Diabetic Retinopathy and Maculopathy

Authors **H. P. Hammes**[1], **K. D. Lemmen**[2], **B. Bertram**[3]

Affiliations
[1] V. Med. Klinik, Universitätsklinikum Mannheim, Mannheim
[2] St. Martinus-Krankenhaus, Augenklinik, Düsseldorf
[3] Augenärztl. Praxis, Aachen

Epidemiology

Diabetic retinopathy is a frequent microvascular complication of diabetes mellitus.

Patients with Type 1 Diabetes

- Retinopathy is rare in children before puberty
- Up to 85 % of patients with diabetes for 25 years or more years may develop retinopathy
- Diabetic maculopathy is present in 15 % of patients with diabetes for more than 15 years

Patients with Type 2 Diabetes

- Up to one third of patients are diagnosed as having mild retinopathy when diabetes is detected
- Nearly 80 % of patients develop retinopathy after 15 to 20 years
- Diabetic maculopathy can occur in nearly 25 % of patients

Symptoms

Diabetic retinopathy and maculopathy usually develop and progress without symptoms. Fundus screening is mandatory, since only advanced stages cause symptoms.

Signs and symptoms that suggest the development of retinopathy are:

- sudden drop of visual acuity
- non-correctable drop of visual acuity

If the macula is affected:

- impaired vision
- impaired colour vision
- blurred vision
- "floaters" seen in front of the eye; these are caused by vitreous haemorrhages or tractive retinal detachments.

Risk Factors

- hyperglycaemia
- arterial hypertension
- diabetes duration
- hormonal changes (pregnancy, puberty)
- smoking
- concomitant nephropathy

Early Worsening of Diabetic Retinopathy

Early worsening (euglycaemic re-entry) of retinopathy affects patients with type 1 diabetes. It is rare (< 5 % of the patients), occurs primarily during the first 12 months of metabolic improvement, and is more frequent in patients with diabetes duration > 10 years and long term poor glycaemic control (HbA1c > 10 %). It cannot be prevented by gradual improvement of HbA1c. The positive effect of improved glycaemic levels outweighs early worsening.

Diagnostic Work-Up

Check the following items:

- visual acuity
- lens and vitreous
- intraocular pressure (in cases of severe non-proliferative or proliferative retinopathy or advanced eye disease),
- ocular fundus using binocular biomicroscopic funduscopy (in mydriasis)

The results should be documented using standard examination procedures (**Fig. 1**).

Treatment Objectives

Prevention of visual loss and blindness through interdisciplinary cooperation by:

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Bibliography
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Correspondence
Prof. Dr. med. H. P. Hammes
Sektionsleitung Endokrinologie
V. Medizinische Klinik
Universitätsklinikum Mannheim
Theodor Kutzer-Ufer 1–3
68177 Mannheim
Tel.: 06 21/3 83 26 63
Fax: 06 21/3 83 38 04
hans-peter.hammes@med5.ma.uni-heidelberg.de

- near normoglycaemia as safely as possible
- blood pressure normalization (< 140/80 mm Hg)
- ophthalmological treatment (laser/IVOM).

Examination Schedule as a Rule

The following apply in principle:

- Retinopathy absent – Examination by a retina specialist once per year
- If retinopathy is present, examination at intervals as specified by the retina specialist.

Exceptions

- Children below the age of 11 do not need fundus inspection until they have had diabetes for 5 years or more
- Pregnant women with type 1 diabetes must be examined at diagnosis with close follow-up throughout pregnancy
- Type 2 diabetes: shortly after diagnosis of diabetes
- Patients at high risk of early worsening (T1 Diabetes) must be monitored by a retina specialist before ICT is established.

Annex

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AOK	LKK	BKK	IKK	VdAK	AEV	Knappschaft

Patient Name

Date of Birth

Health Insurance Details

Date

I F D A

A G D A

Diabetes Type ☐ type 1 ☐ type 2 ☐ other ☐ HbA1c.....% ☐ diabetes duration .....

Art. Hypertension ☐ yes ☐ no ☐ treated ☐ untreated ☐ Diabetic nephropathy

OPHTHALMOLOGICAL EXAMINATION SHEET

Please mark the applicable diagnostic criteria. The fundus should be examined in mydriasis.

Best corrected visual acuity	right eye	left eye
Anterior segments:		
- cataract	☐	☐
- artificial lens	☐	☐
- rubeosis iridis	☐	☐
Fundus:		
- microaneurysms (enter the numbers of quadrants involved)	☐_____	☐_____
- intraretinal hemorrhages (enter the numbers of the quadrants involved)	☐_____	☐_____
- venuous beading (enter the numbers of the quadrants involved)	☐_____	☐_____
- intraretinal microvascular abnormalities (enter the numbers of the quadrants involved)	☐_____	☐_____
- hard exudates	☐	☐
- soft exudates	☐	☐
- neovascularisations	☐	☐
- tractional retinal detachment without macular involvement	☐	☐
- tractional retinal detachment with macular involvement	☐	☐
- vitreous haemorrhage	☐	☐
- laser scars	☐	☐
Retinopathy Stage:		
- no retinopathy	☐	☐
- mild or moderate non-proliferative diabetic retinopathy	☐	☐
- severe non-proliferative diabetic retinopathy	☐	☐
- proliferative diabetic retinopathy	☐	☐
- clinically significant diabetic macular oedema	☐	☐

Other ophthalmological diagnoses:

_____

_____

Recommendations:		
- fluorescence angiography	☐	☐
- IVOM	☐	☐
- pan-retinal laser coagulation / cryocoagulation	☐	☐
- focal laser coagulation at the posterior pole	☐	☐
- vitrectomy	☐	☐

Comparison with previous examination ☐ **stable** ☐ **better** ☐ **worse**

Next examination in _____ months

_____

Date of examination, signature and stamp
of the retina specialist

Fig. 1 Standardised Ophthalmological Examination Sheet.

