

Polypharmacy After Elective Orthopaedic Surgery

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Polypharmacy is common, especially among older patients. Polypharmacy can lead to adverse patient outcomes and increased healthcare costs. After elective hip or knee arthroplasty, several new medications are prescribed, which can contribute to polypharmacy, although these medications are necessary in the postoperative period. Although some instances of polypharmacy may be appropriate, many are not. Nurse practitioners play a vital role in identifying and preventing inappropriate polypharmacy in the postoperative period and can develop individualized therapy plans for each patient to provide safe medication use in patients. This would be beneficial in the orthopaedic surgery postoperative period because of the introduction of several new medications.

olypharmacy is common in the older patient population and can provide several hurdles to prescribers. Polypharmacy can contribute to adverse outcomes such as falls, increased hospital costs, prolonged hospital stays, increased hospital readmissions, adverse drug reactions, and mortality (Garpestad & Devlin, 2017). After hip or knee arthroplasty, there are several new medications that are prescribed to make recovery easier and prevent major complications (such as deep vein thrombosis [DVT], pulmonary embolism, or severe constipation). On average, each patient receives five new prescriptions after undergoing an elective hip or knee arthroplasty (Davies et al., 2020). Through medication reconciliation and development of individualized medication plans, nurse practitioners can promote medication safety. This is beneficial in the orthopaedic surgery postoperative period because of the introduction of several new and necessary medications.

Polypharmacy Defined

There is a large heterogeneity in defining polypharmacy. Polypharmacy is most simply defined as the use of multiple medications, most commonly referring to being taking five or more medications (Masnoon et al., 2017). The presence of multiple chronic health conditions requiring medication therapy is common, especially in the older patient population (Garpestad & Devlin, 2017). When two or more chronic conditions are present, this is defined as multimorbidity. Multimorbidity can increase the complexity of patient care for both healthcare providers and patients (Masnoon et al., 2017). Polypharmacy is often a result of multimorbidity, especially when multiple providers prescribe multiple medications for patients. An example of this would be a primary care provider, a cardiology specialist, and an orthopaedic specialist all caring for and prescribing medications for a mutual patient. Polypharmacy can contribute to adverse outcomes such as falls, increased hospital costs, prolonged hospital stays, increased hospital readmissions, adverse drug reactions, and mortality (Garpestad & Devlin, 2017).

In many cases, such as after major joint arthroplasty, polypharmacy may be clinically appropriate to reduce major postoperative complications. However, it is important for providers to identify inappropriate polypharmacy to reduce adverse effects or outcomes (Masnoon et al., 2017). The term "appropriate polypharmacy" is used to differentiate between using many or too many medications (Masnoon et al., 2017). This allows providers to identify appropriate use of multiple medications rather than simply counting the number of medications a patient is taking, as counting alone is of little clinical value (Masnoon et al., 2017).

Clinical Significance of Polypharmacy

It is generally known that the worldwide population is aging and the number of persons older than 65 years is increasing. As polypharmacy is most common in older adults, this should be concerning for prescribers. There as many negative consequences with polypharmacy including increased risk of adverse drug reactions,

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medication nonadherence, increased healthcare costs, falls, and others (Garpestad & Devlin, 2017; McIntosh et al., 2018).

As the population ages and the elderly population increases, this will increase the demand for healthcare providers to be on the lookout for polypharmacy. Unfortunately, with shortages of healthcare providers, this may be difficult. However, it is imperative to identify patients with inappropriate polypharmacy to result in positive patient outcomes with the least amount of adverse consequences (Maher et al., 2014).

Orthopaedic Surgery Background

Approximately 350 million people worldwide have some form of arthritis (Park et al., 2018). In the United States alone, there are approximately 40 million people affected by arthritis, with more than a quarter million of these being children (Park et al., 2018). More than 21 million Americans are diagnosed with osteoarthritis, and approximately 2.1 million Americans are living with rheumatoid arthritis (Dragosloveanu et al., 2017). Nearly one in three Americans has some form of arthritis (Park et al., 2018).

Arthroplasties of the hip and knee are prevalent in more than 6 million Americans, making them the most commonly performed elective surgeries in the United States. It is estimated that 4.7 million Americans have undergone total knee arthroplasty and 2.5 million have undergone total hip arthroplasty (Kremers et al., 2015; Park et al., 2018).

Although hip and knee arthroplasties are highly prevalent, they are still major and life-altering surgeries to undergo. These surgeries require a great deal of patient education, adherence to instructions, and several new medications in the postoperative period (Park et al., 2018). As many patients, especially those older than 65 years, are already taking several medications, the introduction of new medications could result in polypharmacy.

