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Blood Pressure Monitoring During Caesarean Deliveries

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Introduction

Practice standards established by major professional associations stipulate that arterial blood pressure (BP) readings must be taken at least once every five minutes during the intraoperative phase of care. It is essential that BP monitors be resistant to potential artefacts from sources like shivering or other frequently encountered types of interference that may occur during typical patient care because measuring blood pressure is an essential part of monitoring vital signs during anaesthesia. The reliability of these commercially available systems in the context of routine intraoperative care of parturients during Caesarean Delivery, a population particularly susceptible to shivering artefacts, has not been extensively compared in published research. Systolic and diastolic blood pressures are calculated by proprietary algorithms in the automated, non-invasive oscillometric blood pressure (NIBP) monitors that are currently on the market. However, automated monitors have outperformed manual sphygmomanometry in the workplace. During the renovations that took place toward the end of the summer of 2018, our tertiary care hospital installed two distinct brands of automated NIBP monitors in three adjacent operating rooms (ORs) [1].

Description

A Philips Intellivue MX800 NIBP monitoring system and Philips NIBP cuffs were installed in two operating rooms (ORs), and a Datex-Ohmeda S5 Anaesthesia Physiologic Monitoring system and Welch Allyn Non-Invasive Blood Pressure (NIBP) cuff were installed in one OR. Both of the NIBP monitors are components of monitoring systems that are regulated and approved for human use by the FDA. In August 2019, approximately one year after the installation was finished, providers reported seeing a higher prevalence of unreadable or otherwise abnormal NIBP readings when patients were undergoing anesthesia for a Caesarean Delivery (CD) in the rooms with the Phillips system as opposed to the adjacent room with the Datex-Ohmeda system. This occurred when patients were in the rooms with the Phillips system. Representatives from the company stated that the monitors were in good physical condition when asked about these potential anomalies. The anecdotal claims about the amount of changes in abnormal BP between the two systems in adjacent rooms were not supported by quantitative evidence, despite the fact that the healthcare professionals' subjective experiences were taken seriously [2]. As a response, we looked into the frequency of significant NIBP measurement gaps and other potential blood pressure aberrations that were observed during CD using these two monitoring devices. The outcomes of our investigation are presented in this paper. The current study provides quantitative support for practitioners' perceptions that abnormal blood pressure readings were more common when Phillips monitors were used in obstetric operating rooms as opposed to Datex-Ohmeda monitors. Due to the previous use of two monitoring systems in nearby ORs, the dataset used for this study produced very similar cohorts, which may give it credibility not found in other retrospective observational studies. Public registration and adhering to a published analytical plan are additional strengths following the significant absence of two factors.

Due to variations in intraoperative provider charting accuracy, this study may be biased, which is one of its limitations. For instance, we believe that more parturients were given exogenous oxytocin than our dataset indicated because of the care practices that were followed at our facility. We are reassured by the fact that there was almost no oxytocin charting in any of the room types, indicating that there would not have been any difference in the classification of this covariate between patient groups. Since oxytocin delivery did not appear to be significantly linked with the primary outcome, we suggest that incorrectly charting it did not likely result in significant distortion in the primary outcome analysis's conclusions [3]. A machine-recorded variable that was automatically incorporated into our dataset and was not susceptible to provider charting errors was the primary outcome of this trial, which relies on blood pressure measurements. Despite the strength of our approach's ability to identify highly similar historical cohorts, we continue to emphasize that the data described here are primarily retrospective and observational in nature, and that the observed association between rooms where one type of monitor was used in comparison to another and aberrant BP readings cannot establish causation. Due to the retrospective nature of the study, there were a number of missing variables in the data, including BMI, which was not different between the two groups.

In addition, the current investigation was not conducted with the intention of determining the underlying cause of the observed variations in the art factual blood pressure readings that were recorded on either monitor. Although it is speculative, a number of medical professionals at our hospital have asserted that the aberrant readings are frequently observed in the context of shivering patients. This is a common occurrence among parturients receiving neuraxial anesthesia for CD that has received a lot of attention in the literature on anesthesia [4]. The fact that the majority of aberrations occurred during the first third of the anesthetic, when shivering would typically be most common, lends credence to this suspicion. If the alleged link between shivering and abnormal BP readings is true, better incorporating shivering into automated algorithms should be a priority for future quality enhancements of commercial BP monitors. In addition to our primary analyses, we would like to bring to your attention two additional intriguing outcomes derived from our dataset. First, it is important to note that doctors frequently experienced monitoring gaps of at least six minutes in all three operating rooms in this study. Even in the "best" room, more than one in five cases had at least one monitoring gap. This suggests that both kinds of monitors under consideration in this study may benefit from modifications to their algorithms to improve reliability and accuracy [5].

Conclusion

The second finding emphasizes the potential significance of these findings by pointing out that the majority of these aberrations took place in the first third of the anesthetic. It was discovered that the monitoring that medical professionals rely on malfunctioned alarmingly frequently right when instability is at its highest and placental blood flow is still crucial to the outcome of the fetus. The fact that the majority of these aberrations occurred during the first third of the anesthetic underscores their potential significance further. When instability is at its highest and placental blood flow is still crucial to the outcome

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of the fetus, the monitors that doctors rely on were found to malfunction alarmingly frequently [6]. Among the three types of likely aberrant readings that we took into consideration in our analysis, the number of instances where at least one reading revealed a pulse pressure less than 20 mmHg was the second highest relative difference between the monitors. 11.2% of the time, these kinds of aberrations were significantly different between the two BP monitors. We believe that this finding indicates a clinically significant distinction between the two automated BP methods that calls for additional validation in multicenter observational cohorts and a specific prospective study.

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