Nursing Management of Hospitalized Child

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The management of hospitalized children

Parental involvement has become an accepted feature of the care of hospitalized children. Some kinds of disease they are now expected to play a part within hospitalization and discharge home.

Family – centered care

The institute for Family-Centered Care (2003) in U.S.A described there are 8 cores concepts about the relationship between health care providers, children and families:

. Respect
. Support
. Strengths
. Flexibility
. Choice
. Collaboration
. Information
. empowerment

Family – centered care

Galvin et al, (2000) explored parental attitude using a questionnaire reflected the FCC philosophy and using analysis of variance to explore relationships between sociodemograhic characteristics:

- **Collaboration**
  . partnership-in-care and planning
  . feeling able to manage their child's care after discharge and knowing who to call for help if needed.
- **Support**
  staff knowledge of the child's special needs, willingness to listen to parental concern and communicating a sense of hopefulness.
- **Respect**
  feeling welcome being with the child as much as they wanted, and the right to question medical recommendation.

Empowerment

- Empowerment requires an individual to take care of one's self and make choices about care from among the options.
- Patient empowerment is a process of helping people to assert control over factors that affect their health.
- Patient empowerment begins with information and education and includes seeking out information about one's own illness or condition, and actively participating in treatment decisions.

Empowerment model

- In the empowerment model, the term used is **adherence**. Adherence implies a contract between patients and providers in whom **joint responsibility** is taken for achieving agreed-upon outcomes.[6]
- The empowerment model is thus one of **mutual respect**. The respect derives from the valuing of human life and the building of a good clinician-patient relationship.
- In the empowerment model, healthcare professionals **respect** the patient and **assist** the patient in **making decisions** in ways that have meaning to the patient.
- Empowerment models aimed at improving patients' **confidence** and **efficacy** in self- treatment.

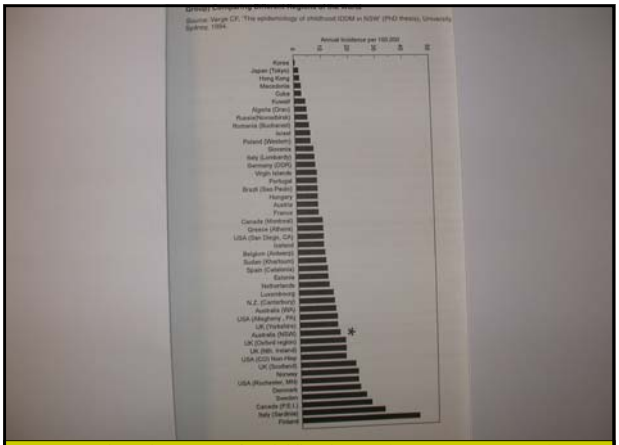
Children Type I Diabetes

Children DM -- Definition

- Diabetes mellitus is a metabolic disorder of multiple etiology, characterized by chronic hyperglycemia due to defective insulin secretion or insulin action or both.
- In childhood and adolescence, diabetes is most often associated with a genetically determined predisposition, the presence of autoimmune markers, aggressive beta-cell destruction, severe insulin deficiency.
- The urgent need for insulin replacement therapy because of the risk of ketoacidosis.

Childhood diabetes

- There are estimation of Type I DM children about 430,000 in worldwide 2003.
- The new incident of childhood Type I between countries – ranging from 2/100,000 in Japan to 43/100,000 in Finland new cases under the age of 15 years.
- Type 2 childhood diabetes will be the predominant within 10 years in many populations.



Annual Incidence Rates for Childhood IDDM (0-14 Years Age Group)

Childhood diabetes

A registry was established in 1997 to collect childhood diabetes cases retrospectively from all districts in Hong Kong. A total of 255 diabetic cases were identified, 227 type 1 diabetes mellitus, 18 type 2 diabetes mellitus and 11 secondary diabetes.

Classification of Young DM

- Type 1 DM
- Type 2 DM
- MODY (maturity onset diabetes of the young)
- Neonatal diabetes
- Non-autoimmue IDDm due to pancreatic damage: cystic fibrosis, thalassemia
- Diabetes associated with other disease or syndromes

Presentation of diabetes (Type 1)

- Polyuria, polydipsia and weight loss over 2 -6 weeks
- A long slow onset over several months, then develop to diabetic Ketoacidosis (DKA)
- Catastrophic onset to their diabetes and present within a few days in DKA

The main aspects of diabetes care are:

- Replacement of insulin by giving insulin injections
- A good healthy diet, with a regular intake of carbohydrate containing food
- Monitoring of blood glucose levels at home
- A healthy amount of exercise
- Regular review by the diabetes team

The Special needs of children and their parents with diabetes

- Requiring skilled self-management in the home and local environment
- Importance of providing a good start with confident, clear positive messages, support and advice cannot be over-emphasised
- Diabetes education is the keystone of diabetes care and management

Literature review

- Diabetes education must move beyond knowledge improvement and metabolic control. They concluded that "the past decade also has witnessed a dramatic shift from knowledge/ attitude/ belief models of diabetes education to focus on patient-centered perspective, self-efficacy, self-management, and empowerment issues. (Glasgow & Osteen, 1992)
- There are at least five key features to an empowerment consultation: acceptance, affect, autonomy, alliance and active participation. (Skinner & Cradock, 2000)
- Increased patient participation may also result in patients being more satisfied with their consultations. Some studies suggested that patient participation in decision making, assessed in relation to patient's desires for participation can affect satisfaction. (Golin et al. 1996)

Literature review

- The medical model of care prevailed in hospitals, nurse found it difficult to relinquish control to parents. This suggests that for empowerment of parents, organizations must ensure that medical staff develop skills to work in collaboration with parents. (Brown & Ritchie 1989)
- Study of empowerment programmes for diabetic teenagers, there was a significant decrease in HbA1c 12 and 24 months after the intervention of the empowerment programme in the group that involved their parents. As conclusion, empowerment programmes for diabetic teenagers in early and middle adolescence should include parental involvement. (Viklund et al. 2007)

Expected outcome of empowerment in care of DM children

The empowerment of the young person and the family helps reduce the frustrations related to diabetes care and improves treatment outcome.

- The expected outcome is the success of self-care, ideal HbA1c, reduce complications.
- Parents can lead the process of health care informing health professionals of changes in their children's health, telling us what is working well or not so well.
- One of the most essential tools to measure empowerment are surveys evaluating patient satisfaction.
- Improved quality of life of children and adolescents with diabetes and their parents.

