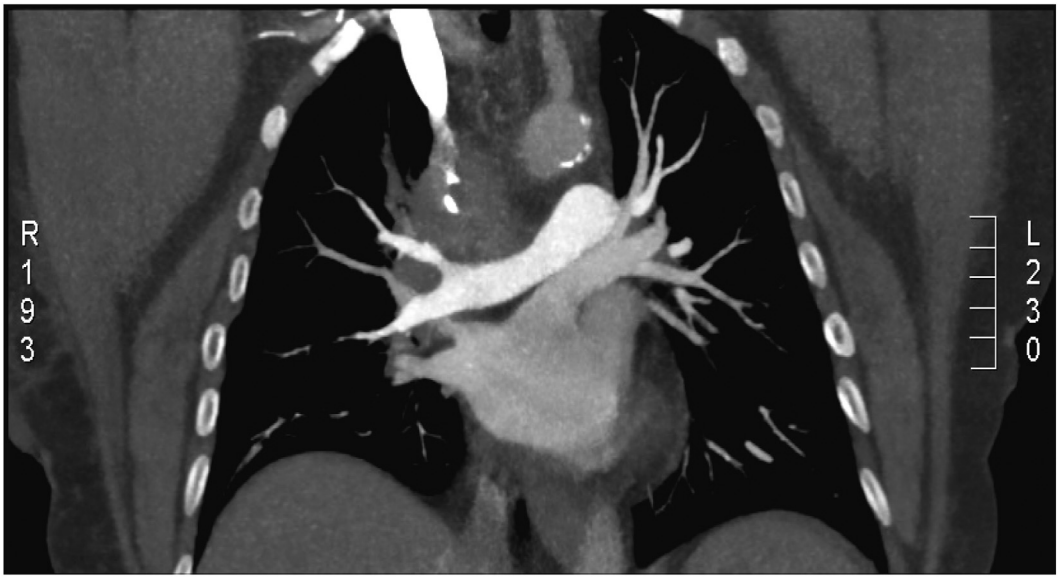

Fig. 1. CT with IV contrast of the chest demonstrating a right hilar/paratracheal mass highly concerning for bronchogenic malignancy with encasement and vascular invasion involving the Superior Vena Cava and azygos vein.

In conclusion, we present a patient who used Facebook to help diagnose her condition after traditional means were unsuccessful. This case is an example of how social media can be used through crowdsourcing to allow patients to access a large pool of users to aid in diagnosis when traditional medical avenues fail them.

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Validating the LUCAS® mechanical chest compression fit specifications

1. Introduction

Annually, more than 350,000 out-of-hospital cardiac arrests (OHCA) occur in the United States, with nearly 90% of cases being fatal [1]. One critical factor impacting cardiac arrest survival is timely and continuous high-quality cardiopulmonary resuscitation (CPR) [2]. High-quality CPR is defined as compressions delivered with a depth of 5 to 6 cm, at a rate of 100–102 compressions a minute [2-5].

Providing high-quality manual CPR for prolonged periods can be difficult because it is physically demanding [4, 6-10]. Mechanical CPR devices address this challenge by offering continuous hands-free-high-quality chest compressions throughout the cardiac arrest [4, 10, 11].

One challenge in designing a mechanical CPR device is for it to fit the myriad of human body shapes and sizes. In response to this challenge, the vendor designed their LUCAS® Chest Compression System with an adjustable piston to accommodate different sternum heights [12]. Current research such as the PARAMEDIC trial (2015), LINC trial (2014), and a pilot study conducted by Yost et al. (2010) confirms that the LUCAS® has a universal adaptation mechanism, as the results from these studies show the LUCAS® fit 95–98.2% of cardiac arrest patients [11, 13, 14]. However, during a broader evaluation process completed by the authors, some Emergency Medical Service (EMS) and hospital personnel being trained to use the LUCAS® challenged that the LUCAS® would fit the majority of the patients, contending that their patient population has been growing physically larger over time (LUCAS® clinical trainer, personal communications, 2014–2017). These concerns are supported by recent

American health statistics, where the prevalence of overweight adults in the U.S., has increased from 41% in 1975 to 67.9% in 2016, with over one-third (36.5%) being obese [15, 16].

The queries and observations of EMS and hospital personnel coupled with the data supporting a trend toward a larger population initiated our study to examine whether the vendor-provided specifications for LUCAS® size are supported by third-party data.

2. Methods

2.1. Study design and setting

This study was part of a larger healthcare initiative, funded by the Leona M. and Harry B. Helmsley Charitable Trust, where approximately 2500 LUCAS® devices were granted to EMS and Hospitals in seven rural states: North Dakota, South Dakota, Minnesota, Iowa, Nebraska, Wyoming, and Montana, where the obesity rate varies from 25.5% to 32% [17]. Prior to receiving their LUCAS®, all device recipients attended mandatory training sessions, to enhance their cardiac arrest response [18].

