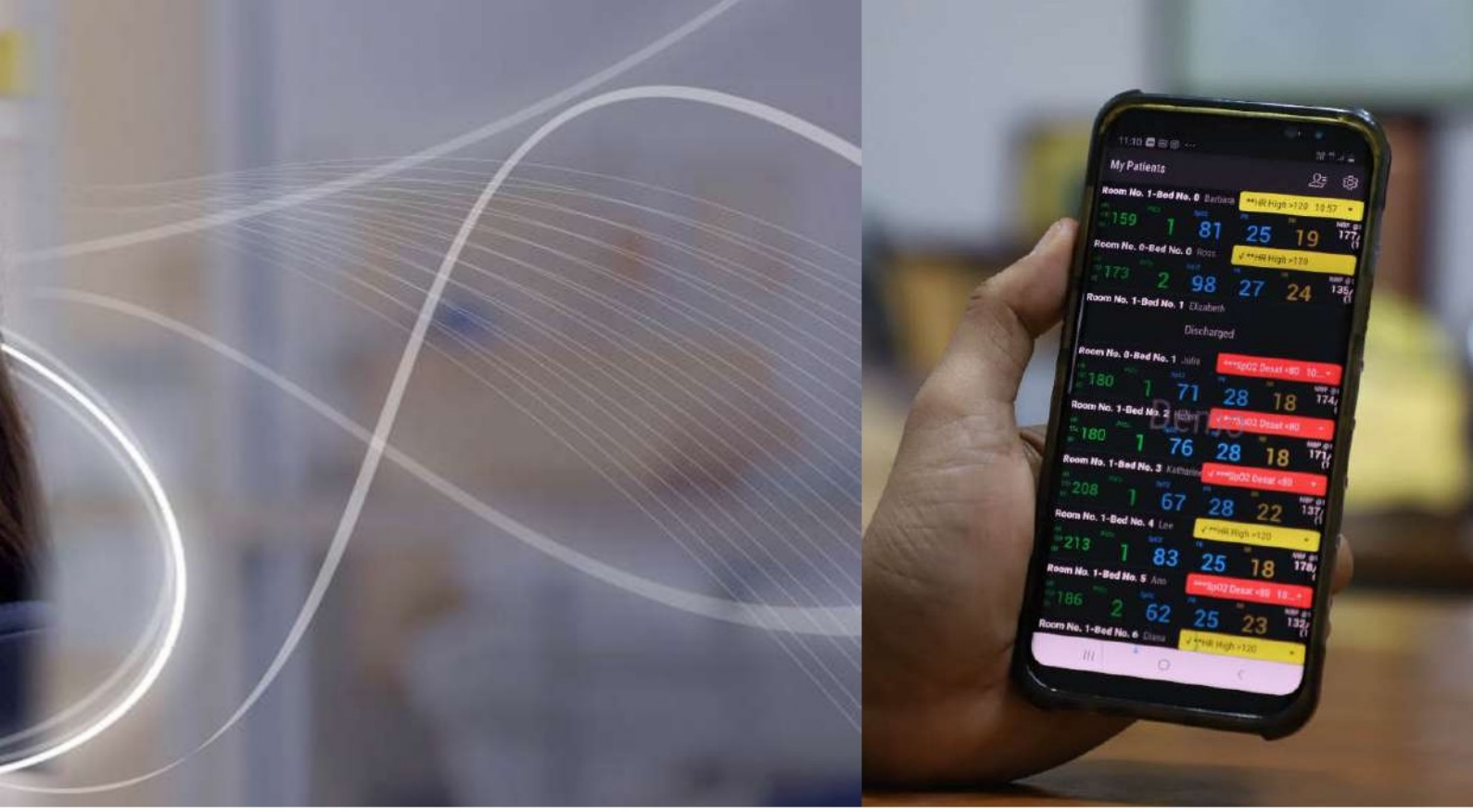
Lack of digitalization and overreliance on manpower is another challenge that impacts the growth of critical care in this country.

We want to compliment the latest launch of the **Mindray "M-Connect"** solution. It meets the need of a clinician by connecting remote places to the main command centre for making medicine more evidence-based and protocol-driven.

Q2. WHAT ARE YOUR VIEWS ON INFORMATION TECHNOLOGY COMPLEMENTING HEALTHCARE? HOW DO YOU SEE THIS TRANSFORMATION IN THIS DIGITAL ERA?

We all know that skilled manpower in the form of trained doctors and nurses is the most important challenge in critical care. Digitalization and innovations like tele ICUs can go a long way in solving many of these problems. In ICUs, the intensivist relies a lot on lifesaving alarms and early warning signals. Through digitalization and tele ICUs a remotely situated critical care specialist can monitor and give junior doctors & nurses a lot of advice in managing critical care patients. This not only improves the quality of care but has also been proven to decrease mortality. I can envisage that most of the critical care units in tier 2 and tier 3 will be managing their patient via digitalization or tele ICUs in the near future.

The ICU is the last defense in saving lives. We were eager with Mindray's latest "M-Connect". It is an IT solution that provides a universal centric monitoring platform, which seamlessly integrates medical devices, using a standard interface to connect with the 3rd party information system. A connected workflow helps analyze and prioritize patients more



quickly, alleviating pressure on busy clinicians and emergency medical personnel to ultimately reduce the risk for patients and in turn save lives.

Q3. WHAT IS THE ROLE WHICH YOU THINK IT CAN BRING IN TERMS OF MAKING CRITICAL CARE MORE OF ANYTIME, ANYWHERE, AND MAKING IT AN EVIDENCE-BASED MEDICINE AND COMPLETELY DRIVEN ON DATA?

Anytime anywhere critical care by a trained intensivist is the most important factor, which can decrease mortality in our ICUs. Digitalization of the ICUs and tele ICUs can not only achieve these clinical benchmarks but also help improve the skill set of junior doctors and nurses. Digitalization can help achieve easy implementation of critical care protocols and good clinical practices like infection control bundles and other things. Through the same platform, evidence-based treatments can be initiated into remote parts of the country, particularly in Tier 2 and Tier 3 cities.

Mindray has very prominent solutions which actually make it more accessible in terms of making this anytime, anywhere technology through their Advanced IT Platform where information seamlessly can flow from any remote places. Critical care specialist can access vital information from life saving devices like ventilator, syringe pump, patient monitors or another third party device thus ensuring better patient care even at remote location.

Q4. HOW THIS DATA ACCESSIBILITY CAN WE USED IN TERMS OF MAKING YOUR CLINICAL DECISIONS FASTER AND MAKING IT MORE PRECISE IN TERMS OF SAVING LIVES?

Gathering authentic data and using it for early clinical decision-making can be of great help as far as managing ICU patients is concerned. Intensive care is all about proactive care and monitoring. Life and death in an ICU can be defined in a span of a few minutes. If the critical care specialist can get a set of early warning signs, they can intervene quickly in the form of prevention & treatment of life-threatening conditions. Early warning signs can also help in giving more precise and accurate treatment anytime anywhere.

Acclimating to digital technology is beneficial for healthcare, which offers a very broad base of data and treatment options with greater efficiency to patients. Efficient patient management also reduces the lengths

of stay (LOS), which negatively impacts hospitals, too. Length of stay directly impacts bed management and load on staff and the hospitals may not be able to meet the needs of another patient. Real-time data availability through digital technology not only reduces LOS but also ensure better patient management

Q5. WHAT IS YOUR VIEW ON RECENT TECHNOLOGICAL ADVANCEMENTS ON SPECIALIZED VENTILATION MODES, WHICH ACT AS A VERY EFFECTIVE TOOL FOR PATIENT WEANING IN DIFFICULT ICU ENVIRONMENTS? HOW SIGNIFICANTLY DOES LUNG MECHANICS, PV LOOPS ARE EFFECTIVE IN UNDERSTANDING LUNG COMPLIANCE?

Mechanical ventilation has been a life-saving modality in critical care units. Mechanical ventilation has advanced a lot since the inception of polio days, various advancements have happened during the last two decades. These include advanced ventilatory strategies for ARDS, newer modes of ventilation, and the concepts of compliance, PV Loops, and Scalars. Understanding the physiology of the patient and machine is still a crucial factor in determining the outcomes of a mechanically ventilated patient.

All these things actually make a big difference in the ICU environment, which helps the clinicians to make their action plan accordingly and drive it evidence based.

