

Journal of Diabetes Education

To Dispel Darkness Of Diabetes

DIET MANAGEMENT ►



◀ EXERCISE

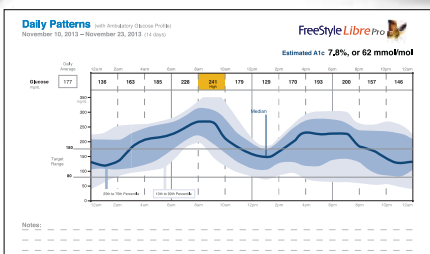
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To Dispel Darkness of Diabetes

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BASICS OF COMPREHENSIVE DIABETES MANAGEMENT

*Rajiv Kovil**

DIABETES is a national health priority. The number of people with type 2 diabetes is growing, most likely the result of rising overweight and obesity rates, lifestyle and dietary changes, and an ageing population.

General practitioners continue to provide most of the medical support to people with type 2 diabetes. The complexity of care for this common disease requires systematic care from the practice team and the timely referral to community and hospital based specialists.

The American Diabetes Association's (ADA's) Standards of Care are intended to provide clinicians, patients, researchers, payers, and other interested individuals with the components of diabetes care, general treatment goals, and tools to evaluate the quality of care.

CLASSIFICATION AND DIAGNOSIS:

CLASSIFICATION

Diabetes can be classified into four clinical categories:

- Type 1 diabetes (due to β -cell destruction, usually leading to absolute insulin deficiency)
- Type 2 diabetes (due to a progressive insulin secretory defect on the background of insulin resistance)
- Other specific types of diabetes due to other causes, e.g., genetic defects in β -cell function, genetic defects in insulin action, diseases of the exocrine pancreas (such as cystic fibrosis), and drug- or chemical-induced (such as in the treatment of HIV/AIDS or after organ transplantation)
- Gestational diabetes mellitus (GDM) (diabetes diagnosed during pregnancy).

DIAGNOSIS

People in high risk groups need to be screened for undiagnosed type 2 diabetes.

Diabetes is diagnosed based on plasma glucose criteria, either the fasting plasma glucose (FPG), the 2-h plasma glucose (2-h PG) value after a 75-g oral glucose tolerance test (OGTT), or the A1C (threshold $\geq 6.5\%$).

Criteria for the diagnosis of diabetes

A1C $\geq 6.5\%$

OR

FPG ≥ 126 mg/dL

OR

Two-hour PG ≥ 200 mg/dL during an OGTT

Categories of Increased Risk for Diabetes (Prediabetes):

Individuals with impaired fasting glucose (IFG) (FPG levels 100–125 mg/dL), or impaired glucose tolerance (IGT) (2-h PG OGTT values of 140–199 mg/dL) are considered at risk for diabetes.

“Prediabetes” is the term used for individuals with IFG and/or IGT, indicating the relatively high risk for the future development of diabetes. IFG and IGT are associated with obesity (especially abdominal or visceral obesity), dyslipidemia with high triglycerides and/or low HDL cholesterol, and hypertension.

Categories of increased risk for diabetes
(prediabetes)

FPG 100 mg/dL to 125 mg/dL (IFG) OR

2-h PG in the 75-g OGTT 140 mg/dL to 199 mg/dL (IGT) OR

A1C 5.7–6.4%

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Management of IFG and IGT

Patients with IFG/IGT must be counseled that they are at increased risk of CVD, and strict control of all cardiovascular risk factors (blood pressure, lipids and smoking) should be a priority. Dietary and exercise advice should be given.

Testing to detect type 2 diabetes and prediabetes in asymptomatic people should be considered in adults of any age who are overweight or obese ($\text{BMI} \geq 25 \text{ kg/m}^2$) and who have one or more additional risk factors for diabetes. In those without these risk factors, testing should begin at age 45 years.

Patients should be counseled about the increased risk of progression to diabetes, and advised of the results of recent diabetes prevention studies that have shown that lifestyle change (diet together with at least 150 minutes of exercise per week to achieve a weight loss of 7%) can delay or prevent progression to type 2 diabetes.

Periodic testing for undiagnosed diabetes is recommended in high risk individuals. All high risk people with a negative screening test are at risk of cardiovascular disease and the future development of type 2 diabetes, and need to be given appropriate advice on Smoking, Nutrition, Alcohol and Physical activity risk factor reduction.

DETECTION AND DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS

Recommendations:

- Screen for undiagnosed type 2 diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria.
- Screen for GDM at 24–28 weeks of gestation in pregnant women not previously known to have diabetes.
- Screen women with GDM for persistent diabetes at 6–12 weeks postpartum, using the OGTT and non pregnancy diagnostic criteria.

The diagnosis of GDM is made on the basis of a 75 g OGTT, where the fasting level is $\geq 99 \text{ mg/dL}$, or 2 hour result $\geq 144 \text{ mg/dL}$.

Women who have had gestational diabetes should be encouraged to exercise regularly and maintain an optimal weight as this may reduce their risk of developing type 2 diabetes.

INITIAL ASSESSMENT

Assessment includes appraisal of cardiovascular risks and end-organ damage.

A detailed assessment needs to be made at first diagnosis.

History

Specific symptoms:

Glycosuria causing:

- Polyuria
- Polydipsia
- Polyphagia
- Weight loss
- Nocturia
- Malaise
- Fatigue
- Altered vision

Predisposition to diabetes:

- Age
- Family history
- Cultural group
- Overweight
- Physical inactivity
- Hypertension
- Obstetric history of large babies or gestational diabetes
- Medication causing hyperglycemia
- Autoimmune disease (personal and/or family history of other autoimmune diseases (eg: hypo or hyperthyroidism))

Risk factors for complications including:

- Personal or family history of cardiovascular disease
- Smoking
- Hypertension
- Dyslipidemia

General symptom review including:

- Cardiovascular symptoms
- Neurological symptoms
- Bladder and sexual function
- Foot and toe problems
- Recurrent infections (especially urinary and skin)

Lifestyle issues:

- Smoking
- Nutrition
- Alcohol
- Physical activity
- Occupation

Examination

Weight/waist: – Body Mass Index (BMI) = weight (kg) divided by height² (m²)

- Waist circumference

Cardiovascular system: – Blood pressure, ideally lying and standing

- Peripheral, neck and abdominal vessels

Eyes:

- Visual acuity (with correction)
- Cataracts
- Retinopathy

Feet:

- Sensation and circulation
- Skin condition
- Pressure areas
- Interdigital problems
- Abnormal bone architecture

Peripheral nerves: – Tendon reflexes

- Sensation: touch (eg: with 10 g monofilament) vibration (eg: with 128 hz tuning fork)

Urinalysis:

- Albumin
- Ketones
- Nitrites and/or leucocytes

Investigations

Baseline: – Renal function: plasma creatinine (eGFR), micro albuminuria

- Lipids: LDL-C, HDL-C, total cholesterol, triglyceride

- Glycemia: glycosylated haemoglobin (HbA1c)

Other:

Consider: – ECG, if >50 years old and at least one other vascular risk factor

- Microalbuminuria if high risk group
- Thyroid function tests if there is a family history or clinical suspicion.

