Title: Worsening angle closure glaucoma and choroidal detachments subsequent to closure of a carotid cavernous fistula

Authors:

Sumeer Thinda (sumeer.thinda@vanderbilt.edu)
Mark R Melson (mark.r.melson@vanderbilt.edu)
Rachel W Kuchtey (rachel.kuchtey@vanderbilt.edu)

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Author's response to reviews: see over
Dear Editor,

The authors would like to thank the reviewers for their careful read and insightful comments. Below is a point-by-point response to their comments and questions. Changes have been made to the accompanying revised manuscript using the highlighter function in MS Word.

**Reviewer # 1 (1 June 2012)**

1. The authors answered to my questions and their revisions are satisfactory. I, as an ophthalmology researcher and practitioner, have no further comments to be addressed. In other words, the article is acceptable, "ophthalmologically". However, the comments of the other reviewer are extremely important since they challenge neuro-radiologic issues; I think that the final acceptance of this work should be based on complete satisfaction of Dr. Halmagyi; the second reviewer.

   The authors wish to thank Dr. Abtahi for his critical appraisal of our manuscript.

**Reviewer # 2 (23 May 2012)**

5. We need to be shown the arteriogram (carefully labelled).

   The labeled arteriogram has been added to the manuscript- please see Figure 1 (and our previous Figure 1 has been renamed to Figure 2).

   5. The arteriogram shown is a selective external carotid injection and this needs to be stated in the figure legend. We also need to know which branches of the external carotid supplied the fistula (?ascending pharyngeal) and if there was any supply from a selective internal carotid injection. Not sure what Dr Ayad’s contribution was to this case. Did she/he do and interpret the angiogram and advise on embolization, report the “normal” orbit CT?

   The angiogram confirmed the presence of a small Barrow type D right CCF with retrograde drainage in the right SOV. Early filling of the SOV was seen on internal carotid artery injection; however, there were no feeders large enough to be actually visualized. On the right external carotid artery injection, there was filling of the cavernous sinus via small branches of the right accessory meningeal artery. The aforementioned, including a statement mentioning that the angiogram in Figure 1 is a selective ECA injection, has been added to the manuscript.

   Dr. Ayad performed and interpreted the cerebral angiogram. He also advised on treatment options including embolization and self-administered manual carotid jugular compressions. He did also review (in addition to a neuroradiologist) the CTA and CT orbits which showed possible asymmetry of the SOVs.
6. No orbit CT MR?

A CTA of the head and CT orbits with and without contrast was obtained prior to the six vessel cerebral angiogram. The CTA showed atherosclerotic disease within the distal cavernous segments of the internal carotid arteries. The CT orbits showed possible asymmetry of the superior ophthalmic veins. As neither exam was diagnostic, the authors did not include them in the manuscript. A cerebral angiogram was subsequently performed and has been added to the manuscript (Figure 1).

6. The results of orbit CT need to be given so that the reader does not go away with the false idea that one does carotid arteriograms for all red eyes with normal CT – unless it is believed that corkscrew vessels are virtually pathognomonic. There needs to be some discussion of why one might go on to arteriography for a red eye with the normal CT orbits. Was contrast given? Has a neuroradiologist seen the CT?

The results of the CTA head and CT orbits with and without contrast have been added to the manuscript. The CTA head showed atherosclerotic disease within the distal cavernous segments of the internal carotid arteries. The CT orbits showed possible asymmetry of the SOVs. Contrast was indeed given and the images were reviewed by a neuroradiologist. Cerebral angiogram was subsequently performed as neither exam was completely diagnostic and high suspicion for a CCF remained.

One might go on to angiography for a red eye with normal CT orbits if there are other concerning ocular signs worrisome for a CCF. These signs include proptosis, resistance to retropulsion, choroidal detachments and narrow angles (all of which our patient had).


The bruit was heard by one of the authors who is both a fellowship trained neuro-ophthalmologist and an oculoplastic surgeon. Although CCF is a relatively uncommon disease, we frequently encounter these patients due to the nature of our large tertiary referral center. It is our common practice to listen for bruits with a stethoscope in any patient suspected to have a CCF.

7. The bruit is truly puzzling as it almost never occurs with indirect CC fistulas and again the reader might gain the false impression that absence of a bruit in someone with a red eye and a “normal” CT means no CC fistula.

We agree that the presence of a bruit in an indirect CCF is rare but can occur [1], as it did in our case. We are simply reporting the objective physical exam findings in our patient and hope not to give the reader a false impression.
8. Why try jugular compression if the CCF has closed.

The CCF was not completely closed. As mentioned in the manuscript, our patient had undergone spontaneous partial closure of the CCF and thus the planned transarterial embolization was aborted. She went on to develop choroidal detachments but declined further angiographic testing. It was assumed that perhaps her CCF was worsening and thus she was started on manual carotid jugular compressions.


Our patient did not have a suitable endovascular corridor to the CCF via the petrosal sinuses, therefore transfemoral venous embolization did not appear possible. The plan was for transarterial embolization and if satisfactory occlusion could not be achieved from embolization of the right accessory meningeal artery feeder, then an alternative approach through the right SOV was to be considered. A statement justifying the transarterial approach has been added to the manuscript.

We hope that this revision adequately addresses all of the concerns of our reviewers. Thank you for your attention and consideration.

Sincerely,

Rachel W. Kuchtey, M.D., Ph.D.