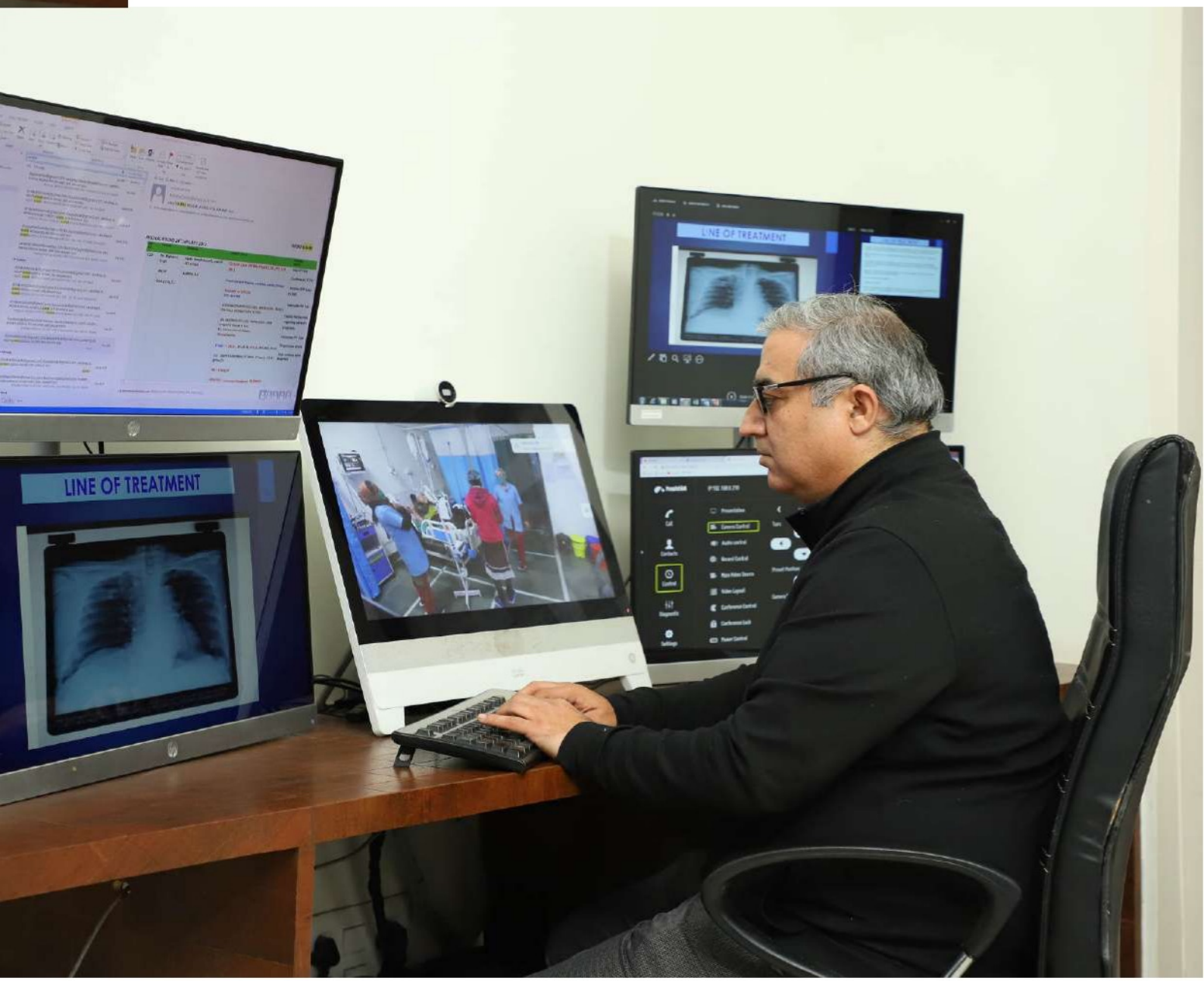
Unfortunately, the training of our doctors and nurses on the ventilatory concept is inadequate. But the scenario has changed post-COVID, as both government & private health care players are keen on opting for equipment, which has advanced ventilatory mode and supports training. Advisory and early warning signs are pivotal for any ICU, we have to move to a more proactive ICU model, where any change in clinical status of the patient can not only be prevented but also treated fast.

At **Fortis Memorial Research Institute**, we have digital ICUs for the last 10 years and have been able to run one of the most transparent and quality-driven critical care units in the whole country. Our team of critical care specialists can give advice and early warning signs on their devices, be it a laptop or any handheld device, and prevent complications from happening rather than treating them.

Clinical indications of advanced modes are to improve patient-ventilator synchrony and provide better respiratory monitoring in the assisted modes of mechanical ventilation.

Newer and advanced modes of ventilation have helped to improve outcomes, patient-ventilator interactions, and patient care. Interactive graphics and newer weaning tools have contributed to a better understanding

> Mindray has very prominent solutions which actually make it more accessible in terms of making this anytime, anywhere technology through their **Advanced IT Platform**



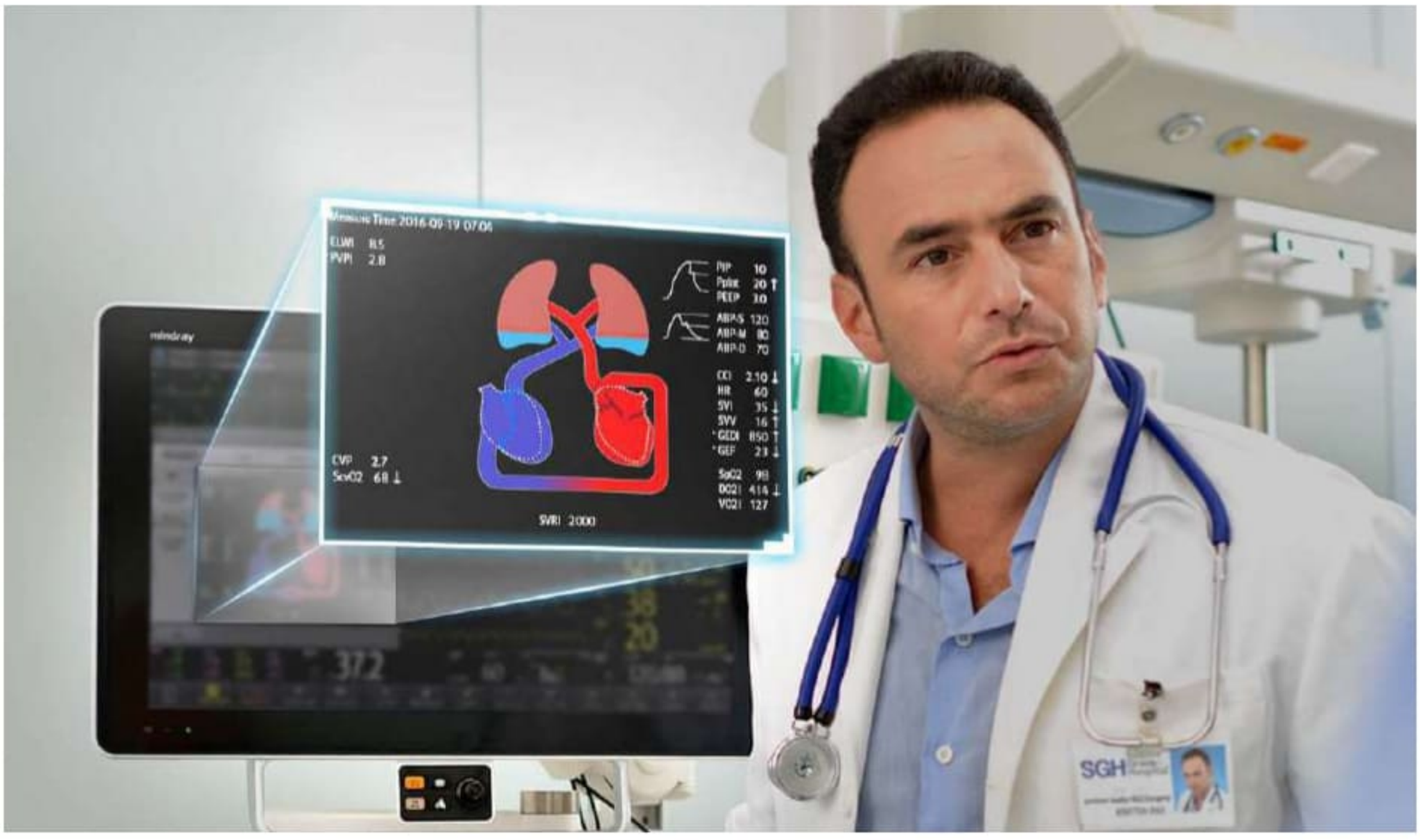
of respiratory physiology and how different ventilation strategies impact the respiratory system. PV Loops effectively represent a relationship of flow and pressure with a close understanding of the mechanics of breathing and changing compliance. PV loops are the gold standard for measuring direct, real-time cardiac function.

Q6. WHAT DOES THE ROLE OF ADVISORIES IN CRITICAL CARE AND HOW JUDICIOUSLY THOSE ADVISORIES ARE BEING FOLLOWED IN THE CRITICAL CARE DEPARTMENT? HOW IMPACTFUL IS *EWS (EARLY WARNING SCORING)* AND *GCS (GLASGOW COMA SCALE)* HELPFUL IN YOUR ICU ENVIRONMENT?

Clinical advisories for infection prevention and control in healthcare facilities impact morbidity, mortality, and quality of care. New guidelines by the government have been revised from time to time, especially during the pandemic time. These advisories have been adapted to hospital-specific situations and patient profiles. They have helped in setting global standards for controlling infection and found useful to improve the overall quality of healthcare delivery. Studies have shown that in a large number of patients admitted to critical care departments, life-threatening changes were observed and documented up to 8 hours before the admission. These observations and decisions arising from such early manifestation could improve care and resuscitation outcomes because most further deteriorations and even death can be prevented with early intervention.

EWS protocols advocate a system to standardize the assessment and response to acute illness. It is recommended to use EWS during the initial prehospital and/or hospital assessment of a patient throughout the patient's hospital stay. EWS should only be used as an aid to clinical decision-making. Aiming to Wcreate safer patient environments, many manufacturers incorporate automated early warning scoring notification systems in a wide range of patient monitors, from low to high acuity. By including this EWS system, such high-end products contribute to safer and more efficient patient management by anticipating potential complications and improving workflows.

