Letters to Editor

Mapleson D continuous positive airway pressure system for weaning of mechanical ventilation in pediatric patients

Sir,

We read with great interest the original article written by Palomero-Rodriguez et al.[1] published in the latest issue of your journal. At first, we would like to commend the authors for their endeavor; however, at the same time, we would like to make the following comments, explanation to which is expected to benefit the general readers of the journal.

The abstract mentioned that “The primary goal of that study was to assess the usefulness of the ‘Mapleson D continuous positive airway pressure (CPAP) system’ for weaning of mechanical ventilation (MV) in infants who received MV over 24 h” and that “All infants who received MV for more than 24 h in the last year were enrolled in the study.” However, the main text stated that “All infants and children who received prolonged MV for more than 72 h during 4 years and … were eligible for the study.” Again, in the subsequent paragraphs, they stated that “Patients were classified into two groups according to the length of MV: Patients with acute respiratory failure with MV for more than 48 h (MV >48 h) and patients with MV fewer than 48 h (MV <48 h).” Further, they mentioned in the inclusion criteria that “Patients were enrolled if they met the following criteria: (a) Full-term infants to 16 years of age ,…” but the results revealed that the children’s age ranged between 1 and 59 months only.

The authors concluded by stating that “The Mapleson D CPAP system, in our opinion, is a useful and safe alternative to more complex and expensive noninvasive CPAP and bi-level positive airway pressure (BiPAP) weaning from MV in infants.” It is not clear how the authors came to such a conclusion as they have not compared any other CPAP/ BiPAP delivery system in the present study. This is of special importance as the current study revealed a much higher extubation failure rate (26%) as compared to earlier studies on spontaneous breathing trial.[2,3]

Table 1 depicts that the mean respiratory rate, heart rate, oxygen saturation (SpO₂), systolic blood pressure (SBP), and diastolic blood pressure (DBP) at baseline CMV (Continuous mandatory ventilation) and 2 h post-NT CPAP and 2 h postextubation did not differ significantly. However, if we compare the mean SpO₂, SBP, and DBP at baseline CMV with 2 h postextubation, they are found to be statistically significant (P = 0.01, 0.00, and 0.00, respectively).

The mean age of the children is stated to be 34 ± 45 months. Therefore, the mean ± 2 standard deviation for age becomes -56 to 124 months, but age cannot be a negative value! A similar type of data is also found in Table 2 (time Nasopharyngeal (NT) spontaneous ventilation, time Nasotracheal (NF) spontaneous ventilation, time MV). The reason seems to be that the aforementioned data do not have normal distribution (with the presence of outliers) in the given population. In such a case, it would have been better if authors presented these data in median ± interquartile range format. The numbers presented in the MV >48 h and <48 h category in both the extubation failure and extubation success groups also seem to be incorrect.

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Conflicts of interest
There are no conflicts of interest.

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Table 1: Respiratory rate, heart rate, oxygen saturation, systolic blood pressure and diastolic blood pressure during the study

|                          | Baseline CMV | 2 h post-NT CPAP | 2 h post-extubation | P     |
|--------------------------|--------------|------------------|--------------------|-------|
| RR (bpm)                 | 34±16        | 41±8             | 38±18              | 0.09  |
| HR (bpm)                 | 145±31       | 147±9            | 142±12             | 0.12  |
| SpO₂ (%)                 | 96±6         | 92±12            | 91±13              | 0.13  |
| SBP (mmHg)               | 84±9         | 89±12            | 79±7               | 0.08  |
| DBP (mmHg)               | 58±9         | 61±5             | 53±9               | 0.09  |

MV: Mechanical ventilation, RR: Respiratory rate, HR: Heart rate, SpO₂: Oxygen saturation, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, CMV: Continuous mandatory ventilation, CPAP: Continuous positive airway pressure, NT: Nasotracheal

Table 2: Characteristics between extubation failure group and extubation success group

|                          | Extubation failure (n=13) | Extubation success (n=37) | P     |
|--------------------------|--------------------------|--------------------------|-------|
| Age (months)             | 15.17±14.3               | 41.18±51.64              | 0.004 |
| Weight (kg)              | 8.57±5.61                | 13.13±10.21              | 0.048 |
| MV >48 h/MV <48 h        | 19/2                     | 13/12                    | -     |
| Time NT spontaneous ventilation (h) | 13.09±14   | 45.12±58.30             | 0.36  |
| Time NF spontaneous ventilation (h) | 3.09±7.55    | 13.24±18.64             | 0.29  |
| Time MV (days)           | 8±3.9                    | 12±8.4                   | 0.006 |

MV: Mechanical ventilation, NF: Nasopharyngeal, NT: Nasotracheal

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In response

Sir,

We are writing in response to the letter from Dr. Mandal et al. regarding our article entitled "Mapleson D continuous positive airway pressure (CPAP) system for weaning of mechanical ventilation (MV) in pediatric patients." We would also like to thank Dr. Mandal et al. for their kind remarks about our article and offer you the following responses. First of all, regarding first point of their letter, we would like to clarify that all infants and children who received prolonged MV for more than 24 h during a period of 4 years were enrolled in this retrospective observational study. Extubation failure rates range from 2% to 22%[2,3] and bear little relationship to duration of MV. We agree that our study showed a higher extubation failure (26%). Patients undergoing major surgery and general anesthesia with muscle relaxation/paralysis have an elevated incidence of intraoperative pulmonary collapse which is associated with worsening intraoperative gas exchange and in some cases, the need for prolonged postoperative respiratory support.[4]

We think that our results could be due in part to the characteristics of the study population included in this research, incorporating surgical patients. We would like to clarify that this is a retrospective observational study and the purpose of this research is to show a useful and simple alternative to more complex and expensive CPAP/bilevel positive airway pressure (BiPAP) systems for weaning of MV in children. We agree with Dr. Mandal et al. that it would be interesting to compare the Mapleson D CPAP system with other CPAP/BiPAP devices in a similar situation. Adult studies show that T-piece or pressure support trials for extubation readiness test have been equally effective;[5] hence, we think further high-quality studies compared this device would be necessary.

We have to highlight that this is a retrospective observational study, and the heterogeneity of results might be related with the different clinical characteristics of the patients, different major surgical pathologies enrolled, and with limited and heterogeneous data recorded. We agree that due to the abnormal distribution of the data we should have presented these in median ± interquartile range. Indeed, the results from Table 3 regarding MV are incorrect and they should be 9/4 instead of 19/22 and 23/4 instead of 13/12. To sum up, we thank the authors about their highlight regarding differences observed comparing mean SpO₂, systolic blood pressure, and diastolic blood pressure at baseline continuous mandatory ventilation (CMV) and 2 h postextubation. This appreciation is interesting and could be due to different sedation level of the patients enrolled in the study in different phases and related to the discomfort of the patients during CMV phase.

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