Patient counseling includes identifying and addressing concerns which may be causing distress and adversely affecting management.

If the patient is symptomatic then treatment of hyperglycemia needs to be prompt but if the patient is asymptomatic initial treatment can be more relaxed. The long term medical goal is the prevention of complications.

Control of blood pressure and dyslipidaemia are important as well as glycaemic control in preventing complications.

The overall aim of management is to improve quality of life and prevent premature death.

All patients should be advised of the risks of smoking and offered assistance with smoking cessation.

Assess cardiovascular risk and consider low dose aspirin for cardiovascular protection in high risk patients.

Nutrition

Nutrition management involves controlling weight and the introduction of a healthy eating plan.

Healthy eating is a critical component in the management of type 1 and type 2 diabetes. In over 50% of people presenting with type 2 diabetes restriction of energy intake, increased activity and weight reduction will initially normalize blood glucose levels. Maintaining cooperation during weight reduction can be a major problem. A consistent coordinated approach by the general practitioner, dietitian and diabetes educator helps the patient maintain the effort.

Body weight

Loss of body weight will often result in near normal glycaemic, blood pressure and lipid profiles. Often an ideal body weight is not achievable and setting this as a goal discourages patients to attempt any dietary change. Many studies suggest that a weight loss of as little as 5 to 10% will improve glycaemic control. Therefore it is important to encourage some degree of weight loss. Hence, initial goal for overweight patients is 5–10% body weight loss, although greater weight loss can be attenuated.

Carbohydrates

Carbohydrate foods which are rich in fibre and have a low energy density are the basis of the eating plan and it is recommended that they contribute up to 50% of the total energy intake. Meals containing carbohydrate are spread evenly through the day. Both the quantity of carbohydrate and the quality of carbohydrate will affect blood glucose levels. The amount of carbohydrate has a larger effect on glycemia than the quality. The quality of carbohydrate is reflected by its glycemic index (GI) which indicates the post prandial glycaemic response to a particular carbohydrate food. This will have a lesser but additional effect on blood glucose levels. The GI classifies carbohydrates as slow acting (low), moderate (medium) and quickly

absorbed (high). In practice it is recommended that people with diabetes have one high fibre, low GI carbohydrate food at each meal. This would include wholegrain breads, rolled oats, low fat, low sugar breakfast cereals, pasta, beans, lentils and temperate fruits. Other carbohydrate foods can be included but in lesser amounts. These include rice, potato and tropical fruits.

Dietary fat

It is recommended that fat contribute to less than 30% of total energy intake. This has a beneficial effect on serum lipids and helps with weight reduction. Saturated fats in the diet will have an adverse effect on general lipid profiles.

The most common sources of oils and fats are:

- Additives in cooking
- Meat
- Dairy products
- Snack and takeaway foods.

Fried foods need to be avoided (even with polyunsaturated or monounsaturated oils).

Monounsaturated fats (Ω -9 fatty acids) as in olive oil or canola have a LDL-C lowering effect. Likewise seed sourced polyunsaturated oils (Ω -6 polyunsaturated) lower LDL-C. Fish oils (Ω -3 polyunsaturated oils) in doses of 5 g/day lower triglyceride levels. They also inhibit platelet aggregation and may protect against thrombosis in diseased blood vessels.

The main thrust of management is to lower total fat intake and to find substitutes for saturated fats. Low fat milk could be used as a substitute for whole milk and some 'light' margarine having 40% of the fat content used in place of standard margarines. Alternative low fat spreads are reduced fat cottage cheese or ricotta cheese. Some margarine contains plant sterols that reduce cholesterol absorption and cholesterol levels.

Alcohol

As many people with type 2 diabetes are overweight or obese, alcohol should be minimized. Australian guidelines at the time of

publication recommend ≤ 2 standard drinks (20 g) per day for men and women. Low alcohol beers are a better choice than ordinary or diet beers.

The inclusion of sugar alcohols, eg: sorbitol, is not recommended as these offer no advantage over sucrose in improving metabolic control, increasing cooperation or in managing weight loss. Non-alcoholic fatty liver disease (NAFLD) is common in people with type 2 diabetes. In 100 people with type 2 diabetes in general practice 40 will have NAFLD and of these 8-12 will have non-alcoholic steatohepatitis (NASH) and 1-2 will progress to cirrhosis. Most patients are asymptomatic. Fatty liver disease is associated with abnormal liver function tests (especially raised ALT), a “bright liver” on ultrasound and other features of the metabolic syndrome. There is no evidence that any medication improves outcomes and the mainstay of treatment is lifestyle change.

Physical activity

- Regular physical activity improves metabolic control and reduces other cardiovascular risks.
- Patients on insulin or sulphonylureas may need to take special precautions to prevent hypoglycemia.
- Appropriate care of feet during physical activity is important.

Increasing physical activity improves metabolic control in people with diabetes.

Low level aerobic exercise (eg: brisk walking for half an hour per day) and physical resistance training have the following benefits:

- Improved glucose tolerance as insulin sensitivity increases
- Increased energy expenditure resulting in weight loss
- Increased feeling of well being
- Increased work capacity
- Improved blood pressure and lipid profiles.

HEALTH CARE FOR DIABETES

Self-monitoring

Self-monitoring needs to be individualized and assist people with diabetes to understand the impact of medication, food and physical activity on blood glucose control. Frequency of self-monitoring can be determined according to the individual's self-management goals. In elderly patients testing on 1 or 2 days per week, varying the time, may be adequate if diabetes control is good.