Orthopaedic Surgery Postoperative Medications

After a hip or knee replacement, there are several medications that are prescribed. Medications make recovery easier and can prevent major complications after surgery. On average, each patient receives five new prescriptions (Park et al., 2018). These include DVT prophylaxis, pain medications, anti-inflammatory medications, stool softeners or laxatives, and gastrointestinal prophylaxis. Sometimes, antiemetics, antibiotics, or medications to prevent heterotopic ossification are warranted as well. Over-the-counter analgesics may also be recommended. Drugs commonly used can vary among practices, surgeons, and patients, but these classes of medications are generally used.

With the introduction of new medications, the provider should perform a thorough medication reconciliation and consider consequences of polypharmacy. The provider should check for interactions with existing patient medication regimens. Postoperative medication regimens should be discussed at appointments prior to surgery to avoid any surprises or confusion after surgery. If patients have aversions or reactions to certain medications, these should be known in advance to minimize adverse effects after surgery. Expectations regarding medication adherence should be discussed prior to surgery (See et al., 2018).

Providers should ask patients about all medications including supplements, herbs, and vitamins. Patients should be educated about how long to hold medications prior to surgery and after surgery. If interactions are determined or suspected, patients should be educated about this as well. This can reduce adverse effects from polypharmacy.

Exemplar Patient

Patient Jane Doe is a 66-year-old woman who was referred to the orthopaedic department for bilateral hip osteoarthritis with left greater than right hip pain. Medical history is significant for hypothyroidism on levothyroxine, atrial fibrillation on warfarin, frequent urinary tract infections, and irritable bowel syndrome. Surgical history involves right hip arthroscopy for labral tear more than 30 years ago and right knee arthroscopy with partial meniscectomy more than 20 years ago. For her social history, she is a retired school administrator and resides with her husband of 40 years. She does not drink alcohol or use tobacco of any form. She has tried physical therapy, weight loss, activity modification, and intra-articular steroid injections.

After consultation with the orthopaedic specialist, Jane elects to proceed with left total hip arthroplasty. During her consult, the provider performs medication reconciliation and checks for any interactions that postoperative medications could have with her current regimen. The astute provider is aware not to use medications that could increase risk of bleeding as the patient is taking warfarin, which could result in hemarthrosis, pain, and wound-healing problems.

Role of the Nurse Practitioner

Polypharmacy after elective total joint arthroplasty has implications for both the primary care nurse practitioner and the orthopaedic nurse practitioner. Both should be diligent about checking medication lists, discussing medication regimens with patients, and providing patient education. Safe prescribing is challenging and requires education and awareness from the nurse practitioner (Davies et al., 2020). Nurse practitioners should use the knowledge of pharmacology and pharmacokinetics learned in their educational backgrounds and translate this information into safe and efficacious prescribing in the clinical practice (Davies et al., 2020).

It is important to recognize patients who already have polypharmacy before undergoing surgery, as drug interactions can have significant impacts on patients postoperatively. It is generally recommended to have patients stop all vitamins, supplements, and herbal remedies for at least 7 days prior to planned surgery to reduce interactions that could result in increased blood loss. Also, both prescription and over-the-counter

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nonsteroidal anti-inflammatory medications should be stopped at least 7 days prior to the planned surgery to reduce the risk of bleeding or hemarthrosis, both intraoperatively and postoperatively.

Nurse practitioners should carefully perform medication reconciliation and risk-benefit assessments to develop individualized therapy plans for each patient to provide safe medication use in patients (Davies et al., 2020). This would be beneficial in the orthopaedic surgery postoperative period because of the introduction of several new medications. Medication calendars, education sheets, telephone access, and online portals are just a few of the many ways nurse practitioners can be involved in reducing inappropriate polypharmacy after orthopaedic surgery (Pelt et al., 2018).

Summary and Future Implications

Almost any nurse practitioner regardless of specialty will say that working with older adults is challenging and rewarding. The changes brought about by the aging process introduce a new set of challenges to prescribing for and managing this patient population (Pelt et al., 2018). It is important for nurse practitioners to perform a thorough medication preoperatively as well as frequently in the postoperative period to keep patients safe. Ownership should be taken when discontinuing medication as soon as appropriate. Also, it is important to maintain multidisciplinary collaborative relationships with primary care providers, pharmacists, and other specialists (such as cardiologists who may be managing Coumadin [warfarin] or other anticoagulants). Nurse practitioners should be aware of times of appropriate polypharmacy, such as after elective knee or hip arthroplasty, and stay up to date on prescribing guidelines. Although this postoperative polypharmacy is necessary, it must be performed in an individualized and safe manner with the patient's best interests in mind. Polypharmacy will never be eliminated. Providers should stay up to date on safe medication practices to provide the safest and most efficacious care to patients.

Key Points for Ensuring Medication Safety

- Perform risk assessment for new medications to determine appropriateness.
- Thoroughly reconcile medications at each visit and care transition.
- Communicate with and counsel patients regarding medication reactions and interactions.

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