The surgical management of massive intraoperative and postoperative suprachoroidal hemorrhage - anatomic and functional outcomes

O tratamento cirúrgico da hemorragia supracoroide massiva intraoperatoria e pós-operatoria: resultados anatômicos e funcionais

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ABSTRACT

Purpose: To describe the clinical characteristics, management and treatment outcomes of patients with post-surgical suprachoroidal hemorrhage (SCH).

Methods: A retrospective cross-sectional study was conducted, in which the medical records of 9 consecutive patients with SCH admitted to the Goldschleger Eye Institute were reviewed.

Results: The mean age was 74 years (range 61-84) and the mean follow-up time was 38.3 ± 0.1 months (range 4-47.8 months). Four cases were associated with glaucoma surgeries (2 trabeculectomies and 2 Ahmed valve implantations), 3 cases with cataract surgery and 2 cases with pars plana vitrectomy. The diagnosis of SCH was ranging from intra-operative to 8 days following the primary procedure. Most patients underwent posterior sclerotomies and drainage alone or combined with pars plana vitrectomy in a mean timing of intervention of 11 ± 4 days. At one month follow-up the visual acuity improved in 7 eyes and remained stable in 2, compared to the VA prior to the drainage operation. The mean VA improved from 2.03 to 1.285 logMAR units at 1 month following the drainage procedure (p=0.003).

Conclusions: SCH still remains a challenging complication of many ophthalmological procedures. The current surgical management may improve visual acuity though the general prognosis is still poor.

Keywords: Choroid hemorrhage/comlications; Cataract extraction; Glaucoma/surgery; Vitrectomy; Ophthalmologic surgical procedures/comlications

INTRODUCTION

Appositional suprachoroidal hemorrhage (SCH) (“expulsive hemorrhage”) is considered as one of the most devastating complications of intraocular surgery. Most studies report poor prognosis with low visual acuity at follow up[1-11]. SCH has been reported to occur in the setting of all types of intraocular procedures, including cataract extraction[1-4], penetrating keratoplasty[6-10], glaucoma filtering surgery[10-12], and vitreoretinal surgery[13-15]. The incidence of expulsive SCH during glaucoma filtering surgery has been reported to be approximately 0.15%[10]. The hypotonic eye may be more susceptible to episcleral venous pressure fluctuations induced by post-operative Valsalva maneuvers and therefore, be more vulnerable to rupture of ciliary arteries[1-15]. Myopia was also described as a potential risk factor[11].

The systemic risk factors described to be associated with SCH such as advanced age, systemic hypertension (HTN), and arteriosclerosis are presumably related to increased sclerosis and fragility of the choroidal vessels[17-19]. Other risk factors implicated in these patients are blood dyscrasias or coagulation defects and diabetes mellitus. There were also reports of an association between the development of SCH in the perioperative period with a history of liver disease and with preoperative use of digoxin[2].

If an intraoperative SCH is suspected, immediate tamponade of the open globe is required. This can be accomplished by either direct digital pressure or rapid suturing of all surgical incisions. The creation of drainage sclerotomies in an experimental model, during the acute formation of SCH, resulted in a further increase in the size of the SCH with marked extension of the hemorrhage[16,17]. The mean clot lysis time for an SCH is doubtful. The creation of drainage sclerotomies in an experimental model, during the acute formation of SCH, resulted in a further increase in the size of the SCH with marked extension of the hemorrhage[16,17].

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If an intraoperative SCH is suspected, immediate tamponade of the open globe is required. This can be accomplished by either direct digital pressure or rapid suturing of all surgical incisions. The long-term benefit of performing posterior sclerotomies immediately is doubtful. The creation of drainage sclerotomies in an experimental model, during the acute formation of SCH, resulted in a further increase in the size of the SCH with marked extension of the hemorrhage into the retina and vitreous[18,19]. The mean clot lysis time for an SCH has been reported to be between 7 and 14 days. Attempts to drain an SCH before some degree of clot lysis has occurred are usually unsuccessful[15]. Some recent reports have advocated early surgical...
intervention in the management of SCH. Despite all the surgical efforts, most studies report poor visual prognosis with a low final visual acuity at follow up.

