Technology enhances safety and efficiency of chemotherapy medication compounding

By Niels Erik Hansen, Ph.D.

Chemotherapy is perhaps the most complex medication treatment patients receive. Chemo protocols and regimes not only require the compounding of toxic chemicals, but a patient’s specific medication needs can change over the course of a treatment cycle. For these reasons – and the fact that most chemotherapy treatments continue to be compounded manually – risks exist in almost every step in the process.

Unfortunately, problems with manual compounding are all too common. Following last fall’s meningitis outbreak linked to contaminated steroids, three other compounding pharmacies – in Georgia, New Jersey and another in Massachusetts – recalled compounded medications due to concerns about contamination earlier this year. While contaminated medications can have serious effects on reasonably healthy individuals, the impact on people battling cancer can be disastrous.

That’s why a growing number of hospitals and other chemotherapy providers are turning to hardware and software solutions such as automated compounding technology and computerized process management applications. Each of these solutions provides substantial benefits on its own, but can be even more effective when used in tandem to enhance the accuracy of chemo medication ordering, verification and administration, minimize contamination risks and protect pharmacy staff from exposure to cytotoxins.

The critical drivers of an integrated chemo compounding solution are safety and efficiency. There tends to be little waste with chemo processing; doses are generally not made in anticipation of orders, but when the patient arrives and needs are confirmed via lab work. The prepared products are mostly bags, and the bags often need to have their fluid volumes adjusted to either control the fluid administered to a patient or achieve a target concentration. Because of these requirements, the manual process can be very labor intensive and slow.

Intelligent Hospital Systems in Winnipeg has worked to develop an automated pharmacy technology that virtually eliminates the need for manual preparation of compounded medications. The result of this work is RIVA, a fully-automated IV compounding system.
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RIVA provides process accuracy and repeatability, and prepares bags or syringes in a fully-enclosed ISO Class 5 environment that is USP<797> compliant. RIVA also can be configured with negative air pressure to protect pharmacy workers during chemotherapy compounding.

Earlier this year, Intelligent Hospital Systems teamed with Cato Software Solutions to integrate its chemocato® software with RIVA hardware. chemocato® is an oncology software solution that provides support across all stages of therapy: long-term planning, current therapy ordering, preparation of cytotoxic drugs and more. RIVA's photo documentation, step-by-step time stamping and electronic audit trail add more layers of safety and verification - checks that are important when compounding any medication, but critical when preparing oncology compounds.

With the RIVA/chemocato® solution, chemotherapeutic medications can be loaded into the machine in advance, while the software maintains records of a patient's regime that can be adjusted based on lab work. Once the physician inputs the order, the machine makes exactly the right dose, without the need for manual intervention - saving time and substantially reducing the risk of contamination and miscalculation.

This combination of hardware and software offers the safest and most flexible system for delivering verified patient-specific chemotherapy medications. In addition, enhanced safety and accuracy reduces the risk of inadvertent adverse drug events and the associated liability cost.

Throughout the healthcare system, technology has been implemented to enhance the safety and efficacy of any number of procedures and systems - not only because technology is more efficient and accurate, but also because safety reduces costs. When treating a vulnerable population such as people with cancer using highly complex regimes of toxic compounds, safety and accuracy are critical. Fortunately, technology continues to offer ever-better solutions to these challenges, while benefitting patients and pharmacy staff alike.

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