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A study of association of fluoroquinolones in calf pain, tendinitis and tendon rupture

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Abstract
Fluoroquinolones are available only with a physician's prescription and are sold in tablet and injectable forms. Examples of these medicines are moxifloxacin ciprofloxacin, levofloxacin, lomefloxacin, norflo xacin, enoxacin, gatifloxacin, and sparfloxacin.
In the wake of the anthrax terrorist attacks in the United States in 2001, ciprofloxacin received extensive media attention because it was the only drug labeled as approved by the Food and Drug Administration (FDA) for both prophylaxis and treatment of inhalation anthrax (the most serious form of the disease). However, in late October 2001, the FDA issued a notice clarifying that the antibiotic doxycycline is also approved for anthrax prophylaxis and that doxycycline and amoxicillin are also approved for treatment for all forms of anthrax.
This study is intended to understand the side effects of using these drugs especially when it comes to the calf pain, tendonitis and rupture.

Keywords: Fluoroquinolones, tendinitis, tendon rupture

Introduction
Fluoroquinolones are the quinolone antimicrobials, which are known to have one or more fluorine substitutions. The first generation fluoroquinolones, which was introduced in 1980s have one fluoro substitution. This was very effective in cases of gram-negative bacterias [1]. In the 1990s, compounds with additional fluoro and other substitutions have been developed further extending antimicrobial activity to grampositive cocci and also anaerobes, which also has higher metabolic stability [2, 3, 4]. The present topic of controversy is tendinopathy and tendon rupture induced by fluoroquinolone. There is enough data, which suggest that fluoroquinolones should be used with utmost care in population of patients [5]. That means not all the patients with gram-negative infections can be given this antibiotic as it has its own side effects. The first one to publish report was that of a fifty-six-year-old patient who had urinary tract infection and was treated with norfloxacin. The patient developed Achilles tendinopathy and the associated rupture was reported in New Zealand in the year 1983 [6]. Subsequently, there were many other case reports and case-controlled studies reporting similar findings [7-9]. Fluoroquinolone are commonly prescribed to treat community-acquired infections involving the respiratory, urogenital and gastrointestinal tracts [10]. Fluoroquinolone concentration is seen on a higher scale in bones and joints when compared to the serum levels. So, it is ideal to treat the bones and joint infections [11]. The cartilage infections is also treated with fluoroquinolone. Achilles tendinitis or rupture is among the most serious side effects associated with fluoroquinolone [12, 13].

Aims and Objectives
To study the association of fluoroquinolones in tendinitis.

Materials and Methods
Two hundred thirty patients were selected. Gender-based statistical analysis was not done as female patients were very low in number.
Inclusion Criteria
1. Only positive use of fluoroquinolone drugs if present in the past history was taken for the study.

Exclusion Criteria

1. Injuries and other trauma cases were not considered.
2. Negative fluoroquinolone drugs usage history was not considered.

The study was done from Nov 2019 to March 2020 in the Department of General Medicine, Azeezia Institute of Medical research and Sciences

Results

Table 1: Age Distribution

Mean Age	Std. Deviation
32.98 years	±3.87 years

Table 2: Sex Distribution

Male	Females
161	69

Table 3: Tendonitis and Tendon Rupture

Condition	Incidence	$X^{2\ value}$	Significance
Calf muscles pain	74	8.97	<0.001 (Sig)
Tendonitis	22	2.12	0.212 (Not Significant)
Tendon Rupture	03	0.332	0.872 (Not Significant)

Discussion

An important precaution for any antibiotic is that unnecessary use or abuse of antibiotics can encourage drug-resistant strains of bacteria to develop and proliferate. These drug-resistant strains then become difficult, or even impossible, to treat. Bacteria found in hospitals appear to have become especially resilient, and are causing increasing difficulty for patients and the doctors treating them. Following the U.S. 2001 anthrax attacks, for example, the American Medical Association urged its members not to prescribe ciprofloxacin unnecessarily. One fear is that the overuse of the drug could reduce its effectiveness against infections such as typhoid fever, hospital-acquired pneumonia, and others.

Research suggests that fluoroquinolones may cause bone development problems in children and teenagers. Infants, children, teenagers, pregnant women, and women who are breastfeeding should not take this medicine unless directed to do so by a physician.

Although such side effects are rare, some people have had severe and life-threatening reactions to fluoroquinolones. Call a physician immediately if any of these signs of a dangerous reaction occur:

- Swelling of the face and throat
- Swallowing problems
- Shortness of breath
- Rapid heartbeat
- Tingling of fingers or toes
- Itching or hives
- Loss of consciousness

Some fluoroquinolones may weaken the tendons in the shoulder, hand, or heel, making the tendons more likely to tear. Anyone who notices pain or inflammation in these or other tendon areas should stop taking the medicine immediately and call a physician. Rest and avoid exercise until the physician determines whether the tendons are damaged. If the tendons are torn, surgery may be necessary to repair them.

These medicines make some people feel drowsy, dizzy, lightheaded, or less alert. Anyone who takes these drugs should not drive, use machines or do anything else that might be dangerous until they have found out how the drugs affect them. This medicine may increase sensitivity to sunlight. Even brief exposure to sun can cause a severe sunburn or a rash. While being treated with fluoroquinolones, avoid being in direct sunlight, especially between 10 a.m. and 3 p.m.; wear a hat and tightly woven clothing that covers the arms and legs; use a sunscreen with a skin protection factor (SPF) of at least 15; protect the lips with a sun block lipstick; and do not use tanning beds, tanning booths, or sunlamps.

Do not take antacids that contain aluminum, calcium, or magnesium at the same time as fluoroquinolones. The antacids may keep the fluoroquinolones from working as they should. If antacids are needed, take them at least two hours before or two hours after taking norfloxacin or ofloxacin, at least four hours before or two hours after taking ciprofloxacin. Follow the same instructions for taking sucralfate (Carafate), a medicine used to treat stomach ulcers and other irritation in the digestive tract and mouth.

Anyone who has had unusual reactions to fluoroquinolones or related medicines such as cinoxacin (Cinobac) or nalidixic acid (NegGram) in the past should let his or her physician know before taking the drugs again. The physician should also be told about any allergies to foods, dyes, preservatives, or other substances.

Before using fluoroquinolones, people with any of these medical problems should make sure their physicians are aware of their conditions:

- Kidney disease
- Liver disease with kidney disease
- Diseases of the brain or spinal cord, including hardening of the arteries in the brain, epilepsy, and other seizure disorders

Taking fluoroquinolones with certain other drugs may affect the way the drugs work or may increase the chance of side effects.

Side effects

The most common side effects are mild diarrhea, nausea, vomiting, stomach or abdominal pain, dizziness, drowsiness, light-headedness, nervousness, sleep problems, and headache. These problems usually go away as the body adjusts to the drug and do not require medical treatment unless they are bothersome.

More serious side effects are not common, but may occur. If any of the following side effects occur, check with a physician immediately:

1. Skin rash or other skin problems such as itching, peeling, hives, or redness
2. Fever
3. Agitation or confusion
4. Hallucinations
5. Shakiness or tremors
6. Seizures or convulsions
7. Tingling of fingers or toes
8. Pain where the medicine was injected (lasting after the injection)

9. Pain in the calves, spreading to the heels
10. Swelling of the calves or lower legs
11. Swelling of the face or neck
12. Swallowing problems
13. Rapid heartbeat
14. Shortness of breath
15. Loss of consciousness

Other rare side effects may occur. Anyone who has unusual symptoms after taking fluoroquinolones should get in touch with his or her physician.

Conclusion

The side effects are present and so this drug should be used judiciously.

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