2.2. Study device description & patient size specifications

The LUCAS® is a piston-driven compression device that delivers high-quality CPR [4, 12]. The vendor training and LUCAS® manual highlight the device application is more dependent on sternum and chest dimensions than overall body size, fitting patients with a sternum height from 170 to 202 mm, and maximum chest width of 450 mm [12]. However, according to vendor training, some patients might exceed these dimensions due to carrying excess adipose tissue around their chest. In these instances, physical attempts to apply the LUCAS® should be made by placing the patient's arms above their head, while maneuvering their adipose tissue away from the support legs and the suction cup of the LUCAS® (LUCAS® clinical trainer, personal communications, 2014–2017).

2.3. Data collection

Data was collected between September 2016 and August 2017, as part of a larger evaluation process. Device recipients were verbally informed about the evaluation process during training and were requested to call the toll free number, attached to the device, after each deployment LUCAS®. The data was collected through semi-structured phone interviews, where callers answered survey questions about the deployment of the LUCAS®. This study only reports on the data collected pertaining to the question as to whether the deployed LUCAS® device fit the patient.

3. Results

A total of 1075 LUCAS® deployment interviews were conducted with EMS agencies and hospitals. In only 27 cases was the patient too large to fit the LUCAS® device, that is, the LUCAS® fit in 98% of deployments.

4. Discussion

The LUCAS® has potential to improve cardiac arrest patient outcomes, by providing prolonged high-quality compression CPR [7, 9, 11, 19, 20]. However, there is some skepticism in the health provider community as to whether the LUCAS® fit the majority of the population. This skepticism is based on the healthcare providers concerns and longitudinal research on the increasing prevalence of overweight adults. Furthermore, our study results suggest this skepticism is unfounded. To the contrary, our findings suggest the manufacturers' and previous supporting studies' estimates on population fit are conservative. Given that application time is less than 10 s, and the chances for fit are greater than 98%, in our population, our protocols will recommend attempting LUCAS® placement in all cases, as application depends more on sternum and chest dimensions than overall body size.

5. Limitations

Though 1075 interviews were conducted, we do not know how many deployments were not reported, because participation was voluntarily. This could change the results dramatically and serves as a limitation to our study.

Declarations of interest

None.

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Aggressive fluid therapy for pain control in pediatric acute pancreatitis: A topic for future research

Dear Editor,

It has been estimated that the incidence of emergency department visits due to acute pancreatitis (AP) in children is roughly 16 per 100,000 [1]. Nearly all of these patients suffer from a severe abdominal pain, which almost always requires prompt intervention. Several pharmacological and non-pharmacological interventions have been developed for diminishing or alleviating acute pain associated with AP. However, most of these interventions are tailored for adult patients and there is a paucity of information regarding the optimal analgesic intervention for pediatric patients suffering from AP in the emergency department. There is a lack of clinical practice guideline for the treatment of pain in this cluster of patients [2,3]. Opioids have an important role in pain control; however, their usage in children is controversial and is associated with major adverse events such as dysfunction of the sphincter of Oddi. Additionally, nonsteroidal anti-inflammatory drugs could not produce long-lasting analgesic effects [4]. Therefore, new effective interventions need to be developed to improve pain control in children.

Intravenous fluid therapy by crystalloid is the foundation of the initial management of AP [5]. Recently, clinical guidelines on AP in adult have focused on aggressive fluid therapy using either lactated Ringer's solution (LRS) or normal saline solution (NSS) in order to both maintain the adequate arterial pressure to prevent organ hypoperfusion and lower the level of inflammatory mediators, which are supposed to be as a main trigger of systemic inflammatory response syndrome [5,6]. A recent systematic review has shown that LRS may have more anti-inflammatory effects than those of NSS [6]; nevertheless, in the latest American Gastroenterological Association guideline on initial management of acute pancreatitis, the superiority between the use of normal saline and Ringer's lactate has not been determined that one of the reasons for this is due to the lack of reliable evidence [5].

The aggressive fluid therapy for acute pancreatitis in pediatric patients in the emergency department has many challenges. There is no specialized clinical guideline for usage of aggressive fluid therapy in pediatric patients, and most of the current treatments are based on the adult population. In addition, potential clinical advantages of aggressive fluid therapy with LRS over NSS in pediatric patients are unclear and in need of further research [3]. Moreover, different definitions have been used for the rate of aggressive fluid infusion in studies. Conventionally, it is defined as a rate of 1.5–2 times the maintenance rate [2,3], but it ranges from 1.5 to 3 mL/kg/h along with 20-mL/kg bolus [7]. Furthermore, regarding the pediatric patients, no studies compare the initial resuscitation volumes and currently, the ideal rate of fluid administration is unclear [3].

Based on the available evidence in adult patients, it can be assumed that aggressive fluid therapy with or without pharmacological therapy may be helpful to lower the severity of abdominal pain in pediatric patients who suffer from AP, referring to the emergency department. However, at least, three questions remain to be answered regarding pediatric patients. What is the best solution for aggressive infusion? What is the ideal volume for initial fluid resuscitation? Moreover, what is the ideal rate of fluid administration that is defined as aggressive? Further prospective clinical trials are needed to test this assumption and to answer these questions.

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