Monitoring in type 2 diabetes need not be as intensive as with type 1 diabetes except when the normal pattern is broken (eg: travelling, the festive season, undercurrent illness, changes to medication and diet). The ideal would be blood glucose estimation before + after meals. A reasonable approach in a patient with stable glycaemic control would include blood glucose estimation at different times of the day on 2–3 days each week.

People on either insulin or hypoglycemic agents must be able to identify ‘hypos’ and understand treatment.

Medical monitoring

Regular follow-up visits offer an opportunity for the general practitioner and patient to explore the patient's understanding, fears and concerns about diabetes. Some practices run diabetes clinics, often delivered by practice nurses. The use of practice protocols, checklists and algorithms that have been developed by the doctors and nurses in a practice ensures the practice nurse can undertake a large proportion of the routine care (under the clinical oversight of the doctor).

The following is a guide for the doctor's oversight of patients:

Quarterly review

- Discourage smoking
- Review symptoms
- Check weight, BP
- Review self-monitoring

Ask about: Smoking

Nutrition

Alcohol intake

How much exercise and how often

Any problems with medication

Check: Weight/waist

Height (children and adolescents)

Blood pressure

Feet examination without shoes, if new symptoms or at risk (eg: neuropathy $\pm$ peripheral vascular disease)

Review: Goals with patient to identify specific areas of focus for doctor consultation

Annual review

- Review goals of management
- Check for diabetic complications
- Update immunization schedule
- Consider specialist referral

The yearly review is a time for more detailed assessment, updating the problem priority list and re-establishment of goals, and contractual arrangements for management. Eating plan, lifestyle, home monitoring and treatment need to be reviewed.

Full physical assessment:

- Cardiovascular system
- Eyes
- Peripheral nervous system
- Feet

Immunizations:

- Influenza (Once per year)
- Pneumococcal

Investigations: (annually if below target, more frequently if being actively treated)

Lipids – triglyceride; HDL-C, LDL-C and total cholesterol

Renal – microalbuminuria and plasma creatinine (eGFR)

ECG – second yearly if age >50 years plus >1 other cardiovascular risk

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MICROALBUMINURIA IN DIABETES

Vimal Pahuja*

Introduction:

Diabetes is a chronic progressive multifactorial disease of metabolism that leads to vasculopathy as the result of the chronic hyperglycemia.

Complications of diabetes both microvascular and macrovascular, can be seen early during the course of disease and cause significant morbidity and mortality and incurring huge costs for the family, society and country.

Diabetic nephropathy is the most common cause of End Stage Renal Disease in our country and is preventable if the patients are screened in time and preventive measures initiated. Micro-albuminuria is the precursor of diabetic nephropathy and fortunately can be detected and treated early in the course of the disease. It represents an abnormally elevated urine albumin level that is not raised to a level which will be detected with the use of a urinalysis dipstick.

The presence of microalbuminuria predicts worsening of renal disease eventually to overt diabetic nephropathy and additionally an elevated risk of cardiovascular disease.

In newly diagnosed type 2 diabetic patients up to 30% of people will already have abnormally high urine albumin levels; about 75% of the affected people will have microalbuminuria and about 25% will have overt diabetic nephropathy.

The MICRO HOPE study revealed that the risk of progression from micro-albuminuria to overt diabetic nephropathy is 20% in 5 years.

The screening of microalbuminuria allows early intervention to prevent overt nephropathy.

Screening:

Several methods for screening microalbuminuria are available, which include:

- 1) Timed urine collections (over 24 hours or overnight) to measure protein levels and

random urine tests using laboratory tests.

- 2) Dipsticks or special devices (e.g., automated urine analyzers) to measure microalbumin levels or to calculate the microalbumin:creatinine ratio (MACR).

Regular urinalysis dipsticks are not sensitive enough to detect microalbuminuria.

Diagnosis:

Microalbuminuria is diagnosed when the urine albumin level is 30 mg/d or greater. This can be expressed either as a quantity of albumin excreted per time ($> 20 \mu\text{g}/\text{min}$) or as a concentration ($> 20 \text{ mg/L}$ urine).

The MACR is preferable to a simple measure of albumin excreted in urine because the albumin excretion can be distorted by the effects of urine concentration or dilution. The MACR is more convenient to perform than a 24-hour urine collection, and the results of these 2 tests have shown a good correlation.

Certain factors like exercise within the first 24 h, infection, fever, congestive heart failure, marked hyperglycemia, menstruation, and marked hypertension may elevate UACR.

Hence, two of three specimens of UACR collected within a 3- to 6-month period should be abnormal before labelling a patient as having albuminuria.

Microalbumin and its progression to Diabetic kidney disease

Diabetic nephropathy occurs in 20–40% of patients with type 2 diabetes and is the single leading cause of ESRD. Persistent albuminuria in the range of 30–299 mg/ 24 h has been shown to be an early stage of diabetic nephropathy in type 1 diabetes and a marker for development of nephropathy in type 2 diabetes. It is a well-

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established marker of increased CVD risk. However, there is increasing evidence of spontaneous remission of albumin levels 30–299 mg/24 h in up to 40% of patients with type 1 diabetes. About 30–40% remain with 30–299 mg/24 h and do not progress to more elevated levels of albuminuria over 5–10 years of follow-up. Patients with persistent albuminuria (30–299 mg/24 h) who progress to more significant levels (>300 mg/24 h) are likely to progress to ESRD.

Interventions to prevent micro-albumin and progression to Diabetic Kidney Disease

Good glycemic control can prevent progression to microalbuminuria. Preventing the progression of each step of renal disease in patients with diabetes — microalbuminuria, diabetic nephropathy, and ESRD or death — can be achieved with blood pressure control and the use of antiangiotensin therapies such as angiotensin-converting-enzyme (ACE) inhibitors and angiotensin II receptor blockers.

Levels of prevention:

Primary Prevention (preventing microalbuminuria) can be achieved through good glycemic, blood pressure control, tobacco cessation and further through the use of an ACE inhibitor in both type 1 and type 2 diabetes.

Secondary Prevention (preventing the progression from microalbuminuria to diabetic nephropathy) can be achieved with an ACE inhibitor in both type 1 and type 2 diabetes and with an angiotensin II receptor blocker in type 2 diabetes. Once the microalbuminuria is diagnosed the target blood pressure should be below 130/80 mm Hg, the target low-density lipoprotein cholesterol level should be below 70 mg/dl and smoking cessation should be mandatory. Glycated hemoglobin should be maintained at 6.5 without hypoglycemia.

