

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

APPROVED FOR AMA PRA CATEGORY 1 CREDIT; SEE INSERT FOR DETAILS

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

VOLUME 6, ISSUE 1 JANUARY 2016

The Duties of an Orthopaedics Nurse

By: Nabil Ebraheim, MD.

Nurses are burdened by multiple pages of patient assessment documents and are constantly distracted by more clinical duties and tasks. Because of the large amount of material they have to enter into the computer, they may overlook items that may be very important to the patient's care. This information was designed to make it easier for nurses dealing with orthopaedic patients to remember those important functions.

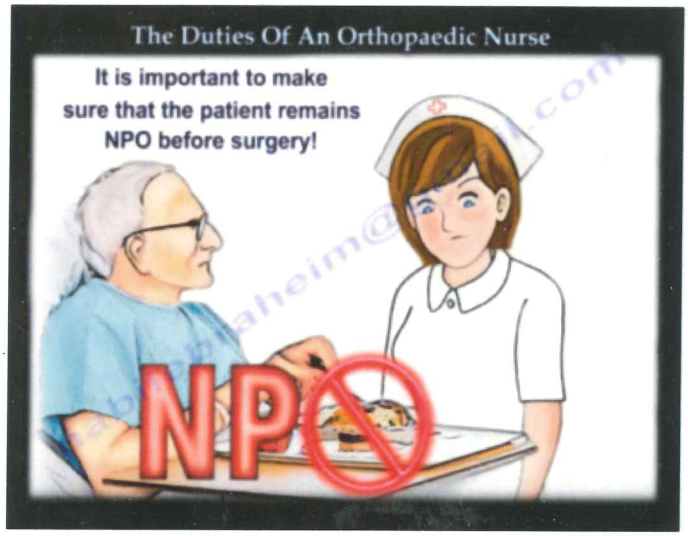
Here is an example of how the nurse may forget something that is important to the patient's care: The patient may be given breakfast by the dietary service despite the fact that the patient is in preparation for surgery. In this situation, the patient should not have anything to eat past midnight. The patient was fed because the NPO sign was not posted in the room. It is important to make sure that the patient remains NPO before surgery.

In order to remember the important functions of an orthopaedics nurse, think about it in the following manner: (this is not the exact sequence of patient assessment, but a method to memorize them).

If the patient is NOT safe to walk: •Give DVT prophylaxis. •Check for decubitus ulcers and take precautions to avoid them.

SAFETY: Does the patient have the appropriate identifiers (bracelet)? Did I wash my hands before handling the patient? Assess the patient's wounds, allergy status, risk of falling and probable drug interactions. If you find a situation that isn't safe, talk about it and FIX it. If you can't fix it on your own, get someone who can help.

WALKING: Is the patient out of bed or on bed rest? - Activity level, weight bearing status, physical therapy and ambulatory aids. Remember that mobilizing the patient and getting them back on



their feet is the goal! Also, early mobilization decreases the chance of developing bed sores, pneumonia, DVT, psychosis and constipation. Sometimes patients are kept in bed despite the fact that they should be up and mobile. Therefore, the nurse needs to ask the doctor about the activity status of the patient in case the order was not written.

EATING: Is the patient allowed to eat or are there any food restrictions like NPO, supplements or special diet (diabetes)?

Neurovascular Check: •Assess the patient's neurovascular status. •Check for signs of compartment syndrome. While assessing the patient's neurovascular status, insert an IV line for fluids and administer antibiotics and pain medications.

Tumoral Calcinosis

Tumoral calcinosis is a rare condition that can be mistaken for a sarcoma. It is a tumor-like lesion that occurs more often in people of African descent and females. It is a spontaneous periarticular calcification that occurs around joints (especially hip and shoulder). The etiology is not fully understood but may be hereditary.

Calcinosis of Renal Failure (uremic tumoral calcinosis): Appears similar to tumoral calcinosis but occurs in patients with renal failure or are on long-term dialysis. Patient is usually hyerphosphatemic and hypercalcemic and there is less hip and shoulder involvement than with tumoral calcinosis.