Impact on child / adolescent (1)

- Overprotected
- Enforced maturity
- Bored with routine
- Guilt
- Adolescent striving to independence
- A feeling of being different from their peers
- Peer group pressure
- Coping with possible embarrassment when situation such as hypoglycemia occur

Impact on adolescent / child (2)

- **Shame and fear**
  - Reluctant to let people know they have diabetes
  - Embarrassed to test blood glucose or eat when needed
  - Embarrassment caused by hypoglycemia
- On regular diet and insulin, with increased risk of weight-related concerns and **eating disorders**, particularly teenaged girls with diabetes

Impact on parents

- Guilt
- Worry
- Intensive probing
- Mother medical carer but emotionally involved

Impact on sibling

- Often left out
- Sibling rivalry
- Provide diabetes education

How to promote a healthy relationship between the diabetes children and their siblings

- Try to include all family members in the management of diabetes by giving each sibling (especially older siblings) a role to play.

Psychological adjustment

Promoting positive behavioral change
Help the child / adolescent

- feel more confident about managing diabetes
- feel more helpful about the possibility of living healthier life
- feel more enthused about becoming active managers of their diabetes and health

" Diabetes education will only be successful when diabetes knowledge is interwoven with these major principles of attitude and behavior change."

Coping with diabetes

- Diabetes can be stressful for the whole family, but should be settle down overtime.

Life with Diabetes

- Life is regimented by the clock
- Diabetes never takes a holiday

Critical Pathway

Critical Pathway for acute management of newly diagnosed insulin dependent diabetes mellitus

- Day1 – Day7 in- hospital
- 1st – 2nd week on discharge
- Ambulatory care

The diabetes team

- A diabetes doctor
- A diabetes educator
- A diabetes dietitian
- Clinical Psychologist
- Social worker

It is the responsibility of the diabetes team to ensure that the person with diabetes can follow the life-style of their educated choice, based on the three elements of empowerment: knowledge, behavioral skills, and self-responsibility.

D.M. Education

Assessment

- Initial assessment for parents/ caretaker/child/ whole family
  (including educational level, patient's eating habit, usual meal time, school time table ……)
- Psychological aspect (including needle phobia, emotion, behaviour……)

D.M. Education

Survival skills

- Explain how the diagnosis was made and reasons for symptoms
- Simple explanation of uncertain cause of diabetes **(No blame on parents)**
- The need for immediate insulin and how it will work
- What is glucose - normal BG and glucose targets
- Practical skills - injections, blood &/urine tests, reasons for monitoring
- Basic dietetic advice
- Simple explanation of hypoglycemia
- Diabetes during illness

D.M. Education

(cont'd)

- Diabetes at home & at school, sport & exercise
- Discharge advise
- Membership of diabetes association & support services
- Emergency contacts

Assessment of Empowerment

Assess whether the person with diabetes:

- Has the knowledge, behavioral skills, and sense of awareness necessary for optimum self-care.
- Makes early and effective responses to everyday problems.
- Has the confidence to obtain the best input from the diabetes health-care team.

Empowerment in Diabetes

Obtain information (education)
↙
Assume a more active role in treatment decision making
↙
Decrease their levels of anxiety and depression
↙
Increase their levels of personal control in the patient-physician relationship
↙
Participated in medical decision making

Empowerment

Feeling empowered
↙
Participatory competence
(the ability to be heard by those in power)
↙
Allowed a movement from an original focus on feeling to a focus on ability that was acquired and developed over time and maintained

DM education and age group

Infants and toddlers

- Total dependence on parents and care providers for the DM care.
- Difficulties in distinguishing normal infant behaviour from diabetes-related mood swings.
- Unpredictable erractic eating and activity levels.
- Education on prevention , recognition, and management on hypoglycaemia.

DM education and age group

School-age children

- Help to develop self-esteem and peer relationship.
- Learning to help with and developing skills in injections and monitoring.
- Adapting diabetes to school programs, school meals, exercise, and sport.
- Advising parents on the gradual development of child's independence, with progressive stepwise hand over of appropriate responsibilities.

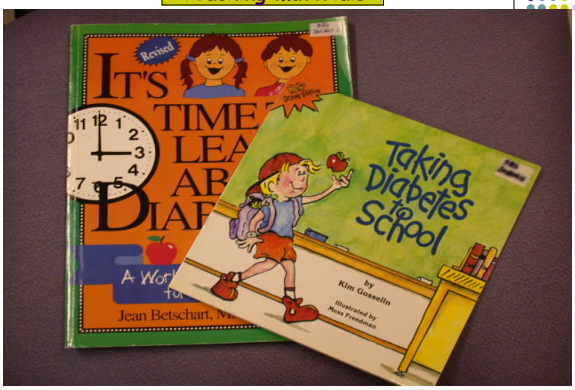
DM education and age group

Adolescents

- The critical role of continued parental involvement and promoting independent, responsible self-management appropriate to the level of maturity and understanding.
- Discussing emotional and peer group conflicts; teaching problem-solving strategies for dealing with dietary indiscretions, illness, hypoglycemia, sports, smoking, alcohol and sexual health.
- Understanding that omission of insulin is not uncommon. The opportunity should be grasped for nonjudgmental discussion about this.
- Developing strategies to manage **transition** to adult service.

Teaching materials

Teaching materials



Teaching materials

Management of self-monitoring

- **Monitoring of urine glucose**
  - Reflects glycaemic level over the proceeding several hours
  - Is related to the renal threshold for glucose, which in children is approximately 9 - 10 mmol/L
  - Can be less traumatic than SMBG for some children
  - Limitation --- inability to detect hypoglycaemia

Management of self-monitoring

- **Monitoring of urine ketone**
  - Urine strips measure asetoacetate (AcAc)
  - Uncontrolled hyperglycaemia
  - Dawn phenomenon
  - Sick day (fever / vomiting)
  - Impending ketoacidosis (abdominal pain/ rapid breathing)
- **Monitoring of blood ketone**
  - Blood ketone tests that quantify β-hydroxybutyrate acid (BOBH), the predominant ketone body, are preferred for diagnosing and monitoring ketoacidosis. (ADA position statement)
  - Indications are same as monitoring of urine ketone
  - Early detection of DKA
  - Blood BOHB monitoring may be especially useful in very young children or when urine specimens are difficult to obtain

Management of self-monitoring

- **Monitoring of blood glucose (SMBG)**
  - Helps to monitor immediate and daily levels of control
  - Detects hypoglycaemia
  - Assists in the safe management of hyperglycaemia
  - Has educational value in assessing BG response to insulin, food and exercise

Monitoring of blood glucose (SMBG)

Timing of SMBG

- At different time in the day
- To confirm hypoglycaemia and to monitor recovery
- During sick day to prevent hyperglycaemia crises.
- In association with vigorous sport or exercise

Monitoring of blood glucose (SMBG)

Frequency of SMBG

- Individualized
- 2-4 times a day
- 4 times a days (before breakfast, before lunch, before dinner, before bed time)
- 2 times a day with alternative
- Pre-prandial or post-prandial
- Occasionally to have SMBG overnight (2 -3 am)

Recommended target ranges

Recommended target ranges	Pre-prandial	Post-prandial	At bed time
Babies, infant & children less six	5 - 12 mmol/L	8 -12 mmol/L	7 - 12 mmol/L
Children 6 - 12 years	4 - 10 mmol/L	6 - 10 mmol/L	7 - 10 mmol/L
Adolescents and adults	4 - 8 mmol/L	6 - 10 mmol/L	7 - 10 mmol/L

Nutritional Management

- The initial nutritional plan/ diet pattern should be reviewed by the specialist paediatric dietitian.
- Provide periodically reassessments to keep pace with the child's growth, diabetes management, lifestyles changes, developmental stages.
- Identify the specific dietary problems, such as weight loss, obesity and eating disorders.

