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Scleral Buckling in the Treatment of Retinal Detachment Due to Retinal Dialysis

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Abstract

BACKGROUND AND OBJECTIVE—To describe clinical features and outcomes of scleral buckle surgery as treatment for patients with rhegmatogenous retinal detachment caused by retinal dialysis.

PATIENTS AND METHODS—Nonrandomized, consecutive case series. All patients underwent encircling scleral buckle for retinal detachment secondary to retinal dialysis. Visual acuity (VA) and retinal attachment status were recorded for the postoperative period.

RESULTS—The study included 16 eyes of 15 patients with mean age 25.8 years; 80% were male, and 75% of the cases were associated with trauma. Dialyses were most commonly found inferotemporally (63%). Mean preoperative VA was 20/103 and mean postoperative VA was 20/62. VA improved in nine cases, and eight cases had a VA of 20/40 or better at the last follow-up. Due to retinal re-detachment, two patients (13%) required additional surgery with vitrectomy.

CONCLUSIONS—Retinal dialysis is an uncommon etiology for retinal detachment and is often associated with trauma and younger age. Scleral buckling can be an effective strategy in the initial management of these patients.

INTRODUCTION

A retinal dialysis, the disinsertion of the retina from the vitreous base, is an uncommon cause of retinal detachment, accounting for 8% to 17% of rhegmatogenous retinal detachments.^{1,2} Retinal dialysis most commonly occurs in young people following trauma, although there is also a hereditary source of retinal dialysis.^{3–6} With examination of the retinal periphery and ora serrata, a retinal dialysis can be differentiated from a giant retinal tear (which may also follow trauma and cause a retinal detachment)⁷ by the location of the defect in reference to the vitreous base. A retinal dialysis occurs within the vitreous base, whereas a retinal tear occurs posterior to vitreous base insertion; however, the surgical

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management of the two etiologies often differs. Vitrectomy surgery has become a popular method for repairing retinal detachment associated with giant retinal tears, whereas scleral buckling alone may sometimes be sufficient for patients with retinal dialysis.^{8,9} In general, the use of scleral buckling has been on the decline.^{10,11} However, in cases of retinal detachment associated with retinal dialysis, scleral buckling may avoid the need for positioning, which can be especially difficult for children, and may reduce the risk of premature cataract formation, iatrogenic retinal breaks,¹² and gas-and silicone oil-related complications. The purpose of this study is to report outcomes of patients with retinal detachment associated with retinal dialysis treated with scleral buckling.

PATIENTS AND METHODS

The study was a nonrandomized, consecutive case series, approved by the institutional review boards at the University of Miami Miller School of Medicine and Beth Israel Deaconess Medical Center. From January 1, 2002, to October 31, 2013, patients with retinal detachment associated with retinal dialysis were identified by ICD-9 codes, and the diagnoses and management were confirmed by reviewing the clinical records. A total of 42 eyes were identified, and 26 were excluded due to penetrating trauma, giant retinal tear, or management with pars plana vitrectomy. All patients underwent primary repair with encircling scleral buckling at Bascom Palmer Eye Institute or Beth Israel Deaconess Medical Center. Surgical technique was surgeon-dependent. Data collection included patient age, gender, laterality, clinical history, location of retinal dialysis, presenting visual acuity (VA), surgical procedure performed, lens status, postoperative VA, duration of follow-up, and any additional surgeries. The main outcome measures were final best-corrected VA and retinal anatomic status. Calculations were performed using Snellen VA, converting to logMAR format for calculations, and then converting back to Snellen equivalent for reporting purposes.

RESULTS

A total of 16 eyes of 15 patients were identified that met inclusion criteria, and the baseline characteristics are summarized in Table 1. The mean age was 25.8 years (range: 6.2 years to 47.8 years). Males made up 80% of the patients. Right eyes made up the majority (75%) of the cases, and most were associated with trauma (75%). All the patients were phakic at the time of detachment. Anatomically, the dialyses were noted inferotemporally (10; 63%), inferiorly (three; 19%), nasally (two; 13%), or inferonasally (one; 6%). In 11 of the eyes (69%), the macula was affected by the retinal detachment. None of the patients had additional ocular pathology noted preoperatively aside from retinal detachment, including proliferative vitreoretinopathy (PVR).

