

# RETROBULBAR HEMORRHAGE - A LITERATURE REVIEW

Correspondance to:

Dr.Vijay Ebenezer <sup>1</sup>,

*Professor Head of the department of oral and maxillofacial surgery, Sree balaji dental college and hospital, pallikaranai, chennai-100.*

**Email id: [drvijayomfs@gmail.com](mailto:drvijayomfs@gmail.com), Contact no: 9840136328**

**Names of the author(s):**

*Dr. Vijay Ebenezer<sup>1</sup>, Dr. Balakrishnan Ramalingam<sup>2</sup>,*

*Professor and Head of the department of oral and maxillofacial surgery, Sree Balaji dental college and hospital, BIHER, Chennai-600100, Tamilnadu , India.*

*professor in the department of oral and maxillofacial surgery, Sree balaji dental college and hospital, pallikaranai, chennai-100.*

## **ABSTRACT**

***Retrobulbar hemorrhage (RBH), sudden space occupying or expanding intraorbital lesions, herniation, or swelling lead to decrease in visual acuity secondary to orbital trauma. RBH must be diagnosed and treated as early as possible without delay. The purpose of this article is to give a insight on various treatment options for RBH. MEDLINE database was used to perform literature review. RBH patients are classified into RBH classes I to III according to three different clinical and radiological manifestations of acute RBH. Three categories of manifestations of acute RBH serve as a diagnostic tool that may help in the determination of treatment options.***

***KEYWORDS: Retrobulbar hemorrhage, retrobulbar hematoma, orbital trauma, optic nerve trauma***

## **AIM**

***The aim of this article is to provide knowledge about the existing treatment options and an efficient alternative to make diagnostic and therapeutic more simplified for planning the treatment in patients who present with acute RBH.***

## **1. INTRODUCTION**

Retrobulbar hemorrhage (RBH) is not a frequent case encountered but remains as orbital emergency with the potential to cause blindness ,hence quick diagnosis and treatment are ideal to maintain or reconstitute visual acuity. According to literature based on the causes, RBH can be distinguished as: traumatic and nontraumatic. Traumatic causes of RBH can be further more classified as nonpenetrating and penetrating trauma. Penetrating orbital trauma is documented to be iatrogenic. The surgical and anesthesiological procedures performed in the periorbital region is the major cause.<sup>1</sup> RBH has been reported to be the most common risk of peri- and retrobulbar anesthesia<sup>2-5</sup> and the main cause of loss of vision after blepharoplasty.<sup>6,7</sup> Orbital surgery and procedures performed in adjacent anatomical sites, which includes the sinus and oral cavity, can cause intraorbital hemorrhage.<sup>8-14</sup> In cases of nonpenetrating orbital trauma the fractures of the orbit involved due to blunt facial trauma may be associated with RBH, and loss of vision is also noted in few of these patients.<sup>15,16</sup> Drug therapy<sup>17</sup> or hemorrhage related to congenital or systemic conditions <sup>18-20</sup> may be due to nontraumatic RBH. Drug-related nontraumatic RBH occurs in hemorrhagic diatheses as a result of circulating anticoagulation medication,<sup>21,22</sup> vessel malformations are congenital

causes of RBH.<sup>23</sup> RBH can occur spontaneously in drug-related pharmacological or congenital conditions.<sup>24</sup> Ischemia of the optic nerve is the main underlying pathophysiological cause<sup>25</sup> of loss of vision in RBH. Elevated pressure in the orbital compartment and hemorrhage or swelling caused by an expanding intraorbital lesion<sup>26</sup>; leads to a condition that occludes the central retinal artery, causing mechanical compression of both the optical nerve and the afferent blood supply, either of the pathways result in optic nerve ischemia and optic nerve neuropathy.<sup>27</sup>

## 2. DIAGNOSIS, SIGNS, AND SYMPTOMS

The most notable signs and symptoms which is specific to acute RBH is decreasing visual acuity, axial proptosis, and a fixed and dilated pupil or a relative afferent pupillary defect (RAPD). The main thing in clinical examination are testing for visual acuity and pupillary light reflexes, chiefly the swinging flashlight test.<sup>31,32</sup>

