

Case Report

# Scleral buckle induce orbital cellulitis and scleritis – A case report and literature review



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## Abstract

We report a case of a young healthy patient who developed orbital cellulitis and scleritis after retinal detachment surgery that was repaired with a scleral buckling procedure. Once scleral implant infection occurs, orbital infection results requiring removal of the implant in all previous reported cases. However, our patient was treated with systemic antibiotic and steroids without the need for removal of the scleral buckle.

**Keywords:** Orbital cellulitis, Scleritis, Scleral buckle

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## Introduction

Scleral buckling (SB) is a surgical technique that has been successfully used to treat rhegmatogenous retinal detachment (RRD). The technique as recognized today, using solid silicone or sponge implants, was developed in the United States by Harry Lincoff and Charles Schepens.<sup>1,2</sup>

Silicone implants are economical, easy to obtain, soft, biochemically inert, non allergenic, and generally well tolerated in the body, being commonly considered the material of choice in SB procedures.<sup>2,3</sup> However, silicone can occasionally induce long-term complications including increased intraocular pressure (IOP), choroidal and ciliary detachment, diplopia, strabismus, refractive changes, endophthalmitis, macular pucker, extrusion or intrusion, swelling and fragmentation of the buckling device.<sup>4–6</sup>

Orbital cellulitis is an unusual complication of SB.<sup>7</sup> We report a case of orbital cellulitis after a SB procedure that

was diagnosed and clinically treated at our hospital with good outcomes and we provide a revision of the pertinent literature.

## Case report

An 18 years old healthy male had a spontaneous RRD in the left eye (OS) and was treated at King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia using placement of a 240 solid silicone band combined with vitrectomy and silicone oil. Five weeks postoperatively the patient presented with ocular pain associated with headache. There was no fever, diplopia or change in vision. Visual acuity (VA) with Snellen chart was 20/20 in the right eye (OD) and 20/200 OS, intraocular pressure (IOP) was 17 mmHg OD and 30 mmHg OS. Pupil was reactive with no afferent pupillary defect OD and dilated and not reactive OS. Ophthalmic exam OD was unremarkable and OS showed mild lid edema and erythema,

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motility minimally limited in abduction and supraduction and proptosis (Hertel measurement OD = 18 mm and OS = 24 mm). On slit lamp examination, OS presented with conjunctival injection, chemosis with no discharge and the SB was not exposed or extruded. Cornea and lens were clear, anterior chamber was deep and quiet, with silicone oil and peripheral anterior synechia. Dilated fundus examination showed OS with hyperemic disc and flat retina under silicone oil. Ultrasound B-scan OS was unremarkable.

Contrast enhanced computed tomographic scan (CT scan) of the brain and orbit showed left periorbital and pre-septal soft tissue thickening and stranding of the pre-septal fat planes associated with enlargement of the left lacrimal gland, intravitreal silicone oil. The appearance likely represented left pre-septal and orbital cellulitis, scleritis and dacryoadenitis. There were no alterations in the bony boundaries of the orbits or in the paranasal sinuses bilaterally (Fig. 1).

The patient was admitted for silicone oil removal to control high IOP and started clinical treatment for orbital cellulitis using intravenous Cefazolin (Zolecin, Hlkma Pharm, Jordan) 1 gm every 8 hours/7 days and Gentamicin (Gentam, Spimaco Addwaeih, Saudi Arabia) 80 mg every 8 hours/7 days, topical steroid and cycloplegic drops OS and full antiglaucoma medications, the condition improved resulting in less ocular pain, better ocular motility and reduced proptosis. After five days 1 mg/kg/day oral Prednisolone (Prednisolon, Takeda Pharma, Austria) was added to the treatment and further improvement was noticed. After 7 days, the intravenous antibiotics were changed to oral Moxifloxacin (Maxim, Jamjoom Pharma, Saudi Arabia) 400 mg once per day to complete 10 days of treatment. Patient was discharged from our hospital in good condition with a prescription for oral antibiotic and tapering dose of steroid. On 2 months follow up after discharge the signs of orbital inflammation and proptosis subsided with full ocular motility. Our patient did not develop orbital inflammation and the SB remains in place.

## Discussion

This case report document the management of orbital cellulitis after SB surgery in a healthy young patient. There are

other 17 cases that have been previously reported (Table 1) however our patient is the youngest. All the other patients were over 40 years old. Management of our case resulted in a good outcome without requiring SB removal.