Nutritional Management

Different approach in teaching DM diet

- Pyramid + less sugary food / drinks
- CHO exchange concept
- Glycaemic index

Nutritional Management

Total daily energy intake come from

- Carbohydrate > 50%
- Fat 30 -35%
- Protein 10 - 15%

Nutritional Management

Nutritional plan (CHO distribution)

Breakfast	snack	lunch	snack	Dinner	snack
20%	10%	25%	10%	25%	10%

- Distribution of CHO portion is according to the individual
- According to the insulin regimen, no need morning and afternoon snack if on Lispro

Nutritional Management

Time	Description of diet	Amount	Remark (10gmCHO exchange)
6:30am	Milk	240ml	1
	wholemeal + margarine	2 slice (no crust)	4
9:30am	Soda biscuit	2 pieces	1
1 pm	meat/fish	80gm	
	noodle	250gm	5
	vegetables	180gm	
	orange	1 no.	1
3pm	Ham sandwich		
	(bread x 1slice no crust + ham)	1 serving	2
6:30pm	As Lunch		6
9:30pm	Milk	240ml	1
	soda biscuit	240ml	1
		Total	22

Diet pattern

Nutritional Management

Food exchange

1 exchange = about 10 gm of CHO

- 1 tablespoon rice
- orange 1small size
- grape 6 - 8 pieces
- banana 1/2 piece
- milk 240ml
- Digestive biscuit 1 piece
- Bread (no crust) ½ piece ---- size

Nutritional Management

Food exchange (Fast Food)

McDonald's	CHO(g)	Calories
Hamburger	30	240
Cheese Hamburger	35	290
Big Mac	43	500
Apple pie	30	200
Potato chip (small)	25	260
Hot cake (3 pieces) (no butter/syrup)	45	250

Food exchange

1 exchange = 10g CHO (40 Cal)

橙(中)	1個
萍果(細)	1個
奇異果	1個
提子(中)	10粒
車厘子(大)	6粒
皇帝蕉	1隻
布冧(中)	1個
沙田柚	2件

Food Label

Nutrition Facts	
Frozen Chicken & Rice Dinner	
serving Size 1 box	
Amount per Serving	
Calories 356	Calories from Fat 72
	% Daily Value
Total Fat 8g	13%
Saturated Fat 4g	7%
Cholesterol 0mg	0%
Sodium 567mg	25%
Total Carbohyrate 45g	14%
Dietary Fiber 3g	12%
Sugar 0g	0%
Protein 26g	

Glycaemic index

Different CHO food produce different BG levels due to variation in rates of digestion. GI is a ranking of foods based on the post-prandial blood glucose response in comparison with a reference food such as glucose.

Low GI food < 55
Moderate GI food 55-70
High GI food >70
The GI of glucose is 100

Glycaemic index

Factors that glycaemic index

- Fibre containing
- Processing (unprocessed fresh food such as whole grains, beans, fruits and vegetables has low GI values, while highly processed foods have high GI values)
- Amount of fat and protein containing
- Presence of sugar

The Glycaemic Index of some food

- Low GI food
  Apple 36
  Chocolate 49
  Whole milk 27
  Mung Bean Noodle 33
  Spaghetti 42
- Moderate GI food
  Banana 60
  Regular ice cream 61
  White rice 64
  Brown rice 55
- High GI food
  Glutinous Rice 98
  Lucozade 95
  Jelly beans 80
  Honey glucose 87

Glycaemic Load (GL)

GL builds on the glycemic index to provide a more reliable measure of total glycaemic response to a food or meal

$$\frac{\text{Glyceamic index (GI)}}{100} \times \text{Grams of available CHO}$$

Feeding /diet problem for diabetes child

- Age 0 - 2 years
- Age 2 - 4 years
- Age 5- 7 years
- Age 8-12 years
- Adolescent

Feeding /diet problem for diabetes child

0 -2 age

- Breast feeding
- Formula feeding (e.g. Enfamil 70g CHO/L)
- Mixed feeding

2- 4 age (Pre-school age)

- Toddler will choose foods what they like, may be limited to two or three choices.
- Provide healthy food
- Potential problems of hypo when they refuse food

Feeding /diet problem for diabetes child

5 -7 age

- Explores and tries out different foods
- varying appetite and activities, varying insulin dose
- Sharing decisions about food choices
- Birthday parties

Feeding /diet problem for diabetes child

8 – 12 age

- Take responsibility for their food choices.
- They may receive more pocket money, so their buying power increases
- Learning to make food choices away from home
- Teach them to read food label and carbohydrate counting

Feeding /diet problem for diabetes child

13 – 17 age

- Test out their growing independence
- Have varied eating habits
- Missing meals
- Disordered eating

Hypoglycaemia

Causes of hypoglycaemia

- Too little to eat or delayed meal
- Skipped a meal
- After heavy physical exercise
- Too much insulin
- Sick day due to diarrhoea or vomiting

Management of hypoglycaemia

Definition

Counter-regulatory hormone and symptom responses to falling glucose levels develop at higher levels in children than adults and may be detected at plasma glucose values between 3.5 – 4 mmol/L

Severity of hypoglycaemia

- Mild
- Moderate
- Severe

Treatment of hypoglycaemia

- Avoid over- treat

Management of hypoglycaemia

Mild hypoglycaemia

Hungry, shakiness, tremor, nervousness, anxiety, sweatiness, pallor, palpitations and tachycardia

Moderate hypoglycaemia

Headache, abdominal pain, behavior Changes, impaired or double vision, confusion, drowsiness, weakness, difficult in talking, tachycardia, sweatiness

Severe hypoglycaemia

Extreme disorientation, loss of consciousness, focal or generalized seizures

Treatment of hypoglycaemia

Mild hypoglycaemia

- Give one exchange of fast acting CHO (10gm)
  * 2 spoonful of sugar / 2 sugar cubes
  * 120ml juice (Vita juice)
  * Lucozade 60ml
- There may be a need to bring forward the scheduled meal

Moderate hypoglycaemia

- Give 10-20 grams simple sugar food , wait ~5-10mins, if no response , repeat oral intake as above
- As symptoms subsided, the next meal or oral complex CHO should be given

How quickly does the sugar work

10 – 15min

Glucose drink
Liquid glucose
Honey
Lemonade
Fruit syrup
Milk
Ice cream
Chocolate bar

1 - 1½ hours

Treatment of hypoglycaemia

Severe hypoglycaemia

- Treatment is urgent
- Give IMI Glucagon
- 0.5mg for age < 5 years old
- 1mg for age > 5 years old

  (Glucagon is a linear pepide of 29 aminoacids /stimulates breakdown of glycogen stored in liver/ activates hepatic gluconeogenese)
- Observe the S/E of Glucagon (vomiting or headache)
- When the child is awake, give sips of ordinary soft drink and later follow this with some slow acting CHO
- Monitor the blood glucose level frequently
- Send to hospital if still vomiting

Idenfication bracelet or card

- DM patients should always carry some identification.
- Some of children wear identification as a bracelet or necklace that label the word of "Diabetes".
- Teenagers bring along the identification card of Diabetes in their wallet.
- The identification card giving full information. There has child's name, address, telephone number, kinds of insulin and hospital name.

