

Case study of kidney failure and treatment



According to Mr Lim's age, gender and serum creatinine level, his estimated glomerular filtration rate (GFR) is moderately below normal values at of 43 mL/min/1.73 m² (NKDEP, 2009) and is considered a stage 3 chronic renal failure (CRF) (Tisher & Wilcox, 2005). GFR is an indicator of the extent to which Mr Lim's kidney function is impaired, as it measures the clearance rate of all nephrons in his kidneys (Mobley, 2009).

The main pathology of Mr Lim's CRF is characterized by consecutive organ deterioration (RelayHealth, 2009) and nephron impairment, as a result of his history of hypertension and high blood sugar (Mobley, 2009). His failing kidney function will not cease progression, as other healthy nephrons have to step up and go beyond their usual workload till damaged themselves; because their filtration is not as efficient anymore, serum creatinine and blood urea nitrogen (BUN) rise (Kluwer, 2008). Undesirable urine output also results, as seen by Mr Lim's concentrated and dark-coloured urine as well as his urinary catheter draining a less than optimum amount of urine every hour (Ralph & Taylor, 2005).

The kidneys are the main moderators of uric acid in the body, so when Mr Lim's urine test revealed a higher than normal uric acid presence, it was an indicator of kidney impairment, but not a key factor in the disease (Rodeghiero & Ronco, 2005).

Circulation and comfort

Mr Lim's hypertension and type 2 diabetes have significant impacts on nephropathy (Klahr & Mitch, 2005) and kidney damage has many complications. One of them is the overloading of body fluids, which resulted

in an edematous status of both his lower legs (Brown & Morgan, 2005).

Another common complication of CRF, is calcitrol insufficiency (Collerone, et. al., 2005), whereby calcitrol is crucial for the body's ability to absorb dietary calcium, the re-absorption of calcium in the kidneys and the production of calcium from bones (RelayHealth, 2009). This thus results in Mr Lim's hypocalcemia.

His medications for hyperglycemia and hypertension are Metformin and Cozaar respectively. Cozaar works as an anti-hypertensive drug by blocking angiotensin receptors, causing a drop in blood levels of angiotensin 2 and a rise in endogenous vasodilators such as bradykinin, while Metformin reduces blood sugar level by stimulating glycolysis and converts glucose to pyruvic and lactic acids (Katzung, Masters & Trevor, 2008).

Controlling body temperature (BT)

Mr Lim has an elevated temperature of 37.8 degree Celsius (Perry & Potter, 2006). However, it is not above 38 degree Celsius and both his heart and respiratory rates are normal, hence infection is currently unlikely (Mosby's Nursing Consult, 2009).

Sleeping and resting

Mr Lim verbalizes that he is incapable of having a well-rested sleep for the past 2 weeks. His pain score of 4 and indications of anxiety and tiredness are possible contributors. This difficulty in having a good night's rest is associated with higher risk for falls (Ancoli-Israel & Ayalon, 2006).

Maintaining a safe environment

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Mr Lim has risk of falls for a few other reasons, including the possible progression of diabetic neuropathy and a previous fall or lost of balance as evident by the graze on his temple (Conley & Lueckenotte, 2009).

Communication

Mr Lim has no trouble talking to his nurse about his problem, as evidenced by him expressing his worry about being unable to look after himself alone. He is however, having trouble communicating to his sons, not because of language barrier, but due to fear of being a burden to them.

Problems identification and planning

Ineffective renal tissue perfusion, related to vascular and nephron destruction by underlying conditions such as diabetes and hypertension, as evidenced by symptoms of CRF including oliguria and elevated creatinine and BUN values (Ralph & Taylor, 2005).

Patient outcome:

Mr Lim will experience minimal complications of CRF such as hypertension, anemia and fluid overload. Mr Lim will show acceptable understanding of drugs to take note of and warning signs of complications, such as a sudden significant change in weight. Progression of kidney damage, monitored using lab values like GRF and BUN, will not show a fast or dangerous deterioration. Urine output will increase gradually.

Imbalanced nutrition due to impaired absorption of nutrients from diet (Ralph & Taylor, 2005) as evidenced by Mr Lim's hypocalcemia.

