

Use of Airway Pressure Relief Ventilation (APRV) in Burn Patients with and without Inhalation Injury

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Introduction

Burn patients often require ventilator management because of large % TBSA injury, the presence of inhalation injury, and/or other factors. Airway pressure relief ventilation (APRV) offers several advantages over conventional ventilation modes including improved alveolar recruitment, better oxygenation and hemodynamics, preservation of spontaneous breathing and possibly less ventilator-induced lung injury. This study reviews the use of APRV as the primary ventilator mode in burn patients with and without inhalation injury.

Methods

A retrospective chart review of patients admitted to the burn center and requiring APRV ventilation over a ten year period was performed. Data collected included demographic data, burn injury data, ventilator settings, arterial blood gas data, and development of ventilator-associated pneumonia (VAP).

Results

There were 411 patients identified over the ten year period. Mean age was 46 years, and mean % TBSA burned was 33. Seventy-three percent were male. One-half (51%) of patients had an inhalation injury. Mean hospital length of stay was 32 days with 23 mean ventilator days. Average number of surgeries was 4.4 per patient. Mean high pressure (P high) was 23 mm Hg. Mean FiO₂ was 88% on post-injury day (PID) 1, 65% on day PID 2, and 45% thereafter. Mean P/F ratio was 333. Mean pH was 7.40, mean pCO₂ was 40 mmHg, and mean HCO₃ was 25 mm Hg. Forty-six percent of patients met criteria for diagnosis of VAP.

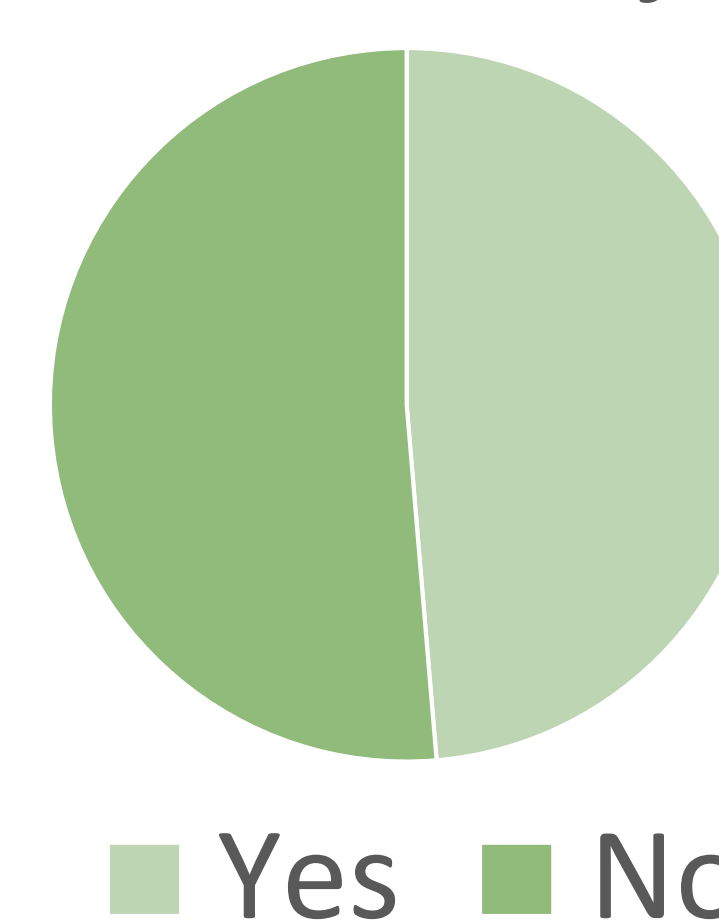
Conclusion

These data demonstrate that burn patients requiring mechanical ventilation can be safely and effectively managed with APRV. Oxygenation, carbon dioxide removal, normal acid-base status, and excellent P/F ratios were maintained with relatively low ventilator settings such as peak airway pressure and FiO₂. Patients were able to breathe spontaneously when able and were easily liberated from the ventilator at the appropriate time.

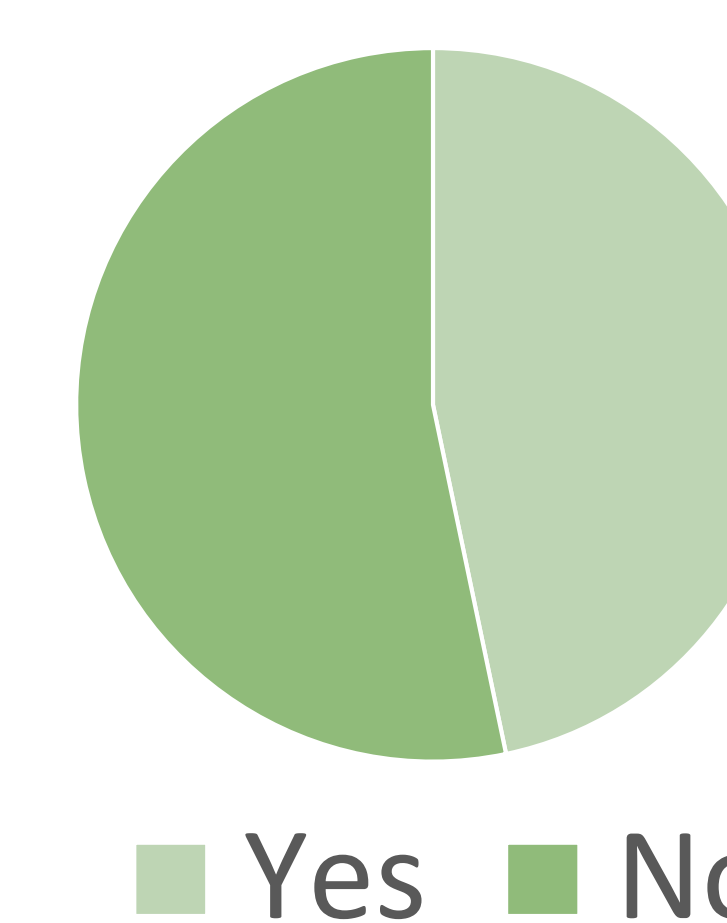
DEMOGRAPHICS / OUTCOME DATA n = 411

	Average	St. Dev
Age	46.08	17.480
TBSA	32.83	26.824
Days on APRV	8.14	11.101
Total Days on Vent	22.96	26.311
Number of Surgeries	4.42	5.375
Length of Stay	31.64	32.167

Inhalation Injury



VAP



Pulmonary Variables n = 411

	Average
P High	23 mm Hg
P/F ratio	333
pH	7.40
pCO ₂	40 mm Hg
HCO ₃	22 mm Hg

FiO₂ n = 411

Post Injury Day	Average
1	88%
2	65%
≥ 3	45%

Applicability to Practice

This study defines an unconventional and potentially improved ventilator mode use in burn patients.

