

# Infected surgical wound of total knee replacement nursing essay



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Wound care with all its aspects is the very most important step in nursing care for patients with surgical wounds, it has given nurses a very comprehensive approach to stimulate the healing process and get the maximum benefit out of the treatment (Cook. 2011). But when this care fails it has a lot of consequences, and the most abundant one that accounts for 14% of the complications is surgical site infections. Surgical site infections (SSI) occur due to lack of care (Wilson, Burman-Roy & Leaper. 2009). One of the most commonly infected surgical wounds are those of total knee replacement (TKR) as some studies showed that 9% of total knee replacement surgeries got infected (Venkataramanan & Sinha. 2002). In another studies TKR infections are most common in the orthopedic with a percentage of 0. 3% - 0. 25% (Wójkowska-Mach, et al. 2008). TKR is performed for patients with rheumatoid arthritis RA to allow patients' to gain full function, RA patients are three times more virulent to acquiring post-op infection than any other patients (Carl, Gelse, & Swoboda. 2011& Chesney, Sales, Elton, & Brenkel. 2008). This essay will critically analyze a scenario addressing infected TKR surgery; explain the plan of care done by the nurse that includes assessment, goals, interventions with mentioning which is the best one and discharge planning and education.

## Discussion

### 1. Assessment:

The assessment is the first step in any nursing care plan, in this step the nurse gathers all important information that would help in establishing a diagnosis and selecting an appropriate intervention to accelerate the healing

process (Myers. 2008) and perform wound bed preparation using wound bed preparation tools (Granick, & Gamelli. 2012). When doing the first step of assessment the nurse should gather all information from patient himself and other sources. The nurse would ask about the patient demographical information that are age, sex, education and language as this would affect the processes of some diseases and would help in building the patient education based on the patient level of understanding (Granick & Gamell. 2012). Also about patient life style that includes information about patient living status what do the patient do for a living. Referring to the scenario the patient is a retired 72 years old male that lives alone with three cats. Other information to gather is patient history of all past medical conditions and why the patient is seeking medical help, in this case patient history is atrial fibrillation, chronic case of RA and cholecystectomy 20 years ago that got complicated with deep vein thrombosis (DVT). He came to the hospital with infected surgical wound after right knee replacement surgery on the same leg with DVT and RA after noticing that his wound became hot to touch, red, painful and swollen (signs of inflammation) (Casey. 2012).

When gathering information regarding medical conditions the nurse would also ask about any allergies and mention all the medications taken by the patient to ensure proper medication administration know if it may affect wound healing and prevent any interactions. The patient is on wafarin daily, prednisone 5mg (steroids), Diclofenac 50mg and Cefazolin IV 1gram.

Wound bed preparation tool (TIME) is the acronym for four assessment areas, T for the tissue type, I for inflammation and infection, M for moisture, E for edges. In the scenario the patient wound is acute surgical, unhealthy  
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granulated with unexpected acute inflammation and all signs of infection like Edema, pain , redness, purulent exudates thus delayed healing (Cook. 2011). The use of wound assessment tools would fall under the physical examination of the patient that would also include checking vital signs (BP: 152/87(hypertension) – P: 89 -RR: 18-T: 37. 9-CBR- BMI 34), the patient is also experiencing pain in his right knee in the place of surgery that is relieved with elevation. Taking pulses from site of the wound as the patient has DVT which will cause weak pulses in the limb and poor healing outcome using Doppler ultrasound for accuracy (Carl, Gelse & Swoboda. 2011) and perform CBC count to show WBC count to confirm the infection.

## 2. Pathophysiology:

To understand the Pathophysiology related to the patient in the scenario with infected surgical wound; understanding the healthy surgical wound healing path is essential. The healing process contains three stages which are separate yet correlate; these are: Inflammation, proliferation and remodeling. In the first stage (inflammation) the first response is vasodilatation which increases blood flow to the area and cause an increase in the flow of white blood cells, (cytokines, interleukin, Histamine, growth factors, coagulating factors) that are inflammatory mediators which produce all signs of inflammation. Second stage includes the proliferation of the damaged tissue to regain full thickness and healthy tissue and finally the remodeling stage includes the reorganization of new tissue to much stronger one that can withstand stress (Li, Chen & Kirsner. 2007).