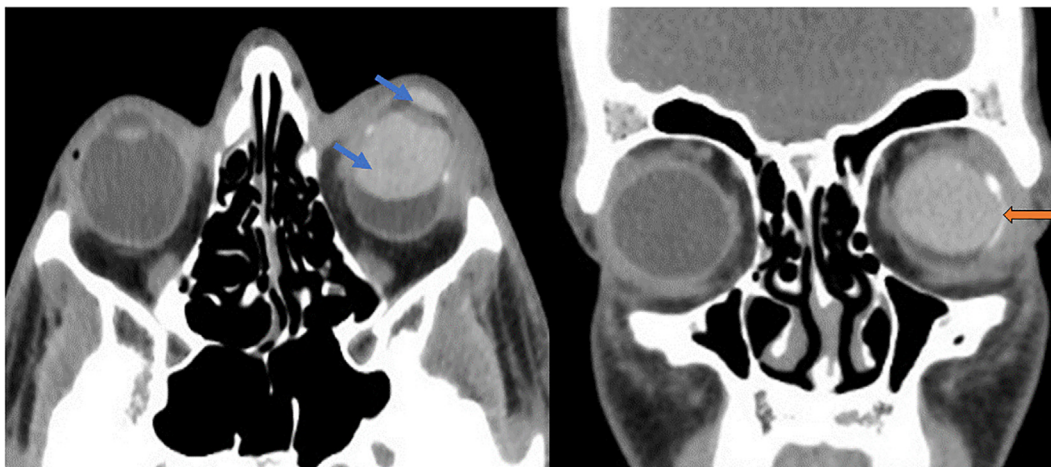
The SB surgery was uneventful with a normal outcome. However, five weeks postoperatively, the classic signs of orbital cellulitis including pain, redness, conjunctival chemosis, limitation in extraocular motility and proptosis were detected. CT scan confirmed our clinical suspicion of orbital cellulitis showing the inflammatory reaction surrounding the SB and also inflammation in the lacrimal gland and sclera.

Postoperative inflammation after SB surgery is unusual, even more unlikely to progress to orbital cellulitis, occurring in only 0.83% of all SB surgeries.<sup>7</sup>

Previous literature has reported the orbital infectious process as an acute or chronic inflammation, starting 3 days to 31 years after surgery (Table 1). Infections occurring 2 to 8 weeks after surgery are likely due to bacterial contamination during the surgical procedure arising from the skin, lid margin, or conjunctiva.<sup>18,19</sup> Late infections, occurring more than 2 months after surgery, in general result from secondary infection in a mechanically extruded buckle.<sup>19</sup> We suspect the contamination in our case occurred during surgery because the infection started in a relatively short period without SB exposition.

VA was maintained with anterior and posterior chamber normal, with no vitreous reaction. This finding excluded the possibility of endophthalmitis. Endophthalmitis after SB surgery is also extremely uncommon, with reported incidence of 0.3%.<sup>20</sup> However, infectious scleritis remains a possibility. Scleritis after RRD can be infectious as well as noninfectious and this diagnosis should be considered in the setting of pain, with each considered serious complications after SB.<sup>21</sup>

As our patient had no exposure of the SB we decided not remove the buckle. All the other reported cases of SB associated to orbital cellulitis except our had SB removal. The most common reasons for silicone SB removal include conjunctival or skin extrusion, extraocular infection, intraocular erosion, endophthalmitis, scleritis and recurrent retina detachment.<sup>7,22</sup> In cases of infectious scleritis, the buckle must be removed immediately to avoid scleral perforation and the outcome can be poor, delaying the removal of the buckle.<sup>23</sup>



**Fig. 1.** Axial and coronal post contrast CT scan of the orbit showed status-left globe post scleral buckling as curvilinear higher density (red arrow) with intra-vitreous silicone oil extending into the anterior chamber (blue arrow), with peri-orbital, pre-septal thickening on either side anterior and posterior to the scleral buckle with mild enlargement of the left lacrimal gland.

**Table 1.** Presentation of our case and the literature review of complicated sclera buckle with orbital cellulitis and their management.

