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Intravitreal Ranibizumab Injection as A Treatment for Diabetic Macular Edema

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ABSTRACT

Introduction: In general, diabetic retinopathy is classified into early stage, namely non proliferative diabetic retinopathy (NPDR), and advanced stage, proliferative diabetic retinopathy (PDR). Diabetic macular edema is the most common cause of visual impairment in cases of early stage or NPDR. **Purpose:** To describe Diabetic Macular Edema (DME) with intravitreal injection of anti-VEGF as a treatment. **Case presentation:** 43 old female, came with chief complaint of blurred vision on her right eye since six months ago. Blurring is felt slowly. Patient has a history of uncontrolled diabetes since 10 years and a history of hypercholesterolemia since 1 year ago. visual acuity of the right eye is 4/60. On posterior segment examination, neovascularization of the papilla was found. Decreased foveal reflex (+), hard exudates (+) within 500 µm from the central macula. Microaneurism (+), dot hemorrhage (+), blot (+) in 4 quadrants, hard exudates (+) in 2 quadrants in her right eye. The patient was planned for intravitreal injection of anti-VEGF on her right eye. **Conclusion:** Intravitreal injection of anti-VEGF can improve visual acuity and reduce exudate and hemorrhage in retina from ophthalmoscope and fundus photography examination. In addition, the investigation with OCT was found to improve with reduced macular thickness.

1. Introduction

Diabetic retinopathy is a major cause of vision loss in people aged 20 to 74 years. This situation is a complication of diabetes. Nearly 99% of people with type 1 diabetes and 60% of type 2 develop diabetic retinopathy after suffering from diabetes for 20 years. In general, diabetic retinopathy is classified into early stage, namely non proliferative diabetic retinopathy (NPDR), and advanced stage, proliferative diabetic retinopathy (PDR). Diabetic macular edema is the most common cause of visual impairment in cases of early stage or NPDR.[1-4]

Diabetic macular edema occurs due to retinal micro vascular changes that can cause plasma leakage to the surrounding retinal tissue leading to retinal edema. There is also a loss of pericytes and endothelial cell dysfunction which causes fluid extravasation and causes edema. Diabetes macular edema was previously defined as thickening of the retina in 2-disc diameter from the center of the macula.[5-8]

The management of diabetic retinopathy focuses on controlling metabolism by controlling blood sugar levels. This metabolic control has a major influence on the progression of complications that occur in micro vascular systems; reduce the risk of retinopathy progression, decreased vision and macular edema. A few years ago focal photocoagulation argon laser was the only proven long-term management option for diabetic macular edema. However, several new studies evaluate the role of anti-VEGF (Vascular Endothelial Growth Factor) for the treatment of retinal neovascularization and exudative processes in diabetic retinopathy. Multicenter studies show that intravitreal anti-VEGF injections every month for 5 months followed by macular laser action immediately thereafter or ≥24

weeks apart can provide improved vision results and a very significant reduction in macular thickening.[3,4,9,10]

2. Case Reports

A 43 year old woman came to the eye clinic of Dr. Mohammad Hoesin General Hospital Palembang on April 22, 2019 with the chief complaint of blurred vision on the right eye since 6 months ago. Blurring is felt slowly without complaints of red eyes, and pain. Complaints like curtain-like shadows is denied, eye floaters is denied, seeing sudden flashes of light is denied, and a history of seeing as seeing in the tunnel is denied. Since ± 3 days ago, when control to internist, the patient complained that there is a blurred vision on her right eye, so that the patient was consulted to Dr. Mohammad Hoesin General Hospital Palembang eye clinic.

Patient has a history of uncontrolled diabetes since 10 years and a history of hypercholesterolemia since 1 year ago. On physical examination showed good general status and vital signs within normal limits. Visual acuity in the right eye 4/60 and in the left eye 6/9. Intraocular pressure in right eye 14.3 mmHg and left eye 14.9 mmHg. There is opacification in the subcapsular lens in both eyes. On posterior segment examination, neovascularization of the papilla was found in both eyes. Decreased foveal reflex (+) in the right eye and normal foveal reflex in the left eye. On retinal examination there are hard exudates (+) within 500 µm from the central macula. Microaneurism (+), dot hemorrhage (+), blot (+) in 4 quadrants, hard exudates (+) in 2 quadrants in both eyes. Fundus photography shows early PDR in both eyes and ocular coherence tomography showed the is a macular edema in right eye. The laboratory examination showed an increase in cholesterol and triglycerides.

Intravitreal injection of anti VEGF was performed. The first step is administering local anesthesia using 2.5% tetracaine and 0.5% Ringer Lactate-Povidone iodine spooling then blepharostate installation is performed. The patient is instructed to look towards the foot or opposite the injection site. Mark the location of the injection in the eye using a caliper (4 mm from the limbus) superotemporal region. Ranibizumab 0.05 ml injection was performed, the injection was carried out with a G 27 needle, perpendicular to the eyeball. A 2% chloramphenicol eye ointment was administered in the injection site, then the right eye was temporarily closed with sterile gauze.

Patients were given cefixime tab 100 mg every 12 hours, mefenamic acid tab 500 mg every 8 hours, Metformin tab 500 mg every 8 hours, Glibenclamid tab 2.5 mg every 24 hours, Atorvastatin tab 20 mg every 24 hours, Levofloxacin eyedrop 1 drop every 4 hours hour OD, Prednisolone acetate eyedrop 1 drop every 4 hours OD as a postoperative therapy.

