CENTRAL LINE CART: AN EMERGENCY DEPARTMENT INITIATIVE TO IMPROVE EFFICIENCY

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BACKGROUND

- Critically ill patients that present to the emergency room often require time sensitive resuscitative measures, which often necessitates placement of a central venous catheter.
- Efficient placement of a central venous catheter is often limited by the time it takes to gather the number of supplies needed for the task.
- It is already known that central venous catheter procedure carts and kits decrease the incidence of central line associated bloodstream infections (CLABSIs)[1] as well as reduce the incidence of procedural mistakes during central line insertion[2]
- However, there is a paucity of data in regards to the impact of central line procedure carts on the efficiency of central line insertion.
- The objective of this study was to assess whether a pre-stocked central line cart would reduce the time it takes to place the catheter in critically ill patients in the emergency room.

METHODOLOGY

- A 4-question survey was distributed amongst all current ER residents to assess their experiences with the central line insertion process
- An procedure cart was secured and filled/organized with all components needed to perform the insertion of a central line
- The cart was strategically placed in an area of the ER that is easily accessible to all ER residents
- Residents were encouraged to use this cart whenever placing a central venous catheter
- A follow up survey was distributed to the same group of residents after an 18 week period of time, and the results were compared with the initial survey results.
- The results from the pre- and post-central line cart implementation survey were plotted out graphically and the means were then compared using an unpaired t-test.

The questionnaire is as follows:

1. On average, how long does it take you to insert a central line from consent form to finishing placement of dressing? [see Figure 1a/1b and Figure 1 Data Analysis]
2. On average, how long does it take you to gather all supplies needed for the procedure (e.g. central line kit, drape, caps, etc)? [see Figure 2a/2b and Figure 2 Data Analysis]
3. How often do you forget a component of the central line insertion and have to leave the room to get it (e.g. biopatch, sterile, flush, etc)?
4. Would/Did the centralized cart complete with all central line supplies increase efficiency of the procedure?

RESULTS

- 92.31% of residents found the central line cart to increase efficiency, while 7.69% of residents surveyed did not find the central line cart to be helpful.

Figure 1a

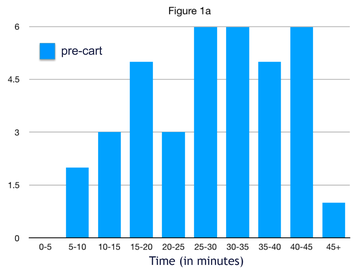

Figure 1b

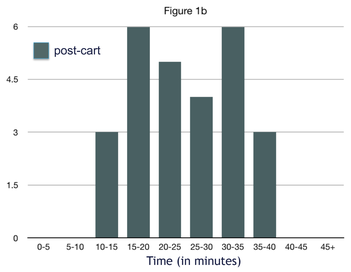

Figure 1 Data Analysis

	Pre-cart	Post-cart
mean	26.1	22.4
SD	2.21	1.60
SEM	0.36	0.31
N	37	27

Question 1: P value and statistical significance:
- The two-tailed P value equals 0.1476
- By conventional criteria, this difference is considered to be not statistically significant

Confidence interval:
- 95% confidence interval of this difference: from -0.27 to 1.74

Figure 2a

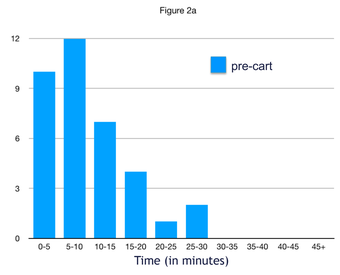

Figure 2b

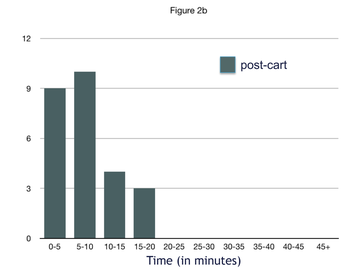

Figure 2 Data Analysis

	Pre-cart	Post-cart
Mean	12.2	10.2
SD	1.38	1
SEM	0.23	0.2
N	36	26

Question 2: P value and statistical significance:
- The two-tailed P value equals 0.2073
- By conventional criteria, this difference is considered to be not statistically significant

Confidence interval:
- 95% confidence interval of this difference: from -0.23 to 1.04

CONCLUSIONS

- We applied principles of the LEAN process to decrease waste and increase time utilization in critically ill patients in the emergency department.
- The data showed that having the procedure cart decreased the amount of instances in which residents forgot an item essential to the placement of the central line. The data also showed that the central line cart helped decrease the amount of time needed to gather supplies for performing the procedure. However, these results were not determined to be statistically significant.
- The data collected suggests that the implementation of a centralized procedure cart for the placement of central venous catheters in the emergency department did not increase the efficiency of the procedure, in terms of statistical significance.
- Despite the lack of statistical significance, there was a generally positive trend in regards to resident attitudes towards the central line cart.
- Further investigation is needed utilizing objective measures to determine if other benefits of a central line cart exist.

DISCUSSION

- A limitation of this study was incomplete participation by residents in the follow up survey. Additionally, over the course of the implementation of the central line cart, it is possible that not all residents have gotten the opportunity to use the central line cart due to off-service rotations and other factors. This may have skewed the results.
- External validity and generalizability of this study is low due to the relatively small sample size of the study population.
- This study was subject to recall bias by having residents subjectively answer a questionnaire about their experiences with central line placement in the emergency department
- Future studies might investigate central line placement utilizing a larger sample size, multiple centers, and objective measures of evaluation such as direct observation.

REFERENCES

[1]Papierniak, Eric & Febre -Viera, Lilia & Warren, Jamie & Faruqi, Ibrahim. (2012). Introduction Of Central Line Insertion Checklist And Procedure Cart Decreases The Incidence Of Central Line Associated Bloodstream Infections Outside The Intensive Care Unit. A1456-A1456. 10.1164/ajrccm-conference.2012.185.1_MeetingAbstracts.A1456.

[2]Fenik, Yelena & Celebi, Nora & Wagner, Róbert & Nikendei, Christoph & Lund, Frederike & Zipfel, Stephan & Riessen, Reimer & Weyrich, Peter. (2013). Prepackaged central line kits reduce procedural mistakes during central line insertion: A randomized controlled prospective trial. BMC medical education. 13. 60. 10.1186/1472-6920-13-60.