Author's response to reviews

Title: A case of acute COPD exacerbation complicated by overlap syndrome in which the use of a Respironics V60 Ventilator in average volume-assured pressure support mode was useful in correcting sleep-related hypoventilation: a case report

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Version: 3 Date: 2 March 2012

Author's response to reviews: see over
Dear The Journal of medical case reports Editorial Team

Thank you for your reviewing our manuscript “A case of acute COPD exacerbation complicated by overlap syndrome in which the use of a Respironics V60 Ventilator in average volume-assured pressure support mode was useful in correcting sleep-related hypoventilation: a case report”.

We would answer the reviewers’ comments as following.

Reviewer: Dimitrios Lagonidis

page 3 ABSTRACT case presentation.
In my opinion the sentence "A ventilator allowing...." does not make any sense. It would be preferrable to change it in "The Respironics V60 Ventilator (Philips Respironics) in the AVAPS mode was attached to the patient and resulted in improving and stabilizing the sleep-related hypoventilation by automatically adjusting inspiratory force to within an acceptable range.

We agree with your comment.
We rewrote it according to your comment.

page 4 ABSTRACT conclusion
You should rewrite the first sentence. Your case report is reffered to the management of a patient with acute exacerbation of COPD (not of heart failure or chronic respiratory failure in general). The main point that you should stress is the correction of the SDB and its consequences(hypoxemia, hypoventilation ans obstructed apneas/ hypopneas in this particular patient by using the AVAPS mode

We agree your comment.
We rewrote “In conclusion, in cases such as the present, in which patients with severe acute respiratory failure requiring full-time NPPV therapy also show SDB, different ventilator settings must be used for waking and sleeping. On such occasions, the Respironics V60 Ventilator, which is equipped with an AVAPS mode, may be useful
in improving gas exchange and may achieve good patient compliance, because that mode allows ventilation to be maintained by automatically adjusting inspiratory force to within an acceptable range whenever ventilation falls below target levels.

2nd line What is the stage of COPD according to GOLD classification? Any spirometric values at stable condition??

Because his condition of a patient was too poor, we were not able to perform a respiratory function test.

page 6 Case presentation
-1st line What are pO2, pH and HCO3 values?
The results were as follows: pH 7.292 PaO2 118.8 mmHg PaCO2 81.5 mmHg HCO3- 38.2 mmol/L (O2 3 L/min)
- 10th line How do you explain the patient's long stay at hospital (32 days). It would be better to put your explanation in the DISCUSSION
Because we became the difficulty in walking by muscle weakness by an extreme lean person and the long-term lying in bed, we needed long-term rehabilitation in the hospital.

- Do you have any data regarding the probable nocturnal hypoventilation (blood gases just before and after sleep or TcCO2 recordings) when he was in stable condition after the first episode of acute exacerbation ?
We have only the results of the PSG.

-12th line. What are the arterial blood gases just after the second episode of exacerbation??
The results were as followed: PH 7.189 PO2 108.1 PCO2 136.4 HCO3- 38.2

- line 17th How do you explain the slow response of the patient to the AVAPS mode in terms of gas exchange ?? Was it a matter of the resolution of hypoxemia or hypercapnia? Please, put your explanation in the DISCUSSION
We described an error. We correct “after 3 days on the V60 ventilator” with “after 1 day on the V60 ventilator”

- In my opinion you should make it clearer when exactly do you perform the PSG. It would be preferable to put a few words about the results of the PSG
The PSG was performed after second episode of acute exacerbation.
The results of the PSG were as follows: Sleep efficiency 75.5%, Apnea hypopnea index 14.0/h, Apnea index 2.7/h, Hypopnea index 11.3/h, Mean nocturnal SpO2 94%, Minimum SpO2 87%, SpO2<90% time(min) 15.0% with NPPV ( ST mide IPAP 8cmH2O ,EPAP 4cmH2O, R-R 14/min, O2 1.5L/min)

Page 8 2nd line DISCUSSION please add “9 patients with stable chronic hypercapnic COPD”
We rewrote “9 patients with stable chronic hypercapnic COPD”

Page 8 8th line DISCUSSION “in good patient compliance” Did you record any subjective indices, like dyspnea scale, comfort etc??