The Glasgow Coma Scale (GCS) is an Assessment function of Coma and Impaired Consciousness. Three aspects of behavior are independently measured: eye-opening, verbal response, and motor response. The scores are added together to indicate the patient's level of consciousness. GCS is highly effective for adults and pediatric patients in correlation with an observation of clinical signs and symptoms.



> Mindray's high-end monitors come with built-in clinical application tools like EWS, GCS and HemoSight, which assist in critical ICU enviornmment

Mindray's high-end monitors come with built-in clinical application tools like EWS, GCS and HemoSight, which assist in critical ICU enviornmment

HemoSight, helps healthcare professionals to enhance hemodynamic monitoring, support diagnosis, and therapy decisions more efficiently with ease. The PulmoSight technology from Mindray high-end SV 600/800 ventilator gives real-time feedback on lung condition, e.g. lung compliance, resistance, ventilation delivery, via graphic representation. These parameters are unique and can help the clinician with more precise information than getting an intervention.

PulmoSight is graphically represented dynamic lung display with brightness and darkness of the lung diagram representing the inspiratory and expiratory processes. It reflects the patient lungs function and ventilation condition as well, such as the patient's lungs compliance, airway resistance, over-inflation, breathing system status and airway blockages etc

Recent innovations in AI have been implemented in patient monitoring equipment in which clinical assistive applications with colored graphics showing the real-time status of patient parameters have been praised by many clinical experts. Such applications not only include grouped numeric displays of parameters but accompany dynamic graphic displays giving a clear view of a patient's status enabling practitioners to make clinical decisions faster and more accurately. Such tools present real-time patient status throughout the treatment process enabling accuracy and optimizing treatment therapy.

Smart is the latest mantra for new-age hospitals

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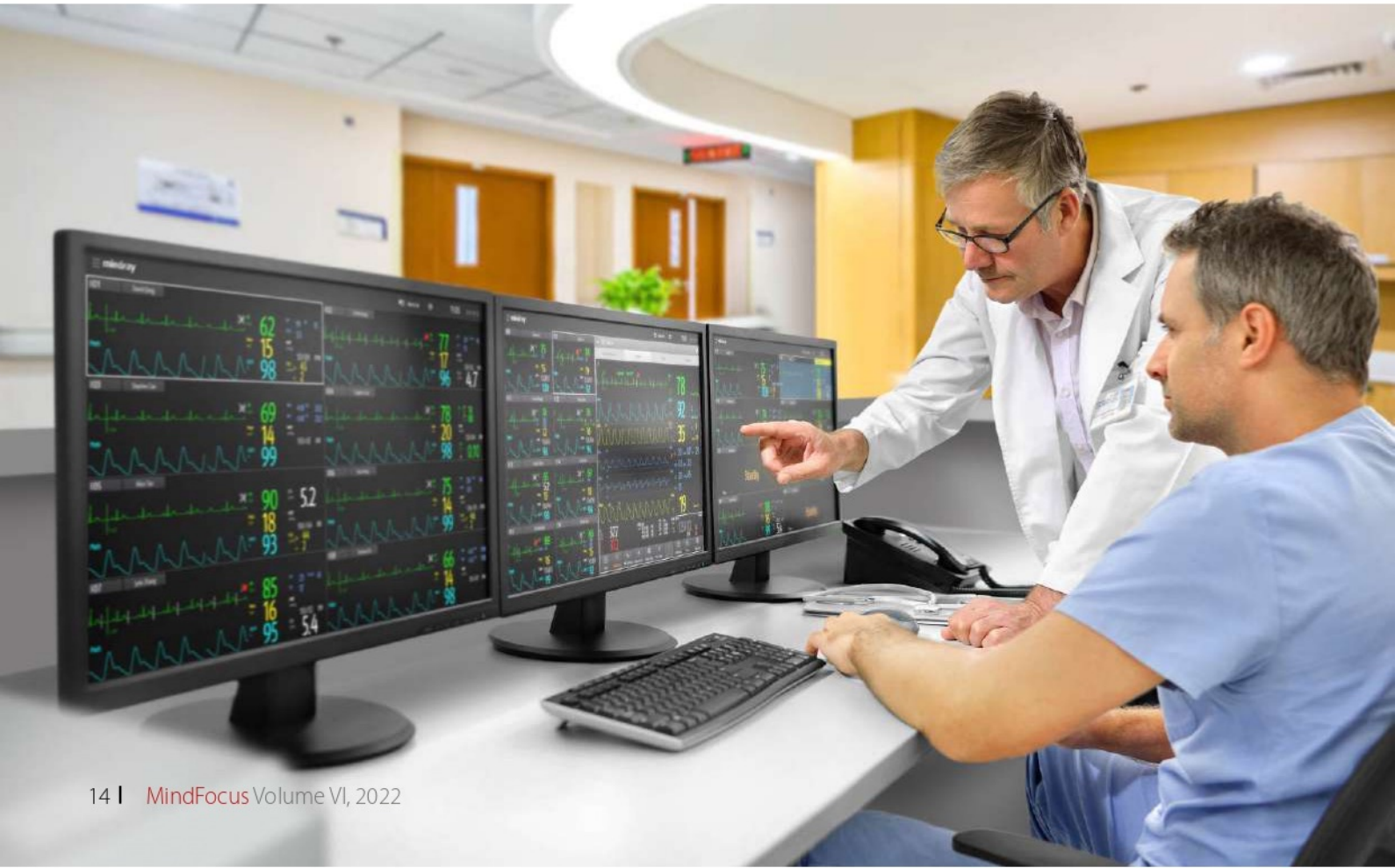

> When a hospital relies on optimized and automated processes built on an ICT environment of interconnected assets, particularly based on IoT, to improve existing patient care procedures and introduce new capabilities, it transforms itself to being a smart hospital.

Being smart has turned out to be one of the key parameter in patient care, with hospitals across the country looking to think and execute smart solutions as they strive to help people with ailments get back to their normal routine. Smart hospitals have evolved over the years, transforming the entire patient care scenario into a digitally driven space that promises zero error and high levels of precision in diagnostics and treatment.

WHAT MAKES A HOSPITAL SMART?

The way a hospital deploys digital tools to optimize and put in place top notch clinical processes and management systems through digital networking of interconnected assets could make it smart. When a hospital turns smart, the services provided in terms of patient care achieve better heights and efficiency in overall operations.

When a hospital relies much on optimized and automated processes built on an information and communication technology environment of interconnected assets, particularly based on Internet of Things (IoT), to improve existing patient care procedures and introduce new capabilities, it transforms itself to being a smart hospital. Ask Mr. Harish Mohan, the AGM, Supply chain, Biomedical Engineering, Projects & Operations, at Apollo Medics Super Specialty Hospitals in Lucknow, and he elaborates on how smart a hospital can be.

Till the recent past, hospitals had been transferring data of patients to specialist doctors, clinicians, and surgeons the traditional way. With everything done manually, data transfer was also through files carried manually by staff designated to do just that. The time taken, the chances of misplacement, error in data rendering and the need for all key individuals to be present at one place had made it a tedious affair.

DIGITAL DATA TRANSMISSION IS THE NEED OF THE HOUR

With the advent of technology, internet and the IoT regime, things have taken a welcome turn. Digital turned out to be the key word. It became possible for data from a patient to be easily transmitted from one place to another. This data transmission ensures that the clinical expert, physician, or surgeon with whom the data relevant in the processes of treatment of the patient lies can access it from any remote location even as monitoring the patient from close quarters. Healthcare professionals find it immensely helpful in taking a call on the treatment procedures based on the data that boast high precision, and zero error.

Patient outcomes are the most significant in any treatment process, and use of such the error-free, digitally transmitted data that has all the illness and treatment history of patients admitted in the hospital wards or intensive care comes handy in helping them walk healthy and lead their daily lives with no cause for anxiety.

A quick look at the objectives achieved by hospitals when they turn smart would throw up laudable results. Smart hospitals always make it possible to ensure correct management of patients' data, helps in remote management, allow clinicians, physicians, and surgeons in dealing with precise and seamless patient flow. Further, cyber resilience comes as a critical aspect on this terrain.

Decisions taken by smart devices are based on analysis of collected data. Such clinical and administrative patient data, such as health records, test results, contact details, data on

financial, organizational, and other hospital data, clinical trial reports, data intended for secondary use, staff data, tracking logs and vendor details come as critical and a smart environment ensures all these are in place, at the right moment in right hands.

Intensive care mechanisms often define one of the many capabilities of a smart hospital. This is in terms of how they play a role in treatment of patients admitted to the ICUs. As it is imperative that critical patients need continuous monitoring and need to be accorded treatment at the right time, a Smart ICU would immensely smart intervention of technology driven processes. Doctors attending to patients who are critical and are lodged in the ICU, split second decisions would come as significant in saving lives, many a time. When an ICU environment is Smart, it can go a long way in helping the doctor and his support staff in saving the patients.

That brings to the table the question of how smart a Smart ICU could be. Smart ICUs ride the concept of placing a critically ill patient at the center of all digital interconnections. In simpler terms, Smart ICUs help in making sure that all technology mechanism work for the patient, so that the best care is accorded without the need to modify the delivery of care based on the available systems. That also means that Smart ICUs should have the capability to interconnect all data and monitoring systems within the same software, with language interpretation and analytics. The system must also be able to store data, use remote storage system, offering autonomous patient monitoring.

