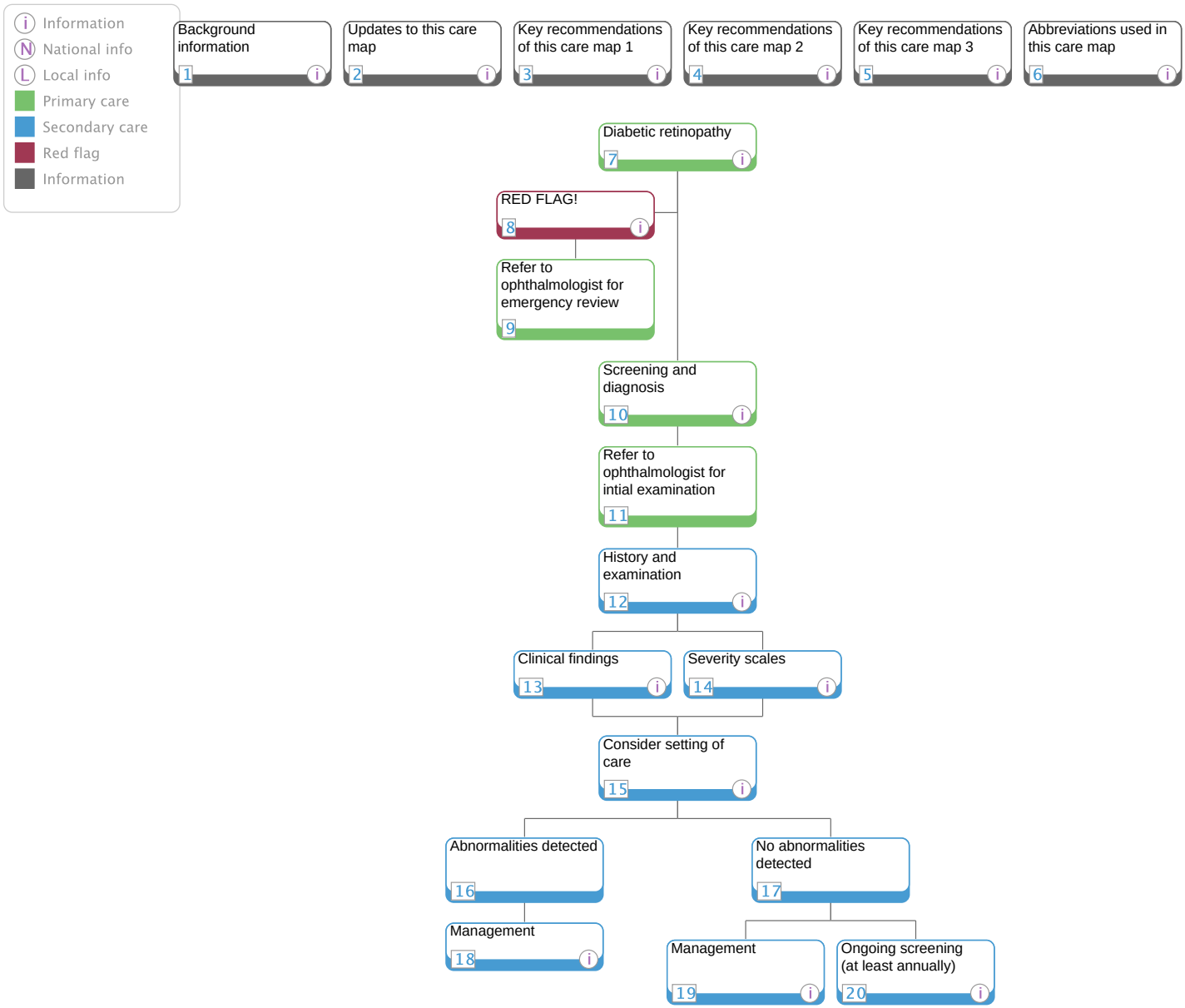
DM chronic complications - diabetic retinopathy

Medicine > Endocrinology > Diabetes mellitus (DM) - chronic complications



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DM chronic complications - diabetic retinopathy

1 Background information

Quick info:

The purpose of this guideline is to define the appropriate management of the common complications of both type 1 diabetes mellitus and type 2 diabetes mellitus in adults and the elderly. The objective is to improve the appropriateness of investigation, prescribing, and referral of patients presenting to provider organisations in Qatar. It is intended that the guideline will be used primarily by generalist physicians in all healthcare settings.