Table 1 Stages, ophthalmological finding and therapy.

Stage	Ophthalmological finding	Ophthalmological therapy
1.1 non-proliferative diabetic retinopathy		
mild level	microaneurysms	no laser coagulation
moderate level	additionally, isolated intraregional hemorrhages and/or some venous beading	no laser coagulation
severe level	"4-2-1-rule": > 20 isolated microaneurysms and intraretinal hemorrhages in 4 quadrants or venous beading in 2 quadrants or intraretinal micro vascular abnormalities (IRMA) in 1 quadrant	laser coagulation only for patients at risk
1.2 proliferative diabetic retinopathy		
	neovascularization of the disk, neovascularization elsewhere	laser coagulation
	vitreous hemorrhage, retinal detachment	laser coagulation if possible; alternative vitrectomy
2. diabetic Maculopathy		
2.1 focal macular oedema	focal areas of oedema, hard exudates or intraretinal haemorrhages at the posterior pole	no laser coagulation
	like 2.1, but parafoveal vision threatening form = clinically significant macular oedema	targeted laser coagulation
2.2 diffuse macular oedema	extensive oedema of the macula and beyond, with hard exudates and intraregional haemorrhages	grid laser photocoagulation – IVOM if center isinvolved
2.3 ischaemic maculopathy	diagnosis using fluorescence angiography: progressive occlusion of the perifoveal capillary network	no therapy available

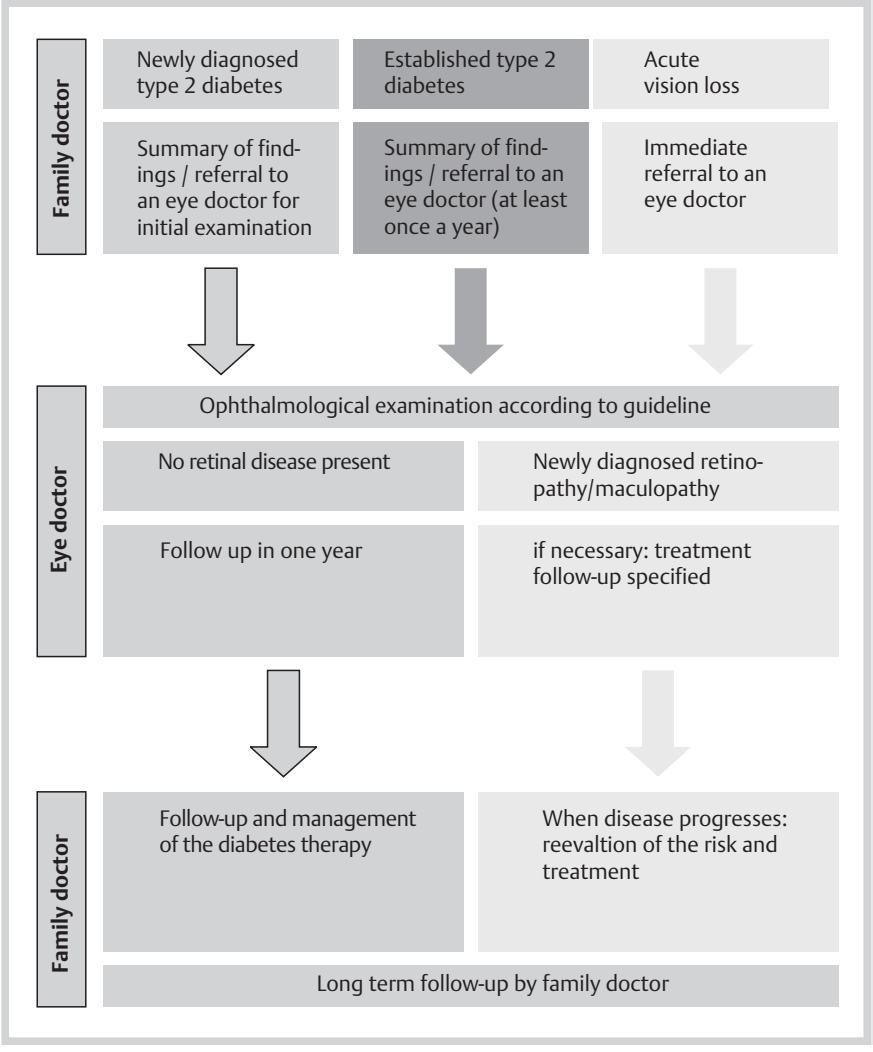

Fig. 2 Procedure for type 2 diabetes pursuant to the National Disease Management Guideline "Diabetic Retinopathy and Maculopathy".