When it comes to Smart ICUs, it is imperative that analytics and interpretations come as prime focus areas. The digital network connecting the command center and the ICUs need to be able to historically store all data with respect to every patient admitted so that doctors who work different shifts will be able to analyze them seamlessly. Further, an important aspect that a Smart ICU needs to be that all aspects connected with the patient in intensive care can be accessed remotely by the clinician.

When a hospital and its ICU environment turn smart, enhanced practices in monitoring, early identification and treatment of critical illnesses, better coordination of care and facilitating the hospital management in providing better care to the patient, and bettering the patient outcome, can also be ensured.

The clinicians, doctors, surgeons, nursing staff and the paramedics also can rest assured that no data is ever tampered with, so that an informed call on the treatment process can be adopted.

MAKING AN ICU SMART

What makes an ICU smart? There are a variety of aspects in delivery of care that a smart ICU can ensure. And they include elimination of harm, engaging all critical care professionals, patients, and families, and increasing the proficiency and personalized care through the use of new age technology. Going smart would make hospital and their ICUs make sure that high-end patient monitoring in areas such as gauging blood pressure, SpO2 saturation, cardiac and neuro parameters, and scoring and sepsis protocols are done. With all equipment in the connected network, doctors will also be able to access data from the patient right through the central monitoring system, even when they are at any remote location. The digital mechanism also can allow doctors to see the patient via a webcam equipped at the central monitoring system.

Turning Smart has turned out to be imperative for hospitals in the modern age. Treatment procedures can be successful when a patient walks out of the hospital healthy and ready to continue with his daily routine. When treating ailments take the tech driven route, patient outcomes see a betterment. Smart hospitals would be the next big thing in healthcare, and in the context of better patient outcomes, the new transformation comes as a welcome leap.

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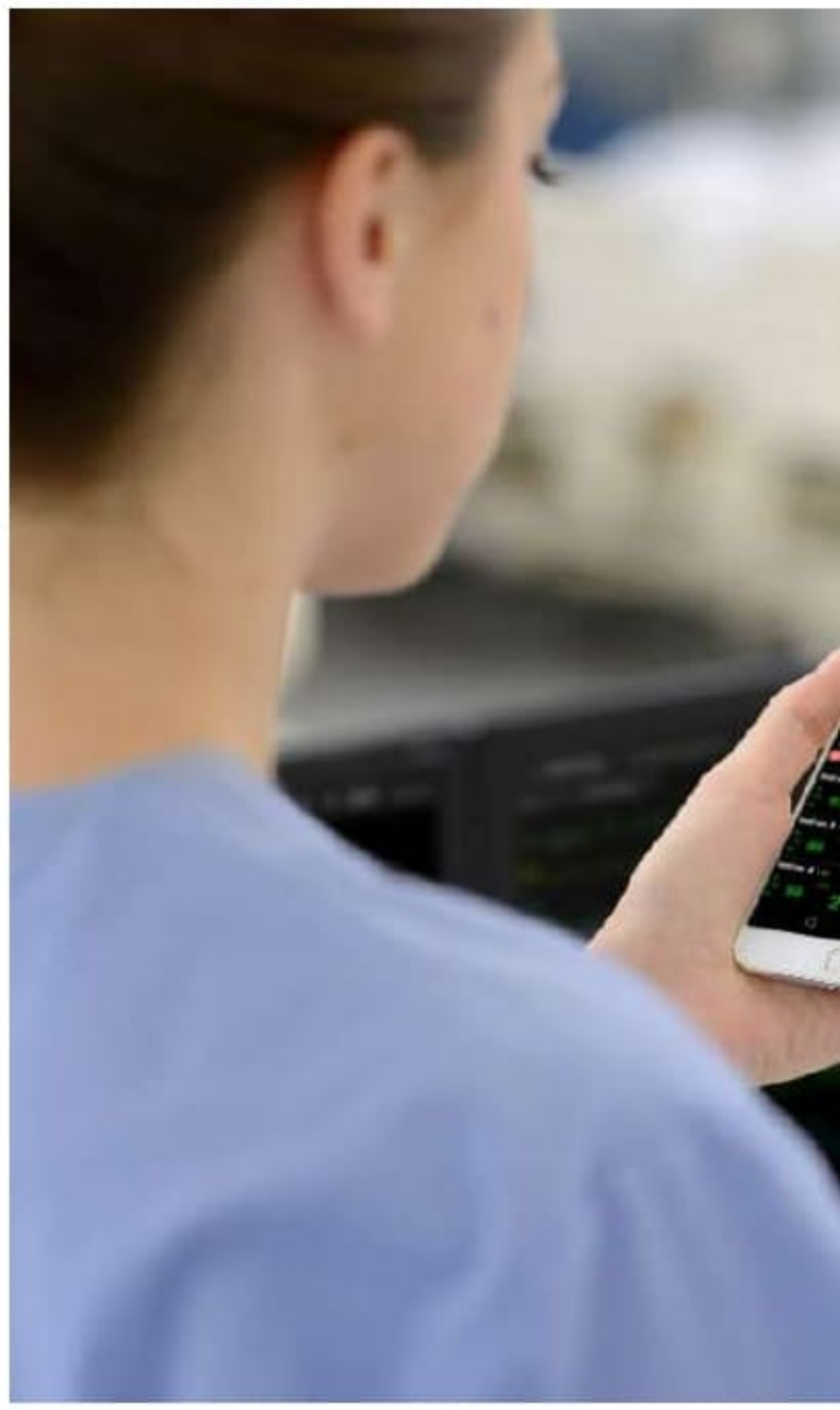
Enhancing reach through technological innovations



The world of healthcare is transforming through continuous innovation. COVID-19 pushed growth of healthcare industry and digitalization became the need of the hour to enable virtual consultations with all-time access to electronic medical records. One thing learnt during the pandemic is emphasis on remote care and we saw drastic expansion in scope of remotely managed ICUs guided by better patient outcomes. Hospitals have technologically advanced equipment's to fully integrate into mobile operating systems, which enables doctors to coordinate with patients across multiple locations. We saw new IT solutions that allowed clinicians to access patient data anytime and anywhere. Such universal central monitoring platform enhances clinical decision-making and workflows to support clinicians efficiently deal with adverse events and diagnose and treat patients. With help of clinical assistive/ AI applications, doctors can access massive amount of clinical data to easily predict, prevent & diagnose many diseases.

Much talked about are Tele-ICU's which is treatment of hospital patients by a remote intensivist using technology like videoconferencing. Hospitals multiple ICU's are connected and patients can be seen remotely via CCTV's installed at bedside and data from bedside devices can be viewed remotely by doctors on their mobile devices or laptops. Tele-Intensivists can run codes, talk the care team through procedures, as well as speak directly to patients and/or their families to help with difficult care decisions. The COVID-19 pandemic has highlighted the need to protect care providers so that they can avoid exposure and continue to treat patients. Tele- ICU has the potential to link all semi-urban/ urban hospitals to Tertiary care ICUs and improve the ICU services of these remote hospitals, thus, ensuring better care and provide real-time services to multiple care centers regardless of their locations.

To cover vast gap of quality healthcare expertise between rural and urban areas, Tele-ICUs have helped to overcome the shortage of specialist doctors who can easily treat critically ill patients in small cities and in remote locations, increasing doctor's efficiency, minimizing patient movements, and their financial constraints. Through such advance technological solutions, patient data (including vital waveforms, alarms, video etc) gathered from all bedside connected medical equipment's, all in real time, is viewed, interacted and accessed by super specialist sitting in a command centre at a major metro city and patients are treated in distant remote ICUs with full confidence and on a 24X7 basis.

A patient in an ICU usually can be seen connected to high end bedside medical devices like Patient Monitors, Ventilators, Syringe/Infusion Pumps, Ultrasound etc. Data from all these devices needs to be visualized by healthcare professionals and needs to be available at any time at any place. Digital Healthcare is driving better clinical outcomes by ensuring digital connectivity of devices to make patient care more efficient, precise,

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and personalized. Hospitals now have system that can capture all patient information including complete patient vitals, all visits details, ECG reports, lab reports, CT Scans/ MRI's all collaborated at one location. Such systems have enabled data sharing, thereby easy access to ultrasound image & monitoring data at the same time base, which can assist doctors to confirm the examination results. All the data is encrypted and secured via username and passwords with authorization done on a central server to help healthcare providers collect, store, retrieve and exchange patient healthcare information more efficiently.

Recently many hospitals are making huge investments in developing software tools like electronic medical records and hospital management system to enable remote care easily accessible to patients. Many available IT solutions are linking the entire pre-hospital, intrahospital and inter-hospital journeys of each and every patient, for seamless transfers and faster remote guidance. Many IT start-ups are working towards building these technologies as all these tools are going to transform the way patient is taken care of.

> "Healthcare IT industry needs to provide a cost-effective solution with high-end medical equipment backed by sophisticated software solutions."

Healthcare IT industry needs to provide a cost-effective solution with high-end medical equipment backed by sophisticated software solutions. India is still going through pandemic phase, where we need an affordable solution which can link critical patients of rural cities with highly trained clinical experts at minimal cost and maintenance of such solutions must not be expensive so that they can be utilized in an optimal way to provide better, safer, and faster the healthcare services.

