Reviewer's report

Title: Semi-closed circuit represents a cost-effective way of heliox administration in patients with severe airway obstruction: An economic study

Version: 2 Date: 5 February 2015

Reviewer: Michael Gentile

Reviewer's report:

The submitted work describes analysis of four different systems for heliox administration.

Discretionary Revisions: (which are recommendations for improvement but which the author can choose to ignore)

1. Diagrams or pictures of the numerous systems would be helpful for the readers to appreciate the technical aspects and differences of each design.

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

1. The Background section is entirely too long and should focus on the administration of heliox.

2. The flow of heliox is quoted as “typically more than 18 l/m”. This liter flow is not universal and may be excessive for some patients.

3. According to the manufacturer, “The 7500 V2 Mask is intended to provide a patient interface for applications of noninvasive ventilation. The mask is intended for use as an accessory to ventilators which have adequate alarms and safety systems for ventilator failure and which are intended to administer positive pressure ventilation for treatment of respiratory failure or respiratory insufficiency”. Are the authors advocating the use of positive pressure ventilation to deliver heliox with these masks?

4. The proposed masks have leaks of 3-5 l/m and dead space volumes of 104-169ml. Are these factors accounted for in the heliox delivery calculations?

5. According the manufacturer, “Contraindications: Need for ventilation or ventilatory support > 12 hours per day”. How will this impact heliox delivery and cost calculations?

6. These masks are available in five sizes: (L, M, S, XS, P). Selecting the proper size for patient will be imperative for the accuracy of cost calculations. Was the possibility of having to use multiple masks for the same patient considered for cost analysis?

7. The mask and swivel port components are expected to stay in service for a minimum of 25 disinfection or steam sterilization cycles or 6 months of use under normal conditions, whichever occurs first. The headgear is expected to stay in service for 6 months of use. If the demand for heliox services fluctuates, will the
costs change in a liner direction?

8. Heliox is often delivered in conjunction with aerosol therapy. Several statements in the paper imply otherwise.

9. The statement, “As the total length of the heliox therapy is considered 25 hours and each cycle lasts 150 min (2.5 h)" suggests heliox is given intermittently to patients. This is contrary to clinical practice and requires supportive evidence with multiple references.

10. The authors should include if these system have been used on human subjects or tested in a clinical trial.

**Level of interest:** An article of limited interest

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.