Introduction diabetes

Health & Medicine, Diabetes

Introduction Diabetes A group of metabolic disease characterized by elevated level of glucose in the blood resulting from defects in insulin secretion, insulin action or both. It is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin. Basic pathology is Insulin Problem (either deficiency or impaired action). Insulin is a hormone secreted by the Beta cells of the pancreas it promotes entry of glucose into the body cells by binding to the insulin receptor in the cell. Risk factors for diabetes are Family history of diabetes, Race/ethnicity, Age â‰¥45 y/o, Previously identified impaired fasting glucose or impaired glucose tolerance, Hypertension, HDL cholesterol level â‰¤35 mg/dL (0. 90 mmol/L) and/or triglyceride level â‰¥250 mg/dL (2. 8 mmol/L). Classification of diabetes includes: 1. Type 1 (IDDM) insulin dependent diabetes mellitus or child onset 2. Type 2 (NIDDM) non-insulin dependent diabetes mellitus 3. Secondary diabetes — diabetes associated with other conditions or syndromes The most common form of diabetes is Type II, It is sometimes called age-onset or adult-onset diabetes, and this form of diabetes occurs most often in people who are overweight and who do not exercise. Type II is considered a milder form of diabetes because of its slow onset. In Type II diabetes, the pancreas may produce enough insulin, however, cells have become resistant to the insulin produced and it may not work as effectively. Symptoms of Type II diabetes are signs of lethargy, extreme thirst, and frequent urination. Other symptoms may include sudden weight loss, slow wound healing, or blurred vision. Management of diabetes mellitus includes five components they are the nutritional therapy, exercise, monitoring, pharmacologic therapy and

education. Over 346 million people worldwide have diabetes. According to the Department of Health, an estimated five million Filipinos suffer from diabetes and expected to increase ten times in five years if not properly addressed. Among the ten leading causes of mortality here in the Philippines, diabetes ranked number 6 with a percentage of 34%. Among males, diabetes ranked number 8 with 20. 8% while in females it ranked number 5 with 22. 5%. As nursing students we chose this case because it is the number 6 among the ten leading cause of mortality here in the Philippines. We as students would like to how we can manage patients with diabetes mellitus to still have a healthy lifestyle. That is why we made this problem as our case. Ten leading cause of mortality in the Philippines: CAUSE | RATE | 1. Heart disease | 79. 3% | 2. Stroke | 57. 9% | 3. Cancer | 45. 4% | 4. Chronic obstructive pulmonary disease | 41. 2% | 5. Accidents | 38. 8% | 6. Diabetes | 34. 0% | 7. Dengue fever | 28. 6% | 8. Maternal deaths | 17. 0% | 9. Kidney failure | 18. 2% | 10. Perinatal conditions | 11. 5% | Patient’s Profile Name : Mr. R. Z Gender : Male Address : Canlalay, BiÃ±an, Laguna Birth Date : November 25, 1965 Age : 45years old Civil Status : Single Nationality : Filipino Religion : Catholic Date Admitted : July 30, 2011 Admitted in : Hospital x Chief complaint : weight loss Diagnosis : DM2, poorly controlled Admitting Physician : Dra. S Health History Patient’s History History of Present Illness: 1 week PTA - Patient experience polydypsia and polyuria associated with loss of weight, no medications taken, no consultation done. Few hours prior to PTA - Still with above symptoms, patient sought consult to a private attending physician, where blood sugar determined and revealed elevated result (430mg/dL), hence advised

