# Diode Laser assisted Drainage of the Subretinal Fluid: Procedure refinement

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**Abstract** Background: Subretinal hemorrhage is a devastating results that may occur during drainage of subretinal fluid (SRF) with standard retinal detachment surgery. The aim of the study was to assess the rule of transcleral diode laser in draining of the sub retinal fluid after refining the procedure. Patients and methods: a prospective study was conducted on 17 eyes of 17 patients presented with bullous rhegmatogenous retinal detachment that required drainage of the subretinal fluid, sealing of the retinal break/s, air or gas injection and buckle implant. The trans-scleral diode laser was applied at an attached retina to adjust the laser power then at the planned site of needle drainage. The diode laser parameters used were 0.2s duration and 0.8-1.4 W power. Results: Adequate drainage of SRF was obtained in all cases. One eye developed a localized subretinal hemorrhage. Conclusion**:** after technique refinement transcleral diode laser became more reliable and effective tool in preventing choroidal hemorrhage that may occur during draining of the subretinal fluid in retinal detachments surgery.
[Ahmed I. M. Kamel. **Diode Laser assisted Drainage of the Subretinal Fluid:Procedure refinement**. Journal of American Science, 2012;8(4):258-260]. (ISSN: 1545-1003). http://www.americanscience.org 34

**Key words:** trans-scleral diode laser, retinal detachment, drainage of the subretinal fluid.

## 1. Introduction

Drainage of subretinal fluid (SRF) during rhegmatogenous retinal detachment (RD) repair is very valuable to facilitate retinal attachment, retinal break apposition and placement of a scleral buckle (SB). It is particularly indicated in patients with bullous retinal detachment, aphakic detachments , inferior retinal breaks, proliferative vitreoretinopathy (PVR) and old detachments. Methods of draining the subretinal fluid include; the needle drainage with or without tightening an encircling scleral buckle , diathermy pin, electrolysis needle, active suction trans-conjunctival drainage using a vitrectomy line coupled to a needle (500 mmHg vacuum), argon laser and trans-sclera diode laser. The incidence of subretinal hemorrhage, iatrogenic break and retinal incarceration were variable in previous studies [1-16].The purpose of the current study is to assess the modified technique of trans-scleral diode laser drainage of subretinal fluid (SRF) during standard retinal detachment surgery.

## 2. Patients and Methods

This was a prospective study which was conducted at Al-Azhar University Hospitals Cairo Egypt. Seventeen eyes of seventeen patients (13 males and 4 females) were included and presented for the first time with subtotal bullous rhegmatogenous retinal detachment in one eye only and required drainage of the subretinal fluid. Exclusion criteria included: eyes presenting with traction or combined traction retinal detachment, eyes presenting with vitreous hemorrhage, penetrating ocular injuries and eyes presented with choroidal detachment. The mean age of patients was 47±6 years (range 41-59 years). The mean duration of retinal detachment to operation day in all eyes was 13 days (range 4–45days). All eyes were phakic and the macula was detached. Prior surgery, patients were subjected to a full medical and ocular examination . The retina was examined in all eyes under slit-lamp with Nidik super field lens and indirect ophthalmoscope. The extent of retinal detachment, the number, site and size of retinal breaks, the presence or absence of vitreous haze and the stage of PVR was recorded in each patients. Eyes were expected to have draining the subretinal fluid, sealing of the retinal breaks by cryo or external diode laser, injection of air or gas and inserting a buckle. During surgery, diode laser retinopexy probe was placed over an attached retina first and repeated shots (1-3) were applied to choose the lowest effective power, then maximum elevation of the neurosensory retinal detachment was identified guided by diode laser retinopexy aiming beam. Trans-scleral needle drainage of subretinal fluid was performed after applying 4-5 diode laser shots by the diode retinopexy probe at the chosen site of drainage where the sclera was lightly cauterized for marking. Diode laser (Oculight SLx Iris Medical Diode Laser) parameters used were 0.2-0.3s duration and 0.8-1.4w power. Then pressure was applied from opposite quadrants and anterior to the drainage site to facilitate subretinal fluid drainage. The drainage was considered successful if it was adequate to complete the retinal reattachment procedure. Drainage was followed by sealing and internal and external tamponading of the retinal break/s. Patients were

followed for up to three months postoperatively for the assessment of retinal detachment repair. Postoperative examination included visual acuity, anterior segment examination and posterior segment examination.

**3. Results**

Drainage of SRF was successful in all cases. Ten (58.8%) eyes had one quadrant buckled and seven (41.2%) eyes had two quadrants buckled. Six (36%) eyes underwent an additional encircling procedure. Two eyes (11.7%) underwent more than one procedure. Neither eye acquired retinal incarceration or iatrogenic retinal break. One eye (5.8%) developed a localized subretinal hemorrhage. The final aided visual outcome was equal to 4/60 or better in all eyes.

**4. Discussion**

External drainage of the subretinal fluid (SRF) in retinal detachment surgery is known to be a risky step. Techniques for the external drainage of the SRF drainage include: needle drainage , diathermy pin, cautery, knife, trans-conjunctival active suction drainage, Argon laser and transcleral Diode laser. Risks of external drainage of the subretinal fluid (SRF) reported in previous studies included retinal perforation and/or incarceration and choroidal hemorrhage. These hazardous complications has been reported to occur in 1.2% to 22.2% of cases [1,2,4,7,8,11,13-15]. Argon laser allows drainage of the SRF even in eyes with shallow retinal detachment and reduces the risk of endophthalmitis because there are no instruments entering the eye. Argon laser also provide gradual and slow drainage of the SRF that may reduce the occurrence of retinal incarceration at the drainage site. Argon laser assisted drainage of the SRF has the advantage of lower incidence of bleeding. [3,5,6,9,12]. **Kamel *et al.,*** 2008 demonstrated that trans-scleral diode laser application was also effective and reliable as argon laser choroidotomy [16]. In their study sclerotomy was performed first then followed by applying the trans-scleral probe over the intended area of drainage on exposed choroid and the diode laser power was adjusted according to surgeon expertise. Although subretinal hemorrhage occurred but this was attributed to improper adjusting of the final correct power reached.

In the current study trans-scleral diode probe was applied over an intact sclera where diathermy mark exists and laser power was adjusted, by applying few shots over the attached retina to identify the minimum adequate laser reaction. This procedure influenced the results of draining the subretinal fluid. This technique refinement added more safety to the procedure. Also diode laser power was slightly higher than **kamel *et al.,2008*** [16].

**5. Conclusion**

Trans-scleral diode laser was significantly valuable in preventing choroidal hemorrhage that may occur during draining of the SRF in retinal detachments surgery especially after proper power adjusting.

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