The UKPDS provided strong evidence that blood pressure control can reduce the development of nephropathy. In addition, large prospective randomized studies in patients with type 1 diabetes have demonstrated that achievement

of lower levels of SBP (140 mm Hg) resulting from treatment using ACE inhibitors provides a selective benefit over other antihypertensive drug classes in delaying the progression of increased urinary albumin excretion and can slow the decline in GFR in patients with higher levels of albuminuria. In type 2 diabetes with hypertension and normoalbuminuria, RAS inhibition has been demonstrated to delay onset of elevated albuminuria. ACE inhibitors have been shown to reduce major CVD outcomes (i.e., MI, stroke, death) in patients with diabetes, thus further supporting the use of these agents in patients with elevated albuminuria, a CVD risk factor. ARBs do not prevent onset of elevated albuminuria in normotensive patients with type 1 or type 2 diabetes; however, ARBs have been shown to reduce the progression rate of albumin levels from 30 to 299 mg/24 h to levels >300 mg/24 h as well as prevention or delay of ESRD in patients with type 2 diabetes. Some evidence suggests that ARBs have a smaller magnitude of rise in potassium compared with ACE inhibitors in people with nephropathy. Recently, SGLT2 inhibitors have shown to reduce, intra-glomerular pressure, and albuminuria and slow GFR loss through mechanisms that appear independent of glycemia.

Follow up:

Diabetic patients with microalbuminuria should have their blood pressure monitored quarterly and their renal function checked annually or more often if they have risk factors for vascular disease. If renal function deteriorates, referral to a nephrologist is appropriate.

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PREVENTION AND CARE OF FOOT PROBLEMS IN DIABETES

Priyanka Dmello*

Diabetic foot disease is one of the most common, serious, feared and costly complication of diabetes. Patients with diabetes are at a 15 to 40 fold higher risk of a lower limb amputation than a non-diabetic patient. Eighty per cent of lower limb amputations in diabetes are preceded by the development of a foot ulcer and it is estimated that the annual incidence of the lower limb ulceration in patients with diabetes varies between 2.2 to 7.0%. Diabetic foot disease is costly, with patients frequently requiring admission to hospitals, investigations, surgery and prolonged hospital stay. Making patients aware regarding foot assessment and foot care is of utmost importance to all healthcare members.⁽¹⁾

Inefficient and insufficient control of diabetes could lead to damage of various organ, nerves, kidneys, eyes, blood vessels and adversely impact your immune system.

Diabetic foot issues are not just common but also may become serious.

MULTIPLE REASONS WHY A DIABETIC MUST TAKE EXTRA CARE OF THEIR FEET

1. Diabetes damages the nervous system, reducing the sensation in the patient. Feet are highly vulnerable to injury.
2. Normal sweat secretion and oil production, which lubricates the skin of the foot, is impaired.
3. Poor blood flow, damage to the blood vessels and weakening of the immune system makes it difficult for wound to heal.

For all these reasons a diabetic must prevent foot problems or get the right treatment for them. It starts with learning to examine one's own foot, recognizing the symptoms of foot problems and

knowing when to get the right medical attention.

FOOT INSPECTION AND SCREENING

General inspection

A careful inspection of the feet in a well-lit room should always be carried out after the patient has removed shoes and socks. Because inappropriate footwear and foot deformities are common contributory factors in the development of foot ulceration, the shoes should be inspected and the question "Are these shoes appropriate for these feet?" should be asked. Examples of inappropriate shoes include those that are excessively worn or are too small for the person's feet (too narrow, too short, toe box too low), resulting in rubbing, erythema, blister, or callus.

Inspection of skin and joints:

• Dermatologic:

1. Skin color, thickness, dryness, cracking, sweating
2. Infection: check between toes for fungal infection
3. Ulceration
4. Calluses/blistering: hemorrhage into callus

• Musculoskeletal deformity

1. Claw toes, prominent metatarsal heads, Charcot joint
2. Muscle wasting (guttering between metatarsals)

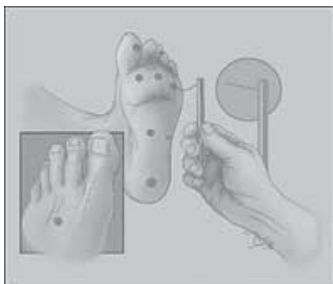
Diabetic foot Screening

• Neurological assessment : Sensory Assessment

1. Cutaneous Pressure Assessment (10g monofilament) delivers a 10-gram force when properly applied.

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- Research has shown that a person who can feel the 10-gram filament in the selected sites is at reduced risk for developing ulcers.
- The sensory exam should be done in a quiet and relaxed setting.
- The patient must not watch while the examiner applies the filament.
- Test the monofilament on the patient's lower arm or sternum so he/she knows what to anticipate.
- The four sites to be tested are denoted with RED dots in the picture given below. Apply the monofilament perpendicular to the skin's surface.
- Apply sufficient force to cause the filament to bend or buckle.
- The total duration of the approach, skin contact, and departure of the filament should be approximately 1-1.5 seconds.
- Apply the filament along the perimeter and NOT ON an ulcer site, callus, scar or necrotic tissue.
- Do not allow the filament to slide across the skin or make repetitive contact at the test site.
- Press the filament to the skin such that it buckles at one of two times as you say "time one" or "time two."
- Have patients identify at which time they were touched.
- Repeat as necessary and randomise the sequence of applying the filament throughout the examination.



2. Vibration Perception (128 Hz tuning fork) –

- Activate the tuning fork.
- Test on the wrist first to ensure that the patient is responding to the correct stimulus.
- Place the stem of the fork over the tip of the big toe (as shown in the picture below) and ask the patient to tell you if vibration is felt.
- Record the result as absent, reduced or present depending on the patients response.



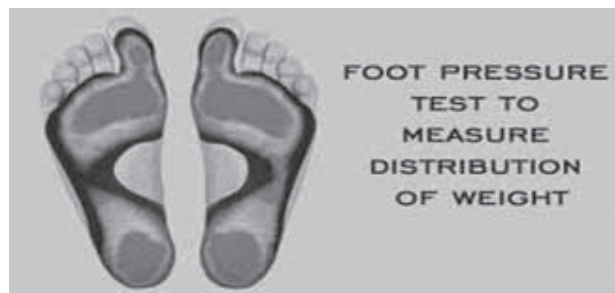
3. Vascular Assessment:

- This involves the manual palpation of the dorsalis pedis and posterior tibial pulses in both feet.
- If a person has claudication or rest pain (especially the latter), there is sufficiently severe peripheral vascular disease to predispose to vascular ulceration.
- If a person has no claudication or rest pain, then one relies on physical examination and, if necessary, investigations to determine the risk.
- Looking at the feet to see if they are dusky red or purplish in colour and feeling them to see if they are cold give important clue that the circulation may be impaired.