admission. Past Medical History Patient has hypertension since 2004 with maintenance medicine (micardis), patient has no asthma, heart disease and allergies. Family History HPN - both sides DM - both sides Asthma - siblings CA - mother side Heart disease — both sides Personal and social history non-smoker occasional drinker hobbies include online gaming and social networking (approximately 5-6hrs daily) no work eats whatever he wants cannot control with the foods he eats prefers to eat sweet and salty foods Physical Assessment MONITORING SHEET Name of patient: Mr. R. Z Date of birth: Nov. 25, 1965 HGT MONITORING DATE | TIME | RESULT | REMARKS | July 30, 2011 | 1: 30pm2: 00pm3: 00pm4: 00pm5: 00pm6: 00pm7: 00pm8: 00pm9: 00pm10: 00pm11: 00pm | 420mg/dL398mg/dL462mg/dL375mg/dL370mg/dL244mg/dL180mg/dL170mg/dL152mg/dL157mg/dL | 5µgtts/min insulin drip5µgtts/min insulin drip | July 31, 2011 | 12: 00mn2: 00am4: 00am6: 00am8: 00am12: 00nn4: 00pm10: 00pm | 166mg/dL141mg/dL298mg/dL271mg/dL238mg/dL253mg/dL | â†‘ 5µgtts/min insulin dripâ†“ 5µgtts/min insulin drip30µgtts/min insulin drip30µgtts/min insulin drip20µgtts/min insulin drip | August 1, 2011 | 2: 00am6: 00am10: 00am2: 00pm6: 00pm | 199mg/dL152mg/dL | | August 1, 2011 | BLBS | 116mg/dL162mg/dL | | August 2, 2001 | MNBBBL | 127mg/dL139mg/dL88mg/dL | Humalog mix 22units SC given | INTAKE AND OUTPUT MONITORING DATE | TIME | ORAL | IVF | TOTAL | URINE | STOOL | TOTAL | BALANCE | 7/30 | 12-2pm2-10pm10-6am | 100500400 | ---200800 | 1007001200 | ---500500 | --------- | ---500500 | 100200700 | | | | 1900 | 1000 | | | 1000 | 7/31 | 6-2pm2-10pm10-6pm | 300450300 | 700800500 | 10001250800 | 520600400 | --------- | 520600400 | 480650400 | | | | 3050 |

1520 | | | 1530 | 8/01 | 6-2pm2-10pm10-6pm | 480600450 | 500600600 | 98012001250 | 450700600 | --------- | 450700600 | 530500450 | | | | | 3430 | 1750 | | | 1480 | 8/02 | 6-2pm | 500 | --- | 500 | 400 | --- | 400 | 100 | Physical Assessment Body Part | Findings | Normal Findings | Interpretations | Skin | > Warm to touch> Skin is whitish but with patches of dark brownish discoloration over extremities> With skin lesions and flakings at both foot> Skin feels rough and dry> Skin goes back slowly | Normally skin is uniform whitish, pink or brown. No skin lesion should be present except for freckles. Birthmark or moles, which may be flat or elevated. Scars are usually present since childhood. Skin should normally feel smooth, even, firm, except where there is significant hair growth. A certain amount of roughness is normal. | > due to dehydration and decreased blood flow in extremities secondary to blood viscosity | Hair | > Black in color and thin | Hair varies from dark brown to pale brown. | Normal | Face | > Oval shaped> No edema, disproportionate structures or involuntary movement> smooth and uniform in consistency> no nodules and masses | The shape of the face can be oval, round, or slightly square. There should be no edema, disproportionate structures or involuntary movement. Should be smooth and uniform in consistency. Absence of nodules and masses. | Normal | Eyes | > Move smoothly and symmetrical. | Both eyes should move smoothly and symmetrical. | Normal | Conjunctiva | > White palpebral conjunciva | Shiny, moist, salmon pink in color. | Normal | Pupils | > equally round, reactive to light and accommodation | Pupils equally round, reactive to light and accommodation. Average pupil size 3-7mm. | Normal | Visual Acuity | > With eyeglasses with vision of 260/280 | 20/20 | > far-sightedness> blurred vision | Nose |

