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LETTERS TO THE EDITOR

And the Doctor Answers: "Dream, Dream, I Will Be the Guardian of Your Breathing…"

Claudio Rabec, MD[1]; Jésus Gonzalez-Bermejo, MD[2]; Christophe Perrin, MD, PhD[3]; Bruno Langevin, MD[4]; Jean-Louis Pepin, MD, PhD[5]; Daniel Rodenstein, MD, PhD[6]; Jean Paul Janssens, MD, PhD[7]; on behalf of the SomnoNIV group

[1]Service de Pneumologie et Soins Intensifs Respiratoires, Centre Hospitalier et Universitaire de Dijon, Dijon, France; [2]Service de Pneumologie et Réanimation Respiratoire, Hôpital de la Pitié-Salpêtrière, Paris, France; [3]Service de Pneumologie, Centre Hospitalier Cannes, Cannes, France; [4]Service de Réanimation Médicale, Centre Hospitalier Alès, Alès, France; [5]Pole Rééducation et Physiologie et Laboratoire HP2, Université Joseph Fourier, Grenoble, France; [6]Service de Pneumologie, Cliniques Universitaires Saint Luc, Université, Catholique de Louvain, Bruxelles, Belgium ; [7]Service de Pneumologie, Hôpitaux Universitaires de Genève, Geneva, Switzerland

In a paper published in a recent issue of *Journal of Clinical Sleep Medicine*, Vrijsen et al.[1] presented their PSG-guided "night after night" approach to titrate NIV in an ALS population requiring home long term ventilation. In the same issue, Fanfulla and Carratu[2] suggest to "spread worldwide" this titration process as the reference pathway to initiate NIV in ALS patients.

Optimization of NIV is crucial and has been related to hard outcomes including survival.[3–6] However, the optimal titration method for long-term ventilated patients is still debated. Hence, the methods used to assess NIV efficacy may vary greatly, ranging from awake blood gas measurements to a sequence of full polysomnographic studies (PSG).

AASM "best clinical practice" recommendations regarding NIV initiation and titration in chronic respiratory failure support the systematic use of PSG or ventilatory polygraphy (PG).[7] However, the feasibility, the level of expertise required and the associated high costs make this recommendation difficult to implement in practice.[8,9] There has been an exponential growth in the number of NIV-treated patients in recent years and, therefore, performing systematically polysomnography both for initiation and eventually for re-titrating during follow-up is unrealistic.

A review series published by our working group focalized on the optimal methodology for evaluating NIV efficacy during sleep by using different tools of different complexity, costs and needs for expertise.[10–12] We proposed a step by step algorithm (**Figure 1**) for NIV titration and monitoring, starting with a basic screening (overnight SpO_2, daytime ABG and/or nocturnal $tcPCO_2$). In this algorithm, we emphasized the interest of using built-in monitoring (BIM) devices and software of modern home ventilators as a second step, before using PG/PSG. Recent studies have demonstrated their reliability and suggested their interest in clinical practice.[13–15] By providing an evaluation of ''critical signals'' involved in NIV effectiveness (i.e., arterial oxygen saturation, leaks, estimated minute ventilation and tidal volume) such systems provide very useful information for assessing quality of ventilation.[15] Some software systems allow a breath by breath evaluation of flow and pressure proposing raw signals close to those provided by PG/PSG. Moreover, as data obtained from the ventilators can be stored in a smart card and no additional sensors are needed, unattended home-based-monitoring is a true possibility and might be integrated in a tele-monitoring strategy. In a recent paper, Georges et al.[14] studying a group of stable OHS patients, evaluated the reliability of automatically calculated events provided by the software of one of these devices as compared with PSG. They found a very good correlation between the number of respiratory events given by the ventilator software and those obtained by simultaneous PSG

Putative physiological impacts of long-term ventilation include resting respiratory muscles, improving lung mechanics and resetting of ventilatory drive. Consequently, and as suggested by Vrijsen and others[16,17] in patients with chronic respiratory failure, several days are needed to achieve optimal NIV results. During this process, monitoring should theoretically be performed over several nights to adjust optimally NIV parameters.[11] In real life, achieving this by performing repeated PSG is practically impossible except in expert centers for highly selected populations or in case of failure to achieve appropriate NIV settings by using simple monitoring tools. Using the information provided by built-in NIV software on a night after night basis could represent an appropriate strategy to monitor quality of NIV and hence to optimize its efficacy.

The systematic use of a basic screening combined with data from ventilator software could allow NIV to be optimised, limiting the indication of PG/PSG to complex cases. Further studies, evaluating large populations and different devices are needed to confirm the place of these tools in adjusting NIV and evaluating its quality.

