A Novel Method for Proning Patients with Acute Respiratory Distress Syndrome

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Introduction

Acute respiratory distress syndrome (ARDS) is a lethal disease effecting around a quarter of a million patients a year[1] in the U.S. and costs the U.S. healthcare system $9-16 billion/year[2]. Severe cases have a greater than 50% mortality[3].

Proning therapy (face down ventilation) has been shown to decrease mortality by half, improve oxygenation, decrease the number of days on the ventilator[4], and has been strongly recommended by all major critical care societies. Despite this, only 10-33% of candidates receive this life saving therapy with the current barriers being awareness, safety concerns, and expense of the current solutions **(Image 1)**.

Here we present a novel, patent pending medical device **(Image 2)** designed to address safety and cost concerns to ensure patients with severe ARDS receive appropriate therapy.

Image 1: Current Solutions are Problematic
Left: Manual proning comes with safety concerns; **Right:** Rotoprone therapeutic bed is too expensive at ~$150,000 or $1,300//day

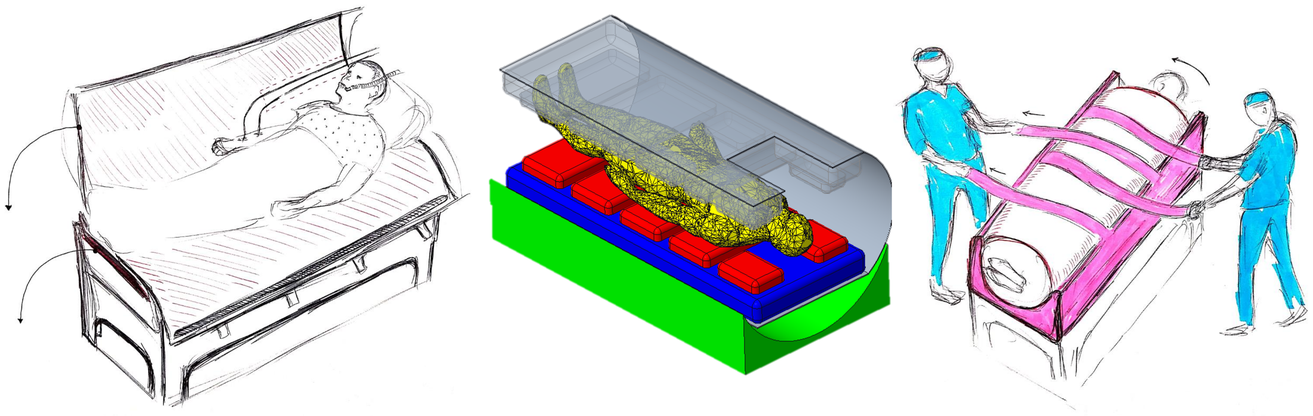

Image 2: Our solution
Patient is enclosed in an inflatable shell and supported within an inflatable base lined with a low friction surface

Material and Methods

Testing was performed on an existing intensive care bed at the Earl E. Bakken Medical Devices Center. Two flat, deflated layers were placed underneath a person and the upper layer was wrapped around the patient and inflated. The base was then inflated providing a cradle for the inner cylinder. Directional fabric was present on both the exterior of the inflatable shell and base reducing force required to prone the subject **(Image 3)**.

Image 3: Left: In human testing; Right: Peak force reduction compared to manual proning

Discussion

Our novel device is single-use, disposable solution that is compatible with existing beds and has been showing to reduce the effort required to prone patients. It has a low regulatory risk as a class I FDA device. It is safe, easy, and cost-effective solution designed to increase adoption of a proving, live saving therapy.

References:

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