symmetrically in the midline of the face and is without swelling, bleeding, lesions and masses | The shape of the external nose can vary greatly among individuals. Located symmetrically in the midline of the face and is without swelling, bleeding, lesions and masses. | Normal | Lips | Appears dry | Appears smooth and with moist | Due to dehydration | Ear | > match the flesh color of the rest of the body> positioned centrally and in proportion to the head> no foreign bodies, redness, drainage, deformities, nodules or lesions | The ears should match the flesh color of the rest of the body and should be positioned centrally and in proportion to the head. Cerumen should be moist and not obstruct the tympanic membrane. There should be no foreign bodies, redness, drainage, deformities, nodules or lesions. | Normal | Abdomen | > same color as the rest of the body> No lesions and masses> Liver is not be palpable> bowel sounds high-pitched occurring at 5-30times /minute | Should have the same color as the rest of the body. No lesions and masses. Liver should not be palpable, bowel sounds are usually high-pitched occurring at 5-30times /minute. | Normal | Upper Extremity and Lower extremity | | | | Nails | > Pale in color> capillary refill return to normal slowly (4 seconds) | Normally the nails have a pink cast for light-skinned individuals. Capillary refill may vary with age but color should return to normal within 2-3 seconds | Due to decreased blood flow to the extremities secondary to blood viscosity. | Hands | > Able to do range of motion | Able to do Range of motion. | Normal | Legs | > Knees are in alignment with each other. The foot is in alignment with the lower leg. The patient will be able to flex and extend the legs with no audible clicks will be heard during joint movement. | Knees are in alignment with each other. The foot is in alignment

with the lower leg. The patient will be able to flex and extend the legs with no audible clicks will be heard during joint movement. | Normal | Anatomy and Physiology Every cell in the human body needs energy in order to function. The body’s primary energy source is glucose, a simple sugar resulting from the digestion of foods containing carbohydrates (sugars and starches). Glucose from the digested food circulates in the blood as a ready energy source for any cells that need it. Insulin is a hormone or chemical produced by cells in the pancreas, an organ located behind the stomach. Insulin bonds to a receptor site on the outside of cell and acts like a key to open a doorway into the cell through which glucose can enter. Some of the glucose can be converted to concentrated energy sources like glycogen or fatty acids and saved for later use. When there is not enough insulin produced or when the doorway no longer recognizes the insulin key, glucose stays in the blood rather entering the cells. Anatomy of the pancreas:
The pancreas is an elongated, tapered organ located across the back of the abdomen, behind the stomach. The right side of the organ (called the head) is the widest part of the organ and lies in the curve of the duodenum (the first section of the small intestine) . The tapered left side extends slightly upward (called the body of the pancreas) and ends near the spleen (called the tail). The pancreas are made up of two types of tissue: Exocrine tissue - The exocrine tissue secretes digestive enzymes. These enzymes are secreted into a network of ducts that join the main pancreatic duct, which runs the length of the pancreas. Endocrine tissue -The endocrine tissue, which consists of the islets of Langerhans, secretes hormones into the bloodstream. Functions of the pancreas: The pancreas has digestive and

hormonal functions: The enzymes secreted by the exocrine tissue in the pancreas help break down carbohydrates, fats, proteins, and acids in the duodenum. These enzymes travel down the pancreatic duct into the bile duct in an inactive form. When they enter the duodenum, they are activated. The exocrine tissue also secretes bicarbonate to neutralize stomach acid in the duodenum. The hormones secreted by the endocrine tissue in the pancreas are insulin and glucagon (which regulate the level of glucose in the blood), and somatostatin (which prevents the release of the other two hormones. FUNCTIONS OF INSULIN * Transports and metabolizes glucose for energy * Stimulates storage of glucose in the liver and muscle (in the form of glycogen) * Signals the liver to stop the release of glucose * Enhances storage of dietary fat in adipose tissue * Accelerates transport of amino acids (derived from dietary protein) into cells Insulin also inhibits the breakdown of stored glucose, protein, and fat. During fasting periods (between meals and overnight), the pancreas continuously releases a small amount of insulin (basal insulin); another pancreatic hormone called glucagon (secreted by the alpha cells of the islets of Langerhans) is released when blood glucose levels decrease and stimulates the liver to release stored glucose. The insulin and the glucagon together maintain a constant level of glucose in the blood by stimulating the release of glucose from the liver. Initially, the liver produces glucose through the breakdown of glycogen (glycogenolysis). After 8 to 12 hours without food, the liver forms glucose from the breakdown of non carbohydrate substances, including amino acids (gluconeogenesis). Pathophysiology Non Modifiable Factors * Age â‰¥ 45 y/o * Family History of DM * HPN Insufficient insulin production and insulin resistance Reduced