On examination one week postoperatively, visual acuity in the right eye improved to 6/60. patients were given advanced therapy Metformin tab 500 mg every 8 hours, Glibenclamid tab 2.5 mg every 24 hours and Atorvastatin tab 20 mg every 24 hours. On examination one month postoperatively, visual acuity in the right eye improved to 6/30. OCT shows macular edema in the right eye. Patients were given advanced therapy Metformin tab 500 mg every 8 hours, Glibenclamid tab 2.5 mg every 24 hours and Atorvastatin tab 20 mg every 24 hours and planned for the second intravitreal injection of anti VEGF.

3. Discussion

One case was reported; a woman, 43 years old, came to the eye clinic of RSUP dr. Moh. Hoesin Palembang on April 22, 2019 with complaints of blurred vision of the right eye for ± 6 months ago without complaints such as curtain-like shadows vision, eye floaters, history of seeing flashes of light, or a history of seeing straight objects so bent. Three days ago, during the re-control to internist, the patient complained that the vision in the right eye had blurred (+), so that the patient was consulted to RSMH eye clinic. Patient has a history of uncontrolled diabetes since 10 years and a history of hypercholesterolemia since 1 year ago. This patient's history is a risk factor for a diabetic retinopathy that has complications of diabetic macular edema.

In the anterior segment ophthalmology examination obtained a cloudy lens, posterior

subcapsularis grade 1 and funduscopic examination and posterior segment fundus photographs of the right eye, the macula looks decreased reflex Fovea (+), with the presence of hard exudates (+) in 500 µm from the macular according to the criteria of the right posterior segment CSME. In the retina microaneurysms (+) are found, bleeding dot (+), blot (+) in 4 quadrants, hard exudates (+) in 2 quadrants. Whereas in the left eye, normal fovea (+) reflexes are obtained, in the retina microaneurysms (+), dot hemorrhage (+), blot (+) in 2 quadrants, hard exudates (+) in 2 quadrants. Neovascularization in the optic disc (NVD) of both eyes also occurs in this patient, so it can be classified as early PDR ODS. OCT examination revealed subretinal hyporeflexity and thickening of the retina and loss of depression fovea which showed macular edema in the right eye, whereas the left eye was within normal limits. From the initial blood laboratory examination, it was obtained blood glucose when under normal with drug control, which was 113 mg / dl, but there was an increase in total cholesterol (294 mg / dl), LDL cholesterol (176 mg / dl), and triglycerides (232 mg / dl). Increased blood lipid levels are factors that can increase the progression of diabetic retinopathy and macular edema.

Diagnosis is based on history taking, ophthalmology examination, OCT investigation and blood laboratory above. The diagnosis of this patient is Early PDR ODS + DME OD + posterior grade I subcapsular cataract ODS.

The main goal of management of diabetic retinopathy is to slow down and prevent complications. This patient was given informed consent regarding diagnosis, management and methods, benefits and goals of therapy. Management strategies include lifestyle changes, exercise habits, controlling blood sugar levels, blood cholesterol, and body mass index (BMI). The Diabetes Control and Complications Trial (DCCT) study shows that intensive blood sugar control can reduce the progression of diabetic retinopathy to severe NPDR and PDR, as well as the incidence of diabetic macular edema. The treatment chosen for this patient was intravitreal anti-VEGF (ranibizumab) injection in the right eye to reduce vascular permeability thereby reducing macular edema. 1-time ranibizumab injection has only a short-term optimal effect, so re-injection is needed at 4-6 week intervals. Anti VEGF (ranibizumab) injection in this patient is planned to be carried out every month for 3 months. Evaluation is done by visual examination and monthly OCT, so it can be determined whether further injection is needed after injection in the first 3 months. After 1 month of the first intravitreal injection of ranibizumab, the patient's vision showed improvement. The initial vision of the right eye 4/60 became 6/30 and OCT examination showed reduced macular thickness. These patients are routinely controlled for treatment at an internist in their area so that follow-up blood sugar, blood pressure, and cholesterol levels are always controlled and can help reduce the risk of progression of retinopathy, macular edema and decreased vision. Patients are still advised to routinely control an ophthalmologist every month. Periodic visual examination and OCT are still needed to see the progression of diabetic retinopathy and diabetic macular edema in these patients.

This case report assesses the results of the management of improved vision and reduced exudate and bleeding in the retina from the examination of the ophthalmoscope and fundus photo. In addition, the investigation with OCT found improvements with reduced macular thickness, so that in these patients planned for the second anti-VEGF injection. But the patient has not come back control.

The prognosis of quo ad vitam in this patient dubia ad bonam is due to the controlled type 2 diabetes mellitus and patient compliance in taking medication. Quo ad functionam dubia ad bonam because there is improvement in vision after intravitreal anti-VEGF therapy. Rapid therapy, adherence to re-control, and elimination of risk factors make this patient's prognosis good.

4. Conclusion

Intravitreal injection of anti-VEGF can improve visual acuity and reduce exudate and hemorrhage in retina from ophthalmoscope and fundus

photography examination. In addition, the investigation with OCT was found to improve with reduced macular thickness.

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