Vol 01
Issue 01

28-03-2020

Critical Rounds

Dear Doctor,

Greetings from Micro Labs limited.

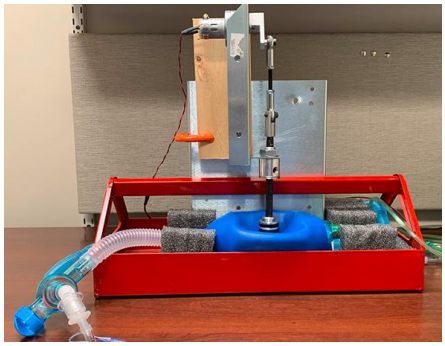
Inside This Issue

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Ltd

Mechanical Ventilator that is Simpler & Inexpensive



Despite the rise in COVID-19 infections in the United States, one of the greatest issues for patients who have serious viral pneumonia is the possible lack of ventilators. A University of Minnesota team has developed a mechanical ventilator that is inexpensive and constructed of components that are easy to acquire.

The Coventor does not need pressurized air, as opposed to conventional ventilators. The system consists of a frame and mechanical actuator which compresses a conventional outpatient ventilation bag (aka Ambu bag or bag valve mask), which is attached to the endotracheal tube of the patient and is used to pump either external compressed oxygen or ambient air.

The finished unit is about the size of a cereal box, and the frame itself can be painted in aluminium, drawn in 3D, or made using adapted consumer products. Ventilators made by the development team are currently shipping from Minneapolis, Minnesota.

The system was first developed and invented by Dr. Steve Richardson, a University of Minnesota anaesthesiology fellow. It is a product of the University's cooperation with local engineering, telecommunications, and medical technology industries. The engineering department, with the partnership, is encouraging them to purchase components and build thousands of ventilators each week to get going.

Additional hepatitis B vaccination for long-term protection in healthcare workers

INTRODUCTION

Vaccination against HBV (hepatitis B virus) is prescribed in the first year of life to avoid infection. Observational findings have shown that over 30 years, vaccination at birth gives immunity to 90 percent of the population. There is a shortage of evidence on reaction to booster doses and long term antibody levels.

METHODS:

A comparison of HBV antibody rates of healthcare students who were immunized for HBV with a primary series during their first year of life (primary) to those students who were immunized with a primary series and obtained an additional dose at age 18 years(boosted). Antibody titres ≥10 mIU/mL were considered adequate. Those that were inadequate received another dose and were reassessed.

RESULTS:

Of the 381 students, 80% were primary and 20% boosted. A significantly higher percentage of students in the boosted group had antibody titre levels ≥10 mIU/mL compared to primary group (88% vs. 41%, $p < .001$).

Parameter	Boosted at age 17–18, $N = 76$	Not boosted since primary series at birth, $N = 305$	p Value	Odds ratio
Mean age (SD), years	22.5 (1.5)	21.7 (1.6)	.17	
Female, *n* (%)	57 (75%)	248 (81.3%)	.26	1.45 (0.8–2.6)
Jewish, *n* (%)	61 (80.3%)	192 (63%)	.004	0.41 (0.22–0.76)
Arab, *n* (%)	15 (19.7%)	113 (37%)	.004	2.39 (1.29–4.4)
Study major, *n* (%)				
Medicine	37 (48.7%)	136 (44.6%)	.52	1.17 (0.71–1.95)
Nursing	18 (23.7%)	92 (30.2%)	.33	0.71 (0.4–1.28)
Other[a]	21 (27.6%)	77 (25.2%)	.78	1.13 (0.64–1.98)
Chronic illness[b], *n* (%)	2 (2.6%)	10 (3.3%)	.55	0.79 (0.17–3.71)
Baseline titre levels ≥10 mIU/mL, *n* (%)	67 (88.1%)	126 (41.3%)	<.001	10.5 (5–22)

[a]Pharmacy, physical therapy, paramedic academic training programme.
[b]Chronic illness included Crohn's disease, rheumatoid arthritis, diabetes mellitus, post-splenectomy and familial Mediterranean fever.

Comparison between the demographic characteristics of students who were vaccinated with HBV primary series only and students who received a booster dose at 17–18 years.

Of 179 students in the primary group with inadequate antibody levels, 134 received a booster dose and 126 of them (94%) developed anti-HBs levels ≥10 mIU/mL. Of 9 students with inadequate levels in the boosted group, 8 received another booster dose and all developed adequate levels.