Patient outcome:

Mr Lim will not suffer from malnutrition due to loss of appetite or over-restriction of protein or calories. He will express an acceptable knowledge on what foods to avoid, like bananas, as well as the risks of not adhering to the diet specially tailored for him.

Ineffective coping, related to chronic illness and helplessness, as evidenced by sleep disturbance, signs of anxiety and verbal complaint of difficulty coping alone but does not want to be a burden to his sons (Ralph & Taylor, 2005).

Patient outcome:

Mr Lim will identify factors that either promote or prevent good sleep. He will fall asleep within a short period of time and the maintenance of sleep will last until he is fully rested. The environment will be kept relaxing. He will continue self-care participation and voice out his problems to his sons so that they can solve it together.

Excess fluid volume

Disturbed sleep pattern

Risk for infection

Risk for fall

Anxiety

Powerlessness

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Interventions and rationales

Diagnosis 1:

Slow renal failure progression. Keep underlying conditions in check by monitoring Mr Lim's adherence to prescribed antihypertensive and diabetic medications (Brown & Morgan, 2005). Discharge planning includes teaching patient the importance of checking his blood sugar and blood pressure (BP) daily and recruiting the assistance of his sons to check for signs of non-compliance or other abnormalities that can contribute to lack of adherence, such as depression (Ralph & Taylor, 2005). Encourage his sons to at least visit Mr Lim once a week or give him a call every night to provide emotional support.

Suppress complications of CRF. Fatigue and anemia can be prevented by avoiding unnecessary collection of blood specimens (Smeltzer, Bare, Hinkle, & Cheever, 2007), and administering iron supplements when Mr Lim's haemoglobin level falls below 12g/dl (Brown & Morgan, 2005).

Fluid overload, due to decreased urine output, can be eased with the elevation of his lower limbs (Smeltzer, et. al., 2007). Document intake and output every hour till output exceeds 30ml/hr, before going to less frequent documentations, so that interventions can be done earlier if condition does not improve (Ralph & Taylor, 2005). Daily weight monitoring helps check for fluid imbalance whereby a rise in weight signifies overload while a decrease in weight indicates dehydration (Pilsworth & Scales, 2008).

Signs of other complications include, fever, chest pain and pericardial friction rub, which may indicate pericarditis (Smeltzer, et. al., 2007), as well as nausea, vomiting, diarrhoea and muscle weakness, which may signify hyperkalemia (Kluwer, 2008).

Discharge planning includes education on the above information. Also, let Mr Lim know he did a good job reporting the abnormal amount and colour of his urine before admission and that it is important to monitor his weight and avoid cuts and grazes that make him lose blood (Ralph & Taylor, 2005).

Avoid nephrotoxic drugs. Medications that are eliminated primarily through the kidneys or contribute to kidney damage must be identified and avoided or monitored closely. For example, Metformin has a dangerous but rare side effect known as lactic acidosis and its risk of occurrence is found to increase in patients with elevated creatinine levels (Zarowitz, 2009).

Other drugs include, potassium-sparing diuretics, which can cause hyperkalemia, non-steroidal anti-inflammatory drugs (NSAIDs) which is found to deteriorate renal perfusion even more, laxatives which can cause fluid loss with diarrhoea, as well as too many vitamin D supplements or calcium-containing antacids which results in hypercalcemia and calcium deposits in the kidney (Ashley, 2004).

Discharge planning includes educating the patient about nephrotoxic drugs, especially those that can be bought over the counter like panadol, which is an NSAID, and consulting his doctor or nurse before consuming medications he is not sure of.

Diagnosis 2:

Discuss the relationship between calcium, phosphate and vitamin D. The renal diet requires a dietary phosphate restriction controlled by calcium-based phosphate binders taken before meals, and vitamin D tablets to hold back parathyroid hormone (PTH) secretion (Mobley, 2009). To explain further, vitamin D tablets are required, because its synthesis is decreased with loss of renal mass in Mr Lim's CRF and this causes calcitriol deficiency because calcitriol is the active form of vitamin D (Collerone, et. al., 2005). Since calcitriol is associated with decreased intestinal absorption of calcium (Klahr & Mitch, 2005), vitamin D supplements will indirectly prevent hypocalcemia. As to how PTH is involved, it is shown that calcitriol is also regulated by phosphorus, such that an increase in phosphorus will lead to a decrease in calcitriol; hypocalcemia is a significant stimulus for PTH secretion and parathyroid growth, hence to avoid secondary hyperparathyroidism, a low-phosphorus diet is required (Gonzalez & Martin, 2007).