How Mindray is Ushering in the Era of

Health Information Technology

With an increasing population, health information technology (health IT) is becoming more prominent. Imagine a patient, from the second he is admitted to the hospital, or even before that, his health information is updated daily via wearable devices and imported into the hospital's information system. Combined with monitoring and pathology diagnosis, the patient's daily health data could help to quickly determine the disease, and evaluate the occurrence time of the disease. The patient's situation can also be remotely checked and advised elsewhere by telehealth. If all of these scenarios can be connected and analyzed via the use of health IT, wouldn't it benefit a great deal for early prevention and diagnosis?

According to statistics, by 2030, the world will be home to more than 8.5 billion people, so pressures on the healthcare system will only increase over time. Patients will have expectations about the quality of healthcare treatments they undergo and the services they receive. In this circumstance, smart healthcare is of great importance as the patient's diagnosis process can be done with health information technology, increasing the proportion of patients receiving treatments, which is the main reason to build smart hospitals.

The question becomes: How can we optimize our benefits from the future of health information technology? First, the concept and definition of smart healthcare vary from different scenarios – during the hospital stay, the building of smart hospital contributes the most of the intelligent level of patient journey. Before and after hospital, telehealth is the other concept which could expand access to care for patients. The foundation of smart hospital is based on the Internet of Things (IoT), with data at its core and information security as the guarantee. Hence, in the global development of intelligent medical care, device integration, diagnosis, and management are all key.

Smart hospital increases accuracy and safety of a diagnosis

With this in place, patients can experience faster recovery while decreasing their financial burden. Buzzback's new survey discovered over 70% of practitioners and patients are satisfied with telehealth appointments. Healthcare professionals said they are especially helpful for answering patients' questions while offering them greater time efficiency.

There's been a long history of unevenly distributed medical resources and medical development; nonetheless, both can be temporarily resolved by telehealth. For example, a senior Tibetan lady close to the age of 80, lives in a small town in the highlands of Tibet, she has prolonged heart issue that has not been effectively treated. By using a remote diagnosis system provided by Mindray, this lady was able to receive an accurate diagnosis of her pain problem from a hyperacusis specialist who was based 3,000 kilometers away in Shenzhen.

Boost the workflow efficiency for medical staff

A critical link for smart hospital is IoT. The interconnected platform management, which breaks down regionals barriers and greatly facilitates the ability to communicate in multidisciplinary diagnostics, is a case in point in the regional laboratories of In-Vitro Diagnostics. It is no secret that healthcare resources are spread thin; using telehealth as a medium between medical advisory and patient can not only create a smoother workflow by reducing the manual workload of medical staff, but enable hospitals to leverage resources for optimal usage.

Establishing a highly efficient workflow is critical for the management of hospitals, as well as large laboratories and core laboratories. The soaring demands for productivity and efficiency have been a big challenge for all laboratory workers across the globe, and the situation has become more severe during the pandemic. Building an all-in-one smart laboratory to achieve automated workflow resulting in more comprehensive and accurate diagnosis, is one of the key areas where Mindray has been working on. The idea of integration of Mindray's In-Vitro Diagnostics is to satisfy the high standards of top-tier hospitals and laboratories across the globe, through conducting information management for samples, reagents, quality control, and result delivery, fulfilling the function of a smart laboratory.

Less stressful management pressure, transforming to a tech-savvy medical network

Smart facilities management is critical for enhancing operation management efficiency. According to an analysis from McKinsey release in July, the overall application of health information technology has stabilized at levels 38 times higher than before the COVID-19 pandemic, ranging from 13% to 17% of visits across all specialties. In addition, leaders of large private health care system in New Jersey and New York have stressed that their ability to respond at scale as a system were essential to their effectiveness against the initial wave and their continuing response.

While health information technology can be applied with different products, it is even more important to integrate all communications and medical data to one dashboard in achieving quick reviews and accurate deWcision-making. With stable wireless network, Mindray's M-Connect unlocks vast patient monitoring potential as well as management for hospital facilities. A cross hospital and cross-department integrated data management platform can help hospital management teams build up a data dashboard, managing the hospital facilities while monitoring patient status; the data stored (with permission from patients) can be further utilized for medical research - the core value of smart management.

Although we are still in its early days and many issues around health information technology still need to be resolved, health information technology is here to stay. With the acceleration of health information technology

and reinforcement of connectivity, the plan is to develop a better "user experience", accessible healthcare for rural areas and the less privileged while creating a solid network with more efficient workflow for the medical industry. The future looks close with innovative technology being more accessible to more people. We will continue to build the path for health information technology, from smart healthcare in hospitals to remote diagnosis, mainstreaming a smart medical ecosystem that includes smart technology, automation, and lifting barriers.

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Novel Innovation

in Healthcare Services

IT technologies together with mobile can play a crucial role in enabling the dissemination of information and can help better management of the disease. Smartphones are growing rapidly around the world. Post pandemic era has made value addition to improve the technology reach up to the remote area of the country. The remote monitoring of patients through teleconsultations for primary health has become a novel necessity of many counties. On another side, due to limited accessibility of services from specialists and super-specialists, the technology for patient with critical illnesses are still far from the reach of a common man.

Dr. Nidhi
(Sharjah-Dubai)
Hospital administrator &
Quality Specialist

From my years of practice as a gynecologist and infertility specialist, I have observed patients with terminal illnesses suffering due to lack of awareness or confused state. Such families overburdened with emotional, psychological and financial difficulties. Our concept behind starting Hello ESO platform is to fill this gap with appropriate guidance and support to improve the healthcare outreach.

Telemedicine is bridging the gap between the patients and their doctors to improve the treatment with an inclusive approach. While the primary consultations are hard to avail, patients and families have rarely thought of expert second opinion. Even if they decide to have a second opinion, they end up paying extra money for the expenses of traveling, absences from jobs, and a hard time getting an appointment from specialists or a group of specialists.

Before purchasing a home or a car, consumers have an epistemological understanding of the market trends, pricing, and expert opinion about the product/service. Similarly, when it comes to your health or the health of your loved ones, it is important that people are conscious and patient/s or their natives are aware of their rights to get a second opinion.

A patient needs a second opinion in critical illnesses or before any major surgery for confirmation of diagnosis, get in-depth counseling for best possible treatment options, and case management from the specialist. A study conducted explored the outcomes of second opinions at a general internal medicine clinic in an academic hospital highlighted that second opinions can result in new diagnoses (Burger, 2020). Of the responses from 173 general internal medicine patients, it was found that 13% were prescribed new diagnoses, and 56% started a new treatment based on a second opinion.

However, virtual second opinion solutions make the quality of patient care more accessible, despite the scarce availability of expert specialists in suburbs or remote areas. Digital platforms and technology make second opinion services accessible, affordable, and quick to respond to address patients' concerns from anywhere.

Dr. Abhinav
(Sharjah-Dubai)
Consultant Social Worker

ESO provides an effective yet user-friendly digital platform that connects patients and doctors globally. It is neither telemedicine nor teleconsultation. It is a platform for Expert Second Opinion.

For Cancer Patients, the families have many questions or dilemmas, because of the complexity of treatment. It is not reflective of a particular clinical manifestation and reduces patient involvement in decision-making to judiciously go for their treatment or delay the patient's treatment. Initiative like this always keep patients in the center of decision-making, provides more focused, evidence-based medical prescription, and makes patient/s aware of any side effects.

New emerging technologies promise new possibilities, opportunities, and experiences for everyone, everywhere. Together, we can leverage the benefits of technology for the healthcare industry.

Road Ahead for India's Diagnostic Industries

Ms. Kshama Nandode
Marketing Manager
Mindray Medical India Pvt. Ltd.

The past two years have been dooms years for the entire globe.

The importance of healthcare has suddenly got onto the white collars and people have started looking at the healthcare sector as The Saviour.

Automation in real sense has become a boon for the healthcare sector wherein a huge number of testings was carried out to save lives which was impossible if only done manually.

The pandemic has brought to light many things and has led a multi fold differentiation to the Diagnostic industry especially the testing part of it.

Market trends have changed for the routine testing and a combination of tests prove to be bang on diagnosis. Hence modular instruments are a trend and need of the hour. These enable faster throughputs and hence abide by the turn around time of the testing.

NLR which has proved to be of utmost importance for decisions on hospitalization during the initial COVID era, the importance of a simple CBC+DIFF test has also increased. Mindray has automatic calculation of this NLR parameter not only for the high end Haematology instruments but for the mid and small segment analyzers also.

Test like CRP, ESR have also gained importance. For faster infection and inflammation detection some companies have combined CBC+DIFF+ESR or CBC+DIFF+CRP testing facility. These instruments also have other parameters like Immaturre Granulocytes #/% values which are reportable parameters and have authentic value in diagnosis. There are some other parameters in modern day Haematology Analyzers which have importance in disease diagnosis and prognosis.

This enables the clinicians to treat the patients faster and hence decrease mortality during such pandemics.

Mindray has come up with two such analyzers in the recent year focusing on the current scenario and Voice of Customer. The recent launches of Mindray Haematology Analyzers combined with ESR and CRP have taken CBC Testing to the next level.