Exercise

- Non-diabetic individuals have a reduction in insulin secretion and an increase in glucose counter-regulatory hormones that facilitate an increase in liver glucose production, which matches skeletal muscle uptake during exercise. As a result of this precise autonomic and endocrine regulation, blood glucose levels remain stable under most exercise conditions.
- In type I diabetes, the pancreas does not regulate insulin levels in response to exercise, and there may be impaired glucose counter-regulation, making normal fuel regulation nearly impossible.

Factors affect response to exercise

- Duration and intensity
- Type of activity (e.g. anaerobic and aerobic exercise)
- Type and timing of insulin injections
- Type and timing of food
- Absorption of insulin
- Degree of stress/ competition involved in the activity

Factors affect response to exercise

Type of timing of the food for exercise

- Short duration and high-intensity anaerobic activities may produce a delayed drop in blood sugar. It may not require CHO prior to the activity, it is better to give extra CHO after the activity to prevent hypoglycaemia.
- Long duration and lower intensity aerobic activities will require extra CHO before, possibly during and often after the activity.

Risk of Exercise Patients with Type I DM

- Hypoglycaemia
- Accelerated ketone body formation
- Delay hypoglycaemia
  * occur in prolonged and of moderate or high intensity exercise.
  *Because of increased insulin sensitivity and delay in replenishing liver and muscle glycogen stores.
  * Increase glucose transport into skeletal muscle tissue for at least 16 h post-exercise

How to prevent hypoglycaemia during or after exercise

- Monitor BG before, during and after exercise
- Monitor BG before bed to prevent nocturnal hypoglycaemia on days of strenuous activities occur
- Extra CHO before or during or after exercise
- The amount of CHO needed depends largely on the mass of the child and the activity performed as well as the level of circulating insulin. Up to 1.5g CHO/kg body mass /hour of strenuous exercise may be needed.

Summary recommendations for physical activity in young people with diabetes

- Arrive at a good level of metabolic control. Measure BG before the activity.
- Always carry some simple sugar food.
- In the case of unforeseen physical exercise, ingest CHO food before, during or after in order to replete the liver and muscle glycogen reserve.
- In the case of foreseen physical exercise, decrease the insulin dose during and after intense muscular activity.
- If the activity s of the prolonged endurance type, be certain to ingest simple sugar food and CHO food just before, during and after exercise.

Summary recommendations for physical activity in young people with diabetes

- Do not inject the insulin at a site that will be heavily involved in the muscular activity.
- Measure the blood glucose before bed or 2 -3 am after major physical activity on the evening in order to avoid hypoglycaemia during the night.
- Make the people accompanying you aware of the procedures and treatment of severe hypoglycaemia.
- It is good practice to have 'Diabetes ID' somewhere on the body.

(From ISPAD Clinical Practice Consensus Guidelines 2006-2007)

Insulin (1)

Children and adolescents with type I diabetes are dependent on insulin for survival. There is no alternative to treatment with **insulin.**

Insulin (2)

Insulin regimens :

- One injection / day
- Two injections / day
- Three - four injections / day
- Insulin pump
- **Therapy must be individualized**

Insulin

Daily insulin dosage varies greatly between individuals and changes over time. It therefore requires regular review and reassessment
Dosage depend on many factors such as:

- Age
- weight
- Duration and phase of diabetes
- State of injection sites
- Nutritional intake and distribution
- Exercise patterns
- Daily routine
- Results of BG monitoring
- Intercurrent illness

Insulin

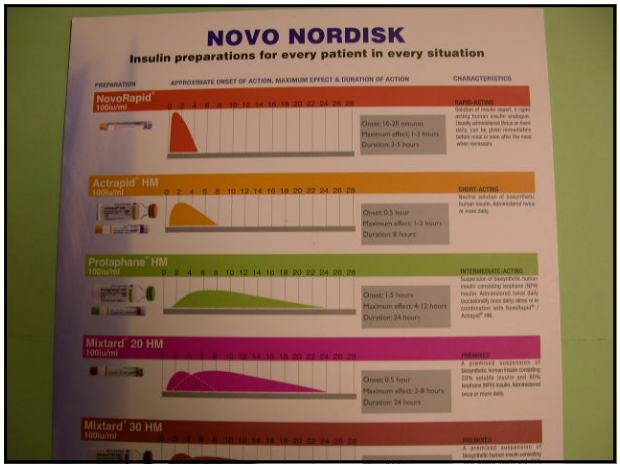
Type of insulin:

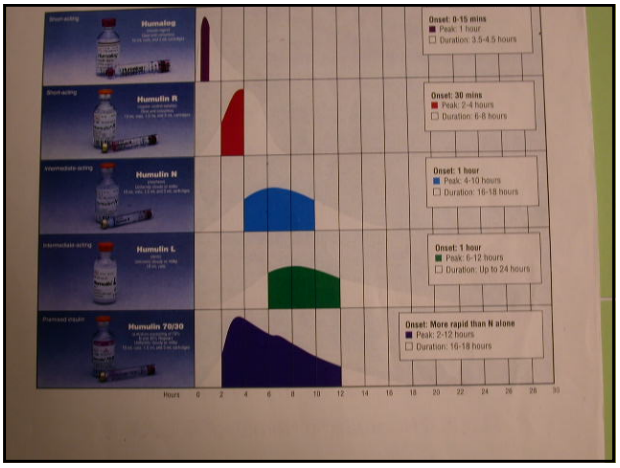
Type	Name	Onset	Peak	Duration
Rapid-acting	Novorapid (Aspart)	10mins	1-3 hr	3-5 hr
	Humalog (Lispro)	About 15 mins	0.5-1.5hr	3-5 hr
Short-acting	Actrapid HM	0.5 hr	1-3 hr	8 hr
	Humulin R	0.5 hr	2-4 hr	6-8 hr

Insulin

Type of insulin:

Type	Name	Onset	Peak	Duration
Intermediate -acting	Humulin N	1-2 hr	6-12 hr	18-24hr
	Protaphane HM	1.5 hr	4-12hr	24hr
Long-acting	Glargine	2-5hr	Peakless	24hr
	Determir	< 1 hr	Peakless	24hr





Insulin adjustment

Expected fluctuations in insulin dosage

- Soon after diagnosis
- Honeymoon period
- During menstruation
- During exams
- Sick days

Guidelines for insulin adjustment

- If blood glucose levels are outside the desirable range, look for a pattern in readings over a 2 – 3 days. High or low readings at the same time of day.
- Identify the insulin that is acting to regulate readings at this time of day (e.g. the pre-breakfast reading is mostly regulated by the previous evenings intermediate insulin).
- Adjust the insulin dosage ~10% of the insulin dosage that will affect the time of BG.
- Unexplained hypoglycaemia, adjust insulin dosage at the next day of the time that affect the time of BG.

