

Acute Burn Treatment and Mechanical Ventilation

¹ Plastic Surgery Burn Center, Johns Hopkins University School of Medicine, Baltimore, MD, USA;

Introduction

Mechanical ventilation (MV) is a "necessary evil" during the acute treatment of patients with extensive burns and/or inhalation injury. Once MV is initiated, minimizing its length is a priority.

Objectives

Our aim was to explore mechanical ventilation during the acute burn treatment and factors associated with a successful extubation.

Materials and Methods

- A retrospective review was performed on all burn patients that required MV in a reference burn center from December 2015 to April 2018.
- Exclusion: Patients intubated after coding on the field and confirmed dead on 1st 24h
- First analysis:
 - Group 1 Patients successfully extubated or on trach collar
 - Group 2) Patients that required reintubation or died on MV
- Second analysis based on duration of MV, after excluding the patients that died under MV:
 - Group A, 3 or less days;
 - Group B, 4 or more days.
- A p \leq 0.05 was considered significant.

Conclusion

Lower expected mortality and age, and smaller %TBSA burned are associated with a successful extubation. Previous psychiatric illness may be associated with the need for re-intubation.

Eliana F R Duraes, MD, PhD; Eliza Slama, MD, MPH; Ashley Modica, MD; Mohammed Asif, MD; Julie Caffrey, DO; Charles S Hultman, MD