tissue uptake of glucose Modifiable Factors * Sedentary Lifestyle * Diet * Obesity * Cholesterol level Elevated hepatic glucose production (glycogenolysis) Increased insulin demand Beta cell exhaustion and dysfunction Impaired secretion of insulin Hyperglycemia Glucosuria TYPE 2 DIABETES MELLITUS Polyuria polyphagia Weight loss Fatigue/ Body weakness Polydipsia There are several factors contributing to the development of type 2 diabetes mellitus. There are non-modifiable and modifiable factors. Included in the non-modifiable factors are age, sex, race, family history of diabetes mellitus, and hypertension. Persons with age 45 years and above are more at risk as well as those who are male in gender. Asian with Hispanic descend has 66% chance of having the disease (CDC, 2004, 2005). Family history of diabetes and hypertension also increase the probability of obtaining the disease. Meanwhile, the modifiable factors include sedentary lifestyle, diet, and obesity. Having sedentary lifestyle and high fat and high sugar diet cause obesity that in turn will increase risk for cell resistance (affecting mostly muscle and fat tissues) to insulin which eventually results to diabetes. These factors aid to the decreased insulin production and the inability of the cells to use insulin properly and efficiently or the condition known as insulin resistance. These conditions result to reduced tissue uptake of glucose. Because of this, the liver will continue to produce glucose through a process called gluconeogenesis despite elevated glucose level. Increased blood glucose level requires increase insulin demand to maintain glucose level at a normal or slightly elevated level. However, if the beta cells cannot keep up with the increased demand for insulin, it will come to exhaustion and dysfunction. As a result, there will be impaired secretion of

insulin leading to increased glucose level in the bloodstream or hyperglycemia and diabetes. In hyperglycemia, glucose in extracellular is abundant while glucose in intracellular is insufficient. As a consequence, there will be starvation of cell (Polyphagia). Since glucose is a source of energy, if the intracellular is inadequate of it, there will be body weakness and fatigue. And if the concentration of glucose in the blood exceeds the renal threshold for glucose, usually 180 to 200 mg/dL (9. 9 to 11. 1 mmol/L), the kidneys may not reabsorb all of the filtered glucose; the glucose then appears in the urine (glycosuria). When excess glucose is excreted in the urine, it is accompanied by excessive loss of fluids and electrolytes (osmotic diuresis). This occurrence will lead to polyuria or frequent voiding. To compensate for polyuria, there will be polydipsia or frequent water consumption. If hyperglycemia is poorly controlled, weight loss may happen due to gluconeogenesis (production of new glucose from amino acids and other substrates). Medical Management DATE | DOCTOR’S ORDER | RATIONALE | NURSING FUNCTION | 7/30/1112: 09 PM | > Please admit patient to ROC under my service: Dr. S | > For confinement & for the comfort of the patient. | > Assist & accompany patient to his ward and attend needs. | | > Secure consent | > Serves as a legal document for provision of approval or assent. | > Ask & assist patient in his questions regarding filling the consent form. | | > Low salt, low fat DM diet(TOK is to be computed by MROD) | > To provide your body with the variety of foods it needs to meet nutritional goals. Moderating the amount you eat and eating scheduled meals throughout the day will help you control blood sugar and weight. | > Educate the patient regarding meals of foods which are restricted and those

that are needed by the body. | | > Request for - 12 lead ECG * Na â€º, Kâ€º * HBA, C * Other labs are attached herein | > To determine if there are abnormalities that can cause harm to patient and to provide baseline data for interventions; it is part of diagnostic criteria | > Explain the procedure, keep patient comfortable. | | > Plain NSS 1L x 6°Please start insulin drip c/o MROD | > For rehydration and to control patient's blood glucose | > Monitor for fluid overload and regulate IVF and insulin drip. | 7/30/112: 35 PM | | | | | > Please follow- up request of pending labs relay once available | | | > AP informed of this admission | | | > Refer accordingly | | > Refer to NOD and ROD accurately | | | | | > Start insulin drip: PNSS 500cc +50cc HR +25mEqs KCl via soluset +Mgtts/min CBG5 > 13010 > 16015 > 19020 > 21025 > 25030 > 28035 > 320 40 > 35045 > 400 50 > 450 | > Established basis to prevent hypoglycemia | > Monitor and record CBG and evaluate | | > Incorporate 10cc D5W per 100cc if mainline for CBG â‰¤90mg/dL hold for CBG > 120 | > To prevent hypoglycemia | > Monitor gradual or sudden decrease of blood glucose level | 9: 25 PM10: 40 PM11: 30 PM7/31/115: 30 AM11: 00 AM12: 40 PM9PM08/01/116: 00 AM8: 30 AM5: 15 PM7: 45 PM8: 10 PM08/12/115: 30 AM | > IVF to ff: PNSS 1L x 6° | > For replacement of current losses, maintenance & provision of nutrients | > Monitor for fluid overload and regulate the infusing IVF and insulin drip. | | > For urine ketone | > To diagnose disease further> Urine is check for presence of ketone that are common in patient with diabetes as the byproduct of fat metoblism | > Inform patient about the diagnostic procedure to be done.> obtain a clean catch urine sample > accurate labeling of the specimen> carry the specimen in the laboratory | | | | | > CBG to q2° monitoring | > Monitoring of blood

