

The AMPS Insider

An AMPS LLC Magazine

The AMPS Insider is a quarterly magazine dedicated to all AMPS' partners and customers. Published by AMPS, it provides news and information about AMPS' products and initiatives.

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Executive Overview

Sepsis, the Invisible Man of hospital illnesses. Product news.

Editorial

We are honored to host in our quarterly newsletter J. Randall Moorman, Professor of Medicine at the University of Virginia. As most of our readers already know, Prof. Moorman is a pioneer researcher in the analysis of neonatal and adult life-threatening diseases, with great focus on the assessment of predictive analytics and the early detection of sepsis. Since the 1990s he has contributed to the field with outstanding publications, but also with the development of software solutions that have reached actual implementation of such as the HeRO system to monitor heart rate and heart rate related observations in the neonatal intensive care unit and the CoMET system for the entire hospital. Prof Moorman is the perfect example of a clinical cardiologist that perfectly understands the technical background of a solution, but also of a biomedical engineer that can wisely determine the right technique to address a clinical problem. We are proud to have him on board on this issue.

A Noteworthy Contribution:

Continuous cardiorespiratory monitoring can reveal sepsis, the Invisible Man of hospital illnesses

“The stranger came early in February, one wintry day ... wrapped up from head to foot, and the brim of his soft felt hat hid every inch of his face but the shiny tip of his nose...”

HG Wells, The Invisible Man.

In his 1897 ripping yarn The Invisible Man, HG Wells told the story of Griffin, the medical student turned physicist turned homicidal madman, who made himself invisible. In order to carry on life in Victorian rural society, it was necessary to give himself recognizable shape, which he achieved with coverings of clothing, spectacles, wig, gloves and an artificial nose. What with one thing and another, Griffin lost his mind, and England must be saved from his planned Reign of The Invisible Man by a physician, Dr. Kemp, who led a crowd of interested community members to capture Griffin who, only upon his death, became visible.

While many point to the work as a study of man conflicted with himself, I see it as a morality tale for how we monitor patients for early detection of subacute potentially catastrophic illnesses such as sepsis. The problem is common - under our noses, our patients deteriorate, apparently suddenly, and we find out their diagnoses only too late. How do we improve on the current state? We propose that continuous cardiorespiratory monitoring is essential.

As an example, consider sepsis. The illness might as well be invisible in its earliest stages, and we run into it surprised by the contact:

“(Kemp) extended his hand: It seemed to meet something in mid-air, and he drew it back with a sharp exclamation. ‘I wish you’d keep your fingers out of my eye,’ said the aerial voice, in a tone of savage expostulation. ‘The fact is, I’m all here: head, hands, legs, and all the rest of it, but it happens I’m invisible. It’s a confounded nuisance...”

Clinicians know this well - one minute, all is well and we are happily alone, and the next we are in a conversation

with a lunatic, and distinctly at the disadvantage - a confounded nuisance, indeed.

We wish, of course, to avoid all this by early detection of illness by examining real-time data from the patient EHR and from the bedside continuous cardiorespiratory monitoring. Day in and day out, we have a more sporting chance with sepsis than with the Invisible Man because we are forever doing tests, making measurements, and peering at the results to see if they take on a recognizable shape. In this context, each test is bit of covering that we aim at the Invisible Man. If we place enough bits, and in the right places, we see the outline of an illness, and we can take action.

But we have a problem. If we do not do a good job with aiming the bits of covering - that is, not enough testing, or not the right tests - then illness advances undiagnosed. And we know that the tests follow the mind of the clinician - if s/he is not thinking of sepsis, then we have even fewer hopes than usual of seeing what is lurking in the room with us.

Enter continuous cardiorespiratory monitoring. We propose that this is the essential ingredient of early detection of sepsis and other subacute potentially catastrophic illnesses. The bits of covering - more than 200 per second, for the most part, illuminating the physiology of the heart and the lungs - seem ample to outline the shapes of illnesses. There are success stories. Heart rate characteristics monitoring reduces the death rate in the neonatal ICU, and continuous monitoring of

event trajectories reduces septic shock in the surgical ICU - both strategies used only continuous cardiorespiratory monitoring to glean information about the changing risks of individual patients.

The moral of The Invisible Man is that if you want to see your assailant, you have to cover him with many well-placed data points. This is the intent of the new field of predictive analytics monitoring. For this, we propose continuous cardiorespiratory monitoring to be the cornerstone of monitoring all hospital patients.

Products News

As announced and expected approval was granted for the Conformité Européene (CE) Mark, and FDA clearance was obtained through the 510(k) process for the new CER-S v4.3, which includes several enhancements including optimized multi-day reporting, increased limit for standard analysis on long recordings, superimposition display. In addition is capable to load user events from an EDF channel and includes new input plugins for H12 and Apple Watch.

CER-S Version 4.4 allowing for the management of the paced beats with the capability to perform beat measurements in the beat-to-beat modality is now ready, and we are already at work with Version 4.5. which will include the possibility to modify the format of the pdf reports and will also have a Graphical User Interface available in several different European languages.

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