Scope

Aspects of care covered in this care map include the following:

- Complications of T1DM and T2DM in adults and elderly, including the following:
  - Diabetic retinopathy.
  - Diabetic kidney disease.
  - Diabetic neuropathy.
  - Atherosclerotic cardiovascular disease.
  - Diabetic foot disease.

Aspects of care not covered in this care map include the following:

- Complications of T1DM and T2DM in children and adolescents.
- Management of the acute complications of diabetes, e.g. hyperglycaemic emergencies (HONK, HHS) and hypoglycaemia.

Common chronic complications

The common chronic complications of diabetes include [1,2]:

- Microvascular complications, including:
  - Diabetic retinopathy.
  - Diabetic kidney disease.
  - Diabetic neuropathy, including:
    - Distal symmetric polyneuropathy.
    - Autonomic neuropathy.
    - Radiculoplexus neuropathy (diabetic amyotrophy).
    - Mononeuropathy.
  - Diabetic foot problems, including:
    - Foot ulcers.
    - Foot soft tissue infection.
    - Osteomyelitis.
    - Charcot arthropathy.
    - Foot amputation.
- Macrovascular complications:
  - ASCVD, including:
    - Coronary artery disease, including – ACS, MI, stable or unstable angina.
    - Cerebrovascular disease, including – stroke, transient ischaemic attack.
    - Peripheral vascular disease.

References:

Please see the care map's Provenance.

2 Updates to this care map

Quick info:

Date of publication: 18-Sep-2017

Please see the care map's Provenance for additional information on references, contributors, and the editorial process.

3 Key recommendations of this care map 1

DM chronic complications - diabetic retinopathy

Quick info:

The key recommendations of this care map are:

Diabetic retinopathy:

- Is the most common diabetic complication in Qatari patients attending a diabetic outpatient clinic (43.6% of patients) [7].
- All patients with T2DM should undergo dilated or non-dilated retinal photography, which should be undertaken by a trained technician, optometrist, or ophthalmologist [**R-GDG**].
- Screening should be undertaken at the time of diagnosis and annually thereafter, or at an alternative frequency as decided by the ophthalmologist [2].
- All adult patients with T1DM should undergo retinal screening as above, within five years of the initial diagnosis [2].
- Refer for an emergency review by an ophthalmologist if the patient experiences any eye emergency and in particular, any of the following [1,11][**L2**]:
  - Sudden loss of vision or deterioration in vision.
  - Rubeosis iridis.
  - Pre-retinal or vitreous haemorrhage.
  - Retinal detachment.

Management of diabetic retinopathy:

- To reduce the risk or slow the progression of diabetic retinopathy, optimise all of the following [2][**L1, RGA1**]:
  - Glycaemic control.
  - BP.
  - Serum lipids, particularly triglycerides.
  - Smoking cessation.
- Decisions on ophthalmological treatments should be taken by an ophthalmologist (retinal specialist) [2][**L1, RGA1**].

Diabetic kidney disease:

- Screen for diabetic kidney disease in all adults with T2DM at the time of diagnosis, and all adults with T1DM 5 years from initial diagnosis [2].
- Screen for diabetic kidney disease at least annually using a spot urine sample for urinary ACR and eGFR [2,16].
- 2 of 3 ACR specimens collected within 3-6 months should be reported as abnormal before a patient is considered to have albuminuria [2,13].
- In order to delay the progression of diabetic kidney disease and prevent cardio-renal complications [2,4,16]:
  - Optimise glycaemic control to near-normoglycaemic levels, where the risk and benefits allow [2,4][**L1**].
  - Optimise BP control (<140/90 mmHg) [2,4][**L1**]:
    - In patients with albuminuria, consider a BP target of <130/80 mmHg.
    - Use clinical judgement when aiming for systolic BP targets of <130 mmHg to avoid diastolic BP levels of <60-70 mmHg [2][**L2**].
  - Achieve optimal lipid control.
  - Counsel on smoking cessation.
  - Avoid high protein intake (>1.3 g/kg/day) in adults with CKD at risk of progression (see the '*Nutrition*' care point of the '*Diabetic nephropathy*' page).