Unfortunately any disruption due to external or internal causes would lead to delayed wound healing. Generally, these factors lead to either prolonged inflammation at wound site, or decreased oxygen and nutrients delivery. Infection can be addressed as the most common cause for delayed healing (Casey. 2012). Infected surgical wounds of TKR surgery occur due to certain risk factors that are entirely found in the patient from the scenario.

In the scenario the patient has a lot of risk factors that were proven by research to increase risk for infection after TKR surgery, the highlight of the risk factors found in the patient are RA and its' medication (Prednisone), age, obesity DVT with medication (Warfarin).

RA is a disease that causes poor bone strength and density due to increased osteoclasts activity. Also RA affects the surrounding soft tissue and increase antibodies count that attack all self and foreign antigens (Carl, Gelse & Swoboda. 2011 & Schrama, et al. 2010), it also makes the skin very vulnerable which increases the ability of microorganism to enter the site. Thus, increase the ability of the foreign body implanted in the knee to cause the infection as there are more antibodies to reject the implanted prosthesis and cause a prolonged inflammatory reaction which in return cause infection (Schrama, et al. 2010).

Another effect of RA is increased risk for infection is the medication given for the patient that is mainly corticosteroids and Diclofenac. In the scenario the corticosteroid given to the patient is prednisone 5mg, this medication main action of corticosteroids is immunosuppressant, which inhibit both prostacyclin synthesis and recruitment of leukocytes (Vince, Chivas & Droll.

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2007). These mediators are important in the inflammatory stage in wound healing.

In a study done by Garvin, K., & Konigsberg, B. (2011). It was found that patients with average age of 62.8 and obese had higher risk for infection after the surgery like TKR. In the scenario the patient is 72 years old with body mass index of 34.

The third risk factor is the DVT. In this disease there is an abnormality in the production of coagulants and ability of platelets to protect vessel walls but instead it forms an embolism in the blood vessels. An aggregation of platelets and other clotting factors to the specific vein causes decrease in the blood flow to the site. This in return causes low antibodies, fibroblasts, nutrients and WBC to initiate the healing processes and aid in the proliferation stage as it causes ischemic tissue injury (Motto. 2011). In addition, this pathogenesis makes the patient more prone to acquiring infection than other people with no DVT (Battinelli, Murphy & Connors. 2012).

For the DVT treatment the patients are put on anticoagulants to decrease the coagulation and prevent tissue from becoming necrotic, but in TKR it was found that patients put on anticoagulants like warfarin which is given to the patient in the scenario made patients twice as likely to acquire infection as it reduces the ability of the body to normally fight infection (Vince, Chivas & Droll. 2007 & Yurube, et al. 2010). Therefore the patient in the scenario is in much higher risk to developing the infection.

### 3. Goals:

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In the goals part of the plan of care includes basically covering how to achieve the objectives of the interventions, which should be specific measurable and time framed (Myers. 2008). In this scenario the goals include: minimize pain, swelling, exudation and any other clinical signs and symptoms of infection. Promote healing by applying therapy and directly observing its' effects. Verbalize to the patient and make him repeat the personal care to be performed by the patient (Casey. 2012). Watch and minimize for any factors that could cause complications. The patient will be able to ambulate effectively without pain (Vince, Chivas & Droll. 2007). Finally, providing a safe environment for the patient promotes healing (Wilson, Burman-Roy & Leaper. 2009).

#### 4. Interventions:

After assessing the patient and understanding the patients' risk factors it is important to intervene to be able to achieve the goals put by the nurse (Schrama, et al. 2010). In the scenario case the nursing interventions should not be the regular TKR postoperative interventions, but rather focus on curing infection and promote healing (Casey. 2012).