Sick Day Management

Sick days can cause high blood glucose levels or low blood glucose levels.

- Treat the underlying illness
- Symptomatic relief
- Rest
- Sugar-free medications
- Hydration
- Insulin must not be omitted
- Glucose levels during illness may rise, close monitoring B.S. and check urine ketone if B.S. ≥ 15 mmol/L
- May be give extra insulin if in high B.S. and ketone in the urine
- Provide enough food and fluid, thus food exchange can apply
- Advise to parents if they have no confidence to manage, need transfer to hospital

Discharge From Hospital

When a diabetes child is ready for discharge, going home feels like a big step and will naturally cause some anxiety to the child and his/ her parents

Discharge From Hospital

A guide what is required before the child leaves hospital

- Basic education completed
- Psychological support
- Equipment and supplies on hand
- Support group information
- Update insulin dosage
- Hotline telephone no.
- Follow up date

Ambulatory care

- Once discharge, multiple disciplinary diabetes team continue provide care and service for child and family
- The aim of ambulatory care is to achieve the best possible glycaemic control
- Psychological support
- Advice on issues such as alcohol, smoking, exercise, contraception
- Follow up visit
- Consistent education
- Screening for complication
- 24 hours telephone hotline

School and Diabetes

Issue to be discussed with school personal

- Having general information about diabetes and its management (letter and educational materials)
- Avoiding delays in meals, snacks
- Special provisions for privacy if testing blood glucose level and injecting insulin at school if necessary
- Management of hypoglycaemia
- Encouraging full participation in all school social, sporting and academic activities
- Help to fit diabetes into the school routine to prevent the child from feeling different
- Knowing that diabetes does not alter the child's academic potential

DM Camp

- A program of full immersion in the management of diabetes with structured diabetes programme.
- Duration : 3 days to 3 weeks.
- It is important that social and recreational activities with peers be developed in a "non-medical" environment to encourage feelings of freedom and independence.
- To experience common difficult situations in a safe environment and discuss them with the group.
- Camps are an ideal learning opportunity for people with diabetes, and offer health professionals the chance to live with DM children for a few days in a unique setting.
- A respite for parents and the rest of family from the routine of diabetes.

Support

- Diabetes Hong Kong
- Juvenile Diabetes Hong Kong (www.hkjda.org)
- Hospital own diabetes support group

How to support

- Visit of newly diagnosed patients by another parents with diabetes child
- Provide opportunity for them to share experiences and feelings
- Prevent social isolation
- Participate on activities and services related to diabetes

Hotline Services

Teaching patients in an ambulatory setting:

- Allow on going education over a long period of time.
- Provides chances for reinforcement, misconception clarification and problem solving related to daily diabetes care.
- A flexible system which may fit in patient's daily activities.

Hotline Services

Service includes:

- Frequent contact.
- Make sure patient and care taker are competent to carry out treatment plan.
- Review adjustment of the therapeutic regimen (new case).
- Assess and discuss the results of self monitoring with patient and care taker.
- Special consultation e.g. sick day management, missed dosage….etc.

Practical session

Home Blood Glucose Monitoring

- Visual testing

- Meter – testing
  . Photometric
  . Biosensor

Guideline on introduction of blood sugar analyzer to patients and their significant

- Freedom in choosing
- Providing relevant information after assessment
- Introduce more than one BGA to choose
- Consider patient's preference / financial situation
- Following objective data on BGA should considered (or introduced) to facilitate the comparison among different models, e.g. additional function

(Guideline was prepared by DEG,DD,HJSEMR AUG/2002)

Tips of the finger pricking

- Sticking slightly on the side of the finger-tip is preferable since it bleeds will and hurts less.
- Can take blood glucose tests from toes.
- A topical anaesthetic cream (EMLA) will not work on fingertips as the skin is too thick.
- Advise parents to choose the BGA that need small amounts of blood.
- Choose the fine finger prick needle and consider the depth of puncture.

Insulin injection

Devices for Insulin Delivery

- Insulin Syringe
- Insulin Pen
- Insulin Pump
- Jet injectors

Insulin syringes

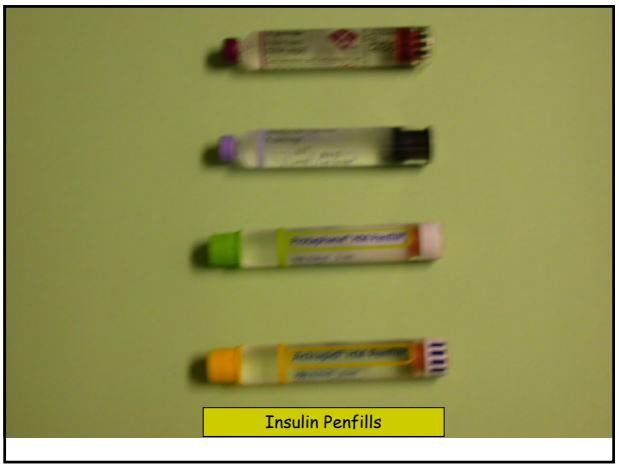
- Conventional insulin administration involves subcutaneous injection with syringes marked in insulin units.
- Insulin syringes are manufactured with 0.25ml, 0.3ml, 0.5ml and 1ml capacities.
- Several lengths of needles are available.
- Blood glucose should be monitored when changing from one length to another to assess for variability of insulin absorption.
- Travelers should be aware that insulin is available in a strength, e.g. the strength of insulin in U.S. is U-40 that syringes that need to match the conc. of insulin.