The indications and timing of drainage procedures in patients with a postoperative SCH depend on the ocular findings. These include the presence of retinal detachment, central retinal apposition (“kissing choroidals”), vitreous incarceration into the surgical wound, or a breakthrough vitreous hemorrhage; increased IOP; retained lens material during cataract surgery; and intractable eye pain. The surgical approach includes drainage through posterior sclerotomies, often in association with vitrectomy for removal of vitreous hemorrhage and/or retained lens material, and for reattaching detached retina.

The present study describes the anatomic and functional results of drainage surgery in a consecutive series of cases with suprachoroidal hemorrhage.

METHODS

This is a cross-sectional retrospective study based on chart data from 9 eyes of 9 consecutive patients diagnosed with intraoperative or postoperative suprachoroidal hemorrhage (“expulsive hemorrhage”) in our Institute between March 2002 and December 2007. The review of the charts was authorized by the hospital IRB. All patients had at least 4 months of follow up.

The data retrieved included demographic, ocular and systemic details of the patients prior to the procedure complicated by SCH (the primary procedure), following the SCH and prior to the second procedure (the drainage procedure), and throughout the follow up. Visual acuity (VA) was measured with Snellen chart, and the values were converted to logMAR for statistical analysis.

RESULTS

There were 3 females and 6 males, and the mean age was 74 years (range 61-84). The average follow-up time was 38.3 ± 30.1 months (range 4-87 months). Table 1 describes the demographic, systemic and ocular data of these patients. Three patients were taking aspirin when the SCH occurred, 6 patients had documented glaucoma and 3 patients had high myopia.

The primary procedures associated with the SCH are presented in Table 1. There were four cases of glaucoma surgery (2 trabeculectomies and 2 Ahmed valve implantations), three cataract operations and two pars plana vitrectomies (PPV) for retinal detachment treatment. Intraoperative SCH occurred in the three cataract operations, and the other six cases had postoperative SCH, within 6 ± 3 days (range 1 to 8 days) of the operation. On US examination there were kissing choroidals in 7 eyes. Retinal detachment was observed in 1 eye.

The surgical management of the SCH was performed 11 ± 4 days following the SCH, as our policy is to wait at least 1 week prior to intervention, to allow for the liquefaction of the suprachoroidal blood. The procedure included: insertion of an anterior chamber maintainer (ACM) at the limbus for inducing the pressure required for the drainage and volume replacement, exposure of the sclera and bridle sutures for the extraocular muscles, and posterior drainage sclerotomies (beginning 5-8 mm posterior to the limbus and extending 3-5 mm posteriorly). The exact site of the sclerotomies was based on the US findings, corresponding to the locations where the SCH was thicker. PPV was performed in 6 of the 9 eyes at the same operation (Table 1), with silicone oil injection in five of these eyes. Additional procedures following the drainage procedures included removal of the silicone oil in 4 eyes (cases 4-6, 8), removal of the Ahmed valve (case 7), and reinsertion of the Ahmed valve tube to the anterior chamber (case 1). At the end of the follow up the retina was attached in all 9 eyes, and the silicone oil was retained in 2 eyes.

At one month of follow-up the visual acuity improved in 7 eyes and remained stable in 2, compared to the VA prior to the drainage operation (Table 2). The mean VA improved from 2.03 to 1.285 logMAR units at 1 month following the drainage procedure. In Snellen units, the VA improved from hand motions to 20/385. This corresponds to more than quadrupling of the visual angle (p=0.003). In the 7 eyes that improved, the mean change was 1 logMAR unit, which is more than quadrupling of the visual angle (p=0.003). In the 7 eyes that improved, the mean change was 1 logMAR unit, which is more than 10 lines of improvement. The VA slightly deteriorated at the end of the follow, to 1.441 (20/552) (p=0.027).