There are a lot of nursing interventions to do in case of infection these interventions include: Continuous monitoring of vital signs to ensure stability and decrease of infection, the patient at admission showed high vital signs including high BP, RR and temperature which indicates infection, so as the proper treatment is taking place it is vital to keep record of how the patients' vital signs are improving to assure that the treatment is working and infection is being healed. Always reassess wound appearance and characters

using the TIME tool and other measurement tools, this will be recorded in patient chart and a comparison between different measurements taken at different times will address the wound improvement and that infection is subsiding (Schrama, et al. 2010).

Asses patients' pain level on a scale from 1 to 10 and apply measures to relief it like massage, analgesia and teaching patient breath exercises. This will increase patient comfort and compliance to his treatment and own care (Allnurses, 2009).

Administer antibiotic prescribed (Cefazolin) IV precisely and monitor for side effects and any abnormalities, this is the main pharmacological treatment and the fastest intervention to relief infection it works on interfering with the synthesis of bacteria cell wall and makes cell membranes very rigid and protective (Jones & Bartlett, 2011). As the patient is in complete bed rest it is important to position him Q 2 hours to prevent any complications like pressure ulcers and decrease of blood flow to the surgery, it is of high importance for this patient due to the DVT. DVT as mentioned before increases the risk for ischemic injury and necrosis of the limb that ultimately may lead to limb amputation (Brunner & Suddrath, 2008). Of course because the patient is on complete bed rest the nurse should assure that the patients' environment is safe and that the patient has all his needs near him in a way that will not endanger him, so the nurse should have the bed side rails up at all times, calling bell placed at the patients sides and that the bed is not high.



check the tubular bandage and remove it every 20 minutes to check pulses and skin temperature so it wouldn't cause any complications and compromise tissue perfusion (Allnurses, 2009), make sure that the urinary catheter is placed correctly to assure normal and safe voiding and make sure to provide regular assistance in hygienic procedures (Brunner & Suddrath, 2008).

The main intervention to perform for this wound is the correct wound dressing (Brunner & Suddrath, 2008). Because the patient in the scenario has an infected surgical wound, it is required to use dressing with very specific characteristics. The most appropriate dressing to use is calcium alginate dressing its' benefits come from the ability to form gels when in contact with wound exudates. The high absorption occurs due to the gel formation which limits secretions, minimizes bacterial contamination and maintains the healing temperature. In addition it has been proven by research like (Oateng, Matthews, Stevens & Eccleston, 2008) that calcium alginate dressings have the ability to actively enhance wound healing either by increasing macrophages, improve inflammation or by forming hematoma.

#### 5. Discharge plan and teaching:

At the end of the hospitalization period the nurse will initiate the discharge plan (Brunner & Suddrath, 2008). In this scenario the nurse will advise the patient about daily exercising program to maintain the normal function of the joint and strengthening it with emphasizing on the fact that it will take time to regain full strength (about 3 months). So, it is important to take things slowly and perform certain activities in a certain way. Use of assistive

devices and show the patient how. Also the nurse will need to tell the patient about the prescribed medications and how to take them and what side effects it may cause with telling the patient about what complications should he visit the GP for.

As the patient lives alone the nurse need to make home visits to assess for problems and to monitor wound progression. Assess home environment for physical barriers that may delay the patient's progress. Assist the patient in acquiring devices, such as reachers or toilet seat extenders (Brunner & Suddrath, 2008).

## 6. Conclusion:

In conclusion, wound TKR surgeries are very effective in improving patient quality of life (Carr, 2012 & Clement, Breusch, & Biant. 2012), but it has a lot of risks including the risk for infection (Kotelnicki, & Mitts. 2009) this scenario is one of those cases that got infected and this essay mentioned all the parts of the nursing plan of care starting with assessment, that covered all subjective and objective data, explained all the physiological factors associated with the patient risk factors that increased his risk of acquiring the infection (DVT, RA, age and obesity). What are the goals of the nurses' plan was also addressed and the interventions to meet these goals and facilitate patient treatment (dressing, monitoring vital signs and pain management) and finally the discharge plan and patient education including teaching patient about medications, complication how to take care of himself.