glucose level indicates if the patient is hyperglycemia or hypoglycemia at a specific a time | > Monitor and record accurately> Make sure the blood is flowing freely from a clean, warm, dry puncture site> apply pressure on the puncture site | | > Refer | | > Refer to NOD and ROD accurately | | | | | > AP updated | | | | > Continue meds | > Continued medication may help in eliminating and executing certain microorganism | > Assist patient in taking medications > observe 10 r’s> instruct patient to report any signs of side effects. | | > Refer accordingly | | > Refer to NOD and ROD accurately | | > â†“ CBG monitoring to q4° | > Monitoring of blood glucose level indicates if the patient is hyperglycemia or hypoglycemia at a specific time. | > Monitor and record accurately> Make sure the blood is flowing freely from a clean, warm, dry puncture site> apply pressure on the puncture site | | > IVF to follow: PNSS 1L x 6° | > To correct fluid and electrolyte balance> It is an isotonic solution used to treat dehydration and fluid losses. | > Monitor and regulate the infusing IVF> check for the alignment of the IV> encourage the patient and relatives to report any signs of dislodgement such as swelling/edema, and bleeding. | | > Start with Humalog mix knickpen at 20 units —o- 10 units BS 15 minutes before or after breakfast | > To control blood glucose level.> A rapid acting human insulin analog indicated to improve glycemic control in diabetic patients. | > Give insulin with right dosage and time> Closely monitor blood glucose in all patients> Administer within 15 minutes before a meal or immediately after a meal> Do not inject cold insulin | | > Once started, d/c insulin drip after an hour | > To prevent hypoglycemia | > Monitor blood glucose level accurately | | > â†“ CBG monitoring for q4° | >> Monitoring of blood glucose level indicates if the

patient is hyperglycemia or hypoglycemia at a specific time | > Monitor and record accurately> Make sure the blood is flowing freely from a clean, warm, dry puncture site> apply pressure on the puncture site | | > Refer accordingly | | > Refer to NOD and ROD accurately | | | | | > Rounds with Dra. S | | | | > Refer to dietician | > To be knowledgeable about the specific diet that the patient should eat to control the blood glucose level | > Advise patient to follow the prescribed diet | | > Refer accordingly | | > Refer to NOD and ROD accurately | | | | | | > IVF to follow: PNSS 1L x 6° | > To correct fluid and electrolyte balance | > Monitor and regulate the infusing IVF | | | | | *We signed to have a consultation with a nutritionist for dietary condition | | | | | | | > AP updated | > To update the physician about the condition of the patient | > Inform the doctor about abnormalities seen observed to the patient | | > Please inform dietician for counseling | | > Explain the need for dietitian counseling | | > Refer accordingly | > To update the physician about the condition of the patient. | > Refer to NOD and ROD accurately | | > IVF to follow: PNSS 1L x 6° | > To correct fluid and electrolyte balance | > Monitor and regulate the infusing IVF and ensure that IVF is infusing well. | | | | | > CBG monitoring to q6° pre meds | > Monitoring of blood glucose level indicates if the patient is hyperglycemia or hypoglycemia | > Monitor and record accurately | | | | | > IVF to follow: PNSS 1L x 6° | > To correct fluid and electrolyte balance | > Monitor and regulate the infusing IVF | | | | | > Start Lactulose 30cc ODHS, hold for BM > 3x/day | > Lactulose is used to regulate the BM. Thus, inhibits glucose absorption in the intestines and prevents hyperglycemia. | > Monitor BM and assess for frequency and appearance of stool, and occurrence of diarrhea.> Hold for BM > 3x/day