Recently Mindray launched two Haematology Analyzers which will prove to be beneficial for infection and inflammation case: BC-700 Series (combination of CBC+DIFF+ESR) and BC-7500 CRP (combination of CBC+DIFF+CRP)

Artificial Intelligence is also booming up and is of astounding utility in the Diagnostic industry. In Haematology the peripheral blood smear will be replaced slowly and gradually to digital morphology.

Mindray has launched its Automated Digital Morphology System MC-80 last year which has substantial utility for a high workload laboratory.

Mindray's new MC-80 is taking digital morphology analysis to the next level, delivering clearer images which can capture abnormalities in more detail. With advanced algorithms, the analyzer enables better identification of different cells with high throughput, resulting in greater productivity. This is a product of prodigious efforts and has been optimized by collaborating with over 200 top hospitals world wide.

MC-80 is a revolutionary cell morphology system that provides more clarity, more intelligence, and more productivity for morphological analysis.

Machine Learning a subfield of Artificial Intelligence has not only gained popularity and utility in Imaging but also in Testing. This is the future although. There will be very little requirement of feeding the computers with the required data. Computers will have a capacity to enable robust interrogation of multiple datasets to identify previously undiscovered patterns and relationships in the data. Hence providing accurate, accessible, and smart diagnosis.

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Things you need to know about

Upgrading from Quality Control to Quality Management System

in the laboratory

LABORATORY QUALITY

can be defined as accuracy, reliability and timeliness of reported test results. The laboratory results must be as accurate as possible, all aspects of the laboratory operations must be reliable, and reporting must be timely in order to be useful in a clinical setting.

Dr. Anuja Chopra
Pathologist and Owner
Precision Diagnostics, Ahmedabad

An accuracy level of 99% may at first glance appear acceptable, but the resulting 1% error can become quite large in a system where many untoward events can occur, such as laboratory testing. If inaccurate results are provided, the consequences can be very significant, including: unnecessary treatment, treatment complications, failure to provide the proper treatment, delay in correct diagnosis, additional and unnecessary diagnostic testing. These consequences result in increased cost in time and personnel effort, and often in poor patient outcomes.

In order to achieve the highest level of accuracy and reliability, it is essential to perform all processes and procedures in the laboratory in the best possible way. The laboratory is a complex system, involving many steps of activity and many people. The complexity of the system requires that many processes and procedures be performed properly. Therefore, the quality management system model, which looks at the entire system, is very important for achieving good laboratory performance

WHAT IS A QUALITY MANAGEMENT SYSTEM?

As defined by the SIO and CLSI, a quality management system is "coordinated activities to direct and control an organization with regard to quality"..

In a quality management system, all aspects of the laboratory operation, including the organizational structure, processes and procedures, need to be addressed to assure quality. In other words, a process control system needs to be in place to ensure that the quality management systems established are working well enough to ensure quality.

Reporting of results includes not just the analytical aspects. It includes the preanalytical and post analytical aspects too. The preanalytical/ pre-examination procedures include an adequate and proper patient preparation , sample collection, personnel competency evaluation, sample packaging and transport, sample receipt and accessioning. While accessioning, special attention needs to be paid to the vaccutainers used for sample collection, ensuring the right anticoagulant being used.

The analytical aspects would include a proper quality control system being in place with internal quality control (IQC) and the external quality control (EQA) system being in place and a thorough quality check being run before actually analysing the sample.

Once the sample is analysed, reporting of results needs a proper report format in which the report is released. A proper record needs to be maintained with a proper LIS in place. It should be ensured that the report reached the patient/ referring clinician in time with special importance being given to the critical / alert range values.

There are many procedures and processes that are performed in the laboratory, and each of these must be carried out correctly in order to assure accuracy and reliability of testing. An error in any part of the cycle can produce a poor laboratory result. A method of detecting errors at each phase of testing is needed if

quality is to be assured. The complexity of the laboratory system requires that many factors must be addressed to assure quality in the laboratory.

The concept of the path of workflow is a key to the quality model or the quality management system, and must be considered when developing quality practices. For example, a sample that is damaged or altered as a result of improper collection or transport cannot provide a reliable result. A medical report that is delayed or lost, or poorly written, can negate all the effort of performing the test well. Hence assuring accuracy and reliability throughout the path of workfl ow depends on good management of all of the quality essentials as discussed in the following sections:

1 ORGANISATION:

In order to have a functioning quality management system, the structure andmanagement of the laboratory must be organized so that quality policies can be established and implemented. There must be a strong supporting organizational structure—management commitment is crucial—and there must be a mechanism for implementation and monitoring.

2 PERSONNEL:

A competent, motivated staff is the most important resource that a laboratory needs to function well and ensure quality of reports. The laboratory QMS must addresses all aspects of personnel management keeping in mind the importance of encouragement and motivation.

3 EQUIPMENTS:

Choosing the right equipment, installing it correctly, ensuring that new equipment works properly, and having a system for maintenance are all part of the equipment management programme in a quality management system.

4 PURCHASING AND INVENTORY:

proper management of purchasing and inventory can produce cost savings in addition to ensuring supplies and reagents are available when needed. The procedures for management of purchasing and inventory need to be designed to ensure that all reagents and supplies are of good quality, and that they are used and stored in a manner that preserves integrity and reliability.

5 PROCESS CONTROL :

comprises of several factors that are important in ensuring the quality of the laboratory testing processes. These factors include quality control for testing, appropriate management of the sample, including collection, handling and transportation, and method verification and validation. Process control continues to play a vital role in ensuring accuracy of testing.

6 INFORMATION SYSTEM:

The product of the laboratory is information, primarily in the form of test reporting. Information (data) needs to be carefully managed to ensure accuracy and confidentiality, as well as accessibility to the laboratory staff and to the health care providers. Information may be managed and conveyed with either paper systems or with computers. It is worthwhile to have an LIS in the lab with a proper data back up to ensure that the results of examination carried out in thelaboratory are safe and reproducible.

7 DOCUMENTS AND RECORDS:

Documents are needed in the laboratory to inform the lab personnel how to do things. Records contain the results of the quality controls and examination done and must be meticulously maintained so as to be accurate and accessible.

8 OCCURRENCE MANAGEMENT :

An "occurrence" or "adverse incident " is an error or an event that should not have happened. A system is needed to detect these problems or occurrences, to handle them properly, and to learn from mistakes and take action so that they do not happen again.

9 ASSESSMENT:

The process of assessment is a tool for examining laboratory performance and comparing it to standards, benchmarks or the performance of other laboratories. Assessment may be internal (performed within the laboratory using its own staff) or it may be external (conducted by a group or agency outside the laboratory). Laboratory quality standards are an important part of the assessment process, serving as benchmarks for the laboratory.

10 PROCESS IMPROVEMENT :

The primary goal in a quality management system is continuous improvement of the laboratory processes, and this must be done in a systematic manner. There are a number of tools that are useful for process improvement.

11 CUSTOMER SERVICE:

Laboratory is a service organization; therefore, it is essential that clients of the laboratory receive what they need. The laboratory should understand who the customers are, and should assess their needs and use customer feedback for making improvements.

12 FACILITIES AND SAFETY :

Many factors must be a part of the quality management of facilities and safety. These include:

Security - which is the process of preventing unwanted risks and hazards from entering the laboratory space.

Containment - which seeks to minimize risks and prevent hazards from leaving the laboratory space and causing harm to the community.

Safety - which includes policies and procedures to prevent harm to workers, visitors and the community.

Ergonomics - which addresses facility and equipment adaptation to allow safe and healthyworking conditions at the laboratory site.

SUMMARY: In a laboratory, a quality management system model should be in place: meaning all 12 quality system essentials must be addressed to ensure accurate, reliable and timely laboratory results, and to have quality throughout the laboratory operations. It is important to note that the 12 quality system essentials may be implemented in the order that best suits the laboratory. Approaches to implementation may vary with the local situation.

Laboratories not implementing a good quality management system are bound to have multipleerrors and problems occurring that may go undetected. Implementing a quality management system may not guarantee an error-free laboratory, but it does yield a high-quality laboratory that detects errors and prevents them from recurring.

Challenges and Advancement in Anesthesia Field

Dr. Bala Bhaskar Swaminathan

Professor, Dept. of Anesthesiology and Critical Care,
VIMS Ballari, Karnataka

Past President, Indian Society of Anesthesiologists (ISA) National
Section Editor, Indian Journal of Anesthesia (IJA)

> “Anesthesia machines are technologically more advanced, which gives us alarms in critical situations and helps us observe mistakes that can be corrected and the patient is managed successfully.”

Anesthesia is one of the pre-eminent fields in medicine. The last few years have brought remarkable advancement and innovative developments to the clinical field, which has significantly improved the quality of perioperative care provided to patients.

We are honored to talk to the leading anesthesiologist in India, Professor Bala Bhaskar Swaminathan, in the Department of Anesthesiology and Critical Care, VIMS Ballari, Karnataka. With extensive clinical and research experience in the field, his views on "challenges and advancement in the Anesthesia field" bring more inspiration to us.

Dr. Bala Bhaskar Swaminathan shares his views on "Challenges and advancement in Anesthesia field"

WHAT IS THE CHALLENGE TO ANESTHESIA?

Anesthesiologists are the only medical professionals who probably deal with the patient's life directly, unlike other specialists. Changes happen in a patient's condition quickly and anesthesiologists are trained to ensure the patient's recovery. They also ensure that patient leaves safely after major surgeries like cardiac arrest and other dangerous events.