Visual outcomes are reported in Table 2. The mean preoperative VA was 20/103, and the mean postoperative VA was 20/62. VA improved in nine cases, and three cases with preoperative VA of 20/20 were stable at the last recorded visit. A total of eight eyes (50%) were reported to have VA of 20/40 or better at the last follow-up, and 13 eyes (81.3%) were reported to have VA of 20/100 or better. Mean follow-up time was 247.5 days (range: 9 days to 959 days). In the five eyes with macula attached status, four (80%) maintained or

improved VA. In the one case with decreased VA, the follow-up period was limited (12 days).

Based on surgeon preferences, some patients had the encircling element sutured to the globe, others had partial-thickness scleral tunnels. All cases received an encircling buckle, and no additional sponges were noted from the operative reports. In two cases (13%), SF6 gas tamponade with subretinal fluid drainage was utilized at the end of the procedure. Measurement of the degree of imbrication was left to the primary surgeon.

Anatomically, the retina was attached at the last recorded follow-up in all eyes. Two eyes required further surgery with pars plana vitrectomy. In one patient, a recurrent retinal detachment occurred and ultimately required a third surgery and silicone oil tamponade. In another patient, vitrectomy with silicone oil tamponade was performed, and the patient underwent silicone oil removal and cataract extraction in a third procedure. Further details of the individual patients are outlined in Table 3, and a representative patient is presented (Figure).

DISCUSSION

The retinal reattachment results of 87.5% of patients attached after single surgery are consistent with other reports in the literature of retinal detachment repair with scleral buckling ranging from 73.7% to 98%.^{4,9,12–15} A higher percentage of young males was found in this series than females, consistent with previously documented risks for retinal detachment, especially when associated with trauma.^{4,13–15} Gauging the relationship of a trauma with a retinal dialysis can be difficult because detachment may occur weeks or even months following the incident. In the current study, penetrating traumas were excluded, and positive history of trauma was defined solely based on history. The current study differs from other reports in which penetrating trauma was included, affecting outcome reporting and rates of re-detachment.⁹

Consistent with prior literature in the management of retinal dialysis, good visual acuity prior to surgery was maintained. This is likely because of the relatively slow progression of detachments to the macula associated with retinal dialysis. Additionally, this outcome confirms that scleral buckling can be very effective in preserving vision.^{4,9,13–15} The two patients who required reoperation eventually were successful in reattaching the retina, but did require vitrectomy and silicone oil tamponade as subsequent procedures. Neither case was noted to have PVR at the time of reoperation.

In comparison to a recent study by Kwong et al., this report had a relatively low complication rate.⁹ Although the two patients requiring additional surgery received silicone oil tamponade, and one had macular hole, none of the other patients developed PVR. One hypothesis is that the attachment between the vitreous base and the posterior edge of the tear in a retinal dialysis may create a barrier, reducing the possibility of retinal pigment epithelial cells migrating into the vitreous cavity.³

The overall incidence of retinal dialysis was lower than has been previously documented.¹⁶ This may be due to variations in coding for the disease and methodology for retrieving

cases. It could also be that fewer retinal dialysis cases are being referred to academic centers as in the past, or an improvement in preventing blunt trauma. Also, the current study had no patients with multiple breaks whereas in the study by Kwong et al., 29% of patients had multiple dialyses and 33% had multiple breaks.⁹ Explaining this difference in this rate of multiple breaks or dialyses may be solely due to differences in sample sizes. Another explanation is that surgeons chose different procedures for patients with multiple retinal breaks or tears.

In the current study, only one patient had bilateral retinal dialysis, which may have a hereditary etiology. This patient did not have trauma and had excellent acuity at the time of diagnosis. Previous literature has noted that the incidence of bilateral dialyses ranges from 2% to 54%.¹⁷

Limitations to the study include its retrospective nature and the potential for missed patients due to ICD-9 coding errors. There was not a standardization in technique in terms of use of fluid drainage or gas tamponade; however, the nature of scleral buckling surgery leads to many variations due to differences in anatomy and configuration of the detachment.