4. Check Structural Foot Deformity for:

- o toe deformity
- o bunion deformity
- o high arch foot
- o Charcot foot

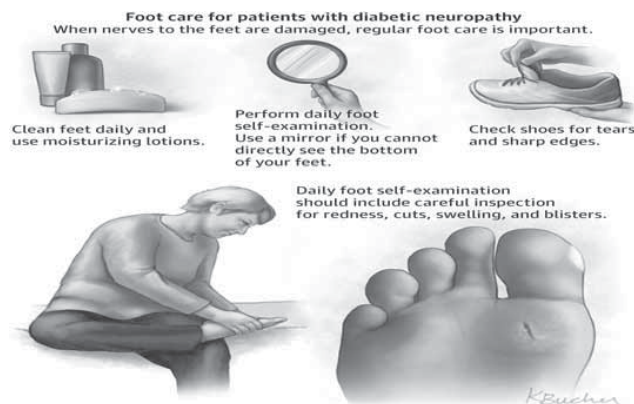
Assessing foot pressure routinely will enable the patient to know whether he/she is using the right foot wear.



5. Footwear Assessment:

- o Improper or poorly fitting shoes are major contributors to diabetes foot ulcerations.
- o Educate patients about appropriate footwear.
- o All patients with diabetes need to pay special attention to the fit and style of their shoes and should avoid pointed-toe shoes or high heels.
- o Properly fitted athletic or walking shoes with soft upper leathers and no or minimal seams are recommended for daily wear.

FOOT SELF EXAMINATION AND CARE



Questionnaire to assess awareness about diabetic foot prevention and care :⁽³⁾

1. Do you self-inspect your foot daily and look for any new red spots/cuts/swelling/blisters?
2. Do you wash your feet daily?
3. Do you apply a lotion/moisturizer on the top and bottom of your feet?
4. Do you trim your toenail straight and file edges?
5. Do you know that you should not walk barefoot?
6. Do you check the inside of your shoes before wearing them?
7. Do you protect and keep your feet away from too hot/ too cold temperature?
8. Do you keep your blood glucose under control?
9. Do you know that you should not smoke?
10. Do you know that you should not cross your legs for long periods?
11. Do you know that you should not cut/use chemicals to remove callus?
12. Do you know that if people with diabetes develop an ulcer, they should use special shoes?
13. Do you use talcum powder to keep the skin between your toes dry to prevent infection?
14. Do you wear shoes/slippers both indoors and outdoors?

FOOT PROBLEMS: SIGNS AND SYMPTOMS

Patients should be made aware of the following early warning signs of foot problems:

- Burning, tingling or painful feet
- Loss of sensation of heat, cold or touch

- Changes in the color or shape of your feet
- Loss of hair on the toes, feet and lower legs
- Thickening and yellowing of the toenails
- Onset of blisters, sores, ulcers, infected corn or ingrown toe nails

FOOT CARE EDUCATION

- Nail care
- Emollient use
- Footwear
- Daily self-examination of the feet
- Not walking in bare feet
- Checking footwear and hosiery before putting them on
- New shoes to be “broken in” gradually
- No hot water bottles
- Checking bath and shower temperature
- Avoidance of home remedies e.g. corn plasters
- What to do and the appropriate person to contact if foot problems develop

For Further Readings

Shyam Kishore, AshishDattUpadhyay, Jyotsna V.P. Awareness of foot care among patients with diabetes attending a tertiary care hospital , The National Medical Journal Of India Vol. 28, No. 3, 2015.

1. American Diabetes Association: Preventative foot care in people with diabetes. *Diabetes Care* 26(Suppl. 1):S78–S79, 2003
2. <http://www.podiatryireland.com/attachments/9998eba0-e877-48a5-8cda-42db7bd7a8ec.PDF> (Model of Care for the Diabetic foot)

QUESTION AND ANSWERS

Q) What are the factors affecting Quality of Life in diabetics?

Everyone wants to have the best possible quality of life. It just feels good to be satisfied and happy. The definition of the quality of life is made as 'the way of perceiving his/her own position in the system of culture and values' by the World Health Organization. In the management of any disease, the most important component is the quality of life, especially in chronic disorder such as diabetes. In diabetic patients, the quality of life is influenced by various factors depending on the presence and severity of associated complications which includes neuropathy, Chronic Kidney Disease, retinopathy, cardiac autonomic neuropathy, and BMI. The main aim of the patients treatment and management should be the improvement in the quality of life.

Factors Affecting Quality Of Life In Diabetic Patients:

1. Affects working life, health status, family and sexual life
2. Fears about or the reality of complications.
3. Freedom to eat, fear of weight gain, rise in the blood glucose levels as well as fear of hypoglycemia affects patient's dietary behavior.
4. Diabetic patients tend to show signs of anxiety and poor emotional health due to negative diabetes perception, loss of control, and fear of complications.
5. Cardiovascular complications such as atherosclerosis, hypertension, and cardiac autonomic neuropathy are also found in diabetic patients which represent a permanent stressor for the diabetic patient.
6. The main cause of chronic kidney disease is diabetes, which requires dialysis treatment which affects the quality of life of diabetic patients.
Another complication Diabetic Retinopathy can lead to visual impairment or even blindness.
7. Diabetic neuropathy (DN) can affect the peripheral nerves, leading to foot ulcerations and even amputations, or autonomic ones, causing gastrointestinal, urinary and sexual dysfunctions.
8. Depression appears shortly after the occurrence of diabetic complications. Diabetic patients show great signs of anxiety and depression if two or more complications are present.

9. Patients with a higher body mass index have a decreased quality of life.
10. Quality of life decreases as the treatment regimen advances; patients taking insulin have a low treatment satisfaction and have more burden of illness than patients controlling their sugar levels by diet, exercise and oral medications.
11. Children with diabetes mellitus experience psychosocial stress and have higher rates of behavioral difficulties and lower social competency compared with healthy children.

