Author response, v. 1

Reviewer(s)' Comments to Author:

Reviewer: 1

This is an interesting manuscript about the outcomes and cost on patients which received long time HFOT. 71 patients were included in this study.

However, there were two different groups of patients included in this article. Patients received HFOT for oxygenation or for humidification.

The main findings were:

For patients with HFOT goaled to improve oxygenation, they needed more oxygen flow. Patients in nHFOT groups received significantly higher oxygenation and higher flow. HFOT presented a positive effect on less hypercapnea. PaCO2 present a reduction of -0.51kPa [-1.44 to 0.1] (p=0.034) after nHFOT. However, the median survival of these patients was 3.6 months. By a subgroup analysis, the survival rate was determined by the diseases and the cost dependent on the necessity of higher oxygen flow.

In contrast, in the tHFOT group for humidification, number of admissions for exacerbation decreased by -1/year [-2 to 0] (p=0.015). 51 (72%) patients were discharged home and 20 (28%) in a post-acute re-enablement facility. Median survival following HFOT was 7.5 months. Monthly costs associated to home delivery in the tHFOT group: 296 euros [261 – 475]. The monthly cost was significantly lower in tHFOT group. (p<0.001).

The use of long-term HFOT allows discharge patients from acute care facilities at a reasonable cost to improve oxygenation or humidification. The cost is dependent on the oxygen flow which was determined by patients idesease. For nHFOT to improve oxygenation, the disease state determines the survival rate. However, for tHFOT to improve humidification, HFOT effectively decreases the readmission rate.

I suggest the authors to address on the outcomes on different groups and make some suggestions on considerations on applying HFOT on patients in each group.

Response to reviewer: We thank the reviewer for its kind comments. We have improved the discussion section and clarified for readers for which criteria we would consider using HFOT at home. The discussion now reads as follow:

Our use of HFOT depicts two distinct clinical situations: (1) patients with severe hypoxemia (2) tracheostomized patients. In the first group, we would suggest assessing the benefit of HFOT on symptoms and quality of life. In this group, the main challenge is to provide at home important volumes of oxygen and requires expert home healthcare provides. In the second group, we included patients with recurrent admission for severe admission and with secretion management issues. We would therefore suggest targeting re-admission rate in further studies. In that group, technical challenges are limited.

Reviewer: 2

Comments to the Author

The authors conducted a retrospective single center observational study to investigate the clinical use of long-term high flow oxygen therapy (HFOT) mainly in the two indications; palliative care of patients with end-stage respiratory failure and humidification in the tracheostomized patients.

The results of the study are potentially interesting. However, the reviewer thinks this report does not meet with the quality of Therapeutic Advances in respiratory Disease.

Major Comments

1. Title

The title of the manuscript is not adequately informative. It is recommended that the authors should revise it according to the main purpose of the study.

Response to reviewer: We thank the reviewer for its suggestion. We have updated the title that now reflect the main purpose of our study. The manuscript title is now:

Characteristics and outcome of patients set up on high flow oxygen therapy at home

2. Page 4 of 21, Line 4-53

The manuscript were discussing different topics in each section and lacking logical connection between them. In the introduction, the authors should clearly state the background of the study, clinical question, research question, and approach to answering to the research question.

Response to reviewer: We thank the reviewer for its comment. We have considerably modified the introduction in order to give a better understanding of our aims to the readers. From line 10, the introduction section now reads as follow.

HFOT is now widely used in ICU for the management of acute hypoxemic respiratory failure as it reduces intubation rate12.

To date, no evidence supports the use of HFOT at home. However, in patients for which low flow LTOT is not sufficient to allow safe return at home, HFOT could be an interesting option. In addition to a better oxygenation, HFOT decreases the work of breathing 10 and improves dyspnea 17. Therefore, in our center, it has been used in patients with end stage hypoxemic respiratory disease as part of palliative management and in order to allow discharge at home.

In our center, HFOT has also been proposed to tracheotomized patients that are frequently admitted for low respiratory tract infection and that have secretion management issues. For these patients, HFOT was offered has it improves ciliary clearance 9, reduces the number of tracheal aspiration 14, generates a positive expiratory pressure 6, increases end expiratory lung volumes 8 and reduced the number of exacerbations in patients with bronchiectasis diseases 16.

The primary aim of our study was to describe the pattern of use of long-term HFOT in our center. The secondary aims were to describe the outcome of patients initiated on home HFOT and the costs-associated to home delivery of HFOT.

3. Page 5 of 21, Line 4-39

The authors should revise the method section according to their objective.