Authors	Gender	Age	Eye	Procedure	Interval of infection after surgery	Symptoms	Management	Outcome
Our patient	Male	18	OS	Ppv + SB	5 weeks	Ocular pain, chemosis, proptosis and limited ocular motility.	IV antibiotic and oral steroid	SB was not removed
Nemet et al., 2017 <sup>7</sup>	Male	44	OD	Ppv + SB	10 months	Ocular pain, proptosis and limited ocular motility.	IV antibiotic	SB removal + Ppv + SO
Nemet et al., 2017 <sup>7</sup>	Female	53	OS	Ppv + SB	14 months	Ocular pain, chemosis, lid redness, proptosis.	IV antibiotic	SB removal
Nemet et al., 2017 <sup>7</sup>	Male	74	OD	SB	10 months	Ocular pain, exposed SB, purulent discharge.	IV antibiotic	SB removal
Nemet et al., 2017 <sup>7</sup>	Male	79	OS	SB	6 years	Ocular pain, lid redness, chemosis, proptosis, limited ocular motility	IV antibiotic	SB removal
Nemet et al., 2017 <sup>7</sup>	Female	75	?	SB	3 days	Ocular pain, chemosis, lid redness, proptosis.	IV antibiotic	SB removal
Nemet et al., 2017 <sup>7</sup>	Female	85	OS	SB	12 years	Ocular pain, lid redness, chemosis, proptosis, limited ocular motility + 2 RAPD.	IV antibiotic	SB removal
Nemet et al., 2017 <sup>7</sup>	Female	52	OD	SB	19 years	Ocular pain, lid redness, limited ocular motility.	Systemic (oral then IV) and topical antibiotics, steroid.	SB removal
Churgin et al., 2018 <sup>8</sup>	Male	56	OS	SB	20 years	Ocular pain, redness, chemosis, nodular lesion with fistula.	Systemic (oral then IV) and topical antibiotics Topical steroid	SB removal
Liu et al., 2004 <sup>9</sup>	male	63	OS	SB	8 years	Ocular pain, mucopurulent discharge, exposed SB.	IV, topical antibiotics	SB removal
Hor et al., 2017 <sup>10</sup>	female	85	OS	SB	Unknown	Ocular pain, blurred vision, redness, yellowish discharge and lid swelling.	IV, topical antibiotics	SB removal
Kotoulas et al., 2014 <sup>11</sup>	female	83	OS	PPV + SB	9 years	Ocular pain, redness, lid edema, discharge, proptosis, limited ocular motility, extruded SB.	IV antibiotics	SB removal
Rubinstein et al., 2016 <sup>12</sup>	female	32	OD	SB	5 years	Ocular pain, redness, proptosis, exposed SB.	Oral antibiotic	SB removal
Shah et al., 2011 <sup>13</sup>	Female	43	OS	SB	16 years	Diplopia, ptosis, limited ocular motility, SB protruded in upper lid.	-	SB removal
Makino et al., 2012 <sup>14</sup>	male	42	OS	SB	16 years	Ocular pain, redness, purulent discharge, exposed SB.	Oral and topical antibiotic	SB removal
Bernardino et al., 2006 <sup>15</sup>	Male	41	OD	SB	15 years	Ocular pain, redness, purulent discharge, limited eye movement, proptosis	-	SB removal
Bernardino et al., 2006 <sup>15</sup>	Male	40	OS	SB	Unknown	SB protruded in the left lower lid.	-	SB removal
Nielsen et al., 2004 <sup>16</sup>	Male	69	OS	SB	31 years	Exposure of SB, nodular scleritis, sclera thinning.	Systemic (oral then IV) and topical antibiotics	SB removal
Oz et al., 2004 <sup>17</sup>	Male	59	OS	SB	18 years	Redness, anterior uveitis, exposed SB.	Topical antibiotics	SB removal

OD = right eye.

OS = left eye.

SB = scleral buckling.

SO = silicon oil.

PPV = pars plana vitrectomy.

IV = intravenous.

When removed, the buckle can be investigated for infectious agents. Previous reports have isolated Gram-positive cocci (41.1%), acid-fast bacilli (20.5%), fungi (15.1%), gram-positive bacilli (13.7%), and gram-negative bacilli (9.6%), sensitive to vancomycin (93%), ciprofloxacin (86%), and amikacin (80%), respectively<sup>21,22,24</sup>. Other microorganisms can be polymicrobial organisms, corynebacteria, *Mycobacterium chelonae*, *Proteus mirabilis*, and *Pseudomonas aeruginosa* (in cases of necrotizing scleritis)<sup>21,22,24</sup>. There was no microorganism isolated from conjunctival culture in our patient.

We started treatment with broad spectrum antibiotics due to the diagnosis of orbital cellulitis after SB and vitrectomy surgery. However, the symptoms also improved after our patient received systemic steroids, which suggested an inflammatory component associated to the infection.

Our patient had a solid silicone SB. Infection in solid silicone is less frequent and can be a chronic, occurring more than 1 year after surgery.<sup>25</sup> Alternately, sponge SB has higher chance of contamination likely due to the higher chance of bacterial adhesion. Bacteria can secrete an extracellular polysaccharide or glycocalyx, called biofilm, that protects against host defenses and antimicrobial treatment, maintaining the adherence of bacteria with the buckle.<sup>26</sup> The presence of bacteria encased in biofilms was reported in 11 of 17 (65 %) buckles evaluated in a previous study.<sup>26</sup> Bacterial production of biofilm is a possible explanation for the persistence of SB infections and their ability to withstand antimicrobial treatment, resulting in the necessity of SB removal in many cases but not in our case.

In conclusion, we report a case of RRD had surgical repair with SB ending with orbital cellulitis and scleritis without implant exposition. The infection was controlled with clinical treatment without necessitating buckle removal. The authors recommend close follow up of patients with SB due to the possibility of complications occurring acutely or even years after the surgery.

## Conflict of interest

The authors declared that there is no conflict of interest.

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