Management of diabetic kidney disease:

- In all non-pregnant patients with diabetes, an ACE inhibitor or ARB [2,4,18]:
  - Is recommended if there is modestly elevated urinary albumin excretion (30-299 mg/day) [2][**L2, RGA1**].
  - Is strongly recommended if urinary albumin excretion is ≥300 mg/day and/or eGFR is <60 mL/min/1.73m^2 [2][**L1, RGA1**].
  - Should be prescribed at the highest tolerated dose in patients with albuminuria [4][**L1**].
  - Is not recommended for the primary prevention of diabetic kidney disease in patients with normal BP, normal urinary ACR (<3 mg/mmol), and normal eGFR (>60 mL/min/1.73m^2).
  - Avoid using ACE inhibitors and ARBs together due to the increased risk of hyperkalaemia, hypotension, and impairment of renal function [18].
- Referral to a nephrologist should be arranged if any of the following apply [2,16,17]:
  - eGFR is 45-59 mL/min/1.73m^2 for initial assessment to rule out other possible causes of CKD, especially in the following clinical scenarios:

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- Absence of diabetic retinopathy.
- Rapidly decreasing eGFR (i.e. an annual decline in eGFR of >5 mL/min/1.73m^2).
- Rapidly increasing proteinuria or nephrotic syndrome.
- Refractory hypertension.
- Signs or symptoms of other systemic disease.
- >30% reduction in eGFR within 2-3 months after initiation of an ACE inhibitor or ARB.
- If significant miroscopic or gross haematuria develops.

- eGFR is 30-44 mL/min/1.73m^2:
  - Refer to nephrologist for initial assessment, to rule out any other underlying renal disease.
- eGFR is <30 mL/min/1.73m^2:
  - For further management and follow up.

ASCVD and risk management:

- ASCVD is the primary cause of morbidity and mortality for patients diagnosed with diabetes and accounts for the greatest costs involved in diabetes care [2].

BP management:

- Unless contraindicated, for diabetic patients with hypertension and renal impairment, an ACE inhibitor or ARB must be the first line drug [2].
- Intensify therapy until BP is consistently within target range [1].
- Continue to reinforce lifestyle advice [1].
- If BP is consistently attained at the target level, continue to monitor the patient's BP at every clinic visit [**R-GDG**] and check for adverse effects, including hypotension [2].
- Note that antihypertensive medications can increase the likelihood of side effects – e.g. orthostatic hypotension in a patient with autonomic neuropathy [1].

References:

Please see the care map's Provenance.

4 Key recommendations of this care map 2

Quick info:

The key recommendations of this care map are:

Lipid management:

T1DM in adults [22]:

- Unless contraindicated, offer a high intensity statin for patients with T1DM who:
  - Are aged >40 years; or
  - Have had diabetes for >10 years; or
  - Have established kidney disease; or
  - Have other ASCVD risk factors.

T2DM in adults [23]:

- Offer statin therapy for all patients aged >40 years, irrespective of cholesterol value or 10 year ASCVD risk [23][**L1, RGA1**].
- Offer high-intensity statin therapy for those [23][**L1, RGA2**]:
  - With established ASCVD.
  - With a 10-year risk of ASCVD using the ACC/AHA pooled cohort equations of ≥7.5%.
  - With persistent proteinuria or CKD with eGFR 30-60 mL/min/1.73m^2.
  - Who do not achieve non-HDL cholesterol targets using a moderate-intensity statin therapy.
  - Statin therapy should be considered for patients with T2DM aged <40 years with any of the following [16,23][**L2, RGA2**]:
    - Persistent albuminuria.
    - eGFR is <60 mL/min/1.73m^2.
    - Proliferative retinopathy.

- Treated high BP.
- Somatic or autonomic neuropathy.

