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Case Report

Ciprofloxacin-Induced Cervical Spinal Stenosis and Upper Limb Paresis Post-Typhoid Fever: A Case Report

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Abstract

Rationale: Typhoid (enteric) fever is one of the most serious infections worldwide. Drug-induced diseases is a vital issue in toxicology and clinical medicine. Ciprofloxacin is a fluoroquinolone antibiotic can cause a serious or irreversible disabling side including tendon, bone, muscles, joints, nerves, and central nervous system problems. Patient concerns: A middle-aged married male patient presented to the physician outpatient clinic with a typhoid fever progress to severe neck pain and weakness of both upper extremities.

Diagnosis: Ciprofloxacin-induced bilateral upper limb paresis and cervical spinal stenosis. Interventions: Magnetic resonance imaging Electrocardiography, Widal test, and decompressive surgical neck repair.

Outcomes: The deterioration after decompressive surgical neck repair had happened. Quadriplegia was a major complication.

Lessons: This is the first case that reports these adverse drug reactions with oral ciprofloxacin. Oral ciprofloxacin can induce bilateral upper limb paresis and cervical spinal stenosis. The identification of drug-induced disease is a pivotal step in the diagnosis decision making of any medical problems.

Keywords: Ciprofloxacin; drug-induced; typhoid fever; bilateral upper limb paresis; cervical spinal stenosis

Abbreviations: ECG: Electrocardiogram; MRI: Magnetic resonance imaging; VR: Ventricular rate

Introduction

Typhoid and paratyphoid (enteric) fever is a potentially serious infective disease mostly, in developing countries1 Poor sanitation and bad food hygiene are major risk factors [1,2]. It is caused by Salmonella Typhi, Paratyphi A, Paratyphi B, and Paratyphi C2. The usual incubation period is 7-14 days with a range of 3-60 days. The infection is usually manifested with fever which increases with disease progression, frontal headache, fatigue, muscular pain, anorexia, and cough. Constipation, less frequent diarrhea, abdominal pain, bradycardia, splenomegaly, and rose spots 'rash are other possible presentations1. The diagnosis of typhoid cannot be confirmed based on symptoms and signs of the infection alone. There is a wide variation in the symptoms of typhoid fever rather than the broad differential diagnosis [3]. Serological markers and bacterial culture with antigen discovery; and DNA intensification are suggested tests [2]. Unfortunately, all of these are unacceptable [2]. The Widal test measured the agglutinating antibodies against LPS (O) and flagellar (H) antigens of Salmonella serovar Typhi in the sera of in suspected cases of typhoid fever. It is an essential and economic to perform is still widely used test [4,5]. Fluoroquinolones (e.g., ciprofloxacin) and third generation cephalosporins (e.g., ceftriaxone) is used the initial antibiotics of choice1. Australian guidelines recommend ciprofloxacin 500 mg orally, 12 hourly for 7-10 days [6]. Typhoid fever may be complicated with intestinal bleeding, intestinal perforation, encephalopathy pancreatitis,

heart failure endocarditis, myocarditis, liver failure, hepatitis or pyelonephritis, glomerulonephritis, renal failure, pneumonia from and respiratory failure, orchitis, arthritis and disseminated intravascular coagulation [1,3]. The overall mortality rate is 10% but it is less than 1% with adequate antibiotic therapy [1].

Ciprofloxacin is a fluoroquinolone broad-spectrum antibiotic that is commonly used to treat different types of bacterial infections, e.g., dermatitis, osteomyelitis and arthritis, sinusitis, pneumonia, urinary tract infections, and infective diarrhea [7]. Ciprofloxacin was patented in 1980 and introduced in 1987 [8]. It is on the World Health Organization's List of Essential Medicines [9]. It is active against some Gram-positive and many Gram-negative bacteria [10]. It acts by inhibiting the type II topoisomerase (DNA gyrase) and topoisomerase IV that are essential for bacterial DNA separation and inhibiting the cell division [11]. Fluoroquinolone antibiotics can cause serious or irreversible disabling side effects e.g., tendon rupture and nerve problems7. So, ciprofloxacin adverse effects are frequently including tendon, bone, muscles, joints, nerves, and central nervous system problems [7,12]. Fluoroquinolone treatment should be immediately ceased if a patient reports neuropsychiatric side effects, tendons, muscles, joints adverse effects. The physician should be switch to a non-fluoroquinolone antibiotic [7,9,13]. All patients who receive a systemic fluoroquinolone should be made aware of the potential for changes in memory, attention span, and other psychiatric functions, and should report signs of alarming CNS effects to a healthcare professional [13].

Aim of this study: In this manuscript, I reported the development of cervical spinal stenosis and bilateral upper limb paresis within 7 days after using ciprofloxacin in a middle-aged male patient.

