2014-2015 PROJECTS

NEONATAL INTUBATION DEVICE TO MINIMIZE HYPOXIA

Neonatal intubation, especially in the premature infant, is technically challenging, with a risk of prolonged hypoxia. Under mentor Dr. Tom Sawyer (Neonatology), the EIM team developed an LMA-like prototype that allows fiber-optic visualization of the airway, placement of the endotracheal tube, while simultaneously providing ventilation. This prototype has been tested with in-vitro airway models, and grant application is underway for further development.

HYPOVOLUME DETECTION IN LOW-RESOURCE SETTINGS

Early detection of hypovolemia is critical for providing timely medical care in low-resource/rural settings. The most widely-used screening method is the nail blanch test. The EIM team, with Dr. Matthew Thompson (Family Medicine), developed a mobile phone app and $5 USD finger adapter that, with data from the camera, quantifies capillary refill to decrease subjectivity and user-to-user variability. The designs and software application for this device will be released open-source in 2016.

BIOPSY NEEDLE TO ADDRESS INTRA/POST-OP PNEUMOTHORACES

Lung biopsy is one of the most frequently performed procedures, with the possible complication of a pneumothorax in 15-60% which can occur both during or after the procedure, sometimes necessitating a chest tube to be inserted. Collaborating with Drs. B. Lehnert and E. Monroe (Radiology), the EIM team developed a new polymer biopsy needle that, for the first time, permits treatment of a pneumothorax during the biopsy procedure and eliminates the need for a post-procedural chest tube. Evaluation of the market size, intellectual property and next development steps are ongoing.

REAL-TIME COAGULOPATHY TESTING

Thromboelastography (TEG) is a new assay for post-traumatic coagulopathy, currently requiring specialized equipment that are costly and large. Collaborating with Dr. Nathan White (Emergency Medicine), the EIM team developed a proof-of-principle prototype that quickly measures the pressure needed for clot rupture – a surrogate metric for in-vivo clot strength. Initial testing showed correlation of the prototype results with TEG data.

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