AARC 2022

View Abstract

CONTROL ID: 3774717

TITLE: FACTORS THAT AFFECT MANUAL VENTILATION OF INTUBATED PATIENTS

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PREFERRED PRESENTATION FORMAT: Poster Discussion (oral presentation)

CURRENT CATEGORY: Respiratory Equipment Evaluation

ABSTRACT BODY:

Background: Bag-valve resuscitators are used to manually ventilate intubated patients. The purpose of this study was to identify factors that affect manual ventilation performance (MVP). We hypothesized that there would be no significant difference in MVP determined by experience or hand-size, when using a regular adult 1600 mL or small adult 1000 mL bag-valve resuscitator.

Methods: IRB approval was obtained from Northeastern University before collecting data. This was a non-randomized study evaluating MVP. Both sizes of CPR Bag resuscitators (Mercury Medical, Clearwater, FL) were tested with registered respiratory therapists (RRTs) (N=10) using a single compartment of the model 2600i dual adult training test lung (Michigan Instruments, Grand Rapids, MI), set to simulate a 75 kg adult with a lung impedance of Cp 0.03 L/cm H_2O, Raw 15 cm H_2O/L/s intubated with a size 8.0 mm ID ETT (Mallinckrodt, St. Louis, MO). A NICO Novametrix Cardiopulmonary Monitor (Respironics, Carlsbad, CA) via CO_2 flow sensor was used to record f, V_T, V_E, I:E ratio, PIP and PIF minute averages. Clinical simulations involved participants manually ventilating the test lung 5 min with 3 repetitions, 15 min for both sized resuscitators (30 min total/participant). Participants were given a scenario to manually ventilate a recently intubated patient with an unknown medical history. All participants took a survey to report their professional experience. Continuous data was analyzed with ANOVA and student t-test, non-parametric data was analyzed with a Mann-Whitley U test using SPSS v27 (IBM, Armonk, NY). A *P* value of <.05 is considered significant.

Results: Significant difference was observed for mean V_T with regular 1600 mL bag (500 ± 133 mL) vs. small 1000 mL bag (390 ± 90 mL) (*P* .029). Experience > 4 yrs. had a significant effect on PIP (*P* .037) and PIF (*P* .033). Positive correlation was observed for I:E ratio and V_E (R .763, *P* = .000). While there was no significant difference in V_E with experience, resuscitator size and hand size (*P* >.05), a wide range in V_E was noted.

Conclusions: Adult resuscitator bag size and experience significantly affects MVP for V_T, PIP and PIF. More research with a larger test cohort is needed to understand what factors affect manual ventilation of intubated patients.

(No Table Selected)

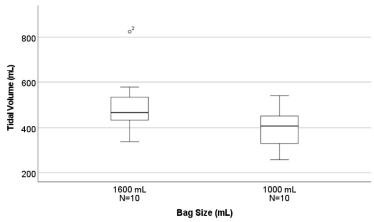

Fig. 1. Delivered tidal volume with 1600 mL vs. 1000 mL CPR bag, *P*= .029

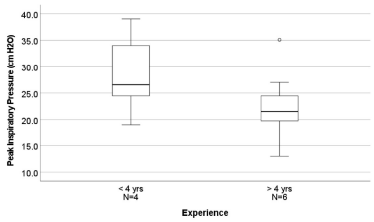

Fig. 2. Experience effect on peak inspiratory pressure, *P*= .037

CONFLICT OF INTEREST: Yes financial interest

Extra Info: Justin Scott Phillips is a consultant for Saxe Healthcare, Burlington, Vt and ContinuED, Houston, TX. Elayne M. Rodríguez is a member of the administrative staff for the Skyline Community College, San Bruno, CA Respiratory Care Program.

IRB & HIPAA DECLARATION: Yes, HIPAA

PUBLISHING ACCEPTANCE: We agree

SPONSORED RESEARCH: Yes

Extra Info: Mercury Medical, Clearwater, FL provided 1000 mL and 1600 mL CPR bag-valve resuscitators for this research. Additionally, Mercury Medical, Clearwater, FL supported this research with an unrestrictive gift. Laboratory space and other research equipment was provided by Skyline Community College, San Bruno, CA.

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Product version number 4.17.4 (Build 139). Build date Thu May 26 07:25:14 EDT 2022. Server ip-10-236-28-46