

Novel procedure of treating sub-macular haemorrhage (SMH) with only pneumatic displacement (PD).

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Introduction

Sub macular haemorrhage results from Choroidal and retinal vessel abnormalities. Sub macular haemorrhage frequently results from a Choroidal neovascular membrane secondary to age-related macular degeneration. Other conditions related to CNVM, including myopia, trauma, ocular histoplasmosis and angioid streaks, also can cause sub macular hemorrhage. 1-3 little, thin SMH can often be observed (See Figure 1), while massive submacular haemorrhages often have a poor prognosis no matter intervention. 1 Thick, medium-sized subretinal hemorrhages that reach under the macula and obscure the underlying retinal pigment epithelium can also cause significant vision loss; however, they are often amenable to treatment. There are a variety of treatments targeted at the removal or displacement of the hemorrhage. Some techniques are office-based, while others are performed in the operating room. Pneumatic displacement of SMH (with and without tissue plasminogen activator [t-PA]) is an office-based procedure first described by Wilson J. Heriot, MD, in 1996 and has shown some success in subsequent small case series. 5-8 This technique attempts to physically displace the SMH out of the fovea using expansile gas.

Over the past decade, anti-VEGF agents have changed the AMD treatment paradigm. Patients with thick SMH were excluded from the trials that led to Food and Drug Administration approval, however, three case series have looked at the treatment of SMH secondary to AMD with anti-VEGF alone. 18-20 In each study, the investigators followed patients with AMD and SMH monthly and administered intravitreal injections of either bevacizumab or ranibizumab alone with favorable results. The authors concluded that intravitreal anti-VEGF monotherapy is superior to natural progression and is a reasonable alternative for poor surgical candidates, patients intolerant to prone head positioning or patients with subretinal hemorrhage which will be displaced directly into the fovea. Sub-macular hemorrhage (SMH) may be a thematic collection between the neurosensory retina and therefore the retinal pigment epithelium; one among its causes is ocular injury that sometimes affects young patients. Persisting SMH results in a damage of photoreceptors mediated by three main mechanisms: iron-related toxicity, impairment of diffusion of oxygen and nutrient, mechanical damage thanks to clot contraction. Since early photoreceptors' damage has been reported within 24 h, it's suggested to supply an early treatment, although there are not any guidelines or consensus between authors regarding treatment strategies. The aim of this review was to present and compare

available treatment options, like intravitreal tissue urokinase (tPA) related to pneumatic displacement, pneumatic displacement alone, subretinal tPA injection with pneumatic displacement, and intravitreal anti-vascular endothelial protein (VEGF) injection. All procedures obtained consistent results, though the foremost effective appeared to be pars plana vitrectomy, subretinal tPA and gas tamponade, probably thanks to a quicker liquefaction and displacement of the clot.

Macular damage due to SMH consists of a combination of multiple mechanisms. Blood coagulation produces erythrocyte degeneration, with release of iron and hemosiderin, and subsequent oxidative stress. Labile iron is one of the key factors for oxidative damage to cellular proteins, lipids, nucleic acids, and other cellular constituents. Iron-mediated toxicity causes selective destruction of the first retinal neuron and has effects on retinal circulation. Blood clot behaves like a barrier to metabolic exchange and limits the passage of nutrient and oxygen from the RPE to the photoreceptors.

Abstract

The natural history for SMH is usually poor. So, many investigators have attempted to find effective surgical options. There is a wide variation of PD success reported and several treatment strategies. But, no consensus or treatment guidelines regarding optical management. Nevertheless, with the advances in vitreoretinal surgery, they continue to evolve novel management strategies for SMH. This is a largest series which was born in a move to find out a definite protocol to effectively manage cases of SMH which had different causes of their bleed. It is seen in this study that SMH if reported within a week of symptoms after PD can have a better visual prognosis than late presentation. The final visual prognosis revolves around the cause for SMH. Why tPA was not used, was due to its non-availability readily, expensive and thinking about the complications of its use, though many reports are present suggesting its use to be safer. PD in this series was done in the next day of the presentation as an emergency procedure. Pure perfluoropropane gas (0.3ml) injected into the vitreous cavity can displace SMH without the use of tPA in all cases. Visual acuity after gas injection improves, making this treatment an alternative to evacuation of SMH. This also helps to find out the cause for SMH after the displacement of the haemorrhage.