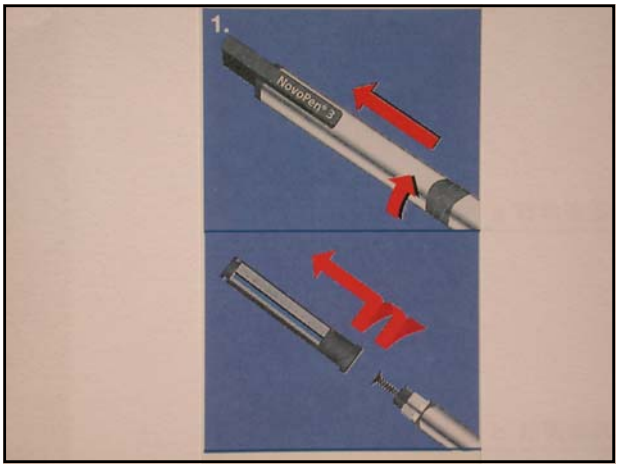
Mixing insulin in a syringe

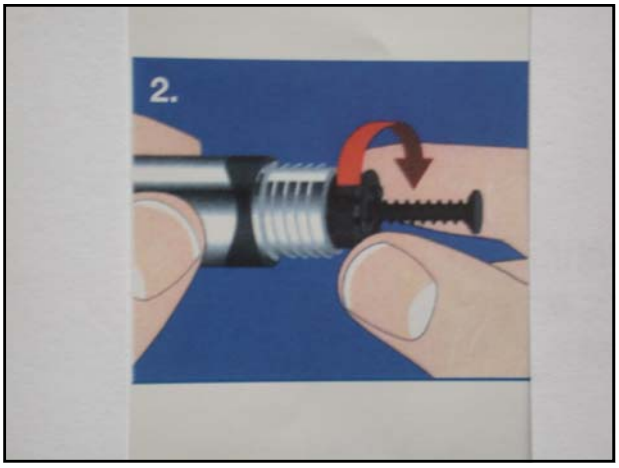
- Start by injecting air into the bottle of intermediate-acting insulin (cloudy insulin)
- Take the syringe out of first bottle
- Inject air into the bottle of the short or rapid-acting insulin (clear insulin)
- Draw up the short or rapid-acting insulin (clear insulin)
- Take out the syringe of the second bottle
- Carefully insert the needle into the bottle of intermediate-acting insulin (cloudy insulin)
- Draw up the correct dose (without injecting into the bottle)
- Take the syringe out of the first bottle

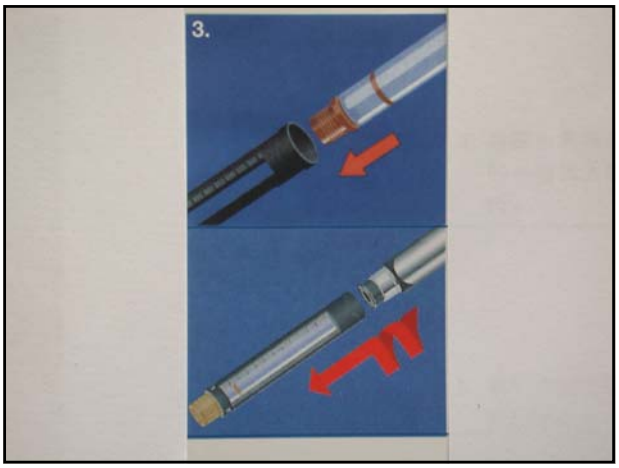
Needle for Insulin pen

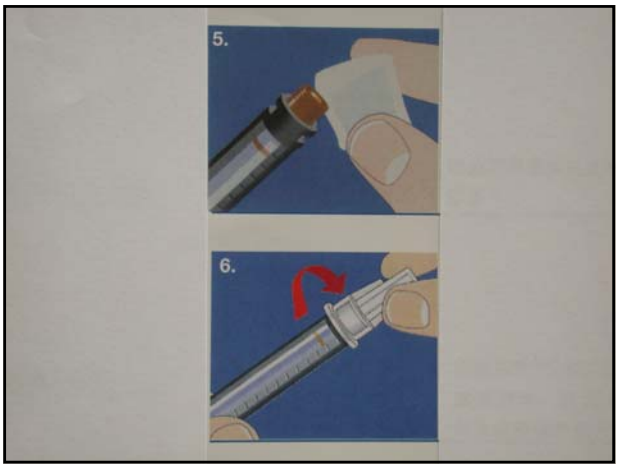
Gauge: 29G, 30G, 31G
Length: 5mm,6mm,8mm,12.7mm