CITATION

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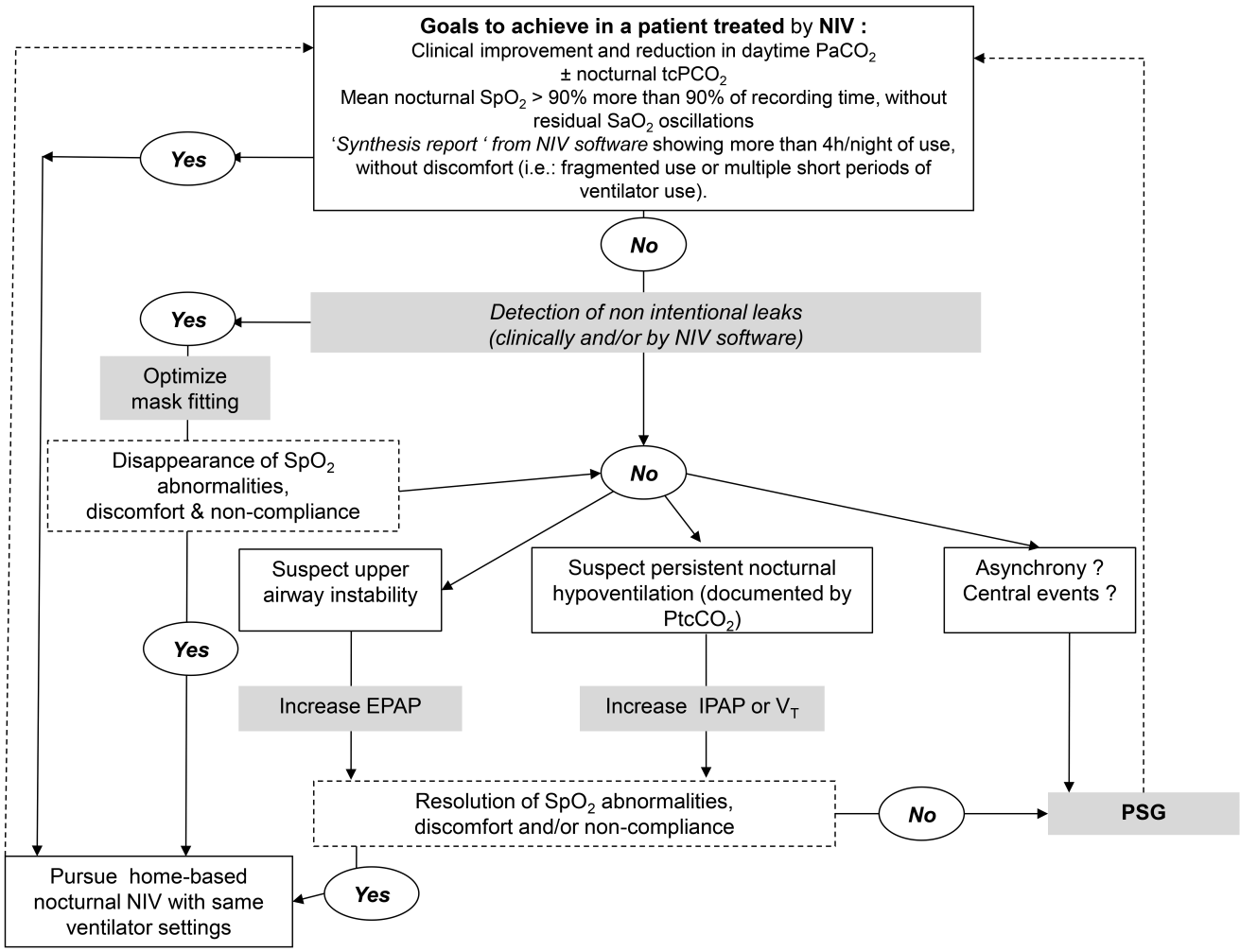
Figure 1—Suggested algorithm for titrating and monitoring non-invasive ventilation (NIV) during sleep.



IPAP, inspiratory positive airway pressure; $PaCO_2$, arterial carbon dioxide tension; $PtcCO_2$, transcutaneous pressure of carbon dioxide; SaO_2, arterial oxygen saturation; SpO_2, oxygen saturation measured by pulse oximetry; VT, tidal volume. Modified from Janssens et al.[11]

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Address correspondence to: Claudio Rabec, MD, Service de Pneumologie et Soins Intensifs Respiratoires, Centre Hospitalier Universitaire de Bourgogne, 14 rue Paul Gaffarel, 21079 Dijon, France; Tel : + 33 3 80 29 37 72; Fax : + 33 3 80 29 36 25; Email: claudio.rabec@chu-dijon.fr

DISCLOSURE STATEMENT

The authors have indicated no financial conflicts of interest.