Reviewer's report

Title: Glucose control in intensive care: Usability, efficacy and safety of Space GlucoseControl in two medical European intensive care units

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Reviewer: Tom Van Herpe

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Amrein and colleagues tested the performance of the SGC system in two tertiary intensive care units. Overall, the manuscript stresses well the background of glucose control and how computerized algorithms may improve glucose control and patient safety. Further, the importance of efficient personnel training before implementing a new medical device has been justified. Some critical issues need to be addressed and clarified, however.

- Major Compulsory Revisions

1. Due to the multi-centre approach of the study presented in the current manuscript two different studies (Graz and Zurich) seem to be combined. Authors mention that "selected data of the trial in Graz have been published previously". It is not clear what the difference is between the Graz data described in current manuscript and the Graz data published earlier [Efficacy and safety of glucose control with Space GlucoseControl in the medical intensive care unit -- an open clinical investigation. Amrein K, Ellmerer M, Hovorka R, Kachel N, Fries H, von Lewinski D, Smolle K, Pieber TR, Plank J. Diabetes Technol Ther. 2012 Aug;14(8):690-5]. In both reports the data of the same 20 medical critically ill patients seem to be described returning the same results. If this is the case, authors should focus on the unpublished data (Zurich) in the current manuscript instead of mixing up two different data sets and averaging the results.

2. The claim that the medical device under study is now tested "under real-life" conditions is misleading since the device was handled by a "dedicated study nurse" in the Zurich centre during daytime. Please reformulate. It is also not clear whether the patients included in the study were treated by the SGC system simultaneously or consecutively (cfr. section Study Population)? How was the end-of-study reason "end of iv insulin need" defined?

3. Table 1: Data of two centres should be described separately; or only focus on Zurich data (see first point).

4. Table 2:
- Time gap from ICU admission to study start is rather large (particularly for Zurich: avg. 6.7 days). Please explain this in the manuscript as the period with typically most unstable glucose dynamics is not incorporated in the study time. Reader can be misled when interpreting day results (e.g. Table 3).

Was the blood glucose controlled using the standard protocol in the period before the study start?

- Report incidence of hypoglycemia (<2.2 mmol/l, <3.3 mmol/l) at patient level and at sample level.

5. Adherence to the SGC advices should be discussed in more detail. Please add:

- insulin dose: magnitude of deviations? reason of deviations?
- sampling time: was the proposed sampling frequency followed? type of deviations?

- Minor Essential Revisions

1. Consort diagram and description of protocol violations (if any?) are missing

2. Include the definitions of hypoglycemia (e.g. "moderate") in the Methods section

3. Sampling interval varied from 1.3 to 3.0 hours (so maximum interval is 3 hours), while the Safety section describes a severe hypoglycemic episode "at the proposed time (i.e. 4 hours after previous glucose measurement) the blood glucose ..."

Does the mentioned sampling interval take into account measurements that were not proposed by the SGC system?

4. What is the percentage of nurses who used the SGC system and who filled out the questionnaire?

5. Figure 1: Indicate difference between blue and green profiles

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

Tom Van Herpe has one patent in the related field.