PALLIATIVE PEARLS
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Principles of Pediatric Dosing
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Pediatric patients, encompassing all individuals under the age of 18, are dose-prescribing challenges for the palliative care clinician. When it comes to medications, children are not mini-adults. Often, labeled dosing recommendations do not include pediatrics and palliative care literature specific to this population is scarce.[1] In these cases, the experience of the palliative care practitioner, specific medication properties, and patient characteristics guide the practical use of medications.

PEDIATRIC PATIENT CHARACTERISTICS

Pediatric patients have immature organ systems that affect drug disposition.[2-3] The function of the kidney and liver must be considered when adjusting doses. Complete maturation of renal function is not reached until an infant is 6-8 months old. When organs are immature, medications are broken down and eliminated more slowly. To account for this, longer intervals can be used when dosing.

Pediatric patients also have different proportions of fat, body water and muscle compared to adults. In most cases, simple weight-based dosing is appropriate, but for others, recognition of water-soluble and fat-soluble medication properties must be considered. For example, the younger the patient, the higher percentage of body water, which means a higher dose of a water-soluble drug is required to avoid dilution.[5]

CALCULATING A DOSE

Dosing is determined on a milligram (of drug) per kilogram (of body weight) basis or by using body surface area (BSA) calculated from the patient's height and weight. When pediatric dosing is available on a commercial product, age group categories help differentiate the stage of development: [5, 6]

- Pre-term – < 37 weeks gestation
- Neonate – newborn to one month
- Infant – one to 12 months
- Toddler – 12 to 36 months
- Child – 3 to <12 years
- Adolescent – 12 to <18 years

Regardless of recommendations, a pediatric dose should never exceed the maximum adult dose.

LIQUID MEASUREMENTS

Remember to use proper dosing devices when measuring liquid doses. Utilize calibrated measuring cups, droppers and oral syringes provided or ask for additional supplies.[7,8] Remind any non-clinical caregivers that kitchen teaspoons and tablespoons do not measure accurately. It's important to note that not all calibrated devices are the same. Familiarize yourself with what a patient's family has on hand—devices that are included within commercial packaging are often specific for that medication product only and may not have standard measurements for reuse with other medications.

Abbreviations:

- Teaspoon = “tsp”
- Tablespoon = “Tbsp” or “TBSP”
- Milliliter = “ml, mL, or mLs”
- Drop = gtt

Measurement Conversion:

- ½ teaspoon = 2.5 mL
- 1 teaspoon = 5 mL
- ½ tablespoon = 7.5 mL
- 1 tablespoon = 15 mL
- 20 drops = 1 mL

Devices:

- Cup: Use for children who can drink from a cup without spilling
- Dosing spoon: Use for children who can drink from a cup but often spill
- Droppers and oral syringes: Use for children who cannot drink from a cup

The American Society of Health-System Pharmacists maintains a helpful medication safety website and a printable flyer, *How to Use Liquid Medications* (PDF) on this topic.[9] To access the main website, click here, or the “How to Use Liquid Medications” section and flyer, click here.

PEDIATRIC MEDICATION ADHERENCE

Pediatric compliance is influenced by the taste and appearance of the medication and its ease of administration. Be cautious in adding flavoring or sweeteners directly to commercially available product containers as this will alter the final concentration of the medication and affect the measured dose. In most cases, medications can be added to foods or beverages at the time of administration for greater palatability. Check with your pharmacist for medication-specific guidance. You may find that compounded medications suit all of the above but be aware that concentrations will differ from commercially available products. The volume measurement of the appropriate dose will need to be identified and communicated to the patient’s family to avoid errors.

SUMMARY

Being aware of the age, height and weight is key to preventing medication errors and will provide the pharmacist needed information to determine dosing. Work with your pharmacist to prepare the most palatable formulation.

References:

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