Medtronic

Timely notifications lead to identification of adverse medication event

BioButton®* multi-parameter wearable device, along with BioDashboard®* clinical intelligence solution

Rosa
76-year-old female

Patient overview

- Admitted directly from physician's office for shortness of breath, cough, and chest discomfort
- History of rheumatoid arthritis, Wolff-Parkinson-White Syndrome treated by ablation, and chronic respiratory failure following COVID-19 infection
- Uses 3 liters of supplemental oxygen per minute via nasal cannula at baseline
- Diagnosed with multifocal pneumonia of right lower lobe

Hospital course

Rosa is admitted to the medical-surgical nursing unit. Her admitting orders include intravenous antibiotics, oxygen via nasal cannula at 5 liters per minute, and bronchodilator therapy. Cardiac telemetry monitoring is initiated for the first 24 hours of her stay. Bedside clinicians perform intermittent spot checks of her vital signs every 4 hours for the first 24 hours, and then every 6 hours. A 12-lead EKG and high-sensitivity cardiac troponin (hs-cTn) are completed, and it is determined that Rosa's chest discomfort is not related to an acute cardiac event.

The BioButton®* multi-parameter wearable is applied to Rosa's left upper chest upon admission. The BioButton®* provides continuous measurements of her resting respiratory rate, resting heart rate, and skin temperature. Data collected by the BioButton®* device flows directly into the BioDashboard®* clinical intelligence solution, which provides automated tools designed to facilitate efficient and actionable clinician decisions. A remote monitoring clinician receives data and notifications generated by the BioDashboard®* system.

On the evening of hospital day 2, Rosa complains of sudden squeezing chest pain and tightness. A STAT 12-lead EKG and hs-cTn are completed. Her vital signs are within normal limits. Her bedside RN contacts the remote monitoring clinician to review BioDashboard®* trends and notifications. Rosa's resting heart rate and resting respiratory rate trends remain within expected limits. The 12-lead EKG shows sinus tachycardia without signs of ischemia and the hs-cTn is normal. An oral anti-inflammatory for pain and intravenous (IV) lorazepam, as needed for anxiety, are administered.

About 30 minutes later, clinicians receive a double high median notification for heart rate and respiratory rate. The remote monitoring clinician reviews the notification and contacts the RN caring for Rosa. The RN assesses Rosa and observes that she is acutely confused and pulling at her oxygen tubing and peripheral IV line. The RN attempts to reorient Rosa without success. Rosa's care team is notified and arrives at her bedside, where it is determined Rosa is experiencing an adverse reaction to lorazepam.

07:40 p.m.
2 mg lorazepam IV administered

08:13 p.m.
NOTIFICATION
Double high median notification for heart rate of 140 and respiratory rate of 30

08:15 p.m.
ASSESSMENT
Oral temperature: 37.1°C (98.8°F),
Heart rate: 140
Respirations: 30
Blood pressure: 108/68
Oxygen saturation: 96% on 5 L NC
Pain: 0
Mental status: acutely confused to time and place, attempting to remove oxygen and peripheral IV line

08:30 p.m.
INTERVENTION
Care team notified, lorazepam discontinued, fall precautions implemented, patient moved closer to central nurses' station for closer visualization

- Patient monitoring products should not be used as the sole basis for diagnosis or therapy and are intended only as an adjunct in patient assessment.
- Please consult the product IFU prior to use. Results and outcomes vary for patients.
- This story reflects a real patient from an anonymized hospital.

1. Niedrig DF, Hoppe L, Mächler S, Russmann H, Russmann S. Benzodiazepine use during hospitalization: automated identification of potential medication errors and systematic assessment of preventable adverse events. *PLoS One*. 2016;11(10):e0163224.
2. Wolfe D, Yazdi F, Kanji S, et al. Incidence, causes, and consequences of preventable adverse drug reactions occurring in inpatients: a systematic review of systematic reviews. *PLoS One*. 2018;13(10):e0205426.

When used in Acute Care Mode, the BioButton® multi-parameter wearable device provides visualization of resting heart rate, resting respiratory rate, skin temperature, activity level and sleep tracking

The RN conducts a focused assessment and measures a full set of vital signs. He notes Regina's oxygen saturation and applies oxygen via nasal cannula. The Rapid Response Team arrives at Regina's bedside and orders labs including a STAT lactate, blood cultures and a urine culture. She is given bolus of 0.9% sodium chloride. A broad-spectrum antibiotic is ordered and administered within the hour.

Outcome

The care team discontinues the order for lorazepam and notes the adverse reaction in the electronic health record. The RN implements fall precautions and communicates the acute change in Rosa's mental status to all members of the nursing team. Rosa is moved to a room directly across from the nurses' station for enhanced visibility, and a bed exit alarm is activated. The nursing team rounds frequently on Rosa to assure that she is in a safe position and has not removed any medical devices. Remote monitoring continues via the BioButton®* multi-parameter wearable device, and Rosa does not require an escalation of care. Her heart rate and respiratory rate return to baseline within 2 hours and her mental status slowly improves over the next 8 hours. The adverse medication event does not prolong her expected hospital stay.

Discussion

Benzodiazepines are frequently administered in the inpatient hospital setting and benzodiazepine-related adverse medication events are not uncommon, especially in the elderly.[1] Adverse medication events may be associated with increased length of stay, morbidity, and mortality.[2] Prompt recognition of a potential adverse medication reaction can facilitate early intervention. Wearable devices like the BioButton®* may facilitate early recognition through frequent data collection and timely, actionable notifications.

Want to learn more about the BioButton®*?
Contact your Medtronic sales representative or visit our site: www.medtronic.com/healthcast_biobutton

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