EXAMINATION: Enlarging, firm, nontender, fixed and painless mass that will limit the movement of the patient and also limit the ambulation. No history of trauma.

Continued on page 2

Tumoral Calcinosis continued

IMAGING: X-rays display extra-articular, multilobulated mineralized masses around the joints. CT scans and MRI may show fluid inside the mass. Bone scan may show hot spots (dark areas). LABS: Calcium levels may be normal in non-renal types. Biopsy of the lesion will show hydroxyapatite calcium deposits with surrounding macrophages (no crystals).

DIFFERENTIAL DIAGNOSIS: •Chondrosarcoma •Malignant tumor. - contains malignant cartilage cells. •Synovial Chondromatosis - occurs inside the joints and contains calcified cartilage within the synovium. • Myositis Ossificans - occurs from trauma, zoning phenomenon and an eggshell-like calcification in which there is a mature bone formation at the periphery. •Parosteal Osteosarcoma - dense bone forming lesion that appears to be stuck onto the cortex of the bone and usually located in the back of the knee.

TREATMENT: If the patient is asymptomatic, observe the lesion. If they are symptomatic, and the mass is enlarging, do a wide excision to prevent local recurrence.

Deep Vein Thrombosis & PE

What is deep venous thrombosis (DVT)? DVT is the formation of a blood clot (thrombus) within a deep vein. The deep veins pass through the deep tissues and muscles. Muscle contractions (walking, running, etc.) squeeze blood through the deep veins to the heart. The deep veins have valves which prevent the blood from flowing back to the ankles and feet. When a blood clot is formed, the majority of them are small and are usually broken down or dissolved. Large clots may form and can block the vein causing the patient to complain of pain and swelling. Homan's sign is not very specific. High index of suspicion is necessary for the diagnosis.

Virchow's Triad contributes to the development of DVT. 1. Endothelial Injury. 2. Venous Stasis. 3. Hypercoagulability. One of the risk factors may contribute more than the others. OTHER RISK FACTORS: - History of previous DVT (most important). - Tumor (malignancy) - up to 20%. - Oral contraceptive therapy. - Aging. - Obesity. - Smoking. The Virchow's Triad: •Venous Stasis: Immobilization (physical therapy is not available), - Being on an airplane or in a car for a long period of time without movement and not taking aspirin. •Intimal Injury: Due to trauma, fracture, dislocation or can result from surgery. - Surgery itself is a risk factor because of the use of general anesthesia and the stress due to the surgery. •Hypercoagulable State: Could be inherited/genetics (Factor V Leiden, Protein S or Protein C deficiency). Increased blood viscosity + immobilization + intimal tear from trauma or surgery may lead to DVT.

Once the condition is suspected, venous Doppler ultrasound examination is ordered to confirm the diagnosis. If the study is positive and the clot is above the knee, then it is usually treated with IV Heparin therapy followed by long-term Coumadin therapy. Occasionally a vena cava filter is used.

Where does DVT come from? It predominantly occurs within the deep veins of the legs but may also occur in the upper extremities. What conditions can cause DVT? •Total knee replacement. •Polytrauma patient. •Hip fractures, •Total hip replacement (less DVT and more PE than total knee replacement).

Prophylaxis for DVT: Chemical methods will include anticoagulants such as aspirin, Lovenox, Coumadin, Heparin and others. - Each of these has their advantages and disadvantages. None of the anticoagulation agents provide absolute protection against DVT or PE. - Currently there are no guidelines for prophylaxis in trauma patients. - When giving prophylaxis, you must weigh the risk of

complication such as bleeding versus the benefit of preventing DVT. - Mechanical prophylaxis should be used in the majority of patients because it increases the venous return and the endothelial-derived fibrinolysis. It is recommended by the American Academy of Orthopaedic Surgeons (AAOS) in low or high risk groups, especially if the patient is having joint replacement.

What is a pulmonary embolism (PE)? A PE is blockage of the pulmonary arteries in the lungs that can lead to death. Usually the pulmonary embolus can become lodged within the upper or lower portion of either one of the lungs (typically the lower portion). It is possible for the blood clot to become lodged in the middle where the pulmonary artery branches, this is known as a Saddle Embolus.