Electrophysiological testing of the visual pathway, such as flash-evoked visual potentials (VEPs) and electroretinograms (ERGs), is the foremost diagnostic tool in noncooperative patients or when clinical tests are compromised because of unconsciousness, morphine medication, or extensive periorbital swelling, in these cases it also serves as an efficient tool for distinguishing between reversible and irreversible optic nerve damage and for selecting either surgical decompression or conservative therapy.<sup>33</sup>

## 3. SURGICAL APPROACH

The treatment for acute RBH to release pressure rapidly and drainage of hemorrhage has evolved for the requirements of transcutaneous transseptal orbital decompression approach. Hematoma is drained out of the orbital compartment without the need for osteotomy of orbital walls through the orbital septum. The transcutaneous transseptal approach is less time consuming procedure as orbital osteotomies with rapid pressure release with drainage of hemorrhage will take a longer time. Changes or even loss of vision, damage to intraorbital neurovascular structures which is caused by increase in ocular pressure can be prevented by immediate treatment. The prescribed time window for the release of intraorbital pressure is limited to approximately 1 hour from the onset of blindness.<sup>26</sup> Though lateral canthotomy and inferior cantholysis are the standard procedures and safest approach for the release of intraorbital pressure but does not suffice for the evacuation of hematoma it has risks of hemorrhage, scarring, and mechanical injury to the globe and ocular muscles. The steps involved is dissection or lysis of the lateral canthal tendon, that can affect eyelid attachment, esthetics, lacrimation flow, and ocular motility.<sup>27</sup> In contrast, the it is observed that there remains a major risk with transcutaneous transseptal approach that includes injuries of the infraorbital nerve and supraorbital nerve, the ocular muscles and direct mechanical injury to globe. In comparison with lateral canthotomy with inferior cantholysis, the transcutaneous approach does seem to have caused any changes in the lateral canthal tendon or its functions. Infraorbital and supraorbital nerve palsy are negligible if the transcutaneous incisions are performed with care. Lateral canthotomy cannot provide evacuation of the hemorrhage from the orbital compartment. An extraconal hemorrhage that can get collected anywhere within the orbit and may be difficult to access if the incision is inappropriately placed.<sup>30</sup> In few studies it is noted that, lateral canthotomy performed along with inferior cantholysis did not sufficiently decompress the orbit because of severe tension of the globe and periorbital swelling; thereby visual acuity was not maintained or reconstituted in these cases.<sup>20</sup> Transcutaneous transseptal orbital decompression provides a rapid intervention indicated for safe release of intraorbital pressure and would provide an efficient drainage of the hemorrhage from the orbital compartment, especially in extensive orbital hemorrhage, periorbital swelling or when imaging cannot be performed. Pulsating exophthalmos caused due to carotid-cavernous sinus fistula is contraindicated to perform surgical treatment. In various studies published it is stated that conservative treatment would be considered as an adjuvant option.<sup>20</sup> The use of steroids as an adjuvant, mannitol and acetazolamide is included in almost all published protocols,<sup>20,35</sup> although the administration protocols vary. Megadose methylprednisolone regimen is used as conservative therapy for the treatment of acute RBH or other sudden expanding retrobulbar lesions or traumatic optic nerve lesions.

#### 4. CONCLUSIONS

Classification of acute RBH into group I to III, provides a simple tool for rapid identification and treatment planning for of this rare clinical condition. Older aged women and severely injured patients are at a greater risk of developing acute RBH. Visual acuity test should be carried out for 24 hour in RBH class I, orbital trauma, or after surgical procedures. In RBH class II and RBH class III with decreasing visual acuity or typical radiological features must be treated immediately with surgical decompression. Conservative therapy should be kept as the last option if the patient refuses for surgery. In a case with pulsating exophthalmos, transcutaneous transseptal orbital decompression in combined with megadose regimen of the methylprednisolone provides a quick and efficient method for treating acute RBH. It is observed that most procedure-related complications respond well to therapy, on the contrary prolonged ischemia of the optical nerve does not respond.

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