observation periods. However, it is very difficult to interpret reduction in terms of work of breathing and regression of respiratory failure without corresponding radiologic improvement in pulmonary infiltrates [2]. When considering the ED setting and short (1 h) period of therapy, it is especially difficult understanding the observed differences in recovery from acute respiratory failure.

Although there was no difference in this study, a similar rate of NIV initiation and endotracheal intubation were observed between the two groups while in the ED. The authors do not elaborate on their hypothesis for this observation beyond having studied patients with less severe illness and early ED management for their acute hypoxemic respiratory failure. This is surprising because in the HOT-ER study, rates of mechanical ventilation at 24 h from admission were less when HFNC was used compared to standard oxygen therapy [3]. Moreover, despite not being a statistically significant difference, the HOT-ER study also showed a trend toward decreased incidence of ED intubations when using HFNC compared with standard oxygen therapy [3]. Their findings are in discordance with prior studies looking at HFNC use in heterogenous patient populations [4], and immunocompromised patient populations [5,6].

With respect to the similar ED length of stay observed in both groups, the authors suggest the use of HFNC does not significantly impact nurse workload in terms of monitoring or organization. However, they do not consider that the cost effectiveness of using HFNC compared to standard oxygen therapy may be only marginal or limited for clinical and practical extrapolations of their study.

Finally, we critique the authors' methodology in using a non-validated scale for grading subjective dyspnea. Instead of the 5-point Likert scale used in the study, the modified Borg dyspnea scale would have served similar purpose while being a validated and widely used scoring tool in the domains of emergency and pulmonary medicine [7].

In our opinion, faster recovery from respiratory failure with HFNC could be better defined not only in terms of oxygenation (especially in hypoxemic respiratory failure associated with pulmonary infiltrates/pneumonia), but also in terms of a cost/benefit analysis in the emergency department.

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Reply to Understanding the benefits of early high-flow nasal cannula for adults with acute hypoxemic respiratory failure in the ED

We answer with pleasure the authors' comments challenging the role of high-flow oxygen therapy in rapid improvement of signs of respiratory failure as compared to standard oxygen. In this before-after study including 102 patients with acute hypoxemic respiratory failure treated by standard oxygen in the first period and then by high-flow oxygen therapy, we found that 61% of patients receiving high-flow presented improved signs of respiratory failure within the first hour as compared to 15% with standard oxygen [1]. These were defined by a decreased respiratory rate and an alleviation of signs of respiratory fatigue.

Surprisingly, the authors highlighted the lack of parallel assessment of pulmonary infiltrate evolution. However, pulmonary infiltrates are commonly used as criteria of severity, i.e. in the definition of acute respiratory distress syndrome [2], rather than criteria of response to oxygenation strategies. The improvement of signs of respiratory distress observed in our study is in accordance with previous clinical and physiological studies showing significant decrease in respiratory rate and work of breathing under high-flow oxygen in patients with acute respiratory failure [3,4]. However, improved signs of respiratory failure under high-flow oxygen therapy were not followed by decreased escalation of ventilatory support as compared to standard oxygen. This is in line with findings of previous studies conducted in the ED. Indeed, we do not share the authors' interpretation of the HOT-ER study, in which no difference between high-flow oxygen and standard oxygen was observed in terms of intubation or intensive care unit admissions [5]. This could be explained by the subsequent application of noninvasive ventilation in 8% of patients in the HOT-ER study [5]. Noninvasive ventilation has previously shown efficacy and is strongly recommended [6] in patients with cardiogenic pulmonary edema or COPD exacerbation, who represented 40% of the population in the HOT-ER study [5]. In our study, these patients were excluded and only those with acute hypoxemic respiratory failure were included. Indeed, 48% of our population were admitted in intensive care unit, where they could receive high-flow oxygen therapy, which has been reported to improve outcomes, in terms of intubation and mortality, in this setting [3]. However, the superiority of high-flow over standard oxygen should be confirmed in future studies, the reasons being: first, the lower risk of intubation was observed only in severe hypoxemic patients in the FLORALI study comparing high-flow oxygen with noninvasive ventilation and standard oxygen [3] and second, a recent study including immunocompromised patients with acute respiratory failure showed no difference between high-flow oxygen and standard oxygen [7].

The present study, like previous studies, showed parallel to improving signs of respiratory failure under high-flow oxygen, and

improvement of feeling of dyspnea, which was assessed by a 5-point Likert scale. This scale is simple, easily reproducible, and describes the evolution of dyspnea and not the level of dyspnea as assessed with a Borg scale. This 5-point Likert scale has been used in previous studies assessing non-invasive oxygen support, including high-flow nasal cannula oxygen therapy, in similar settings of intensive care unit patients [3,8].

We also observed a trend toward lower ED length of stay in patients receiving high-flow oxygen as compared to standard oxygen. This finding suggests that ED organization and staff workload are not impacted by this new procedure. However, our study did not aim to assess the medico-economic impact of high-flow oxygen in the ED, but rather its potential clinical benefits in management of patients with acute hypoxemic respiratory failure.

Conflicts of interest

NM, JM and A-W T: none declared.

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The changing paradigm from subjectivity to objectivity in pupillary assessment during neurological examination

Pupillary assessment beside Glasgow coma scale (GCS) is an important part of neurological assessment because changes in the size, equality and reactivity of the pupils can provide vital diagnostic information in the critically ill and injured patient [1]. Pupil index (NPi) is being used as a sensitive measure of pupil reactivity and an early indicator of increasing intracranial pressure (ICP). Raised ICP may occur in patients with severe traumatic brain injury (TBI), aneurysmal subarachnoid hemorrhage, or intracerebral hemorrhage (ICH) and other acute neurological emergencies [2].

However assessment of pupillary size and reflex is subjective with high rate of inter-observer variability limiting the clinicians in taking critical treatment decision in time [3]. Moreover, ambient light conditions may affect the validity of visual assessment of pupil and increase the inter-observer disagreement. Clinical assessment of pupillary size & reflex is not possible in patients where eyelids cannot be retracted in raccoon eyes or where pupils cannot be visible like corneal opacity and hyphaema [3,4]. This is similar to subjective body temperature assessment before the revolution of objective assessment by thermometer.

The use of ocular ultrasonography for the evaluation of emergency patients has recently been described in the emergency medicine (EM) literature. Point of care ultrasound (POCUS) has been used to assess common acute ocular pathologies such as retinal detachment, lens dislocation, globe rupture and vascular lesion [5]. POCUS is simple, quick imaging tool to assess not only ocular pathology, but also act as window for intracranial pathology which provides bedside real time information [4].

Severe soft tissue damage or hyphaema may obstruct the visual access to the pupil, which makes direct papillary light reflex (PLR) observation difficult or impossible. Due to the importance of PLR evaluation, it seems prudent to consider other potential means of PLR assessment.

Point of care ultrasound assessed pupil in previous studies [3,4,6]. Limited literature suggest B-mode ultrasound is simple, rapid & objective method for quantitative assessment of pupillary function including PLR which may prove useful in where eyelid retraction is not possible or infrared pupillometry device is unavailable [1,5].

However literature regarding its use as an objective assessment tool during neurological examination has not been studied. POCUS guided objective assessment pupillary size and reflex may be used as an adjunct to neurological assessment and monitoring in critically ill or injured patients. Future studies are required validate this concept from subjectivity to objectivity.

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