Antiplatelet therapy:

- Aspirin and other antiplatelet agents are not routinely recommended for patients with T1DM or T2DM in the absence of established ASCVD [2,24,26,27].
- However, the American Diabetes Association recommends initiating low-dose aspirin use for the primary prevention of ASCVD in adults aged 50-59 years who have a 10 year ASCVD risk of ≥10%, using the ACC/AHA pooled cohort equations.
- Patients must not be at increased risk for bleeding, must have a life expectancy of ≥10 years, and be willing to take low-dose aspirin daily for at least 10 years [2].

Diabetic foot problems:

- Diabetic foot problems include [2,29]:
  - Ulcers.
  - Soft tissue infections.
  - Charcot arthropathy.
  - Osteomyelitis.
  - Ischaemia.
- Comprehensive foot evaluation [2]:
  - Should be performed by either a person trained in diabetic foot examination, a podiatrist, or a physician [**R-GDG**].
  - Perform a comprehensive foot evaluation at least annually.
- See the '*Assessment of Charcot foot*', '*Assessment of infection*', '*Assessment of ulcers*' and '*Assessment of peripheral vascular disease*' care points of the '*Diabetic foot problems*' page for detailed assessment of specific diabetic foot problems.
- Risk stratification of diabetic foot problems (see the '*Risk stratification*' care point of the '*Diabetic foot problems*' page)

Referral:

- Refer patients to a HMC Podiatry Clinic at the Ambulatory Care Centre [**R-GDG**] for assessment and ongoing preventative care if the diabetic patient has any of the following [2,29][**L2**]:
  - A history of previous lower extremity complications.
  - Loss of protective sensation.
  - Structural abnormalities of the feet.
  - Peripheral vascular disease.
  - Moderate or high risk of developing a diabetic foot problem (see the '*Risk stratification*' care point of the '*Diabetic foot problems*' page).
  - Foot deformity due to a previous Charcot arthropathy, as they are at high risk of ulceration.
- NB: Assessment by the HMC Podiatry Clinic should be carried out within [29]:
  - 6-8 weeks for patients with moderate risk of a diabetic foot problem.
  - 2-4 weeks for patients with high risk of a diabetic foot problem.
- If a patient has a limb- or life-threatening diabetic foot problem [29]:
  - Refer the patient immediately to the emergency department [33][**L3**].
  - Examples of limb- or life-threatening problems include:
    - Ulceration with fever or signs of sepsis.
    - Ulceration with acute limb ischaemia.
    - Wet gangrene (with or without ulceration).
    - If there is a clinical concern that there is a deep-seated soft tissue or bone infection (with or with or without ulceration).
- See the '*Management of Charcot arthropathy*', '*Management of foot infections*', '*Management of foot ulcers*', and '*Management of peripheral vascular disease*' care points of the '*Diabetic foot problems*' page for a summary of the management of specific diabetic foot problems.

References:

Please see the care map's Provenance.

5 Key recommendations of this care map 3

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Quick info:

Diabetic neuropathy:

- Diabetic neuropathy is classified into the following types [4]:
  - Distal symmetric polyneuropathy (DSPN).
  - Autonomic neuropathy.
  - Radiculoplexus neuropathy (diabetic amyotrophy).
  - Mononeuropathy.
- Screening in patients with T2DM should take place [35]:
  - At the time of initial diagnosis and annually thereafter.
- Screening in patients with T1DM should take place [35]:
  - 5 years after initial diagnosis and annually thereafter.
- Assessment should include a full history and a combination of [2,36]:
  - 10 g monofilament testing (large fibre function and protective sensation)
  - At least one of the following tests:
    - Pinprick sensation (small fibre function).
    - Temperature discrimination (small fibre function).
    - Vibration sensation using a 128-Hz tuning fork (large fibre function).
  - Screening for dysfunction and assessment of future complication risk.
- Further testing may include [4]:
  - Neurophysiological tests, e.g. nerve conduction studies and electromyography.
  - Corneal confocal microscopy may be used (if available) to detect small nerve fibre loss in the cornea [4][**L2**].

