

Fluoroquinolones in Children: To Use or Not to Use?

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Fluoroquinolones have a broad spectrum of antimicrobial activity and they are highly bioavailable, making them an attractive antimicrobial for a broad range of infections. However the use of quinolones in children has been limited by its potential effect of inducing arthropathy secondary to alterations of the growth cartilage, observation performed in young animals.

The mechanism of musculoskeletal toxicity remains unknown with several hypotheses. This adverse event in animals was extrapolated to the human, and therefore quinolone use was contraindicated in children [1,2].

But are such concerns enough not to use fluoroquinolones in pediatric patients?

Nalidixic acid was the first quinolone used in pediatric patients. For several decades, this drug was prescribed to treat urinary tract infections in children aged three months and older without restriction. In some sporadic cases the presence of transient alterations in the joints was reported, but in almost three decades of use, musculoskeletal effects have not been reported secondary to its use in pediatric patients.

Subsequent fluorination of quinolone compounds led to the creation of new generations of fluoroquinolones, resulting in increased antimicrobial spectrum of activity and improved pharmacokinetic characteristics. In the 1980s, fluoroquinolones were first used in children, specially, ciprofloxacin.

In the early stages of fluoroquinolone development, studies in juvenile animals demonstrated the development of arthropathy and damage to immature cartilage of weight-bearing joints.

Due to these effects seen in these young animals, the possibility of observing similar effects in infants and children raised extensive concerns.

As a result, fluoroquinolone use was not recommended in children.

Arthropathy has been evaluated in pediatric patients in studies mostly retrospective, with series of cases, for the treatment of different pathologies and in different kind of host. There have been occasional reports of non-serious and transient arthralgia, often in patients with pancreatic fibrocystic disease, a disorder that usually causes osteoarticular alterations, which makes it difficult to define whether the presence of such alterations therefore is related to quinolones or to the underlying disease.

The possibility of generating adverse osteoarticular episodes in children is controversial and in some cases the risk of serious infection in which quinolones could be used exceeds the potential risk of adverse osteoarticular episodes.

Given the controversy related fundamentally to potential toxic effects on the growth cartilage and the potential benefits of these antibiotics, it was appropriate to perform a systematic review and meta-analysis with the purpose to evaluate the risk of musculoskeletal adverse effects based on evidence in the pediatric population.

Our systematic review and Meta-analysis was not able to reliably document this adverse event [1].

Does this conclusion mean that you can use quinolones indiscriminately?

The indiscriminate use of quinolones is not recommended.

Nevertheless, when the quinolones are indicated because they are the only treatment alternative, its therapeutic benefits should be considered above those potential adverse effects [1].

The Food and Drug Administration (FDA) has approved quinolones for individuals less than 18 years of age with complicated urinary tract infection and for post-exposure prophylaxis and treatment of inhalation anthrax.

The American Academy of Pediatrics (AAP) limits fluoroquinolone use in children to the treatment of multidrug-resistant infections for which no safe and effective alternatives are available [2].

In summary, most authors concluded that there is no clear association between musculoskeletal alterations and administration of fluoroquinolones, but not finding the referred association does not mean the indication can be indiscriminate [1].

Therapeutic benefits of quinolones should be considered over those possible adverse effects that the evidence does not support at the moment.

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