because excessive amounts/frequency of passage of stool may lead to electrolyte losses. | | > Rounds with Dr. S | | | | | | | | | | | | | | > IVF to consume | | | | > Revise insulin regimen as follows: Humalog mix knick pen 22 units-o- 12 units, 15minutes before and after breakfast and/or dinner | > For continuous control of blood glucose level, preventing hyperglycemia. | > Inform patient about the increase in dosage of insulin.> Test the blood sugar level of patient. And, never administer Humalog is blood sugar is too low. | | > NOD (nurse on duty) to start teaching patient and relatives on how to give insulin injection | > To consider insulin as home medication; and to learn to administer insulin independently | > Teach the patient or relatives of patient the location/route of administering insulin injection. (Abdomen, arms, thighs, and buttocks in subcutaneous route of administration). > Instrust to never massage the injection site. > Advise the patient to perform systemic rotation of the site of injection to prevent lypodystrophy. | | | | | > Consume meds - micardis- crestor | > to control HPN> used to treat and decrease high cholesterol levels | > Assess the vital signs of the patient because the medications are indicated to control hypertension.> Advise the patient to follow a cholesterol-lowering-diet plan for the drug to be effective in decreasing cholesterol levels.> Assist patient in taking medications. > Give medications by meticulously following the 10 rights of giving medications to patient. | Laboratory Results July 30, 2011 | S. I. RESULT (MMOL/L) | REFFERENCE VALUE | INTERPRETATION | INDICATION | Potassium | 4. 30 | 3. 5-5. 5 | Normal | Normal | Sodium | 134. 08 | 136-145 | Low | Due to osmotic diuresis | Glycohemoglobin(HBA1C) | 10. 6 | 4. 2-6. 2 | High | Poorly controlled diabetes | Ketone | +2 | | Moderate | Due to glyconeogenesis | July

28, 2011 Urinalysis PARAMETER | NORMAL RANGE | RESULT | INTERPRETATION | COLOR | Yellow to amber | Light Yellow | Normal | TRANSPARENCY | Clear | Slightly Hazy | Normal | REACTION (PH) | 4. 5-8. 0 | 5. 0 | Normal | PROTEIN | Negative | Negative | Normal | GLUCOSE | Negative | ++++ | Glucosuria or hyperglycemia | SPECIFIC GRAVITY | 1. 010-1. 025 | 1. 005 | Diluted urine | RBC | negative | 0-1 hpf | Normal | PUS CELLS | Negative | 0-2 hpf | Normal | MUCUS THREADS | none | few | normal | | S. I. RESULT (MMOL/L) | REFERENCE VALUE (MMOL/L) | REFERENCE VALUE (MG/DL) | INTERPRETATION | INDICATION | BUN | 4. 87 | 2. 5-6. 4 | 6-21 | Normal | Normal | Creatinine | 81. 81 | 53-115 | 0. 62-1. 28 | Normal | Normal | Glucose (FBS) | 22. 2 | 3. 9-5. 8 | 70-105 | High | Hyperglycemia increase blood glucose level inspite of not taking any food | Uric Acid | 245. 87 | 155-428 | 2. 6-7. 2 | Normal | Normal | Cholesterol | 7. 2 | 0-5. 2 | 0-200 | High | Risk of heart and blood vessel disease | HDL | 1. 02 | 0. 91-2. 21 | 35-85 | Normal | Normal | Triglyceride | 3. 23 | 0. 4-1. 8 | 35-160 | High | Elevated in diabetic patient | VLDL | 1. 47 | 0. 5-1. 2 | | High | High risk for heart disease and stroke | LDL | 4. 71 | 1. 16-3. 88 | 45-150 | High | Inceased risk for artherosclerotic heart disease and familial hyperlipoproteinemia | Hepatobiliary Tree There is a slight increase in echogenisity of both lobe of the liver The ducts are not dilated