The incidence of PE is about 700,000 patients per year with 200,000 of these cases being fatal. Early diagnosis and treatment are the most important factors for survival of the patient. According to the AAOS, the rate of DVT does not correlate with PE. DVT and PE can develop independently from each other and are part of the hypercoagulable state. One does not need to have a DVT in order to develop a PE. The origin of PE is debatable. One opinion is that a blood clot breaks off; it may travel to the heart. If a clot becomes lodged in the pulmonary arteries of the lung it may be fatal. A blood clot may occur in the pulmonary artery itself, not originating from the leg.

Continued on page 3

It is best to advise the patient that a PE may occur even if they are on prophylaxis for DVT. Educate them on the symptoms of PE. For example, if symptoms occur in the chest (dyspnea) after surgery on the hip, it is important to go to the emergency room immediately. Early diagnosis is very important for survival of the patients.

Pulmonary embolism should be suspected in patients postoperatively with: •Acute chest pain •Tachypnea •Tachycardia •Syncope •Seizures. Diagnosis is done with ventilation-perfusion (VQ) and helical chest CT scan. Treatment is done with IV Heparin followed by Coumadin. Occasionally a vena cava filter is used.

ACL, PCL & Quadriceps

What is quadriceps avoidance gait? Quadriceps avoidance gait can occur by hip flexion, knee flexion or both hip and knee flexion. The knee can be bent or the patient leans forward so the quadriceps does not have to work (the hip is flexed) and it occurs in ACL injury. Most people with an ACL tear will alter their gait to avoid anterior displacement of the tibia which occurs when the quadriceps contract. The patient will walk with a slightly bent knee to avoid making the quadriceps work; this decreases the demand for the function of the quadriceps which minimizes the anterior pull on the tibia by helping the knee to be more stable.

What is active quadriceps test? It occurs in PCL injury. The examiner stabilizes the leg of the patient, while the patient is asked to actively contract the quadriceps.

ACL INJURY: Mechanism of Injury: The ACL is injured with the knee extended and valgus, or a hyperextension injury. The tibia moves anterolateral in extension. Pivot Shift Test: Palpable clunk on outside of knee as tibia reduces, this clunk is very specific for an ACL tear. The iliotibial band will reduce the tibia and create the clunk on the outside of the knee. The hamstrings muscles are used in therapy for an ACL tear since the hamstrings pull the tibia backwards. After surgery to the ACL, open chain quadriceps exercises such as seated leg extension should be avoided.

PCL INJURY: Mechanism of Injury: Dashboard injury - A common cause of injury to the PCL is due to a bent knee hitting a dashboard during a car accident. Direct blow to the proximal tibia with the knee flexed. Knee bent or foot plantar flexed = PCL injury.

The quadriceps muscle is strengthened during rehabilitation of a PCL injury. The PCL does not like the hamstrings; avoid hamstring curls for rehab of the PCL. The hamstring will create a posterior pull on the tibia and cause increased stress on the posterior cruciate ligament reconstruction.

Anatomy of the Peroneus Longus

The peroneus longus muscle is located within the lateral compartment of the lower leg. The compartment also contains the peroneus brevis muscle and the superficial peroneal nerve. The peroneus longus muscle is longer with a larger muscle belly than the peroneus brevis. It passes down the outside of the lower leg.

ORIGIN/INSERTION: Both the peroneus longus and the peroneus brevis muscles originate from the shaft of the fibula. The origin of the peroneus longus muscle comes from the head of the fibula and the upper ⅔ lateral aspect of the fibular shaft. It also originated form the anterior and posterior intermuscular septa of the leg. The peroneus longus muscle passes over the peroneus brevis and is inserted into the plantar posterolateral aspect of the medial cuneiform and lateral side of 1st metatarsal base. The peroneus brevis tendon runs distally and inserts into the 5th metatarsal base. There are two peroneal retinacula which hold the peroneal tendons at the ankle. The superior peroneal retinaculum (more important) is located at the distal 3 cm of the fibula. It originates from the posterolateral ridge of the fibula and inserts into the lateral calcaneus (prevents subluxation).

