

## CO<sub>2</sub> Laser Blepharoplasty for Vulnerable Elderly Patients with Severe Ptosis



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### Abstract

**OBJECTIVE:** To report the success of CO<sub>2</sub> Laser Blepharoplasty (CLB) for severe ptosis (SP) in vulnerable elder patients (VEP).

**MATERIALS AND METHODS:** A retrospective review of 32 consecutive cases of SP was carried out between 2013-2014 at Bangkok Hospital, Ramkamhaeng Hospital, Patana Medical Center Clinic in Bangkok. All SP case (margin reflex distance (MRD1) 0-1 mm) were aged 60 years or above, ranging between 60-84 years of age, old aged patients were 80 years or above (5 patients (15.62%). The average age was 68.5 years, 20 of the patients were women (72.5%), and 12 were men (37.5%). Each patient had at least one or more underlying diseases: diabetes mellitus (DM) in 12 cases (37.5%), hypertension (HT) in 10 (31.25%), heart diseases (HD) (i.e. post balloon cath, cardiac intervention, coronary bypass) in 8 (25%), bleeding diathesis (i.e. ITP, cannot stop anticoagulation or antiplatelet) in 4 (12.5%), and Parkinson's disease in 2 cases (6.25%). The levator aponeurosis advancement (LA) was performed with a CO<sub>2</sub> laser device in Ultrapulse mode, (power 5-7 W) under local anesthesia. Light intravenous sedation for the 5 very old aged patients was added to calm and comfort them during the operation. The LA adjustment for eyelid height and contour in an upright position was selected to obtain the most consistently favorable postoperative results. MRD1 (pre-and post-op) Intra-op bleeding, post-op bleeding, pain and patient satisfaction were assessed.

**RESULTS:** Margin reflex distance (MRD1) pre-op = 0-1 mm, post-op average = 2.8 mm ( $p < 0.01$ ), low bleeding or nearly bloodless during intra-op & post-op. The advantage of CO<sub>2</sub> laser over conventional surgery is easy dissection of skin and fat tissue and especially being able to clearly identify the LA with ease. Twenty eight cases (87.5%) had mild pain or less, 4 cases (12.5%) had moderate pain, no severe pain observed. There was no serious complication or any harmful effect to the patients or their underlying diseases. All patients reported a high degree of satisfaction after the operation and were happy with their better vision and facial presentation.

**CONCLUSION:** CLB can be a good choice for difficult cases, especially SP and complicated VEP.

**Keywords:** CO<sub>2</sub> laser blepharoplasty, CLB, severe ptosis, SP, elderly patients with severe ptosis, blepharoptosis

Eyelid ptosis or blepharoptosis is defined as an abnormal drooping of the upper eyelid when looking straight.<sup>1</sup> Ptosis can be present at birth (congenital) or can develop later in life (acquired). Ptosis may be due to a myogenic, neurogenic, aponeurotic, mechanical or traumatic cause. Besides the eyelid drooping, patients with ptosis complain of having a tired appearance, blurred vision, upper visual field impairment and increased tearing. Patients with significant ptosis may need to tilt their head back into a chin up position, lift their eyelid with a finger, or raise their eyebrows. Continuous activation of the forehead and scalp muscles may additionally cause tension headache and eye strain.<sup>2</sup>

CO<sub>2</sub> laser blepharoplasty (CLB) or laser-assisted blepharoplasty (LAB) was first introduced by Baker in 1984. The advantages are improved intra-operative hemostasis, decreased operating time and improved appearance in the immediate post operative period.<sup>1,3</sup>

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Received: June, 29, 2015.  
Revision received: July, 1, 2015.  
Accepted after revision: July, 1, 2015.  
Bangkok Med J 2015;10:6-9.  
E-journal: <http://www.bangkokmedjournal.com>

The CO2 laser was first developed in 1964 by Patel in the lab of the Bell Telephone Company. The CO2 laser is 10,600 nm in wavelength, absorbed by biological tissue regardless of pigmentation or vascularity. The target is water by rapid heating and vaporizing intracellular water. CO2 laser has several advantages: extreme precision in depth; excellent hemostasis (can seal blood vessels less than 0.5 mm and up to 2 mm); speeds up the procedure; minimizes post-op pain (seals small nerve endings avoiding frayed endings occurring with scapel use); less edema or swelling (seals small lymphatic vessels).<sup>4</sup>

Thailand is aware of its aging population and in 2005, being aged was defined as being 60 years old or older. By this definition, more than 20% of population will be considered aged by 2024-2025.<sup>5,6</sup>

The surgery for treatment of SP in old aged patients with several underlying diseases or vulnerable elderly patients (VEP) has to be managed and justified with appropriated techniques not only for good and effective results but also causing no harm to underlying diseases.

CLB or LAB is focusing its research to service this critical need.

### Material and Methods

This is a retrospective, case control study which reviewed 32 consecutive cases of SP carried out between 2013-2014 at Bangkok Hospital, Ramkamhaeng Hospital. Vulnerable patients with underlying diseases (at least one or more) i.e. 12 cases with DM (37.5%) 10 cases with HT (31.25%), and 8 HD cases (ie. post balloon cath, cardiac intervention Hospital, Patana Medical Center Clinic in Bangkok) were selected in this study.