DISCUSSION

In this study we present the results of a retrospective study that includes nine consecutive cases of intraoperative and postopera-

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Table 1. Demographic and clinical characteristics

<table>
<thead>
<tr>
<th>Patient, gender, age, eye</th>
<th>Systemic conditions</th>
<th>Ocular pathology</th>
<th>Primary procedure</th>
<th>Extent of SCH by US</th>
<th>SCH procedure</th>
<th>Additional procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. F, 77, LE</td>
<td>HTN, Hyperlipidemia</td>
<td>Glaucoma</td>
<td>Ahmed valve</td>
<td>Kissing</td>
<td>SCD &amp; removal of tube</td>
<td>Reinsertion of tube (8 mo later)</td>
</tr>
<tr>
<td>2. M, 84, LE</td>
<td>None</td>
<td>BE glaucoma</td>
<td>Trabeculectomy</td>
<td>Kissing</td>
<td>SCD</td>
<td>None</td>
</tr>
<tr>
<td>3. M, 74, LE</td>
<td>HTN, Aspirin</td>
<td>BE glaucoma, BE uveitis</td>
<td>Trabeculectomy</td>
<td>Non-kissing &amp; RD</td>
<td>SCD &amp; PPV &amp; SO</td>
<td>None</td>
</tr>
<tr>
<td>4. M, 65, RE</td>
<td>HTN, IHD, Aspirin</td>
<td>None</td>
<td>PPV due to RD</td>
<td>Non-kissing</td>
<td>SCD &amp; PPV &amp; SO</td>
<td>SO removal (7 mo)</td>
</tr>
<tr>
<td>5. F, 79, RE</td>
<td>CLL</td>
<td>BE glaucoma, BE myopia, BE advanced cataract</td>
<td>ICCE</td>
<td>Kissing</td>
<td>SCD &amp; PPV &amp; SO</td>
<td>SO removal (6 months)</td>
</tr>
<tr>
<td>6. M, 81, RE</td>
<td>IHD, sp CVA, HTN, aspirin</td>
<td>None</td>
<td>PHACO + PCIOL</td>
<td>Kissing</td>
<td>SCD &amp; PPV &amp; SO</td>
<td>SO Removal (9 months)</td>
</tr>
<tr>
<td>8. M, 68, RE</td>
<td>None</td>
<td>BE glaucoma</td>
<td>ECCE + ACIOL with vitreous loss</td>
<td>Kissing</td>
<td>SCD &amp; ACIOL removal</td>
<td>SO removal (2 months)</td>
</tr>
<tr>
<td>9. F, 61, RE</td>
<td>None</td>
<td>High myopia, aphakia, retinal detachment</td>
<td>PPV due to RD recurrent</td>
<td>Kissing</td>
<td>SCD &amp; PPV &amp; SO</td>
<td>None</td>
</tr>
</tbody>
</table>

F= female; M= male; LE= left eye; RE= right eye; HTN= hypertension; IHD= ischemic heart disease; DM= diabetes mellitus; SCH= suprachoroidal haemorrhage; SCD= suprachoroidal haemorrhage drainage; SO= silicone oil; PPV= pars plana vitrectomy.
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Table 2. Visual acuity - in logMAR

<table>
<thead>
<tr>
<th>Patient</th>
<th>Prior to SCD</th>
<th>1 month follow-up</th>
<th>Last follow-up (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.2</td>
<td>0.8</td>
<td>2.0 (87)</td>
</tr>
<tr>
<td>2</td>
<td>1.9</td>
<td>0.5</td>
<td>0.5 (52)</td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>1.3</td>
<td>1.6 (4)</td>
</tr>
<tr>
<td>4</td>
<td>1.9</td>
<td>0.5</td>
<td>0.2 (39)</td>
</tr>
<tr>
<td>5</td>
<td>2.2</td>
<td>1.7</td>
<td>1.7 (22)</td>
</tr>
<tr>
<td>6</td>
<td>1.9</td>
<td>1.0</td>
<td>1.6 (9)</td>
</tr>
<tr>
<td>7</td>
<td>1.9</td>
<td>2.0</td>
<td>1.4 (66)</td>
</tr>
<tr>
<td>8</td>
<td>1.6</td>
<td>1.7</td>
<td>1.9 (61)</td>
</tr>
<tr>
<td>9</td>
<td>2.5</td>
<td>2.0</td>
<td>2.2 (5)</td>
</tr>
<tr>
<td>Average</td>
<td>2.0</td>
<td>1.3</td>
<td>1.4 (38.3)</td>
</tr>
</tbody>
</table>

SCD= suprachoroidal hemorrhage drainage.

Suprachoroidal hemorrhage is a severe operative complication, and if left untreated is likely to result in phthisis and complete loss of all vision. Timely surgical management with drainage of the blood and often vitrectomy with silicone oil injection is indicated for restoring some vision and preserving the globe.

REFERENCES