We add “His British Medical Research Council scale decreased to 4 from 5.”

Page 8 12th line DISCUSSION It would be advisable
- to further clarify that the sleep disordered breathing found in COPD patients are the hypoventilation, hypoxemia and the obstructed apneas/hypopneas
- to write a few lines about the pathophysiologic mechanisms of sleep disordered breathing (hypoventilation, hypoxemia, apneas/hypopneas) in COPD
Hypoventilation : decreased CO2 responsiveness…greater in REM sleep…significant decrease in Vt …no change in Resp rate and FRC
Hypoxemia : alveolar hypoventilation…V/Q abnormalities…decrease FRC…increased resistance in upper airways

We agree your comment.
We added “Various mechanisms are thought to contribute to the nocturnal hypoxemia that occurs with COPD. First, COPD patients are exposed to hypoxemia while awake. Because this results in lower chemoresponsiveness of the respiratory center, nocturnal hypoxia or hypercarbia occur more readily. Second, muscular hypotonia of the skeletal muscles, including the respiratory muscles, occurs during sleep, particularly during rapid eye movement (REM) sleep. Respiration in COPD patients is highly dependent on the accessory muscles of inspiration as opposed to the diaphragm, and this hypotonia during REM thus results in worsening of sleep-related alveolar hypoventilation. This, combined with various factors such as decreased functional residual capacity, increases upper airway resistance, and exacerbates ventilation-perfusion mismatch, resulting in profound hypoxemia, particularly during REM sleep.

Page 8 12th line DISCUSSION
Please add the word hypoventilation “…without taking hypoventilation and obstructed sleep apnea syndrome into consideration…”

We add “hypoventilation and…”.

Page 10 CONCLUSION
- You should rewrite the first sentence. Your case report is referred to the management of a patient with acute exacerbation of COPD (not of heart failure or chronic respiratory failure in general). The main point that you should stress is the correction of the SDB and its consequences (hypoxemia, hypoventilation and obstructed apneas/hypopneas in this particular patient by using the AVAPS mode)

- In the second sentence it would be advisable to write “on such occasions… may be useful in improving gas exchange and may achieve good compliance….

We agree with your comment.

We rewrote” On such occasions, the Respironics V60 Ventilator, which is equipped with an AVAPS mode, may be useful in improving gas exchange and may achieve good patient compliance, because that mode allows ventilation to be maintained by automatically adjusting inspiratory force to within an acceptable range whenever ventilation falls below target levels.”

Reviewer: Georgios Kouliatsis
The efficacy and safety of Average Volume-Assured Pressure Support (AVAPS) for the treatment of COPD exacerbations has not been thoroughly tested and a case report describing the successful application of this novel therapy in a patient with severe COPD exacerbation seems worth publishing. In my opinion, the authors put too much emphasis on the comparison of the two ventilation modes. The two models cannot be compared in terms of mean tidal volume when applied in two different episodes of COPD exacerbation. The comparison would seem justified if the application of NIPPV mode and AVAPS were used for the same
clinical scenario and specifically if AVAPS was applied after a NIPPV trial. The authors might also want to comment on the fact that the target volume in AVAPS settings were well below the mean tidal volume during sleep with NIPPV.

We agree that the two models cannot be compared in terms of mean tidal volume when applied in two different episodes of COPD exacerbation. The limitation of this manuscript is that the treatment of COPD exacerbation in the first episode was not under Respironics V60, so we could not use AVAPS mode. At the second episode, we got Respironics V60 in our hospital, so we could use AVAPS mode in the treatment.

Thank you for your comments and queries regarding this manuscript. We would like to respectfully resubmit it for your consideration and hopeful acceptance. Please let me know if you have any problems or questions in the meantime.

Sincerely,

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