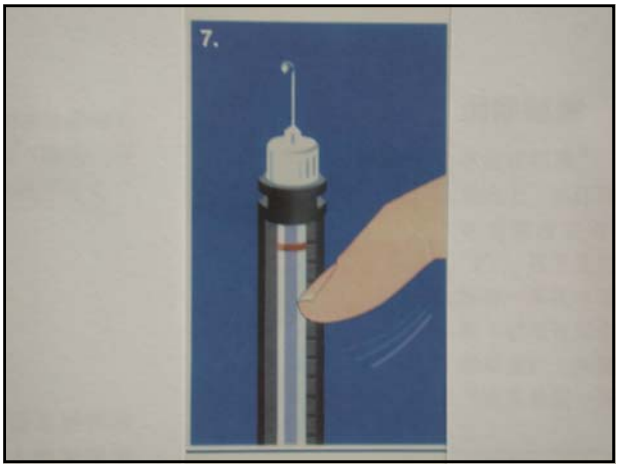


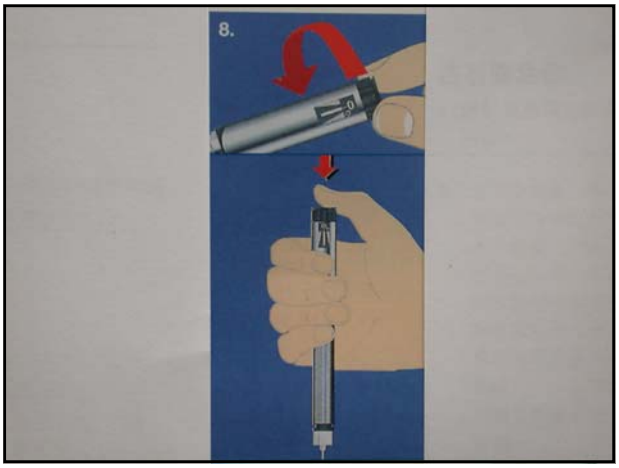


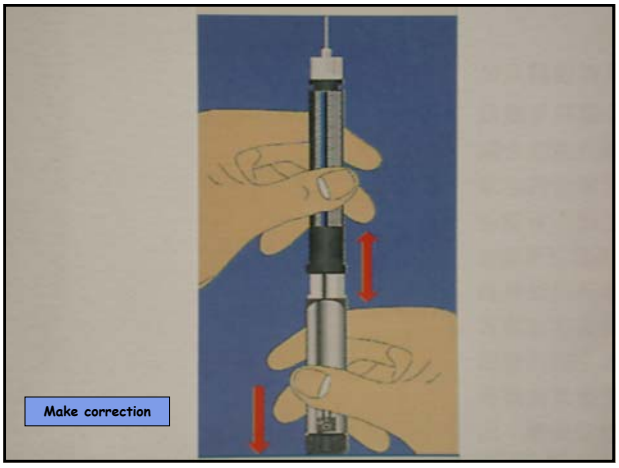


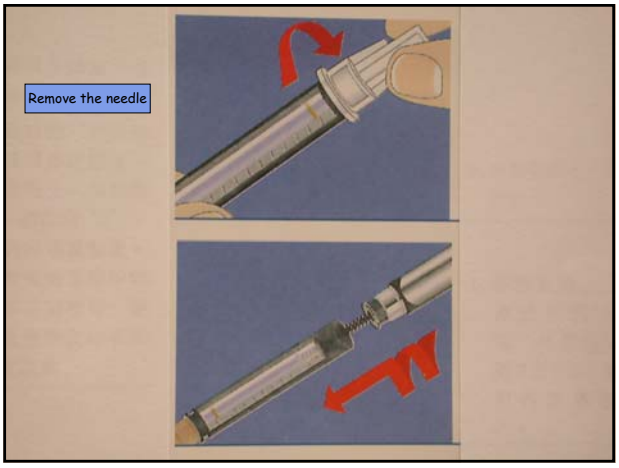


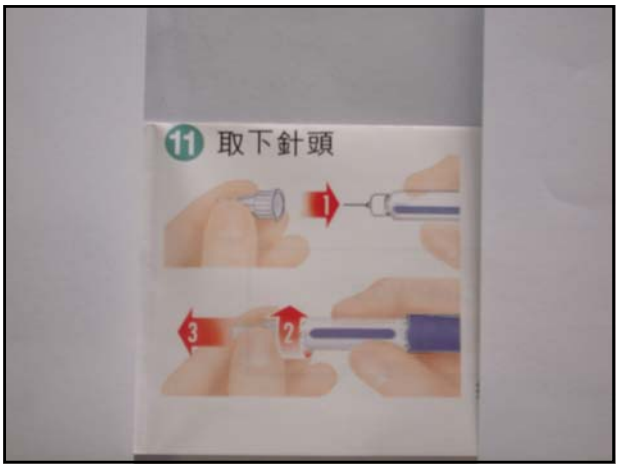




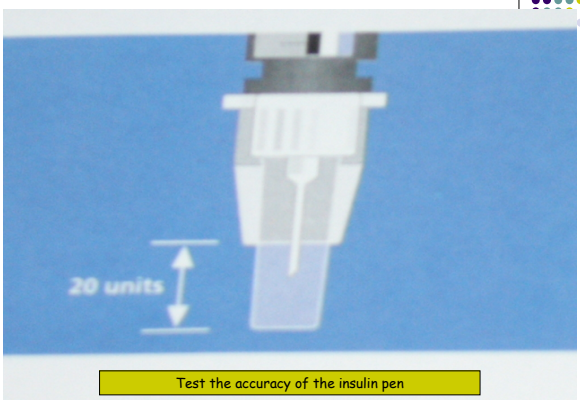




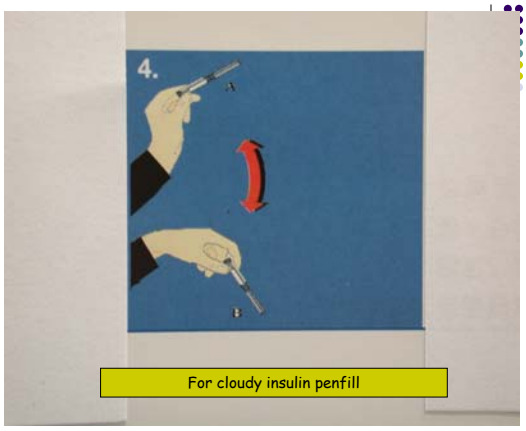




Use 1-2 units of insulin to test the patent of the needle

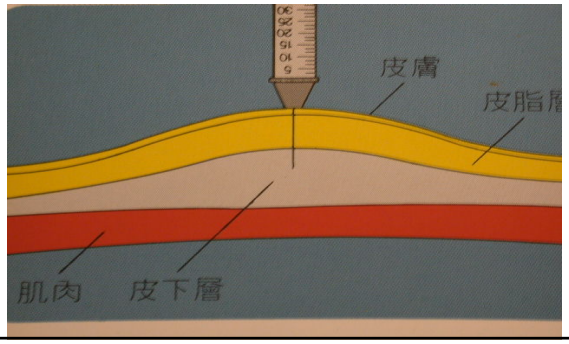


Test the accuracy of the insulin pen



For cloudy insulin penfill

Insulin injection

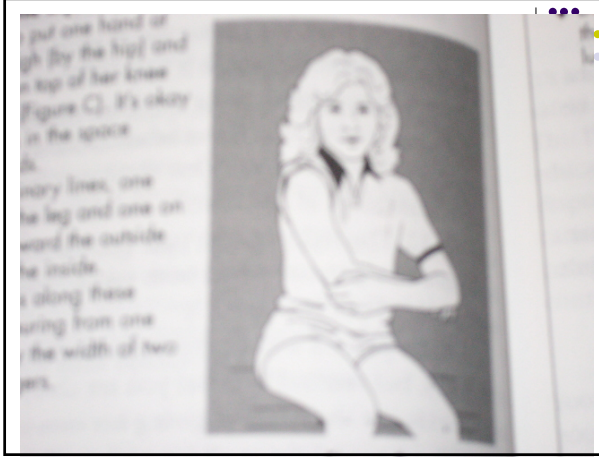


Injection site (1)

Insulin may be injected into the subcutaneous tissue of:

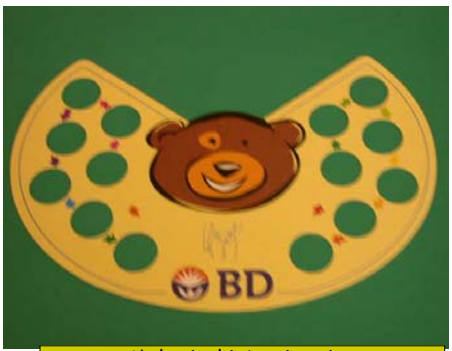
- Upper arm
- Anterior and lateral aspects of the thigh
- Buttocks
- Abdomen

Intramuscular injection is not recommended for routine injection. It will cause the insulin to work faster.



Injection site

Injection site



Abdominal injection site

Injection site (2)

Absorption speed

- Stomach *****
- Arms ****
- Exercised thigh/arms ****
- Unexercised thigh ***
- Buttocks **

Therefore, it is generally recommended that rapid and fast-acting pre-prandial insulin is given in the abdomen if possible.

Injection site (3)

Rotation within injection sites

- Use the same site for the same time of day e.g. stomach in a.m., thigh in p.m.
- Use a different area in that site from day to day, e.g. moving one finger width from the site of the previous injection or alternating from left to right.