#### Inclusion criteria:

- SP with MRD1 = 0-1 mm, from senile or aponeurotic type.
- Elderly patients aged 60 years or above, range 60-84 years (average 68.5 years), 12 men (37.5%), and 20 women (72.5%), 8 coronary bypass cases (25%), 4 bleeding diathesis cases (i.e. ITP, cannot stop anticoagulation or antiplatelet) (12.5%), 2 Parkinson cases (6.25%), and 5 very old aged cases (80 years or above) (15.62%).

#### Exclusion criteria:

- SP from other causes i.e. neurogenic, myogenic, mechanical or traumatic.
- No previous eyelid surgery for SP.

All SP was corrected by LA<sup>7</sup> with CLB in ultrapulse mode, (Power 5-7 W) by the same Oculoplastic surgeon under local anesthesia except for the 5 very old aged patients, where light intravenous sedation was added to calm and comfort them during operation. The LA adjustment for eyelid height and contour was performed in an upright position to obtain a consistently favorable post operative outcome. MRD1 pre-op and post-op, intra-op bleeding, post-op bleeding, pain and patients satisfaction were observed.

### Results

MRD1 pre-op = 0-1 mm, post-op average = 2.8 mm ( $p < 0.01$ ), we observed less bleeding or nearly bloodless during intra-op and post-op bleeding. The post-op pain was recorded as mild or less in 28 cases (87.5%), moderate pain in 4 cases (12.5%), and no severe pain observed (Figure 1). There was no serious complication or harmful effect to VEP or their underlying diseases. All enrolled patients were delighted with a high degree of satisfaction after the operation, enjoying better vision and facial presentation.

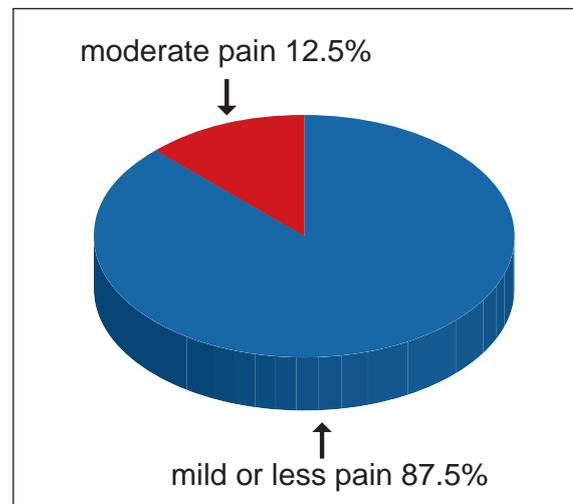


Figure 1

### Discussion

The surgery for VEP with SP by LA is very complicated and difficult. CLB or LAB has several advantages over conventional surgery. It is easier to dissect the skin and soft tissue including fat, with good hemostasis for small blood vessels, sealed nerve endings and lymphatic vessels. Post-op pain and swelling is lower. This unique property of CO2 laser can apply to LA in old aged patients where the eyelid tissue is loose and redundant with numerous blood vessels and high levels of fat.

Furthermore, the levator aponeurosis is situated in the deep part of the lid. The device for making a cleared surgical field and good approach to the deep target is favored by the surgeon. The post-op care is simplified and easy for VEP. Fitzpatrick skin classification<sup>4</sup> was used in the selection of the skin type to reduce any adverse effects and to match the best procedure for CLB or LAB. Wound healing is important for CO2 laser surgery because there is delayed removal of stitches for from the wound when compared to conventional surgery by a factor of at least 3-5 days (normal blepharoplasty 5-7 days; CLB or LAB 10-14 days) to prevent premature wound dehiscence.<sup>4</sup>

From the study data, the MRD1 improved from 0-1 mm to an average of 2.8 mm which was good enough to allow the VEP to open the eye and improved the ability to look but did not pressure the VEP into feeling embarrassment regarding their new appearance. All patients enjoy good vision and facial presentation. The intra op and post op bleeding was low or nearly bloodless. The post op pain was mostly mild (87.5%), with some moderate pain reported (12.5%) and there was no severe pain. All of the patients were relieved by ordinary oral analgesic prescription only. There was no serious complication or harmful outcome to any VEP or their underlying diseases.

The CLB or LAB by LA is a good choice for delicate and difficult cases especially SP in VEP. Thailand's ageing society nowadays can enjoy a future with good vision and better quality of life.

**Conclusion**

CLB's advantages make it a sound alternative to conventional surgery in complicated and difficult cases such as SP and VEP.

**Acknowledgements**

I would like to express my deep gratitude to Dr. John H Hunts MD, PhD. at the Eye Center at Oregon, Prof. Bhupendra CK. Patel at the Moran Eye Center at the University of Utah USA. They have remained as my close mentors and teachers in Oculoplastics since I studied abroad in the USA from 1999-2000. Thanks to all my teachers at Thailand medical schools, my colleagues, my friends and family, especially both my children, who have encouraged and inspired me.

**Financial Disclosure:** The author has no proprietary or commercial benefit in this study





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