

Medication: High Risk Patients



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Mini Review

Medication safety is an important issue especially when it comes to high risk population. High risk population should be given more attention when a drug is being prescribed. High risk populations include, but are not limited to, pregnant patients, pediatrics, and elderly (geriatrics). These populations will be reviewed in this article. First, safety of medication administration to a pregnant patient is a public safety issue. During pregnancy, symptoms such as nausea, vomiting, heart burn may appear. Also, the pregnant patient may receive pain medication or an influenza vaccination. Pregnancy may also necessitate the need for the patient to seek medications for treatment of symptoms associated with pregnancy. It is clear that some drug substances administered to the mother are able to cross the placenta to some extent. This may result in the presence of the administered medication in the fetus which in some cases may lead to harm. Although there are regulations regarding medication use during pregnancy and lactation, unfortunately, many medications have no clear data. The current recommendation is to review data and balance the benefit versus risk, instead of relying solely on the pregnancy risk category.

For safe medication administration to this patient population, taking a clear history of the patient, reviewing the literature for reported data about the intended medication in pregnancy and then balance the risk versus benefit [1]. The second group of high-risk patients, pediatric patients (ages 1-12 years) and adolescent patients (ages 13-18 years) have special pharmaceutical care needs because their bodies are constantly changing as they mature. Changes in the biological processes responsible for drug disposition (i.e., absorption, distribution, metabolism, and excretion) occur at varying rates throughout childhood and adolescence. These changes proceed at different rates in children of the same age, especially for those who were premature at birth and significantly impact the efficacy and toxicity of medications.

The need for adjustments in the dose and dosage interval changes as the child matures. Therefore, careful medication therapy

monitoring is required. Pediatric and adolescent non-adherence is a complex issue that can increase the incidence of medication-related problems. Adverse drug effects and the need for frequent dosing are factors that significantly impact adherence. Medication errors are inclined to occur when calculating dosages, especially for pediatric patients, because small or fractional numbers are often involved. Misplaced decimal points can result in overdoses or under doses and often occur when converting from micrograms to milligrams and vice versa. Ten-fold errors may occur if the prescriber uses a trailing zero (e.g., 6.0 mg may be misread as 60 mg) or fails to use a leading zero (e.g., .4 mg may be misread as 4mg). To avoid such errors, it is recommended by the Institute of Safe Medication Practices (ISMP) that prescribers never use trailing zeroes and always use a leading zero for numbers less than one. Mathematical and measuring errors are also prone to occur when preparing and compounding medications, especially if dilutions or small quantities are needed [2].

The third high risk population to be discussed is the elderly. The World Health Organization defines elderly as persons older than 65 years. Besides chronological age, the definition of elderly depends on many factors including molecular, cellular, physiologic, and psychosocial factors [3]. Elderly have a higher disease burden in contrast to younger adults such as cardiovascular diseases, cancer, diabetes, arthritis, and Alzheimer disease. Also, elderly is prescribed multiple medications to treat their diseases and they are classified as polypharmacy users [4]. Aging is a heterogeneous and individual process, and this could introduce greater variability in treatment responses, making it more difficult to achieve treatment goals. A number of studies have shown that elderly patients' response to medication differs from that of younger adults. Many factors account for the age-related differences, including differences in physiologic features, pharmacologic factors, and cognitive function [5].

Age-related physiologic changes that affect the pharmacokinetics (absorption, distribution, metabolism, and

excretion) of different drug classes are well established [6]. Moreover, pharmacodynamic changes are more complex than pharmacokinetic changes, and tend to be drug class specific. For example, older individuals have increased sensitivity to central nervous and cardiovascular medications. A notable example is the oral anticoagulant drug warfarin, which has been associated with a higher risk of hemorrhage in elderly patients. The risk ratio for major bleeding in elderly patients older than 75 years are 2-6 fold more than younger adult patients, depending on the duration of therapy and target international normalized ratio values [7,8]. There are guidelines for healthcare professionals to help improve the safety of prescribing medications for elderly entitled "Beers Criteria". This Criteria emphasizes on decreasing the prescribed medications that are unnecessary, as well as ensuring the appropriateness of the prescribed medications, which will help to reduce the problems of polypharmacy, drug interactions, and adverse drug reactions [9].

Conclusion

In conclusion, medication administration to high risk populations should be administered carefully and based on evidence.

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