If the main objective of the study was to describe the pattern of use of long-term HFOT, they should clearly present what parameters they collected such as age, gender, the reason of admission, underlying disease, the indication of HFOT, smoking history, pulmonary function tests(PFT), arterial blood gas (ABG), etc. As same, if the second objective was to describe the clinical outcomes, relevant clinical parameters should be explained.

Response to reviewer: We thank the reviewer for its comment. We have clarified what type of data that were collected as well as when tests were performed. The results section now reads as follow:

For patients included in the study, we collected the following data using the electronic medical record: gender, age, height, weight, underlying respiratory disease, smoking history, smoking statuts at HFOT setup and treatments. We retrieved the last available lung function tests and echocardiography before HFOT initiation. We collected results of arterial blood gas prior initiation to HFOT and, arterial blood gas on HFOT at discharge. Previous admissions were collected from the electronic medical admission register as well as those that followed HFOT initiation. For all admission, we reviewed discharge summary to ascertain that admission was related to an acute exacerbation. Survival data were obtained from the home care provider.

4. Page 6 of 21, Line 22-34

The authors should clarify when ABGs were performed.

Response to reviewer: We thank the reviewer for its comment. We have updated the methods section that now reads as follow:

We collected results of arterial blood gaz prior initiation to HFOT and, arterial blood gaz on HFOT at discharge.

5. Page 7 of 21, Line 10-25

The authors should present the detail of cost of HFOT including costs of HFOT devices, water, electricity, etc, and discuss about the difference of cost between the nHFOT group and the tHFOT group.

Response to reviewer: We thank the reviewer for its comment. We have clarified in the methods sections how costs were calculated. As the treatment is not currently approved, we used the health care provider's costs. The methods sections on costs now reads as follow:

Health costs were assessed from the home healthcare provider point of view as there is no reimbursement scheme for HFOT in France. The home healthcare provider did not charged patients for HFOT delivery. HFOT costs was evaluated using the daily amortization costs, a monthly tariff for consumables, home visits performed by technicians. Oxygen costs were calculated according on French National LTOT tariff. We were not able to include data regarding electricity costs.

We have clarified in the discussion that the costs were mainly driven by oxygen consumption in the nHFOT. This section of the discussion now reads as follow:

In patients with nHFOT, the costs are driven by oxygen delivery costs. Costs of HFOT without any oxygen delivery is acceptable: 261euros/month.

6. Page 8 of 21, Line 4-15

The reviewer thinks that the authors' statements and conclusion are too strong because of the following limitations; the purpose of the study are not assess cause-effect and relationship; the methods are not suitable; the study is affected by many biases derived from the nature of retrospective study.

Response to reviewer: We thank the reviewer for its comment. We agree that our study given its retrospective nature can be biased. We therefore modified the manuscript in the discussion which now reads as follow:

Our trial was not designed to assess the efficacy of HFOT in exacerbation. The pre-post analysis suggested a reduction in the number of admissions for low respiratory tract infection following initiation of tHFOT. Therefore, the cost of HFOT may be counterbalanced by a lower readmission rate. The reality of the reduction of exacerbation as well as the cost-effectiveness of such approach needs to be assessed more thoroughly.

(…)

Despite these limitations, these findings provide pilot data on the use of HFOT at home.

As well as in the conclusion

Its use may be considered in tracheostomized patients with severe exacerbations. These results are achieved at a reasonable cost. However, further prospective clinical trials are required to assess the efficacy, the cost-efficiency of such management as well as its impact in health-related quality of life.

7. Table 1

The authors should clarify when PFT, echocardiography, and ABG were performed.

Response to reviewer: We thank the reviewer for its comment. Following previous reviewer comment, we have specified when test were performed in the method section.

8. Table 1

The authors should clarify the reason why they compared the patients characteristics and clinical outcomes between the nasal HFOT group and the tracheostomy HFOT group. These comparison and statistical analysis are not suitable for the purpose of the study.

Response to reviewer: We thank the reviewer for its comment. We agree that the statistical comparison of the 2 groups is not useful and may mislead readers. We therefore removed the p-value column in table 1.

9. Table 2

The authors should explain what this result and statistic analysis mean. The reviewer think this is not generalizable and give little information for the study.

Response to reviewer: We thank the reviewer for its comment. We removed figure 2 from the manuscript as we agree that its relevance is limited.

10.

English should be edited through whole manuscript.

Response to reviewer: Prior to submission of the revised manuscript we carefully edited the English throughout the manuscript and asked Miss Gill Arbane a native English speaker physiotherapist who is working in St-Thomas' Hospital, London as a research coordinator in the chronic respiratory failure unit.