Incidence of Extubation Failure in a Burn Intensive Care Unit: Examination of Contributing Factors

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Introduction

- Extubation failure is associated with negative outcomes
- Prolonged mechanical ventilation is known to increase risk of complications
- Currently there is consensus on the acceptable risk of extubation failure in burn patients
- Conventional indices of extubation success do not accurately predict success in burn patients

Objectives

- Examine the rate of extubation failure in the burned population
- Examine the impact of inhalation injury as well as other factors on extubation outcomes

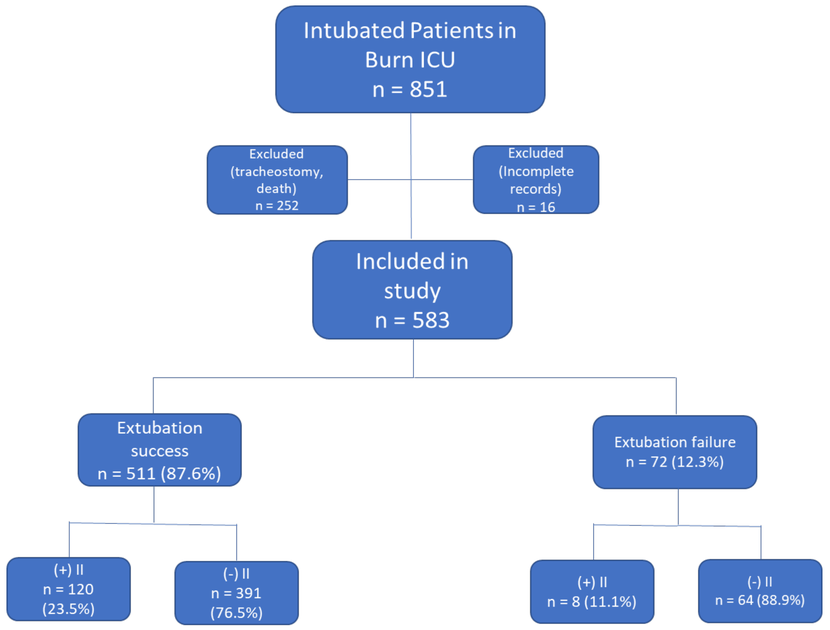
Methods

1. Burn patients from a single center from 2009-2017 were examined in an approved Process Improvement Project
2. Inclusion criteria: intubated prior to arrival or within 48 hours of admission; underwent planned extubation
3. Exclusion criteria: proceeded directly to tracheostomy; died prior to extubation; experienced unintentional extubation
4. Matched case-control analysis based on age, TBSA and gender performed to compare factors that could predict extubation failure

Weaning Parameter	Criteria for Extubation
Minute Ventilation	< 10 L/min
Respiratory Rate (RR)	< 35 breaths/min
Tidal Volume (TV)	> 5 ml/kg
Rapid Shallow Breathing Index (RR/TV)	< 100
Negative Inspiratory Force	> 20 cm H2O

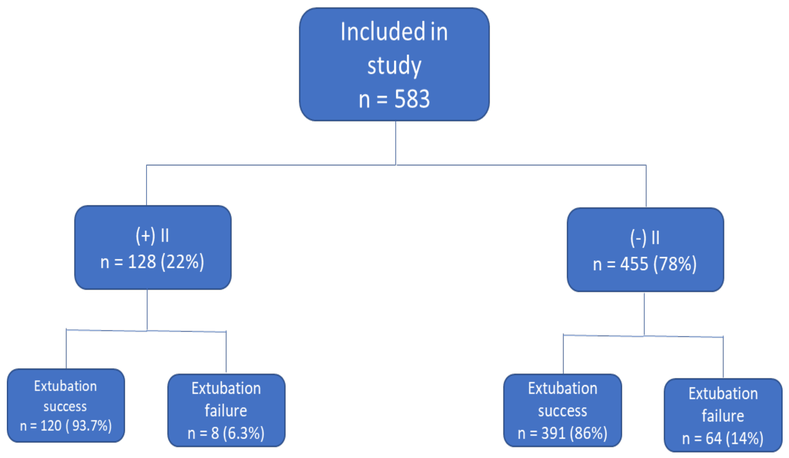
Results

- Extubation success defined as not requiring reintubation within 72 hours of planned extubation.
- Overall failure rate of 12.3%



	Extubation Success (n = 48)	Extubation Failure (n = 58)	p-value
Age (mean ± SD)	52 ± 16	50 ± 19	0.73
TBSA (mean ± SD)	19 ± 16	25 ± 23	0.07
Male sex (n, %)	41 (85%)	47 (81%)	0.55
BMI (mean±SD)	26.8 ± 5.1	29.6 ± 7.1	0.13
(+) Inh. Inj. (n, %)	14 (29.2%)	8 (13.8%)	0.04*

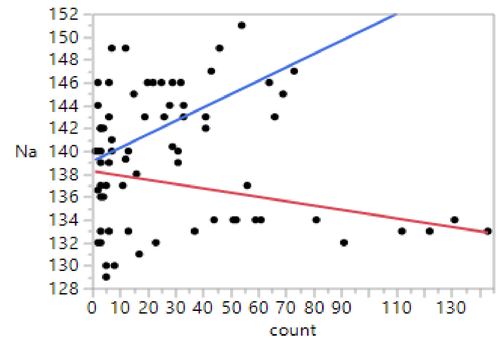
Demographics of matched cohorts



Impact of diagnosed inhalation injury on extubation outcomes

	Extubation Success	Extubation Failure	p-value
Heart Rate	100 ± 15	110 ± 18	0.0016*
MAP	82 ± 10	83 ± 12	0.27
Respiratory Rate	18.1 ± 5	19.6 ± 5	0.08
FiO2	0.38 ± 0.06	0.38 ± 0.08	0.4
PEEP	7 ± 2	7.8 ± 2.3	0.11
pH	7.42 ± 0.04	7.39 ± 0.04	0.04*
PaO2	114 (98-130)	97.5 (86-124)	0.11
PaCO2	41 ± 3.7	41 ± 6.9	0.53
GCS	10 ± 2.5	9 ± 2.2	0.76
Hourly Urine Output	83 (47-137)	80 (48-130)	0.99
Hemoglobin	9 ± 1.5	9 ± 2	0.49
Serum Sodium	140 ± 5	137 ± 5.5	0.85

Clinical parameters



ANCOVA analysis – Na trending higher before extubation was associated with more successes

Conclusions

- Classic extubation criteria do not accurately predict extubation outcome in burn patients
- A constellation of the parameters in this study should be examined prospectively.

Acknowledgements

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References

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