Reviewer's report

Title: The Use of Hyperbaric Oxygen Therapy in the Treatment of Central Retinal Artery Occlusion in Sickle Cell Disease.

Version: 2 Date: 22 June 2014

Reviewer: Michael Mimouni

Which of the following following best describes what type of case report this is?: Other

If other, please specify:

There are a handful of reported cases of central retinal artery occlusion in sickle cell disease. What differs this case report from previous reports is the reported management of the patient with both exchange transfusion and hyperbaric oxygen therapy. The potential benefit of hyperbaric oxygen therapy in itself has been well documented.

However, this would therefore be the first reported\published case of central artery occlusion in a sickle cell diseased patient treated with hyperbaric oxygen therapy.

Has the case been reported coherently?: No

Is the case report authentic?: Yes

Is the case report ethical?: Yes

Is there any missing information that you think must be added before publication?: Yes

Is this case worth reporting?: Yes

Is the case report persuasive?: Yes

Does the case report have explanatory value?: No

Does the case report have diagnostic value?: No

Will the case report make a difference to clinical practice?: Yes

Is the anonymity of the patient protected?: Yes

Comments to authors:
The authors describe hyperbaric oxygen therapy combined with exchange transfusion for the treatment of central retinal artery occlusion in a young adult with sickle cell disease. They concluded that in sickle cell patients, hyperbaric oxygen therapy may be beneficial in the treatment of central retinal artery occlusion.

While the idea behind the paper is important and has to date been scarcely documented, the article suffers from the following weaknesses:

1. It is impossible to determine what the natural history of this patient would have been. The patient was treated with both exchange transfusion and hyperbaric oxygen therapy (HBO). Exactly how much of the improvement in visual acuity can be attributed to the HBO itself is unclear.

Suggestion: This should be mentioned in the discussion of this article.

2. In addition, from the author’s description it is quite difficult to ascertain whether the improvement to 20/200 occurred before or after the initial HBO session. The exact sequence of treatment in the second paragraph of the “case presentation” is insufficiently described. When exactly (on what day) was the systemic therapy applied? What was the visual acuity before and after the systemic therapy? It seems that the author’s meant to say that on the first day of hospitalization exchange transfusion was performed and the visual acuity thereafter improved to 20/200, after which following 20 sessions of HBO the visual acuity improved to 20/60.

Suggestion: This critical section depicting what treatment was provided and when must be provided in detail. In addition the author should explain the rationale behind 20 sessions within a period of 30 days.

3. The statement that sickle cell disease is usually characterized by proliferative retinopathy present in 20% of patients must be rephrased for two reasons:
   A) Non-proliferative retinopathy is the most common ophthalmic manifestation.
   B) Proliferative retinopathy, based on the reference provided by the authors occurs in 14% of the sickle cell patients.

Suggestion: The authors should make the appropriate corrections or avoid such statements.

4. When describing the fundus findings several additional details are worth mentioning. First, on closer examination of the fundus color image, a hemorrhage can be seen inferotemporal of the macula. Second, when examining the fundus fluorescein angiography, it is clear that the lack of arterial filling and peripheral capillary non perfusion is more evident in the superior half than in the inferior half.

Suggestion: The authors should make note of these findings and shortly explain them. In addition they should specify the timing of the fluorescein angiography
5. Stylistic issues: There are too many syntax and grammatical errors to quote all of them and the authors would benefit from having a professional copy editing performed. Among them:

- If the author decides to use an abbreviation then it should once again be used throughout the text instead of going back and forth between the spelled out form and the abbreviated form.
- The paper sometimes uses the abbreviation VA and sometimes uses BCVA, which was actually studied? Best corrected visual acuity or simple “visual acuity”?
- In the abstract, “sickle” is spelled “sicle”.
- In the first line of the abstract “we describe the treatment with…” should be completely rephrased to “We describe hyperbaric oxygen therapy for the treatment of central retinal artery occlusion in a young adult with sickle cell disease”.
- “with Goldmann applanation” should be rephrased to “as measured by…”
- “visit at 6 month” should be corrected to “6 month follow up”.
- Etc...

Suggestion: have a professional copy editing performed.

Revisions Necessary for Publication:

1. The authors should discuss the limitation of how much (or how little) of the improvement in visual acuity may be attributed to either the exchange therapy or the hyperbaric oxygen therapy in the discussion section.
2. The authors should provide more details regarding the treatment provided (sequence, timing, rationale).
3. The authors should rephrase the incorrect statement regarding proliferative retinopathy in sickle cell disease.
4. The authors should make note of findings in both the fundus photograph and the fluorescein photograph that were not mentioned.
5. The authors would benefit from having a professional copy editing performed.

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

**Quality of written English:** Needs some language corrections before being published

**Declaration of competing interests:**

I declare that I have no competing interests