Management

1. It is extremely important that management team treating diabetic patients should include quality of life assessment in their practice as the main goals of diabetes management include learning to live with diabetes, interventions that teach families strategies for decreasing conflict, decreasing psychologically controlling interactions, embracing it as a life style and improving quality of life.
2. To improve the patient's quality of life, special care should be given to the modifiable diabetes-related factors such as the prevention and treatment of diabetes complications, treatment of depression, and weight loss in obese and overweight patients
3. In patients with type 1 Diabetes who are on regular multiple-dose insulin injection therapy, the goal of management is frequent blood glucose monitoring, carefully planned exercise and nutritional programs. These treatment regimens provide a positive impact on the child's short- and long-term health status, quality of life and well-being.
3. Good control of cardiovascular risk factors, and better socioeconomic status is associated with better quality of life in diabetic patients.
4. Patients should adhere to diabetes-related self-care activities, such as proper diet, exercise routine, and glycemic control. These factors play an important role in preventing complications and maintaining a healthy BMI, and having a good quality of life

DIVYA JAIN

PROBLEMS AND SOLUTIONS IN DIABETES

FUNGAL INFECTIONS OF FEET IN DIABETES

Hasmukh Shroff*

EDUCATION

Fungal infections ('tinea') affecting the skin are extremely common in clinical practice. Depending on the site involved these are called tinea corporis (body), tinea cruris (groin), tinea pedis (feet), tinea unguium (nails), tinea capitis (scalp), tinea faciei (face) and tinea manuum (hand).

Tinea pedis is also referred to as 'athlete's foot'. It is the dermatophytic infection of the soles of the feet and the inter digital spaces i.e. toe webs and is more common in young adult males. In one study it was present in 21% of diabetic patients.

The causative fungi are found in shoes, flooring and socks. Moist skin, excessive sweating and lack of cleanliness promote fungal growth.

Diabetic state predisposes patients to various infections including fungal infections. Occasionally, the skin lesions e.g. balanoposthitis help in detecting diabetes. Uncontrolled diabetes may flare up cutaneous infections and vice versa, severe infections may need dose adjustment of anti-diabetic drugs while treating.

The incidence of tinea pedis in diabetic versus non-diabetic patients with interdigital macerations in a prospective study revealed as 37.5% (non-diabetic) versus 42.5% (diabetic) groups.

The development of onychomycosis or tinea pedis was significantly related to type 2 DM, increasing age and male gender. *T. rubrum* was common isolate. Isolation is important as non-dermatophyte fungus can also cause these infections.

Predisposing factors

Situations that favour the occurrence of tinea pedis are as follow:

- wearing tight - fitting occlusive shoes promote warmth and moist environment that encourage fungal growth,
- communal baths may create an ideal condition for repeated exposure to infected material

- going bare foot to locker room, gyms, public facilities
- poor hygienic care e.g. wet socks, unclean foul smelling shoes
- hyperhidrosis plantaris, excessive sweating
- diabetes
- concurrent intake of immunosuppressive agents.
- Peripheral vascular disease.
- Seasonal - monsoon (water logging).

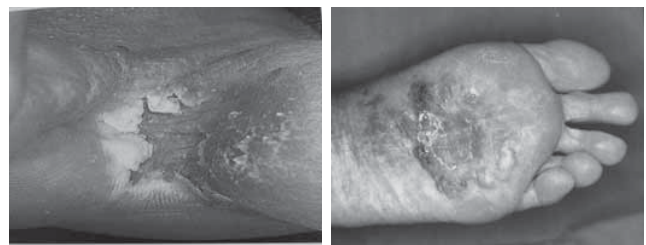
Clinical presentation

Pruritic erythematous skin lesions with scaling, excoriations, or scaling with maceration in the toe web is seen. Fissures may be painful and predispose to secondary bacterial infection. This is of particular importance in patients with diabetes.

Clinical variants:

- Interdigital – macerated scaly lesion in toe web. (4th & 5th common) is noted. Various bacteria and yeast can produce similar lesions.
- Widespread fine scaling on the sole that usually extends up on to the sides of the feet and lower heel.
- Acute well defined inflammatory lesion with micro vesicular border on dorsum of the feet.
- Onychomycosis of the toe-nails with destruction of the free terminal border of the nail plate, sub-ungual hyperkeratosis. Paronychia may be present.

Great toe is more frequently affected.



* Dr. Hasmukh J. Shroff, M.D. Senior Consultant Dermatologist, Saifee Hospital, Mumbai. E-mail ID: hjshroff@yahoo.com



Diagnosis

Diagnosis is clinical in most cases. Fungal scrapings (10% KOH preparation) quickly confirm the diagnosis in a suspected case. Culture on Sabouraud's Agar medium with antifungal antibiotic sensitivity test should be done for academic and rational therapeutics.

Management of fungal infection of the feet in diabetes

Hygienic care – feet (webs in particular), footwear, socks and toenails.

Wash feet daily with soap or antibacterial cleanser. Interdigital areas should be dried thoroughly after bathing and a talc or antifungal powder should then be applied. Socks should be changed frequently. Toe nails must be trimmed periodically. Avoid plastic and rubber footwear.

Topical antifungal therapy

Limited infections can be treated topically.

Lotions and powders are preferred. Twice a day application of the following drugs is helpful viz,

Azoles – clotrimazole, Miconazole, Econazole, Sertaconazole

Allylamines – Terbinafine

Tolnaftate

Ciclopiroxolamine & amorolfine as nail lacquer

Systemic antifungal therapy

It can be combined with topical treatment to yield quick response.

Drugs used have following action:

Griseofulvin (fungistatic), Ketoconazole, Fluconazole, Itraconazole (Fungistatic) and Terbinafine (Fungicidal).

Tinea pedis

Oral triazoles (Clotrimazole, Itraconazole) and allylamine (terbinafine) are used. Tab. Fluconazole 150 mg once in a

week for upto 4 weeks. Tab. Terbinafine 250 mg o.d. for 2-3 weeks.

Onychomycosis

Terbinafine is fungicidal and is the drug of choice. Tab. Terbinafine 250 mg.o.d. for 6 weeks. or Tab. Fluconazole 200-400 mg per week for 6 months.

Liver function test should be monitored.

Therapeutic pearls

Of late, fungal infections have become chronic and refractory to treatment.

