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Editorial

Errors in parenteral drug infusion: an invitation to reflection

Erros na administração de medicamentos pela via parenteral: um convite à reflexão

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Medications are the technology most frequently available and used by health services at the global level. However, with their substantial and increasing use, an increasingly higher risk of harms in their users is observed. And these harms, commonly called adverse drug events, can be the consequence of an error. Such events can be related to (i) insufficient knowledge and experience about medications; (ii) inadequate perception, and sometimes undersized, of risk; (iii) work overload exerting pressures and fatigue of health professionals; (iv) distractions and interruptions; (v) lack of standardized protocols and procedures; and (vi) complexity of the clinical case, including multiple health conditions, polypharmacy and potentially dangerous medications[1].

It is due to the complex evolution of health systems, as well as to the massive proportion use of this technology, that the term "patient safety" emerges. In addition to attributing to the idea of "*primum non nocere*", the safety culture aims at preventing and reducing risks, errors and harms that occur to patients during the provision of health care. The cornerstone of this philosophy is continuous improvement based on learning about the occurrence of avoidable adverse events (errors) or not. However, improvements in medication use safety requires a systemic approach[1,2].

One of the most important steps to improve safety in the processes is understanding how and why errors occur. Patients in more critical conditions, who receive higher-level care with the corresponding increase in parenteral medication use, are more exposed to medication errors. In addition, it is known that most of the medication errors occur during the routine care provided to the patients, not in extraordinary situations[3,4].

Medications used via parenteral routes – intravenous, intramuscular, subcutaneous and intradermal administration – continue to be an essential component of the treatments for hospitalized patients. A recent systematic review investigated errors in drug administration in Latin America and pointed out their frequency, mainly via the intravenous route. The most frequently described underlying errors were dose-related, omission, wrong medication, wrong patient, allergic patient and incorrect administration time. In relation to the preparation of medications, the errors described were also related to dose, lack of hand hygiene before preparation, omission of aseptic techniques in preparation, incorrect identification of the medication, failure to verify the patient's identification and dilution of the medication in volume below the manufacturer's recommendation. In administration, the study highlighted omission of medications, lack of hand hygiene before administration, omission of aseptic techniques for administration and incorrect administration speed[5,6].

Manipulation of an injectable medication starts up from the analysis of the prescription, which must contain the desired dose, reconstituent and diluent. However, it is common to find incomplete prescriptions or with incorrect information. Some of the errors found are as follows: absence of diluent prescription, inappropriate diluent, prescribed dose inconsistent with the proposed dilution and not recommended concentration of the solution[7].

In ideal conditions, the medications used via parenteral routes should be prepared immediately before their use and by the person that will administer them. Drug preparation and administration play a fundamental role in the patient's safety context. Therefore, it is necessary for the professionals who perform these activities to have essential technical

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knowledge and skills, with the being indispensable: a) knowing how the medication should be reconstituted and diluted; b) observing if reconstitution took place correctly; c) calculating the dose, final solution concentration and infusion rate; d) knowing the medication compatibility with diluents and other drugs; e) knowing the medication stability; f) assessing the need for the use of photosensitive equipment for the medication; and g) recognizing the type of infusion, whether in *bolus* or during a certain period of time[3,6].

Lack of knowledge about the physicochemical characteristics intrinsic to medications can also trigger medication errors. Within the universe of these events are drug incompatibilities, which can occur in the "Y administration" or mixing of two or more medication in a syringe or serum bag, where such errors can generate the following: reduction of pharmacological activity or drug inactivation, formation of toxic compounds, increased drug toxicity, access obstruction, allergic reactions and phlebitis. Other relevant points are stability of the solutions, the microbiological contamination risk and photosensitivity[8,9,10].

In their patient safety programs, health services must adopt policies of good practices for drug preparation and administration, and may use some strategies such as: creation of a pharmacovigilance service with active search, computerized systems that associate medications to their respective diluents, alerts on concentration and prevention of phlebitis, review of dose calculations by the pharmacist in the prescription evaluation process, implementation of the unit dose distribution system, use of multi-lumen accesses for patients using multiple medications, institutional materials with diverse information about the reconstituent and presence of expansion, diluents, tables of vesicant and irritating drugs with their respective pH, infusion time, stability time, appropriate route, hypodermoclysis and standardization of solutions.

Definition and dissemination of policies to improve quality of the services are also indicated, with routine supervision and continuing education for prescribers, nurses and pharmacists[4,5,7,11]. Protocols for good preparation and administration practices should comprise the set of guidelines of the teams that perform parenteral drug administration[4]. In the construction process, it is necessary to consider all the medications used in the institution, paying special attention to signaling of high-alert medications. In addition to that, some recommended strategies for health services include qualification of suppliers, in order to guarantee the quality of the technologies and obtain technical information, in addition to that available in the package leaflet, such as adequate reconstitution time, stability after dilution and viability by hypodermoclysis and monitoring of the care process by indicators.

RBFHSS is a partner for the health professionals throughout Latin America for disseminating knowledge in the patient safety field.

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