# Comparative study between Bleomycin sclerotherapy and interstitial Nd:YAG laser in treatment of venous malformations

## Thesis

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Plastic, Burn and Maxillofacial Surgery

**By**

**Mena Gerges Boktor**
M.B.,B.CH.,M.SC.
Faculty of Medicine, Ain Shams University

**Supervised by**

**Prof. Dr. Karim Samir Massoud**
Professor of Plastic, Burn and Maxillofacial Surgery
Faculty of Medicine, Ain Shams University

**Dr. Nada Abd-Elsattar Mahmoud**
Assistant Professor of Plastic, Burn and Maxillofacial Surgery
Faculty of Medicine, Ain Shams University

**Dr. Hany Saad Setta**
Assistant Professor of Plastic, Burn and Maxillofacial Surgery
Faculty of Medicine, Ain Shams University

**Faculty of Medicine**
**Ain Shams University**
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**Mena Gerges Boktor**

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# List of Abbreviations

| Abbr. | Full-term |
|---|---|
| **AV** | **:** Arteriovenous |
| **CVM** | **:** Congenital vascular malformation |
| ILP | **:** Intralesional photocoagulation |
| **LIC** | **:** Localized intravascular coagulopathy |
| **MRI** | **:** Magnetic resonance imaging |
| **Nd-YAG** | **:** Neodymium: yttrium-aluminum-garnet |
| **PE** | **:** Pulmonary embolism |
| **PYM** | **:** Pingyangmycin |
| **STP** | **:** Superficial thromboembolism |
| **STS** | **:** Sodium tetradecyl sulfate |
| **TIE-2** | **:** Tyrosine kinase receptor |
| **US** | **:** Ultrasonography |
| **VM** | **:** Venous malformation |
| **βFGF** | **:** Basic fibroblast growth factor |
| **βTGF** | **:** Transforming growth factor beta |

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# Abstract

**Background:** Venous malformation (VM) is the most common form of vascular malformation, which affects approximately 1% of the population. VM affects different anatomic regions of the body and different types of tissues, with variable presenting symptoms including swelling/contour deformity, skin discolouration and pain. **Aim of the Work:** to compare effectiveness of bleomycin sclerotherapy and Nd:YAG interstitial laser in the treatment of venous malformation by using subjective clinical assessment and objective changes on MR imaging. **Patients and Methods:** This study was done at plastic surgery department in Ain Shams University hospitals between June 2015 to June 2018. It included 30 patients of all age groups of both sex, with venous malformation. **Results:** Considering outcome, in our study (73.3%) of group I showed Significant outcome while (0%) of group II showed significant outcome with mild to moderate outcome mainly occurred in group II. **Conclusion:** Level of satisfaction and improvement are better in patients treated by bleomycin sclerotherapy than of patients treated by Nd: YAG interstitial laser. Also bleomycin sclerotherapy is safer especially in pediatrics and in head and neck lesions, cheaper and occur as outpatient procedure. There was statistically significant relation between overall outcome according to Size and level of satisfaction.

**Key words:** Bleomycin sclerotherapy, interstitial Nd:YAG laser, of venous malformations

# Introduction

Venous malformations (VM) are the most common type of vascular malformation and account for 44% to 64% of all vascular malformation, 40% of which are found in the head and neck **(Keny et al., 2013).** It exhibits a low flow rate because they are post-capillary lesions and have no arteriovenous (AV) shunts. It can affect a patient's appearance and functionality and even cause life threatening bleeding or respiratory tract obstruction. They are thought to be caused by an error in vascular morphogenesis, secondary to hereditable or sporadic mutations, altered gene expression, or environmental factors **(Arnejajs and Gosain, 2008).**

The location of venous malformation can be superficial or deep, and they can involve single or multiple anatomical sites. The commonly affected sites include the cheek, neck ،eyelids, lips, tongue, and floor of the mouth **(Derick, 2010).** Their angioarchitecture is variable, ranging from focal, multifocal, and diffuse forms **(Hassanein et al., 2011).**

Histologically, they are composed of thin-walled, dilated, channels of variable size that drain through fairly small vessels to normal adjacent conducting veins with deficient smooth muscle **(Dockray et al., 2009)**.

Venous malformations can be simple, sporadic or familial (cutaneo-mucosal venous malformation or glomuvenous malformations), combined (e.g. capillaro-venous, capillaro-lymphaticovenous malformations) or syndromic (Klippel-Trenaunay, Blue Rubber Bleb Naevus and Maffucci) **(Kumbhar et al., 2013).**

They are light-to-dark-blue lesions that can be emptied by compression or on elevation of limb. There is no thrill on palpation **(Mc Aree et al., 2012).** The most common symptoms include disfigurement, compression of adjacent structures, pain. Less frequently, they may ulcerate or bleed (**Gokani et al., 2011).**

Complications of VMs depend on the extent and location of the anomaly. Head and neck VMs may present with mucosal bleeding or progressive distortion, leading to airway or orbital compromise. Whereas extremity VMs can cause leg length discrepancy, hypoplasia due to disuse atrophy، pathologic fracture, hemarthrosis. VMs of muscle may result in fibrosis and subsequent pain and disability **(Neurshl.et al., 2014).**

Small superficial VMs do not require further diagnostic workup for. However, large or deeper lesions are evaluated by magnetic resonance imaging (MRI) or ultrasonography (US) to confirm the diagnosis, and define the extent of the malformation, and plan for the treatment **(Gerald and Heran, 2008).**

VM can be challenging to treat. Current management options include sclerotherapy, laser therapy, surgical excision، or combined. All of these methods have advantages and disadvantages. In principle, an individualized treatment modality should be designed according to the location ،size and extent of lesion, speed of venous drainage, and technical availabilities **(Giacomo et al., 2014).**

The treatment of small and superficial venous malformations is relatively simple and effective; however, the treatment of deep and extensive lesions involving multiple anatomical sites remains a challenge for the physicians. For complex cases, the outcomes achieved with one single treatment approach are poor **(Michael et al., 2012).**

Intervention for VM is reserved for symptomatic lesions that cause deformity or threaten vital structures. Many children do not require treatment at the time of diagnosis. However, because a VM slowly expands, patients may become symptomatic and seek intervention in childhood or adolescence. Less commonly, a VM that involving an anatomically sensitive area or causing gross deformity necessitates management as early as infancy **(Roh et al., 2012).**

Surgical excision of VMs can be associated with significant morbidity, such as major blood loss, deformity and iatrogenic injury. The entire lesion can rarely be

removed and the risk of recurrence is high because abnormal channels adjacent to the lesion are not treated **(Frigerio et al., 2014).**

Because many venous malformations are not fully resectable, sclerotherapy has emerged as the primary treatment option for venous malformations **(Stefanie et al., 2014).** Sclerotherapy involves the injection of a sclerosant into the malformation، which causes cellular destruction, thrombosis, and intense inflammation and scarring leads to shrinkage of the lesion **(Blaise et al., 2011).**

Sclerotherapy is a generally safe, less invasive, cost-effective, and practical technique for the treatment of VMs, and several studies have documented reduction in the size of the malformation and improvement in pain.(**Delgado et al., 2014).**

Interstitial Nd-YAG laser coagulation is another effective and minimally invasive method for treating venous malformations and is an alternative or complimentary to other therapies, the mechanism of this treatment is to reduce bulk and hypervascularisation,and improve contour and function **(Vesnaver and Dovask., 2009).**

Interstitial Nd:YAG laser treatment may successfully prevent enlargement and promote improvement with flattening of the lesion, less swelling and improvement in the vascular red or bluish hue with minimal adverse effects. It