Treatment needs to be continued longer and not stopped after 'clinical cure' is achieved when patient feels that there is no more itching. To achieve 'mycological cure' it may be imperative to continue treatment for 2-4 weeks more after skin lesions and symptoms have subsided to prevent relapse.

Avoid use of topical steroid as it can create fungal resistance and the long term use may cause skin atrophy.

Hygienic care of feet, shoes and socks is of paramount importance.

Most cases of tinea pedis can be successfully treated topically, except onychomycosis of toes that require oral antifungal therapy.

Diabetic patients with tinea infection require extra care and may need oral antifungal treatment.

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- 1) Legge BS, Grady JF, Lacey AM 'The incidence of tinea pedis in diabetic versus non-diabetic patients with interdigital macerations - a prospective study' J.Am. Paed. Med Assoc 2008, Sept-Oct, 1998(5) 35-36.
- 2) Gupta, Knnikov, Macdonald et al, 'Prevalence and epidemiology of toe nail onychomycosis in diabetics : a multicentre study' British Journal of Dermatology October 1998, 139: 665-671

WHAT'S COOKING ?

OATS VEGETABLE SOUP



INGREDIENTS	AMOUNT
OATS	2 tbsp
SPLIT GREEN GRAM	2 tbsp
CARROT	1/2
TOMATO	1 Medium
CAPSICUM	1/2
FRENCH BEANS	5-6
ONION	1/2
FLAXSEED POWDER	1/2 tsp
FRESH CORRIANDER	Few sprigs
BLACK PEPPER	A pinch
CHAAT MASALA	1/4 tsp
OIL	1/2 tsp
SALT	To taste

METHOD:

1. Chop all the vegetables, Pressure - cook with green gram and oats together for one whistle.
2. Allow the mixture to cool and then blend it in a mixture grinder.
3. Heat the oil in a pan; add the blended mixture and all other ingredients.
4. Cook for 5 -10 mins and garnish with fresh coriander.
5. Serve hot.

SERVING: 1

NUTRITIVE VALUE:

ENERGY	CARBOHYDRATES	PROTIEN	FAT	GI
284.5 Kcal	47.09 gms	6.09 gms	6.02 gms	low

BARLEY KHEER



INGREDIENTS	AMOUNTS
MILK	2 cups (300ml)
BARLEY	4 tbsp
BOTTLE GOURD (grated)	1/4 th cup
CARDAMON	1/4 tsp
CINNAMON	1/4 tsp
SAFFRON	1-2 strands
ALMONDS	2
SWEETENER	2 tablets

METHOD:

1. Soak barley for 1 hour and drain, pressure cook with 1 cup of water for 4 whistles.
2. Add cooked barley to milk and boil with grated bottle gourd (remove excess of water) till milk thickens.
3. Add cardamom powder, cinnamon powder and saffron.
4. Add sweetener.
5. Garnish with thin flakes of almonds and serve hot.

SERVING: 1

NUTRITIVE VALUE;

ENERGY	CARBOHYDRATES	PROTEIN	FATS	GI
282 kcal	30.04	10.09	12.59	medium

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Association of Diabetes Educators (ADE)

(For eligibility criteria: Check Website www.diabeteseducatorsindia.com)



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E-mail id:

Educational Qualifications:.....

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Work Experience:

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Certificates attached regarding educational qualification and work experience:

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Add ` 100/- for outstation cheques

Cheque Drawn in favour of: Association of Diabetes Education

Payment Details: Cheque No./Draft No. _____ Dated _____

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BOOK REVIEW

RSSDI text book of Diabetes Mellitus; Editor-in-Chief: H B Chandalia, Executive Editor: G R Sridhar, Editors: A K Das, S V Madhu, V Mohan, P V Rao

Jaypee Brothers Medical Publishers; New Delhi; 2014; pages 1457; Price Rs 2995

The third edition of RSSDI Text Book of Diabetes Mellitus (D M) has been published six years after the second edition. It is authored and edited by those clinicians and professors who have been teaching and practising diabetes over many years within the country. A few chapters are contributed by Non-resident Indians. As pointed out by the editor-in-chief, this edition has undergone considerable revision. The material published both within the country and outside till the end of 2013 has been critically analysed and included. A few topics which are paid scant attention in other books, like-the complexity of insulin resistance, the criteria applicable to metabolic syndrome in Asians, challenges in the management of children and elderly with diabetes, musculoskeletal manifestation of diabetes, malnutrition modulated diabetes, Latent Autoimmune Diabetes in Adults (LADA), neonatal diabetes and the role of Yoga and relaxation techniques are unique to this book.

The flow chart on the management of diabetic ketoacidosis available in this book should be in possession of all ICUs. The colour pictures of retinopathy, foot lesions, skin diseases and musculoskeletal manifestation are well presented. The role of alternate therapy is extensively

discussed. The guidelines for the beginner to organise a diabetic clinic and optimal health care for diabetes amidst diversity of social, economic and regional food habits is noteworthy. The limitation of stem cell therapy as of now is a good reminder. Some controversial issues are discussed in individual chapters. Much alike the chapter on A Glimpse in the Future, I wish a full chapter was devoted to controversies in diabetes. New chapters added in this edition are valuable and discuss important current issues. These include Sleep and Type 2 diabetes-mellitus, Early-onset Type 2 DM, Nutrient blockers and Bromocriptine, Insulin Pump Therapy, Glycemic Management in Hospitalized Patients, Continuous Glucose Monitoring System, Vitamin D and DM, HIV in Diabetes, Diabetes and Cancer.

The appendix is retained from the previous edition and gives a wealth of information applicable to Indian subjects like BMI and waist circumference and laboratory values in S I and conventional units. The index has attained perfection. The novel feature of this edition is mentioning the chapter number on the right edge of each page.

The book will prove to be valuable to students, physicians, diabetologists, endocrinologists and providers of diabetes care. It should be on the shelf of every medical library. The availability of this book has made the Western text books redundant. The single volume covering so many topics is bulky and heavy. I wish it was brought out in two volumes.

C. Munichoodappa. F.R.C.P.C.

**Diplomate, American Board in Internal Medicine
Bangalore**

Email id: dr.munichoodappa@gmail.com

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Prof (Dr) H B Chandalia's creative writing abilities & practical acumen has always been illustrated by his multiple contributions as an author of chapters in various textbooks. One such outstanding example is the book '**Conquest of Diabetes- by diet & exercise**' which is running its fourth edition in the English language and also available in Hindi as well as Gujarati. The Marathi version of the book is under preparation. It is a comprehensive, extensively illustrated two color book which is characterized by its brevity, clarity and offers a systematic approach towards the management of diabetes by diet and exercise.

