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Biomedical Engineering Senior Design: EGRB 401

PROJECT NAME
Feedback Device for Orogastric Feeding Systems

ASSIGNMENT NAME
Proof of Concept for Sternheimer Award

TEAM NAME
Lima

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With an astoundingly frequent occurrence of orogastric contents spilling during measurement and its associated risks, engineering a feedback device for orogastric feeding systems has became our team’s mission. After meetings with clinicians and time shadowing in MCV’s Medical Respiratory Intensive Care Unit (MRICU) it has been seen first hand how the currently used system in enteral feeding has many flaws. The current system provides an inaccurate source of feedback on a patient's nutrient uptake. Along with the inaccuracies of the system and procedures, they do not consider the high safety risk to the patients and clinicians, along with the loss of time for the clinicians who are already task saturated. A patient’s nutrient uptake is required to be monitored around every four to six hours. Typically syringes are used to withdraw the gastric contents and measure the fluid in an opened measurement container. This method is currently being implemented in the MCV’s MRICU. The current method with its associated risks of spillage and patient/nurse safety has caused a large negative impact on the MRICU at MCV. It has been reported to our team that every shift, the respiratory therapists and nurses have to change bed sheets and sanitize tools at least once when spillage occurred. In an extreme case nurses or clinicians may have to be tested after contact with gastric content. It is important to be mindful that the patients in the MRICU and other care units are usually equipped with other additional tubings and devices for constant monitoring. The patients also may have a compromised immune system. Avoiding any source of infection and reducing the moving of the patients is of high importance.

With the concern the current enteral feeding system introduces a high chance of spilling gastric content, we proposed a closed orogastric feeding system feedback device. This design will allow nurses to aspirate gastric content by activating a switch of a pump. Utilizing a peristaltic pump, the fluid will end up in a measurement container with an indicator of volume measurement. Then the fluid can be return back to the the patient by turning the switch in the reversal direction. Research into the flow rate of the proposed system and the possibility of interference of our design with the current enteral feeding system is still needed to be done. The project would also provide qualitative feedback into reducing the workload of nurses and clinicians in a hospital setting.

Our effort in designing this feedback device for orogastric feeding system is to contribute our knowledge of engineering and medical devices to ultimately raise our local community’s healthcare standard and provide a safe environment for those who work in it. Our primary goals of this project are to minimize the risk of spilling gastric content, prevent additional unintended infection, reduce the discomfort for critically ill patients, and provide a understandable device that makes the clinician’s jobs easier and safer. We hope this universal design will not only benefit patients and nurses at MCV but also be a suitable upgrade that could be implemented in hospitals nationally.
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