Parameter	Protective baseline levels (≥10 mIU/mL)	Unprotective baseline levels (<10 mIU/mL)	*p* Value	Odds ratio
N	126 (41.3%)	179 (58.7%)		
Mean age (SD), years	21.9 (SD)	21.6 (SD)	.21	
Female, *n* (%)	100 (79.4%)	148 (82.7%)	.55	1.24 (0.69–2.21)
Jewish, *n* (%)	89 (70.6%)	103 (57.5%)	.02	0.56 (0.34–0.91)
Arab, *n* (%)	37 (29.4%)	76 (42.5%)	.02	1.77 (1.09–2.88)
Study major, *n* (%)				
Medicine	62 (49.2%)	74 (41.3%)	.21	1.37 (0.86–2.17)
Nursing	36 (28.6%)	56 (31.3%)	.7	0.87 (0.53–1.44)
Other[a]	28 (22%)	49 (27.3%)	.37	0.75 (0.44–1.29)
Chronic illness[b], *n* (%)	5 (4%)	5 (2.8%)	.39	1.43 (0.4–5.07)

Demographic characteristics of students who were vaccinated with HBV primary series only: comparison by HBV titre protective levels.

Parameter	Protective baseline levels (≥10 mIU/mL)	Unprotective baseline levels (<10 mIU/mL)	*p* value	Odds ratio
N	67 (88%)	9 (11.8%)		
Mean age (SD), years	22.5 (SD)	22.4 (SD)	.88	
Female, *n* (%)	52 (91.2%)	5 (8.8%)	.21	0.36 (0.86–1.51)
Jewish, *n* (%)	56 (83.6%)	5 (55.6%)	.06	0.24 (0.05–1.06)
Arab, *n* (%)	11 (16.4%)	4 (44.4%)	.06	4.07 (0.94–17.62)
Study major, *n* (%)				
Medicine	33 (49.3%)	4 (44.4%)	.67	2.06 (0.37–9.97)
Nursing	15 (22.4%)	3 (33.3%)	.68	1.73 (0.38–7.77)
Other[a]	19 (28.3%)	2 (22.2%)	1	0.72 (0.16–3.31)
Chronic illness[b], *n* (%)	2 (3%)	0 (0%)	1	

Demographic characteristics of students who were vaccinated with HBV primary series only and received a booster dose at 17–18 years: comparison by HBV titre protective levels.

CONCLUSIONS:

Primary HBV vaccination at birth does not automatically have sufficient amounts of antibody for a lifetime duration. 18-year boosting enhances antibody rates for at least four more years. Recent recommendations require that all professional staff be screened and encouraged. This research shows that it might be wise to apply this approach to all individuals at higher risk

REFERENCES

1. Hess L, Riesenberga K, Rolston KVI, et al. Administering an additional hepatitis B vaccination dose after 18 years maintains adequate long-term protection levels in healthcare workers. Infectious Diseases 2020; 0(0):1-6
2. WHO. Hepatitis B [Internet]; 2019. [cited 2020 Jan 3]. Available from: https://www.who.int/en/news-room/factsheets/ detail/hepatitis-b
3. Lavanchy D. Viral hepatitis: global goals for vaccination. J Clin Virol. 2012;55(4):296–302.
4. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394–424.

Convalescent Plasma in the treatment of critically ill patients with COVID-19

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a pandemic that involves no unique therapeutic agents and high mortality. Hunting for alternative therapies is important. The goal of this research is to establish if convalescent plasma transfusion can be helpful in treating critically ill patients with extreme coronavirus 2 (SARS-CoV-2) acute respiratory syndrome infection.