Results			
Table 1: First analysis	Group 1: Successfully extubated (n=68)	Group 2: Re-intubated or dead (n=29)	P value
Female	24 (35.3%)	9 (31%)	0.685
Drug use	26 (38%)	8 (27.6%)	0.314
MME/day	66.09±120.8	113.76±354.68	0.111
Age	48.42±18.66	59.15±21.38	<u>0.032</u>
LOS	40±64.3	38.62±77.34	0.416
Expected mortality	10%±16.11%	48.54±39.33	<u><0.001</u>
Days on Mechanical Ventilation	12.93±20.94	13.72±16.57	<u>0.048</u>
Tracheostomy	13 (19.1%)	7 (24.1%)	0.576
%TBSA	18.4±19.72	34.39±25.86	0.002
Carboxyhemoglobin	5.35±8.4	8.38±13.33	
Inhalation confirmed	25 (36.8%)		<u>0.767</u>
	23 (30.070)	16 (55.2%)	<u>0.093</u>
Smoking status	EO (72 E0/)	2E(9E20/)	0.277
No History of respiratory disease	50 (73.5%)	25 (86.2%)	0.371
Surgeries on the first admission	3.3±5.4	3.66±9.36	0.946
Hour Albumin was started	7.23±4.24	6.69±3.83	0.801
	329.84±619.86	899.45±1199.65	<u>0.016</u>
Urine	1543±1216.56	1004.86±680.1	<u>0.010</u>
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient	1543±1216.56 5383.87±7651 Is that died on MV, a sub-analysis	1004.86±680.1 10345.72±10053.28 of the group that required re-int	<u>0.010</u> <u>0.006</u> tubation
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh	1543±1216.56 5383.87±7651 Is that died on MV, a sub-analysis howed an increased rate of psychi 01.	1004.86±680.1 10345.72±10053.28 of the group that required re-int atric illness among the group red	<u>0.010</u> <u>0.006</u> tubation
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40)	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redThe group redFour or more days on MV (n=38)	<u>0.010</u> <u>0.006</u> tubation
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis	1543±1216.56 5383.87±7651 Is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redatric illness among the group redFour or more days on MV (n=38) Group B	0.010 0.006 tubation quiring re- P value
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis	1543±1216.56 5383.87±7651 as that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%)	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redatric illness among the group redFour or more days on MV (n=38) Group B12 (31.6%)	0.010 0.006 tubation quiring re-
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Drug use	1543±1216.56 5383.87±7651 Is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redatric illness among the group redFour or more days on MV (n=38) Group B	0.010 0.006 tubation quiring re- P value 0.583
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Temale Drug use Alcohol Intoxication when burned	1543±1216.565383.87±7651as that died on MV, a sub-analysisnowed an increased rate of psychi01.Three or less days on MV (n=40)Group A15 (37.5%)15 (37.5%)	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redFour or more days on MV (n=38)Group B12 (31.6%)15 (39.5%)	0.010 0.006 tubation quiring re- P value 0.583 0.858
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History	1543±1216.56 5383.87±7651 as that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%)	1004.86±680.110345.72±10053.28of the group that required re-intatric illness among the group redatric illness among the group redFour or more days on MV (n=38) Group B12 (31.6%)15 (39.5%)9 (23.7%)	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.858
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Fable 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%)	1004.86±680.1 10345.72±10053.28 of the group that required re-integroup reduced atric illness among the group reduced Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%)	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.198 0.377
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day Age	1543±1216.56 5383.87±7651 as that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.198 0.377 0.155
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Fable 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day Age .OS	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54	0.010 0.006 tubation quiring re- 0.583 0.858 0.858 0.198 0.377 0.155 0.029
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day Age .OS Expected mortality	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03	0.010 0.006 tubation quiring re- 0.583 0.858 0.858 0.198 0.377 0.155 0.029 <0.001
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day Age OS Expected mortality Tracheostomy &TBSA	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26%	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25	0.010 0.006 tubation quiring re- 0.583 0.583 0.858 0.198 0.198 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Temale Orug use Alcohol Intoxication when burned Psychiatric History MIME/day Age OS Expected mortality Tracheostomy 6TBSA Carboxyhemoglobin	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis iowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37 5.36±9.35	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25 16 (42.1%) 30.55±22.15 5.96±8.10	0.010 0.006 tubation quiring re- 0.583 0.583 0.858 0.198 0.198 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Fable 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MIME/day Age .OS Expected mortality Fracheostomy &TBSA Carboxyhemoglobin nhalation confirmed	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37	1004.86±680.1 10345.72±10053.28 of the group that required re-integration atric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25 16 (42.1%) 30.55±22.15	0.010 0.006 tubation quiring re- P value 0.583 0.583 0.858 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682 <0.001 0.682
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh ntubation: 18 (26.5%) vs 7 (70%), p<0.00 Fable 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MME/day Age .OS Expected mortality Fracheostomy %TBSA Carboxyhemoglobin nhalation confirmed Smoking status	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis iowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37 5.36±9.35 14 (35%)	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25 16 (42.1%) 30.55±22.15 5.96±8.10 17 (44.7%)	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682 <0.001 0.682
Jrine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Fable 2: Second Analysis Female Orug use Alcohol Intoxication when burned Psychiatric History MIME/day Age .OS Expected mortality Fracheostomy %TBSA Carboxyhemoglobin nhalation confirmed Smoking status No History of respiratory disease	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37 5.36±9.35 14 (35%) 27 (67.5%)	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25 16 (42.1%) 30.55±22.15 5.96±8.10 17 (44.7%) 31 (81.6%)	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.858 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682 <0.001 0.314 0.314 0.380 0.377 0.577 0.607
Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 <u>Fable 2</u> : Second Analysis Female Drug use Alcohol Intoxication when burned Psychiatric History MME/day Age LOS Expected mortality Tracheostomy %TBSA Carboxyhemoglobin Inhalation confirmed Smoking status No History of respiratory disease Surgeries on the first admission	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37 5.36±9.35 14 (35%) 27 (67.5%) 0.67±2.03	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	0.010 0.006 tubation quiring re- P value 0.583 0.858 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682 <0.001 0.314 0.314 0.380 0.314 0.380
Albumin vol 1 st 24h Urine Crystalloids vol 1 st 24h After exclusion of the 19 (19.5%) patient (n=10) and the successfully extubated sh intubation: 18 (26.5%) vs 7 (70%), p<0.00 Table 2: Second Analysis Female Drug use Alcohol Intoxication when burned Psychiatric History MME/day Age LOS Expected mortality Tracheostomy %TBSA Carboxyhemoglobin Inhalation confirmed Smoking status No History of respiratory disease Surgeries on the first admission Albumin volume on the 1 st 24h Crystalloids volume on the 1 st 24h	1543±1216.56 5383.87±7651 is that died on MV, a sub-analysis nowed an increased rate of psychi 01. Three or less days on MV (n=40) Group A 15 (37.5%) 15 (37.5%) 5 (12.5%) 11 (27.5%) 71.87±151.11 53.23±18.21 10.6±15.88 10.39% ±16.26% 1 (2.5%) 7.68±8.37 5.36±9.35 14 (35%) 27 (67.5%)	1004.86±680.1 10345.72±10053.28 of the group that required re-intatric illness among the group red Four or more days on MV (n=38) Group B 12 (31.6%) 15 (39.5%) 9 (23.7%) 14 (36.8%) 109.68±300.96 43.9±17.54 73.89±75.03 10.13±15.25 16 (42.1%) 30.55±22.15 5.96±8.10 17 (44.7%) 31 (81.6%)	0.010 0.006 tubation quiring re- 0.583 0.583 0.858 0.198 0.377 0.155 0.029 <0.001 0.682 <0.001 0.682 <0.001 0.682 <0.001 0.314 0.314 0.380 0.777 0.607