HOW CAN PATIENT MONITORS HELP ANESTHESIOLOGIST?

Anesthesiology is gradually relying on the skilled use of advanced technology. It involves a complex system of an anesthetized patient, technology and people and hence demands high levels of safety. Since the 1990s we are now getting more and more Monitors to witness that the patient is managed safely. One of the major problems in the medical field is human errors causing complications and death. World Health Organization (WHO) has a protocol intended to reduce the risk of errors which has resulted in a drastic reduction in human errors leading to saving more lives. But we were unable to bring down these human errors to below a certain level.

The Patient monitors have been very helpful in this area of clinical practice. A Patient monitoring system allowed the medical experts to monitor and report all vital signs of patients effortlessly. Various clinical monitors, Patient Monitors including pulse oximetry, ECG monitor, and other advanced Monitors helped in improving patient outputs and safety. We can divide the Monitors into advances in anesthesia delivery and advances in monitoring.

HOW HAS ANESTHESIA ADVANCED IN RECENT YEARS?

Due to the advancements in the delivery of anesthesia, we have sophisticated Anesthesia Workstations now. It would be difficult to cover all the recent advances in the field of anesthesia in one editorial, but we will mention some here. Firstly, we have safer, newer anesthesia drugs and agents available nowadays. Now anesthesia machines are technologically more advanced and equipped with alerts and alarms helping us monitor our patients even in critical situations.

Secondly, we have new technologies for monitoring the patient not only during surgical procedure but also in pre-operative and post operative departments. There have been improvements in pulse oximetry and most importantly assessing the depth of Anesthesia. Accurate assessment of the depth of anesthesia contributes to tailoring drug administration to the patient, thus improving patients' outcome. We are also witnessing revolutionary point-of-care devices. All these have helped us bring down morbidity and mortality.

HOW CAN WE IMPROVE PATIENT SAFETY DURING ANESTHESIA?

Monitoring is an essential component of anesthesia care. Perioperative complications and death are major health issues that can be prevented by the Surgical Safety Checklists provided by WHO. The systematic use of checklists can reduce perioperative morbidity and mortality.

To improve patient safety, certain safety features must be incorporated in anesthesia machine such as setting of oxygen flow below levels which can be dangerous for the patient should not be allowed. This will prevent hypoxia condition in patient. The machine should have features for monitoring anesthetic agents, to measure the concentration of inhalational and exhalation agent & we should assess the depth of anesthesia to ensure the patients safety.

WHAT IS THE TREND OF THE DEVELOPMENT OF MEDICAL INDUSTRY?

The developed countries have already adopted advances practices and are way ahead whereas developing countries still need to follow suit. The world of healthcare is transforming through continuous innovation. We are witnessing new digital solutions allowing clinicians to access patient data anytime and anywhere. Developing countries need seamless integration of all semi-urban/urban hospitals to ensure better care and real-time services to multiple care centers regardless of their locations. We need data security to help healthcare providers collect and exchange patient healthcare information more efficiently. In the coming years, we will have an efficient patient data sharing system that is going to guide patient management even in remote areas. We need IT solutions incorporating clinical assistive/ AI applications, helping doctors to access massive amount of clinical data to easily predict, prevent & diagnose many diseases. Developing countries need to invest in developing tools like hospital management systems, cloud storage, and AI technologies to cover the vast gap of quality healthcare expertise between rural and urban areas. Healthcare will become safer with all these technologies. That is the future!

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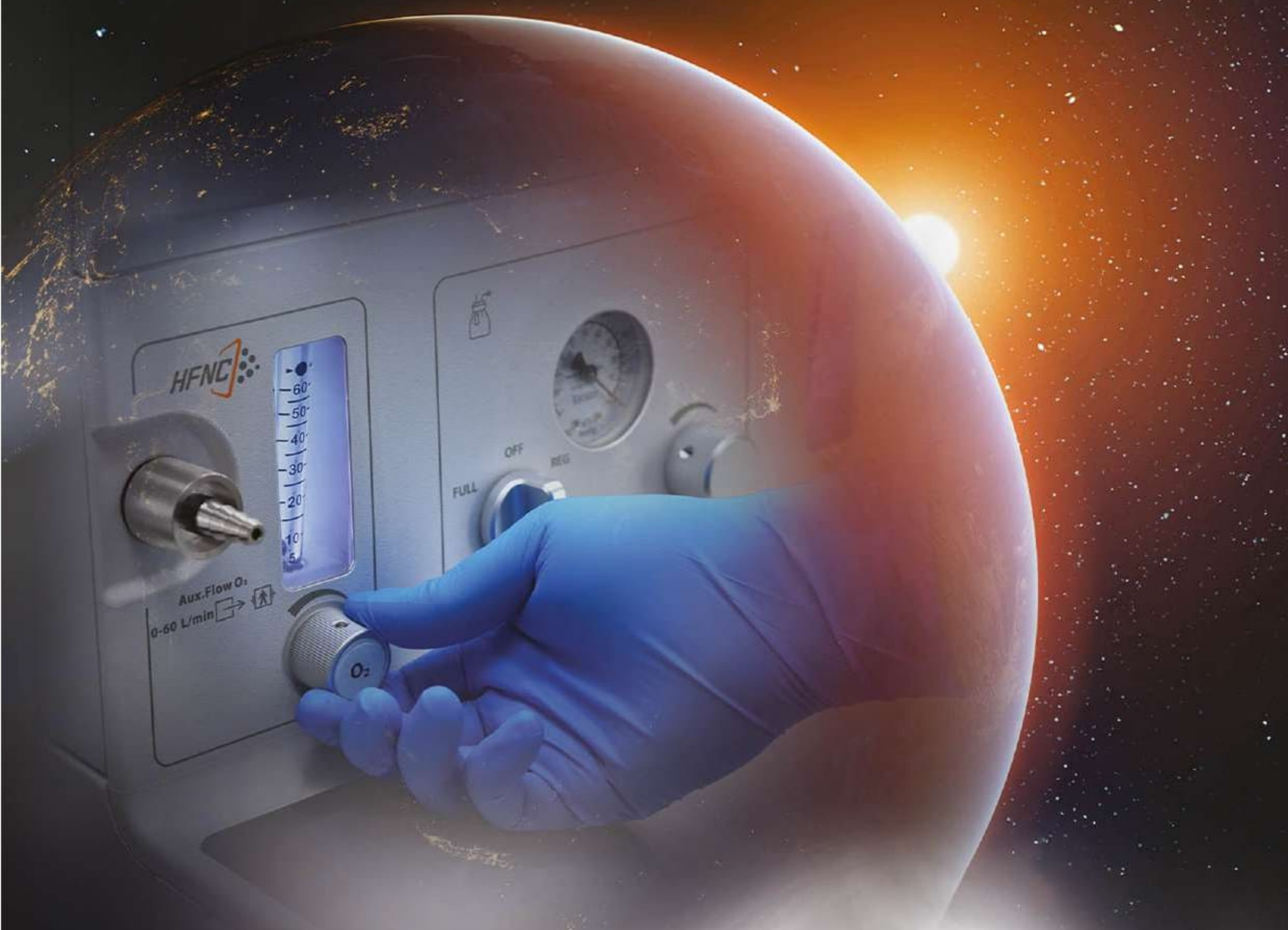
Integrated with the HFNC technology to extend safe apnea time during intubation and extubation to ensure a higher level of patient safety.



Wellness Diagnostics
automates its central lab with Mindray's
SAL 9000
modular system

Wellness Diagnostics Pvt. Ltd., a premier diagnostics lab with rich experience in testing services across North India has automated its central laboratory with Mindray Medical India Pvt. Ltd.'s Serum Automation Line Series (SAL) 9000 modular system.

Wellness Diagnostics currently has its reference laboratory equipped with two units of Mindray's CL-1000i Chemiluminescence Immunoassay System, one unit of BS-380 Biochemistry Analyzer, one unit of BS-240Pro Biochemistry Analyzer, one unit of BC-6000 Hematology Analyzer, and one unit of SAL 9000 Chemistry and Immunoassay Integrated System.

The SAL 9000 Modular System installed at Wellness Diagnostics delivers a high throughput of chemistry and immune-assay testing by integrating the Mindray BS-2000 Chemistry Analyzer and CL-6000i Chemi-luminescence Immunoassay Analyzer, and new Sample Processing Line (SPL) 2000. With patented automatic serum analysis design, the SAL 9000 not only helps in optimizing the management of lab space and manpower, but also offers highly reliable test results.

Mindray Serum Automation Line Series (SAL) 9000 is a high-functioning, integrated system that connects the clinical chemistry analyzers seamlessly with the chemi-luminescence immunology analyzers. Delivering fast and reliable results of both clinical chemistry and immunology tests on one platform, the system helps optimize the laboratory workflow and achieve maximum efficiency at Wellness Diagnostics.

According to Mr. Arun Kumar Gupta,
Owner and Director of Wellness Diagnostic Pvt. Ltd.,

"With the introduction of Mindray India's SAL 9000, we have been able to increase our testing capacity. By making the process simpler and completely automated, we have also been able to reduce the manual workload of our staff members. Our productivity and turn-around time have improved by 50 percent, after the introduction of SAL 9000 modular system at our laboratory."

