

## Commentary

In the paper "Levofloxacin induced acute anxiety and insomnia - a case series" published in the current issue of the *Journal of Neurosciences in Rural Practice*, authors report three cases of neuropsychiatric side effects of levofloxacin.<sup>[1]</sup> Neuropsychiatric effects of fluoroquinolones are common in the elderly. In older age, fluoroquinolones can cause confusions, agitation, and psychosis. In this case series, anxiety and insomnia were reported to be neuropsychiatric side effects in young adults (30-32 years) taking levofloxacin. In the literature, reports of psychiatric side effects of fluoroquinolones in young adults are rare. Fluoroquinolones with the most reports on neuropsychiatric side effects are ciprofloxacin and ofloxacin.<sup>[2]</sup> Neuropsychiatric side effects of levofloxacin are less studied.

In the recent review by Tome *et al.*, who analyzed 145 cases of neuropsychiatric side effects of fluoroquinolones extracted from 83 publications, 46.9% of patients developed psychiatric disorders only and 40.7% of patients developed neurological disorders only.<sup>[2]</sup> In addition to psychosis, delirium, agitation, anxiety, insomnia, and depression, it has been reported that fluoroquinolones can induce suicidal ideations.<sup>[3]</sup> The epileptic seizures, myoclonus, and confusional state were the most frequently reported neurological side effects of fluoroquinolones. Less than 10% of patients had both psychiatric and neurological side effects.

The gerontopsychiatrists and neurogeriatrists are aware of neuropsychiatric side effects of fluoroquinolones and usually try to avoid administration of fluoroquinolones in older patients. In addition, there is growing evidence that neuropsychiatric adverse effects of this class of drugs are also relevant in young adults. The current paper reported on these side effects in young adults taking levofloxacin. In contrast to older patients, which usually develop agitation, psychosis, or delirium,<sup>[4,5]</sup> younger patients in this series claimed to have anxiety and insomnia under levofloxacin. It is unclear, if these neuropsychiatric adverse effects are more typical for younger age. More systematic research with different

fluoroquinolones is required to provide sufficient data for different age groups. Fluoroquinolones should be administered with cautions in patients with psychiatric disorders, until more precise data from studies are available.

In addition, there is another adverse effect of fluoroquinolones, which is important in patients undergoing neurosurgical interventions or in patients with traumatic lesions affecting tendons or ligaments. Tendinitis and tendon ruptures can be induced by fluoroquinolones during the drug treatment or as late as a couple of months after treatment.<sup>[6]</sup> *In vitro*, fluoroquinolones decrease collagen and proteoglycan synthesis in fibroblast cultures and increase matrix-degrading proteolytic activity.<sup>[7]</sup> Therefore, fluoroquinolones can prolongate or disturb the recovery of surgical patients who have affection of tendons or ligaments.

To conclude, fluoroquinolones, which are a widespread class of antibiotics, have potential severe neuropsychiatric side effects and impair regeneration of ligaments and tendous structures. These side effects can occur in younger and older patients and should be considered in the treatment of neurological, psychiatric, and neurosurgical patients.

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