The book highlights very important issues and controversies in the form of a large number of box inserts. Also, the scientific and technical words have been explained in the glossary, which appears throughout the book.

It also deals with recipes and an exercise plan for diabetics, which would prove helpful.

This book is directed to persons suffering from diabetes, health-care practitioners like doctors, nutritionists and diabetes educators and other health professionals involved in the care of diabetics.

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References :

1. ISO 15197:2013 standard

2. Goldy et.al. International conference on Advanced technologies and Treatments for Diabetes 2013

3. Bayer. Data on file

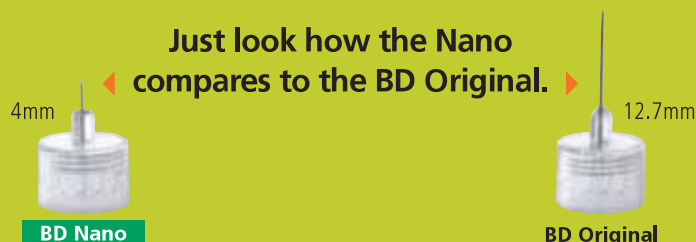


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7. As of April, 2010.

8. Gibney MA, Arce CH, Byron KJ, Hirsch LJ. Skin and subcutaneous adipose layer thickness in adults with diabetes at sites used for insulin injections: implications for needle length recommendations. *Curr Med Res Opin.* 2010; 26 (6): 1519–1530.

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References:

1. INVOKANA[®] India Prescribing Information (January 2014) 2. Lavallo-González FJ et al. Diabetologia. 2013;56(12):2582-92 3. Cefalu WT et al. Lancet 2013;382(9896):941-50 4. Leiter LA et al. Diabetes Care. 2014. 5. Stenlöf K et al. Diabetes Obes Metab. 2013;15(4):372-82.

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Pharmaceutical form: 100 mg - The tablet is yellow, capsule-shaped, immediate-release and film-coated, with "CFZ" on one side and "100" on the other side. 300 mg - The tablet is white, capsule-shaped, immediate-release and film-coated, with "CFZ" on one side and "300" on the other side. **Therapeutic Indications:** INVOKANA[®] is indicated as an adjunct to diet and exercises to improve glycemic control in adults with type 2 diabetes mellitus as monotherapy and combination therapy. **Dosage and Administration:** The recommended starting dose for adult > 18 years is 100 mg or 300 mg once daily orally preferably before the first meal of the day. A starting dose of 100 mg once daily should be used in patients on loop diuretics and patients > 75 years of age. In patients with an eGFR 45 mL/min/1.73 m² to < 60 mL/min/1.73 m², the dose of INVOKANA[®] is limited to 100 mg once daily. The 300 mg dose may be considered for patients with an eGFR > 60 mL/min/1.73 m², who need tighter glycemic control and who have a low risk of adverse reactions associated with reduced intravascular volume with INVOKANA[®] treatment. **Contraindications:** Hypersensitivity to the active substance or to any of the excipients. **Warnings and Precautions:** INVOKANA[®] has not been studied in pediatric patients (< 18 years), patients with type 1 diabetes and is therefore not recommended for use. INVOKANA[®] should not be used for the treatment of diabetic ketoacidosis or in patients with an eGFR < 45 mL/min/1.73 m² [CrCl < 45 mL/min], as it would not be effective in these settings. In patients with evidence of reduced intravascular volume, correcting this condition prior to initiation of INVOKANA[®] is recommended. **Drug Interactions:** The metabolism of INVOKANA[®] is primarily via glucuronide conjugation mediated by UDP glucuronosyl transferase 1A9 (UGT1A9) and 2B4. If a combined inducer of these UGTs and drug transport systems (e.g., rifampicin, phenytoin, barbiturates, phenobarbital, ritonavir, carbamazepine, efavirenz) must be co-administered with INVOKANA[®], monitor HbA1c in patients receiving INVOKANA[®] 100 mg once daily with consideration to increasing the dose to 300 mg once daily if additional glycemic control is needed. INVOKANA[®] neither inhibits cytochrome P450 CYP1A2, CYP2A6, CYP2C9, CYP2D6, or CYP2E1, CYP2B6, CYP2C8, CYP2C9, nor induces CYP1A2, CYP2C9, CYP2B6, CYP3A4 at higher than therapeutic concentrations. INVOKANA[®] is a P-glycoprotein (P-gp) substrate, and inhibits P-glycoprotein mediated transport of digoxin with low potency. Patients taking digoxin or other cardiac glycosides (e.g., digitoxin) should be monitored appropriately. **Pregnancy, Breast-feeding and Fertility:** There are no adequate and well-controlled studies in pregnant women. INVOKANA[®] should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. It is not known if INVOKANA[®] is excreted in human milk. A risk to the breast-fed child cannot be excluded. The effect of INVOKANA[®] on fertility in humans has not been studied. **Adverse reactions:** In clinical studies of INVOKANA[®] the most commonly reported adverse reactions during treatment (> 5%) were vulvovaginal candidiasis, urinary tract infection, and polyuria or pollakiuria. Other adverse reactions in clinical studies of INVOKANA[®] that occurred at a rate < 2% in placebo-controlled studies were adverse reactions related to reduced intravascular volume (postural dizziness, orthostatic hypotension, hypotension, dehydration, and syncope), skin rash, and urticaria. In the event of an overdose, it is reasonable to employ the usual supportive measures, including monitoring of vital signs and observation of clinical conditions. **Overdose:** Single doses up to 1600 mg of INVOKANA[®] in healthy subjects and INVOKANA[®] 300 mg twice daily for 12 weeks in patients with type 2 diabetes were generally well-tolerated. In the event of an overdose, it is reasonable to employ the usual supportive measures, e.g., remove unabsorbed material from the gastrointestinal tract, employ clinical monitoring, and institute supportive treatment as dictated by the patient's clinical status. Canagliflozin was negligibly removed during a 4-hour hemodialysis session. Canagliflozin is not expected to be dialyzable by peritoneal dialysis.

Storage: Store below 30°C and in dry place. Protect from light. Keep out of reach of children.

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