Behind the fibula, the tendons run in a sulcus called the peroneal groove, which is found on the fibula posteriorly. The tendons are stabilized by the superior peroneal retinaculum and the cartilaginous rim. Within the groove, the peroneus brevis tendon is anterior and medial to the peroneus longus tendon. Both tendons curve anteriorly around the tip of the fibula with the peroneal tubercle separating the tendons at the level of the calcaneus. The peroneal tendons are contained in a common synovial sheath. At the level of the tubercle, the peroneus brevis is dorsal and the peroneus longus is plantar. Next, the peroneus longus tendon curves sharply, making a 90° turn medially and passing in a groove beneath the cuboid where it crosses to the plantar aspect of the foot before inserting medially into the base of the 1st metatarsal and the medial cuneiform.

INNERVATION: The superficial peroneal nerve supplies the peroneal muscles (L5, S1 and S2).

FUNCTION: Evert the hindfoot, flexes the ankle, and plantar flexes the first ray (very important).

Some conditions that affect the peroneus longus muscle and tendon:

1.Peroneus Longus Tendonitis – inflammation.

2.Peroneus Longus Tendon Rupture or Tear - Tears of the peroneus longus tendon are not common and usually occur at the peroneal tubercle.

3.Os Peroneum - The Os Peroneum is a sesamoid bone that is present within the peroneus longus tendon in about 20% of people's, it is normally located less than 1 cm proximal or distal to the calcaneocuboid joint. It moves with normal and abnormal tendon motions. This ossicle is located within the peroneus longus tendon and should not be confused with the Os Vesalianum Pedis accessory bone or an apophysis of the fifth metatarsal.

Continued on back page

THE UNIVERSITY OF TOLEDO
MEDICAL CENTER

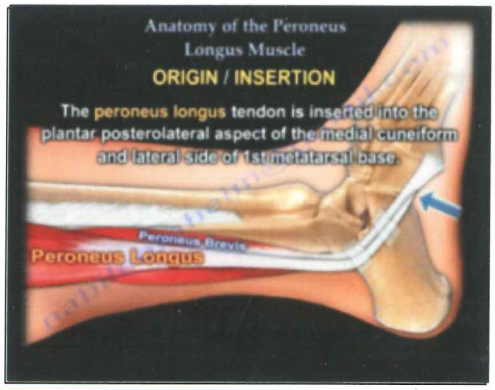
Department of Orthopaedic Surgery
The University of Toledo
3000 Arlington Ave., MS 1094
Toledo, Ohio 43614



Anatomy of the Peroneus Longus Muscle continued

The oblique course of the peroneus longus tendon within the cuboid groove and the presence of the Os Peroneum along with sudden movement such as inversion and supination of the foot may cause a rupture of the tendon at the site of the ossicle. If the Os Peroneum has proximal migration more than 1 cm from the calcaneocuboid joint, rupture of the peroneus longus tendon is likely. An MRI can confirm the diagnosis; it shows the proximal migration of the ossicle. The Os Peroneum is bilateral in about 60% of patients and the ossicle is bipartite in 30% of patients. Fractures of the Os Peroneum are rare. Fragment separation of 6 mm or more is associated with rupture of the peroneus longus tendon, separation of 2 mm or less is not important.

4.Peroneal Tendon Subluxation of Dislocation – The patient may feel a POP or a SNAP sensation as the peroneal tendons move over the lateral malleolus, due to rupture of the superior peroneal retinaculum.



THE UNIVERSITY OF TOLEDO MEDICAL CENTER
ORTHOPAEDIC MONTHLY

Editors:
Dr. Nabil Ebraheim, Professor and Department Chairman of Orthopaedic Surgery; and
Amanda Ferguson

Dr. Ebraheim and Amanda Ferguson do not have any relationships with industry to disclose.

Department of Orthopaedic Surgery
The University of Toledo
3000 Arlington Ave., MS 1094
Toledo, Ohio 43614

For appointments, call
419.383.3761