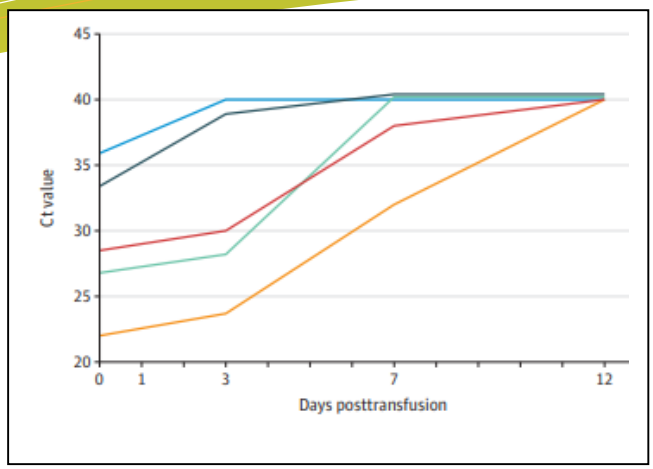
DESIGN, SETTING, AND PARTICIPANTS

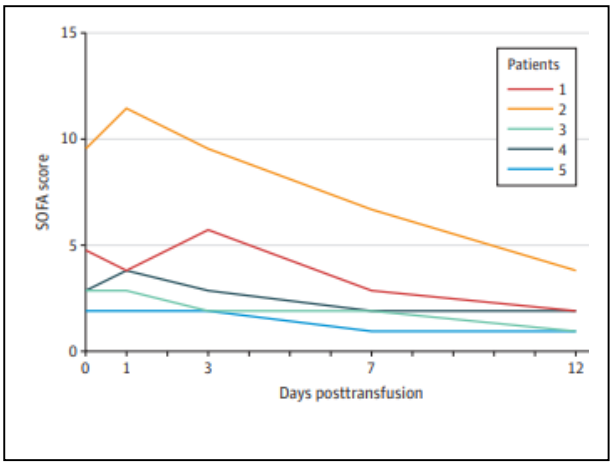
Case series of 5 seriously sick patients with laboratory-confirmed COVID-19 and acute respiratory distress syndrome (ARDS), who followed the following criteria: severe pneumonia and continuously high viral load despite antiviral treatment; PAO2/FIO2<300; and mechanical ventilation. Both 5 were treated with the transfusion of convalescent plasma. The research was performed from January 20, 2020 to March 25, 2020 at Infectious Disease Clinic, Shenzhen Third People's Hospital in Shenzhen, China; the final follow-up date was March 25, 2020. Clinical tests were measured before and after transfusion of convalescent plasma.

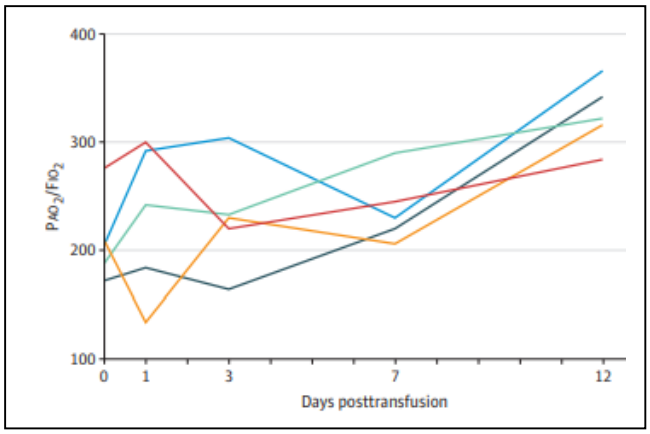
Patients received SARS-CoV-2-specific antibody (IgG) binding titer greater than 1:1000 (end-point dilution titer, enzyme-linked immunosorbent assay [ELISA]) transfusion and a titer of neutralization greater than 40 (end-point dilution titer) collected from 5 patients retrieved from COVID-19. Convalescent plasma was administered between 10 and 22 days after admission.

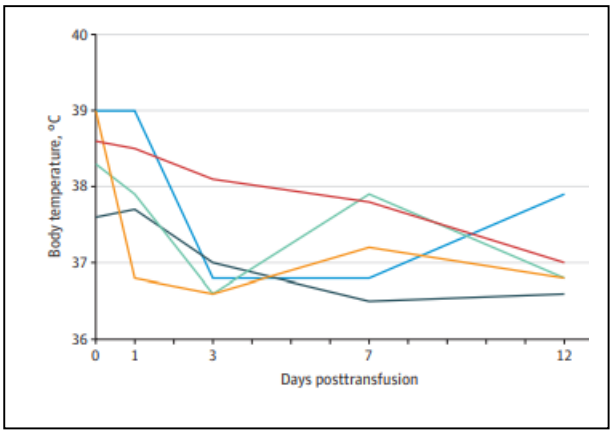
RESULTS

At the time of diagnosis all 5 patients (age span, 36-65 years; 2 women) underwent mechanical ventilation and all had antiviral agents and methylprednisolone. After plasma transfusion, body temperature stabilized in 4 out of 5 patients within 3 days, the SOFA score decreased, and PAO2/FIO2 improved within 12 days (range, 172-276 before and 284-366 after). Viral loads decreased and were negative within 12 days of transfusion, and after transfusion, SARS-CoV-2-specific ELISA and neutralizing antibody titers increased (range, 40-60 before and 80-320 on day 7). By 12 days following transfusion, ARDS was treated in 4 patients and 3 patients were weaned from artificial ventilation within 2 weeks of diagnosis. Of the five cases, 3 were released from the hospital (stay length: 53, 51, and 55 days), and 2 were in good condition 37 days after transfusion.









CONCLUSIONS

The administration of convalescent serum containing neutralizing antibody was accompanied by progress in the health state of the patients in this tentative unregulated case sequence of 5 seriously ill patients with COVID-19 and ARDS. The small sample size and research design preclude a conclusive conclusion regarding this treatment's future efficacy, and such findings need review in clinical trials.

These preliminary findings raise the possibility that convalescent plasma transfusion may be helpful in the treatment of critically ill patients with COVID-19 and ARDS, but this approach requires evaluation in randomized clinical trials.

REFERENCES

1. Shen C, Wang Z, Zhao F, et al. Treatment of 5 Critically Ill Patients with COVID-19 With Convalescent Plasma JAMA 2020. Published online March 27, 2020.
2. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506.
3. WHO. Novel coronavirus (COVID-19) situation. Updated March 24, 2020. https://experience.arcgis.com/experience/ 685d0ace521648f8a5beeeee1b9125cd