It has not been demonstrated that outcome difference exists in terms of placement of scleral buckles by scleral tunnel or by suturing. In one patient, the follow-up period was extremely short due to the patient's need for travel.

Although the use of scleral buckling has declined over time, it remains an effective method for treating retinal detachment, particularly in phakic patients who have a retinal dialysis. Use of buckling may allow patients to avoid face-down positioning, missed air travel, and the complications of vitrectomy, such as increased cataract formation and hypotony. Surgeons should consider the continued use of scleral buckling as a high-success option for management of these patients.

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Figure.

(A) Preoperative fundus photograph of a patient with macula-involving retinal detachment extending from an inferotemporal retinal dialysis. (B) Postoperative fundus photograph of the same patient 4 months following scleral buckling surgery.

TABLE 1

Baseline Patient Characteristics of Patients With Retinal Detachment From Retinal Dialysis

Number of Eyes	16
Number of Patients	15
Male Gender	12 (80%)
Age (Years)	
Mean	25.8
Range	6.2–47.8
Eyes	
Right	12 (75%)
Location of Retinal Dialysis	
Inferotemporal	10 (62.5%)
Inferior	3 (18.8%)
Inferonasal	1 (6.3%)
Nasal	2 (12.5%)
Lens Status	
Phakic	16 (100%)
Associated With Trauma	12 (75%)

TABLE 2

Visual Outcomes of Patients Undergoing Scleral Buckling for Retinal Detachment Associated With Retinal Dialysis

Preoperative VA	
Mean (Snellen)	20/103
Range (Snellen)	20/20-CF
Postoperative VA	
Mean (Snellen)	20/62
Range (Snellen)	20/20-CF
VA Improved With Surgery	9 (56.3%)
VA Stable After Surgery	3 (18.8%)
VA 20/40 or Better	8 (50%)
VA 20/100 or Better	13 (81.3%)

VA = visual acuity; CF = counting fingers

TABLE 3
Case Details of Patients Treated With Scleral Buckling for Retinal Detachment Associated With Retinal Dialysis

Patient	Age (Years)	Gender	Eye	Trauma	Trauma Mechanism	Time Between Trauma and RD	Location of Retinal Dialysis	Preoperative VA	VA at Last Follow-Up	Duration of Follow-Up (Days)	Reoperation Performed
1	40	F	OS	N	N/A	N/A	IT	20/400	CF	959	Y
2	6	F	OS	Y	Stick to eye	Days	IT	20/50	20/80	9	N
3	13	F	OD	Y	Softball	Weeks	IT	20/20	20/20	418	N
4	12	M	OD	Y	Stick	Weeks	IN	20/20	20/20	64	N
5	8	M	OD	Y	Not specified	Unknown	I	6/200	20/100	461	Y
6	27	M	OS	Y	Punch	Weeks	N	20/20	20/50	12	N
7	32	M	OS	Y	Boxer	Unknown	I	20/60	20/40	284	N
8	39	M	OS	Y	Coffeepot	Days	IT	20/20	20/20	63	N
9	17	F	OD	Y	Sports	Unknown	IT	20/400	20/70	457	N
10	18	M	OS	Y	Airbag	Days	IT	2/200	20/30	345	N
11	36	M	OD	N	N/A	N/A	IT	20/200	20/40	43	N
12	29	M	OD	N	N/A	N/A	I	CF	20/200	254	N
13	29	M	OS	N	N/A	N/A	IT	20/25	20/20	128	N
14	48	M	OS	N	N/A	N/A	IT	20/70	20/50	349	N
15	31	M	OS	Y	Tennis ball	Months	N	20/25	20/20	76	N
16	29	M	OS	Y	Blunt	Months	IT	20/200	CF	38	N

RD = retinal detachment; VA = Snellen visual acuity; F = female; M = male; IT = inferotemporal; CF = count fingers; IN = inferonasal; I = inferior; N = nasal