Other dietary requirements include, calorie and protein moderation based on weight goals and presence of malnutrition, fluid restriction as Mr Lim's lower limb swelling shows presence of fluid overload, salt restriction to prevent unnecessary thirst and help him successfully lower fluid intake, and potassium restriction only when lab results show presence of hyperkalemia because potassium is found in many foods, including healthy fruits and vegetable (Klahr & Mitch, 2005). Even though it sounds hard, try to provide the food that Mr Lim prefers within all the dietary restrictions to encourage food intake (Smeltzer, et. al., 2007).

Discharge planning includes education on what foods to avoid, such as eggs, cheese, shell fish and baked potatoes. Referral to a renal nurse or dietician is recommended and telephone counselling can be done to allow regular follow-ups, sharing of updated information with patient and caregiver and improved well-being by reducing frequency of hospitalization (Kim & Song, 2009). Also, if Mr Lim ends up vomiting after a meal, teach him to record the amount and colour so that his nurse knows about it and infer an estimated status of his nutritional absorption (Ralph & Taylor, 2005).

Diagnosis 3:

Solve Mr Lim's sleeping problems. If it remains unsolved, he is more likely to show signs of anxiety and pain, limit his daily activities, suffer from depressive emotions or physical and mental distress and in general, report a poorer health-related quality of life (Chapman & Strine, 2006). Also, sleeping well can improve the patient's perception of a problem's severity, hence his anxiety levels are reduced and ability to cope with daily issues is increased (Ancoli-Israel, 2006).

Non-pharmacologic measures include asking the patient what environmental factors make sleep difficult, making the immediate changes that are possible, such as changing the lighting or reducing noise, planning the medication administration timings that provide maximum rest and avoiding quick, unexpected movements when turning or positioning Mr Lim (Ralph & Taylor, 2005). Practicing with him relaxation techniques, such as guided imagery and muscle relaxation exercises, before bedtime not only aid him to sleep better, they also help in relieving pain (Smeltzer, et. al., 2007).

Do away with his feelings of helplessness. Firstly, provide whatever opportunities available to allow Mr Lim to make decisions of his own, especially in self-care, such as positioning and choosing an injection site, as these will enhance level of independence and sense of control over daily routines (Ralph & Taylor, 2005). Secondly, empower him with information, such as treatment options and disease progress, and emotional support with regard to his coping issues (Hausman, 2006). If communication with Mr Lim's sons could be established by the nurse to express their father's worries and gain their understanding, Mr Lim then need not feel afraid or ashamed to admit he needs someone to assist him in his daily care. This is important because his sons, besides being his closest family, are the ones financially supporting him.

Enhance Mr Lim's coping skills because the lack of coping skills can cause additional anxiety and stress upon him (Smeltzer, et. al., 2007). This can be achieved through identifying and developing coping strategies for Mr Lim and providing him with a variety of resources for support; the nurse can refer him to local support groups, discuss with him his strengths and encourage him to ask questions so that she can specifically give him what he wishes to know (Ralph & Taylor, 2005).

Evaluation

Diagnosis 1:

There is absence of complications and drastic deterioration of renal function. Urine output exceeds 30ml per hour (Ralph & Taylor, 2005). Mr Lim has demonstrated acceptable knowledge such as consulting the doctor on drugs

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he is not sure of. He and his sons verbalize understanding of monitoring indicators such as weight, BP and blood sugar.

Diagnosis 2:

Mr Lim is adhering to his diet without a drastic loss of appetite. There is absence of complications, such as hypocalcemia and secondary hyperparathyroidism. Patient has shown acceptable knowledge by rejecting certain foods such as bananas and nuts.

Diagnosis 3:

Mr Lim is taking an active role in self-care such as having his face cleaned and hair combed outside of shower time when he is expecting visitors. He took less than 30 minutes to fall asleep after bedtime. He verbalizes that he is well-rested and shows no physical signs of sleep deprivation in the morning. He has voiced out to his sons that he is able to cope with his situation emotionally but physically, he cannot do it alone.