Management of distal symmetric polyneuropathy:

- Assess and treat patients with the aim of [2]:
  - Reducing the positive symptoms of pain related to painful distal symmetric polyneuropathy.
  - To improve quality of life [2][**L3**].
- Although there are no disease modifying treatments to reverse diabetic neuropathy, it is speculated that the following treatment approaches may help [2,4]:
  - Improve glycaemic control:
    - Insulin sensitising agents are more effective than insulin-providing agents [37].
  - Improve dyslipidaemia:
    - Particularly treatment of triglycerides with fibrates [38].
  - Treat with an ACE inhibitor and/or CCB [39,40].

Referral:

- Consider referral to a neurologist when there are atypical features or the diagnosis is unclear [2][**L2**].
- Consider referral to a specialist pain service if [41]:
  - The patient has severe pain despite recommended therapies.
  - Their pain significantly limits their lifestyle, participation, or daily activities.
  - Their underlying health condition has deteriorated.

References:

Please see the care map's Provenance.

6 Abbreviations used in this care map

Quick info:

The abbreviations used in this guideline are as follows:

ACC/AHA

American College of Cardiology/American Heart Association

ACE

Angiotensin converting enzyme
ACR
Albumin-creatinine ratio
ACS
Acute coronary syndrome
ARB
Angiotensin receptor blocker
ASCVD
Atherosclerotic cardiovascular disease
BP
Blood pressure
CCB
Calcium channel blocker
CKD
Chronic kidney disease
DASH
Dietary Approaches to Stop Hypertension
eGFR
Estimated glomerular filtration rate
ESRD
End-stage renal disease
HBA_{1c}
Glycated haemoglobin
HDL
High-density lipoprotein
IRMA
Intraretinal microvascular abnormalities
LDL-C
Low density lipoprotein-cholesterol
MI
Myocardial infarction
NPDR
Non-proliferative diabetic retinopathy
PDR
Proliferative diabetic retinopathy
PTH
Parathyroid hormone
T1DM
Type 1 diabetes mellitus
T2DM
Type 2 diabetes mellitus

7 Diabetic retinopathy

Quick info:

Definition:

- Diabetic retinopathy:
  - Is a chronic, progressive, sight-threatening disease of the retinal microvasculature [3].
  - Is associated with prolonged hyperglycaemia and other conditions associated with diabetes mellitus, e.g. hypertension and hyperlipidaemia, etc. [3].
  - Two mechanisms result in loss of vision [3]:

- Retinopathy – growth of new vessels leading to intraocular haemorrhage and possible retinal detachment with profound global sight loss.
- Maculopathy – localised damage to the macula or fovea of the eye resulting in loss of central visual acuity.

- The lesions of diabetic retinopathy include [4,5]:
  - Background or NPDR.
  - Pre-proliferative diabetic retinopathy.
  - PDR.
  - Macular oedema, defined as retinal thickening.

Prevalence:

- Diabetic retinopathy [2,4,6,7,8]:
  - Is one of the most common microvascular complications of diabetes.
  - Was found to be the most common diabetic complication in Qatari patients attending a diabetic outpatient clinic (43.6% of patients).
  - Occurs in 25-45% of patients with T2DM.
  - May begin to develop as early as 7 years before a diagnosis of T2DM is confirmed.
  - Is the most frequent cause of new cases of blindness among adults aged 20-74 years in developed countries.
  - Prevalence is strongly related to the duration of diabetes and level of glycaemic control:
    - Rates are significantly higher in older patients with middle-age onset diabetes compared to old-age onset diabetes.
  - Between 2-8% of patients with T2DM have proliferative retinopathy and/or macular oedema.
- Disorders of the eye, glaucoma, and cataracts present earlier and more frequently in patients with diabetes [2]:
  - When a person with diabetes complains of visual disturbance despite a visual acuity 6/6, abnormalities of refraction, contrast sensistivity, straylight and amplitude of accomodation, diabetic retinopathy should also be considered [9].

Risk factors [2,3,10]:

- Poor glycaemic control.
- Diabetic kidney disease.
- Hypertension.
- Dyslipidaemia.
- Longer duration of diabetes, i.e. earlier age of onset.
- Smoking.
- Pregnancy.
- Carotid arterial disease.
- Elevated homocysteine levels.