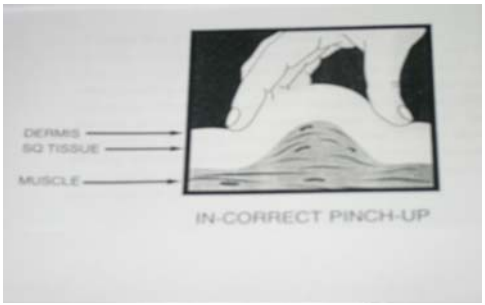
Recommenced injections sites

- Rapid-acting insulin — Abdomen
- Short-acting insulin — Abdomen
- Intermediate insulin — thighs or buttocks
- Long-acting insulin — thighs or buttocks

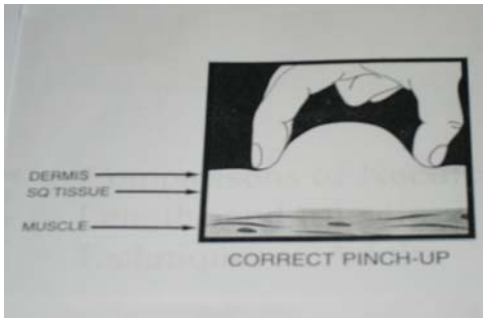
Insulin injection procedure (1)

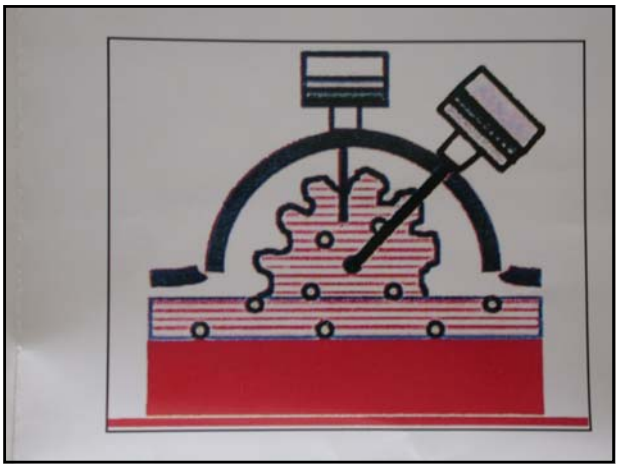
- Wash hands
- Prepare desired amount of insulin into the insulin syringe
- Disinfect injection site skin with alcohol prep (may not necessary)
- Pinch up the skin fold in the suitable injection site by **2 fingers** (the thumb and index fingers)
- Inject at a 90° angle over the pinch up skin fold/ inject at 45° angle over the pinch up skin fold for thin individuals and children
- Hold the skin fold throughout the injection procedure
- Pull out the needle with the skin fold release
- Observe any bleeding or leakage of insulin from injection site

In-correct pinch up



Correct pinch-up





Insulin injection procedure (2)

Point to notes:

- Thin individuals or children can use short needles or may need to pinch the skin and inject at a 45° angle to avoid i.m. injection.
- Routine aspiration (drawing back on the injected syringe to check for blood) is **not necessary**.
- After insulin injection, no rubbing to injection site.
- The use of **insulin pens**, the needle should be embedded within the skin for 5 – 10 sec after complete depression of the plunger to ensure complete delivery of the insulin dose.
- Do not massage the injection sites
- Avoid choosing the area where vigorous exercise is anticipated

Skin problems at injection sites

- Lipohypertrophy: grape – like lumps at the injection sites
- Lipoatrophy: as a dip in the skin
- Lipodstrophy: scarring of the fat

Solve the problem:

- Rotate injection sites
- Don't reuse needle
- Injecting insulin at room temp

How to minimize the painful insulin injection?

- Injecting insulin at room temperature
- Making sure no air bubbles remain in the syringe before injection
- Waiting until topical alcohol (if used) has evaporated completely before injection
- Keeping muscles in the injection area relaxed, not tense, when injecting
- Not changing direction of the needle during insertion or withdrawal
- Not reusing needles
- Using the fine needles

Storage of insulin (1)

- Unused vials / penfills should be refrigerated (stored at 4 - 8 ◦ C) and use before expiry date.
- Novo product (e.g. Actrapid / Protaphane) insulin vials should be discarded after **6 weeks** of opening whatever kept in refrigerator or room temp.
- Novo product insulin penfills cartridges should be discarded after **4 weeks** if kept in the pen **at room temp (below 25 ◦ C)**.

Storage of insulin (2)

- Lily product (e.g. Humulin R, Humulin N, Humulog) insulin vials / penfills cartridges should discarded after **4 weeks** of opening.
- Levemir in flexpen kept in below 30 ◦ C for **6 weeks**.
- Lantus (Glargine) vials / penfills cartridges should be discarded after **4 weeks** of opening.
- The manufacture's expiry date should be checked.

Storage of insulin (3)

Give advise to patients

- Spare cartridges and bottles are best stored in the door of a fridge
- Insulin and Insulin pen should be kept away from the glove box of a car.
- Insulin bottles can be kept in an insulated cool bag or a thermos flask when leave out in extreme temperature.

Diabetes complication

- Diabetic Retinopathy (Proliferative retinopathy, cataracts …)
- Diabetic Nephropathy
- Diabetic Neuropathy

The Diabetes Control and Complications Trial (DCCT) showed that intensive diabetes management reduced the risk and progression of background retinopathy by 61% in adolescent.

DM complication screening

- Michigan neuropathy screening instrument
  . 15 Questionnaires
  . Physical assessment (appearance of feet/ ulceration/ ankle reflexes/ vibration perception at great toe)
- Michigan diabetic neuropathy score
  . Sensory impairment
  . Muscle strength testing
  . Reflexes
- Blood pressure/ pulse (manual sphygmomanometer)
- Snellen Test
- Save urine specimen for 12 hours microalbumin
- Check blood for lipid profile/ TFT/ RFT

Foot Care in Children and Adolescent with Diabetes

- Identify any active foot problems and biomechanical abnormalities e.g. leg length discrepancy, abnormal wear points on footwear
- Callus and corn development indicate mechanical stress on the affected area and should lead to referral to the appropriate specialist for further evaluation (podiatrist)
- Early intervention may prevent permanent changes in structure or function. Children with diabetes should protect their feet from injury because scarring and other damage could cause problems in later life.

General Foot Care

- Daily foot care: clean, dry, lubricate properly
- Avoid prolong soak in water
- Cut the toes nail properly
- Chose appropriate size of shoes: size of shoes head and length of shoes heel
- Do not wear new shoes for a long time
- Wear cotton socks
- Do not walk with bear foot
- Avoid apply hot compress or electric products to the foot

Traveling

- It is necessary to test the BG levels more frequently.
- Remind to keep insulin, glucagon and BGA not under extremes of temperature.
- Remember to take spare insulin. Keep insulin and pens n hand luggage.
- To prepare a letter to identify the DM status that brings along insulin and sharps.
- Alert some countries use other concentrations of insulin, mostly 40u/ml.
- Discuss the detailed management of the diabetes during flights that are long and involve many time zones.
- Prepare the emergency kits for hypoglycaemia management

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Thank You !