ited data are available on the safety of fluoroquinolones in pregnant or lactating women; they should not be used unless the benefits outweigh the potential risks.

Nursing Process

General aspects of the nursing process as described in Chapter 33 apply to the client receiving aminoglycosides and fluoroquinolones. In this chapter, only those aspects related specifically to these drugs are included.

Assessment

With aminoglycosides, assess for the presence of factors that predispose to nephrotoxicity or ototoxicity:

- Check laboratory reports of renal function (eg, serum creatinine, creatinine clearance, blood urea nitrogen [BUN]) for abnormal values.
- Assess for impairment of balance or hearing, including audiometry reports if available.
- Analyze current medications for drugs that interact with aminoglycosides to increase risks of nephrotoxicity or ototoxicity.

With fluoroquinolones, assess for the presence of factors that increase risks of adverse drug effects (eg, impaired renal function, inadequate fluid intake, frequent or prolonged exposure to sunlight in usual activities of daily living):

- Assess laboratory tests (eg, complete blood counts and tests of renal and hepatic function) for abnormal values.

Planning/Goals

The client will:

- Receive aminoglycoside dosages that are individualized by age, weight, renal function, and serum drug levels
- Have serum aminoglycoside levels monitored when indicated
- Have renal function tests performed regularly during aminoglycoside and fluoroquinolone therapy
- Be well hydrated during aminoglycoside and fluoroquinolone therapy
- Be observed regularly for adverse drug effects

Interventions

- With aminoglycosides, weigh clients accurately (dosage is based on weight), monitor laboratory reports of BUN, serum creatinine, serum drug levels, and urinalysis for abnormal values.
- Force fluids to at least 2000 to 3000 mL daily if not contraindicated. Keeping the client well hydrated reduces risks of nephrotoxicity with aminoglycosides and crystalluria with fluoroquinolones.
- Avoid concurrent use of other nephrotoxic drugs when possible.

Evaluation

- Interview and observe for improvement in the infection being treated.
- Interview and observe for adverse drug effects.

PRINCIPLES OF THERAPY

Choice of Drug

The choice of aminoglycoside depends on local susceptibility patterns and specific organisms causing an infection. Gentamicin is often given for systemic infections if resistant microorganisms have not developed in the clinical setting. If gentamicin-resistant organisms have developed, amikacin or tobramycin may be given because they are usually less susceptible to drug-destroying enzymes. In terms of toxicity, the aminoglycosides cause similar effects.

The choice of fluoroquinolone is also determined by local susceptibility patterns and specific organisms because individual drugs differ somewhat in their antimicrobial spectra. The drugs cause similar adverse effects.

Dosage of Aminoglycosides

Dosage of aminoglycosides must be carefully regulated because therapeutic doses are close to toxic doses. Two major dosing schedules are used, one involving multiple daily doses and one involving a single daily dose. The multiple-dose regimen has been used traditionally and guidelines are well defined. The single-dose regimen is being used increasingly, and guidelines are still evolving as studies and clinical experience accumulate. These two regimens are described in the following sections.

Multiple Daily Dosing

1. An *initial loading dose*, based on client weight and the desired peak serum concentration, is given to achieve therapeutic serum concentrations rapidly. If the client is obese, lean or ideal body weight should be used because aminoglycosides are not significantly distributed in body fat. In clients with normal renal function, the recommended loading dose for gentamicin, tobramycin, and netilmicin is 1.5 to 2 mg/kg of body weight; for amikacin the loading dose is 5 to 7.5 mg/kg.
2. *Maintenance doses* are based on serum drug concentrations. Peak serum concentrations should be assessed 30 to 60 minutes after drug administration (5 to 8 mcg/mL for gentamicin and tobramycin, 20 to 30 mcg/mL for amikacin, 4 to 12 mcg/mL for netilmicin). Measurement of both peak and trough levels helps to maintain therapeutic serum levels without excessive toxicity. For gentamicin and tobramycin, peak levels above 10 to 12 mcg/mL and trough levels above 2 mcg/mL for prolonged periods have been associated with nephrotoxicity. For accuracy, blood samples must be drawn at the correct times and the timing of drug administration and blood sampling must be accurately documented.
3. *With impaired renal function*, dosage of aminoglycosides must be reduced. Methods of adjusting dosage include lengthening the time between doses or reducing doses. References should be consulted for specific