References:

Please see the care map's Provenance.

8 RED FLAG!

Quick info:

Refer for an emergency review by an ophthalmologist if the patient experiences any eye emergency and in particular, any of the following [1,11][**L2**]:

- Sudden loss of vision or deterioration in vision.
- Rubeosis iridis.
- Pre-retinal or vitreous haemorrhage.
- Retinal detachment.

References:

Please see the care map's Provenance

10 Screening and diagnosis

Quick info:

All patients with T2DM should undergo dilated or non-dilated retinal photography, which should be undertaken by a trained technician, optometrist, or ophthalmologist [**R-GDG**].

Screening should be undertaken at the time of diagnosis and annually thereafter, or at an alternative frequency, as decided by the ophthalmologist [2].

All adult patients with T1DM should undergo retinal screening as above, within 5 years of the initial diagnosis [2].

An initial dilated and comprehensive eye examination should be by an ophthalmologist [2]:

- In adults with T1DM or T2DM:
  - At the time of diagnosis.
  - Annually thereafter, or more frequently as decided by the ophthalmologist.

Explain to patients the reasons for, and success of, eye screening systems in order to prevent missed appointments due to fear of the outcome or lack of knowledge [1,11][**L2**].

References:

Please see the care map's Provenance.

12 History and examination

Quick info:

Initial history should include the following [5]:

- Diabetes duration.
- Past glucose control (HBA_{1C}).
- Current medications.
- Medical history, including – obesity, renal disease, systemic hypertension, serum lipid levels, pregnancy, and neuropathy.
- Ocular history including – trauma, other diseases of the eye, ocular injections, surgery (including retinal laser treatment and refractive surgery).

Initial examination should be conducted by (but not limited to) an ophthalmologist and should include [5]:

- Visual acuity.
- Slit lamp biomicroscopy.
- Intraocular pressure.
- Gonioscopy before dilatation, if indicated:
  - Neovascularization of the iris:
    - Is best seen before dilatation.
    - When present or suspected, or if intraocular pressure is elevated, undilated gonioscopy can be used to find neovascularization in the anterior chamber angle.
- Pupillary assessment for optic nerve dysfunction.
- Thorough fundoscopy, including stereoscopic examination of the posterior pole.
- Examination of the peripheral retina and vitreous.

Retinal photography [2]:

- Retinal photography may enhance efficiency and reduce costs when the expertise of ophthalmologists can be used for more complex examinations and for therapy [**R-GDG**].
- Should not be used as a substitute to a comprehensive eye exam [2].
- Consider using mydriasis, if necessary, when photographing the retina [1,11][**L2**].

References:

Please see the care map's Provenance.

13 Clinical findings

Quick info:

Damage to the microvasculature in diabetic retinopathy leads to [5]:

- NPDR:
  - Loss of perfusion to the retinal capillaries.
  - IRMA (microaneurysms).
  - Venous abnormalities.
  - Haemorrhages.
  - Cotton wool spots (soft exudates).
  - Hard exudates.
- Pre-proliferative retinopathy [1,11]:
  - Cotton wool spots with any of the following [1,11][**L2**]:
    - Venous beading.
    - Venous reduplication.
    - Multiple deep, round, or blot haemorrhages.
- Proliferative retinopathy [5]:
  - Secondary proliferation of new vessels on the disc, retina, iris, and in the filtration angle.
    - The new vessels can then lead to traction retinal detachments and neovascular glaucoma.
    - In this stage, vision can be lost due to capillary non-perfusion or macular oedema, vitreous haemorrhage, and distortion or traction retinal detachment.
- Diabetic macular oedema [5]:
  - Is seen as retinal thickening.
  - Requires a 3-dimensional assessment, which is best done by dilated examination with slit-lamp biomicroscopy and/or stereoscopic fundal photography.
  - Maculopathy criteria include [1,11][**L2**]:
    - Retinal thickening or exudate within a 1-disc diameter of the fovea centre.
    - Macula circinate or group exudates.
    - Any haemorrhage or microaneurysm within a 1-disc diameter of the fovea centre, with associated deterioration of visual acuity to 6/12 or worse.