Wellness Diagnostics had earlier been accorded a Reference Laboratory status, and following that, services have been extended to the Molecular Testing terrain too. The laboratory chain has been accredited by NABL for Molecular Testing and is also an ICMR-approved lab for Covid tests. It had been accorded the ISO 9001:2008 Certification Standard for Quality Management Systems for advanced diagnostics pathology testing in Year 2017 and has also been awarded the ICertification Standard for Quality Management Systems for advanced diagnostics pathology testing in 2019.

Wellness Diagnostics has entire North India presence through its vast franchise network, and this enables the laboratory to test blood samples at its centralized processing reference laboratory at Rohini in Delhi. Last year, Wellness had opened two satellite labs at Bhatinda in Punjab and Delhi NCR to cover the Haryana region. Both these labs are also equipped with Mindray's high end automated systems for biochemistry, hematology and immunology.

The laboratory chain has been performing 6.5 lakh different tests per month, with up to 2,000 blood tests each day. But it had faced multiple challenges such as high instrument failure rate, low efficiency and long turn-around time, much manual handling and heavy daily workload. With the introduction of the Mindray equipment that offers a tailor-made, integrated automation solution, Wellness Diagnostics Lab has been able to address challenges and enhance efficiency on all levels.

Mr. Sudeep Mukherjee,
Deputy Director – IVD, Mindray Medical India Pvt. Ltd., said,

"Our relationship with Wellness Diagnostics is the manifestation of our core philosophy that aims at advancing medical technologies to make healthcare more accessible. We have been able to build a consistent customer experience every time we interact, and this encompasses mutual regard, trust, understanding and collaboration. Coming together is a beginning, keeping together is progress, working together is success."

Mindray has been providing scalable, automated solutions designed to optimize workflow, and maximize lab efficiency without sacrificing quality. With Mindray's reliable solutions, high-volume laboratories are able to address the challenges of today, and tomorrow, to achieve maximum performance.

Anesthesia machine with Electronic Gas Mixer- An intelligent and reliable Partner

Ms. Manju Goyal
National Marketing Manager - PMLS & SU
Mindray Medical India Pvt. Ltd.

Over the years, we have seen transition in anesthesia practice from Boyles Apparatus to external ventilator machines, from external ventilators machines to integrated ventilators – the two-gas version. Now we have come a long way with three-gas machines having various ventilation modes. We have witnessed the conversation very often between cascaded flow meters and electronic flow meters, about which one is more user-friendly, accurate and safe, etc. But as both technologies have a mechanical way of mixing, the only thing you can see is the fresh gas flow (as flow tubes or digital) changes from external. Therefore, both technologies have the same kinds of limitations like setting independent flow for each gas and user spends a lot of attention in titrating adequate flows to meet minimal flow anesthesia and maintain a balance of anesthesia. As the case progresses, he/she need to manually adjust O2 as per change in patient uptake.

All these extra work can be managed if you have an intelligent and considerate technical partner. That can be your Anesthesia machine with electronic gas mixer. It will take up the task of titration of gases and is able to address many existing challenges including leaks. Many anesthetists are concerned about what flows are adequate for delivering set tidal volume at the lowest fresh gas flow. In this regard, titration is of great importance to set adequate flow and if a leak starts, they are required to change the flow again.

Now you can leave this extra load to your intelligent anesthesia machine. The mixer will inform you automatically when your set gases are not enough for tidal volume delivery or if there is more than what you need. This will be more accurate and reliable as feedback comes from heart of machines not from external signs.

Electronic gas mixing is a well-established technology in ICU ventilations and has been very reliable over the years in anesthesia machines as well. This demand is set to increase with more anesthetists being benefitted from this technology. The reduction of cost by continuous technological advancement has also made it more popular.

We can hence conclude that these new age anesthesia machines equipped with Electronic mixers and tools for guiding us during low flows, are definitely making life easier not only for the clinicians but for Hospital management as well.

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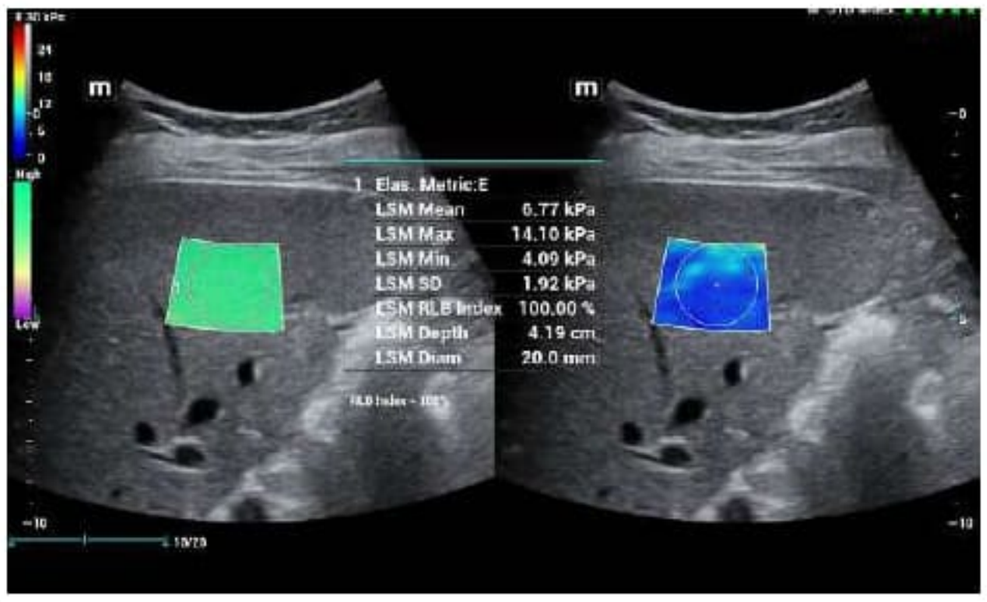
Emerging Ultrasound Technique

Ultrasound equipment market is growing at a good pace, given its unique advantages from diagnostic point. Modern medical ultrasound technology has made vast advancements over 2 decades with many breakthroughs. Technology innovation in area of diagnostic ultrasound imaging has been quite dynamic. Some recent advancement includes integration of Artificial intelligent (AI), automation of functions and measurements, introduction of specialized tool sets and improved ergonomics. Based on the application, the market is fragmented into General imaging, Obstetrics/Gynecology, Cardiology & Urology. The growing application of emerging ultrasound techniques such as shear wave elastography, 3D/4D advance ultrasound, Smart Tools for automation of functions & measurements is further strengthening the market growth.

Ms. Viraj Solanki
Asst. Product Manager
Women Health Care solution
UIS - Mindray India



- Chronic liver disease (CLD) is responsible for nearly 2 million deaths per year worldwide (Asrani et al. 2019). As most causes of CLD are preventable, there is an important opportunity to improve public health by improving the diagnostic accuracy of CLD assessment. Ultrasound Shear Wave Elastography, being noninvasive and affordable method, is widely accepted for its assessment in staging and seeing progression of liver fibrosis. Shear wave elastography (SWE) is a new elastic imaging technology, which can quantitatively measure tissue hardness with adequate repeatability. These measurements can be expressed in elasticity (kPa) or shear wave velocity (cm/s).The powerful processing capability of ZST+ (Zone sonography technology) being 2 generations ahead of traditional platform enables the highest frame rate Shear wave elastography in the field, up to 10 times faster frame rate than before. To ensure the quality of measurements, the reliability (RLB) map and motion stability (M-STB) index are used. Good sensitivity and reproducibility bring more confidence in clinical diagnosis.

- Breast Cancer is one of the most common invasive cancer threatening women's healthcare in the world. Ultrasound can determine the location of the tumor, indicate the size, shape, boundary, internal echo, blood flow, whether there is echo attenuation behind the tumor, and preliminarily diagnosis of benign and malignancy. Smart Breast provides automatic multi-lesions analysis based on BI-RADS and help to make, in clinical routine, lesion diagnosis more accurate, productive, and easier. It has proved the most systematic lesion management with multiple lesions and accurate assessment with multiple planes.

- 3D/4D ultrasound is becoming an essential part of the state-of-the-art sonographic imaging in OBGYN. Facial deformities like cleft lip and palate, brain malformation like microcephaly and dandy walker syndrome, cardiac malformations like aortic transposition, Bone defects like dysplasia or absent nasal bone can been easily diagnosed using 3D/4D. Uterine anomalies like arcuate uterus, polycystic ovaries, ovarian chocolate cyst, Pelvic tissue like levator hiatus muscle injury are some abnormalities easily diagnosed with help of advance 3D/4D applications. Smart Scene 3D is an innovative technique for intelligent scenario-oriented volume scan. Based on intelligent algorithm with domain knowledge, It manages to automatically identify tissue characteristics (such as fetal brain, face, spine, long-bone, endometrium, pelvic floor) and realize organ-specific diagnosis with full-stack intelligence from imaging optimization, to planes acquisition and quantification (high accuracy measurement results). The Goal is to streamline workflow, speed up exam times, and make exams more accurate with different clinical scenarios in OBGYN.

As technology continues to evolve, Ultrasound market will be poised to become dominant technology in field of medical imaging and continue its growth trend.

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Diagnostic Ultrasound System

Innovation, in every facet

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ABD

HiFR STE for liver stiffness quantification

Smart HRI for easy assessment of liver steatosis

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Complete elastography solution

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