References:

Please see the care map's Provenance.

14 Severity scales

Quick info:

Diabetic retinopathy disease severity based on dilated ophthalmoscopy findings [5]:

- Please see the attached table outlining the diabetic retinopathy disease severity scale.

International clinical diabetic macular oedema disease severity scale [5]:

- Diabetic macular oedema apparently absent:
  - No apparent retinal thickening or hard exudates in posterior pole.
- Diabetic macular oedema apparently present:
  - Some apparent retinal thickening or hard exudates in posterior pole.
- If diabetic macular oedema is present, categorise as follows:
  - Please see the attached table outlining the international clinical diabetic macular oedema disease severity scale.

References:

Please see the care map's Provenance.

15 Consider setting of care

Quick info:

An ophthalmologist should perform the initial dilated and comprehensive eye examination [2].

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All patients should thereafter be managed by an ophthalmologist (retinal specialist) if abnormalities are found on examination [**R-GDG**].

References:

Please see the care map's Provenance

18 Management

Quick info:

To reduce the risk or slow the progression of diabetic retinopathy, optimise all of the following [2][**L1, RGA1**]:

- Glycaemic control.
- BP.
- Serum lipids, particularly triglycerides:
  - Retinopathy progression may be slowed by the addition of fenofibrate, particularly in those with very mild NPDR at baseline [12].
- Smoking cessation.

Laser photocoagulation therapy may be used to reduce the risk of vision loss [2][**L1, RGA1**]:

- In patients with high risk PDR.
- In some cases of severe NPDR.

Intravitreal injections of anti-vascular endothelial growth factor may be used in patients with centre-involved diabetic macular oedema that occurs beneath the foveal centre and threatens vision. Decisions on treatment should be taken by an ophthalmologist (retinal specialist) [2][**L1, RGA1**].

References:

Please see the care map's Provenance

19 Management

Quick info:

To reduce the risk or slow the progression of diabetic retinopathy, optimise all of the following [2][**L1, RGA1**]:

- Glycaemic control.
- BP.
- Serum lipids.
- Smoking cessation.

References:

Please see the care map's Provenance

20 Ongoing screening (at least annually)

Quick info:

An initial dilated and comprehensive eye examination should be by an ophthalmologist [2]:

- In adults with T1DM or T2DM:
  - At the time of diagnosis
  - Annually thereafter, or more frequently as decided by the ophthalmologist.

Explain to patients the reasons for, and success of, eye screening systems in order to prevent missed appointments due to fear of the outcome or lack of knowledge [1,11][**L2**].

References:

Please see the care map's Provenance.

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Provenance Certificate

Overview | Editorial approach | Sources of evidence | Evidence grading and recommendations | References | Guideline development group | Responsibilities | Acknowledgements

Overview

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

This care map was approved on **18 Sep 2017.**

For information on changes in the last update, see the information point entitled 'Updates to this care map' on each page of the care map.

Editorial approach

This care map has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The care map will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this care map, has involved the following critical steps:

- Extensive literature search for well reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising physicians and subject matter experts from across provider organisations in Qatar.
- Independent review of the guideline by the Clinical Governance body appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Explicit review of the care map by patient groups was not undertaken.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

Sources of evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.

Where included, the ‘goal length of stay’ stated within this guideline is supported by and validated through utilisation analysis of various international health insurance databases. The purpose of database analysis is to confirm the reasonability and clinical appropriateness of the goal, as an achievable benchmark for optimal duration of inpatient admission.

Evidence grading and recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A1 (RGA1):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade A2 (RGA2):** Evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C1 (RGC1):** Evidence demonstrates a lack of net benefit; additional research is recommended.
- **Recommendation Grade C2 (RGC2):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

References

1. Internal Clinical Guidelines Team (IGCT). Type 2 diabetes in adults: management. London: National Institute for Health and Care Excellence (NICE); 2015.
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The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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Responsibilities of healthcare professionals

This care map has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.
The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

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