Case Presentation

A 58-year-old married, farmer, Egyptian male patient presented to the physician outpatient clinic with palpitations, fever, and headache. The patient gave a history of constipation and abdominal pain. The patient denied a history of cardiac, thyroid, neurological, and musculoskeletal complain or other relevant diseases. Upon examination, the patient appeared sweaty, rigor, fatigued, and coated tongue. His vital signs were as follows: blood pressure of 100/70 mmHg, the pulse rate of 66/bpm; and regular, the respiratory rate of 32/min, the temperature of 39.8°C, and the pulse oximeter of oxygen (O2) saturation of 99%. No more relevant clinical data were noted during the clinical examination. The electrocardiogram (ECG) was done within 7 days of treatment which showed normal sinus rhythm at 76 beats/min (Figure 1). The direct agglutination test for Widal was positive for; Typhi (O); 1/160, Typhi (H); 1/640, Paratyphi (A); 1/160, Paratyphi (B); 1/320. Ciprofloxacin (oral tablet) 750 mg twice daily was prescribed. The patient started to complain of acute neck pain, shoulders pain, tingling, numbness, and weakness in both upper limbs. Symptoms was elicited after bending and twisting the patient neck (Spurling's maneuver). Ciprofloxacin was immediately ceased. The patient referred to neurosurgeon for consultation. MRI film of the cervical spine was requested. It is showing marked cervical canal stenosis at C 3-4 level and mild cervical canal stenosis at C 4-5 level and at level C 5-6 level (Figure 2A). The neurosurgeon decided to make decompressive neck surgery. But, unfortunately, quadriplegia was the end result. The patient was managed conservatively. The investigations done were the troponin test, electrolyte level, thyroid studies, and random blood sugar with no detectable abnormal results. Complete blood count showed leucopenia. Within 15 days of decompressive neck surgery, Plain X-Ray film of the cervical spine on both extension and flexion view was done. It is showing evidence of cervical spine internal fixation at C 3-4 level (Figure 2B). Complete clinical characteristic of the patient on presentation and after treatment was summarized (Table 1).

Table 1: Summary of the clinical characteristic of the patient on presentation and after ciiprofloxacin.

Issue	On presentation	After Ciiprofloxacin
Complaint	Palpitations and headache	Neck pain
Generally,	Constipation and abdominal pain	Upper limb paresis
Vital Signs		
Blood pressure (mmHg)	100/70	130/70
Pulse rate (bpm)	66	80
Respiratory rate (bpm)	32	15
Temperature (°C)	39.4	36.8
O2 saturation (%)	99	97
ECG	Normal sinus rhythm	Normal sinus rhythm
Direct agglutination test for Widal		
Typhi (O)	1/160	Jan-80
Typhi (H)	1/640	Jan-80

Paratyphi (A)	1/160	Jan-80
Paratyphi (B)	1/320	Jan-80
Full blood picture	Leucopenia (WBCs:3.9 000/cmm)	WBCs:6.4 000/cmm
	Neutrophilia (83%)	Neutrophils: (71%)

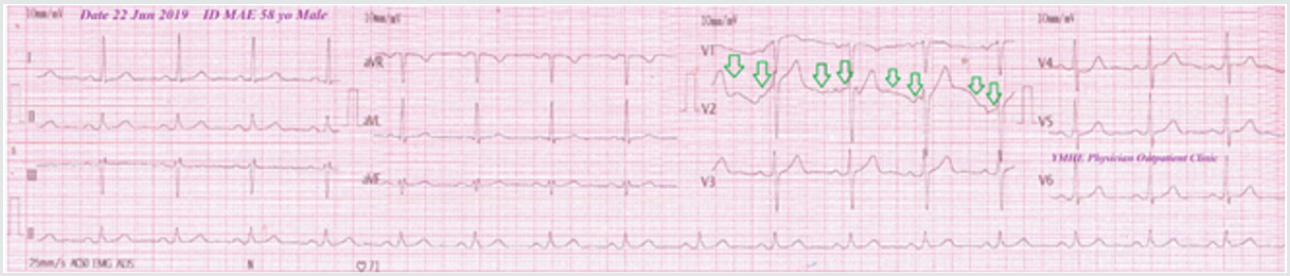

Figure 1: ECG tracing within 72 hours of treatment which showed normal sinus rhythm at 76 beats/min, Wander rhythm at V2 (green color) and left axis deviation.

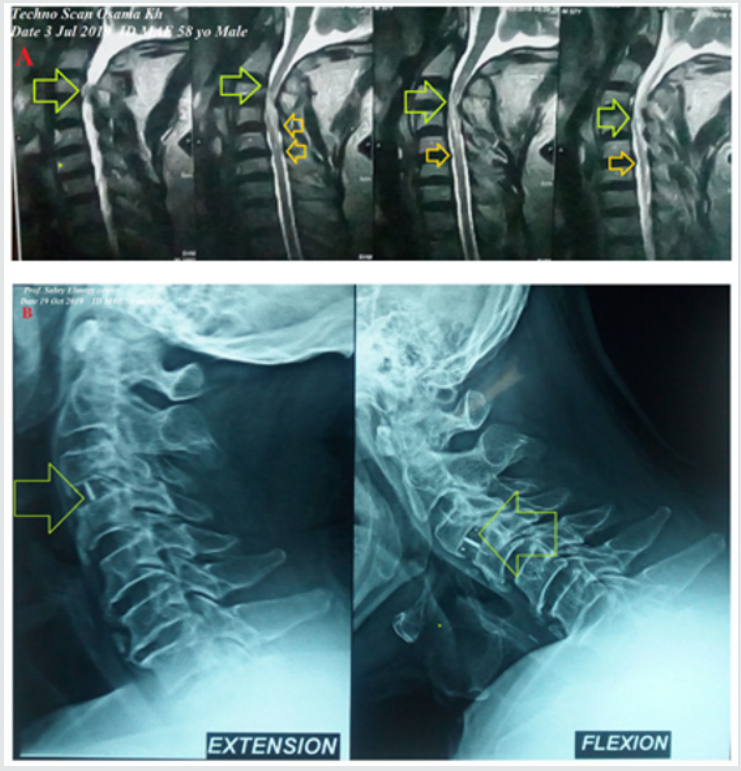

Figure 2: A. MRI film of the cervical spine showing marked cervical canal stenosis at C 3-4 level (lime arrows) and mild cervical canal stenosis at C 4-5 level and at level C 5-6 level (orange arrows). B. Plain X-Ray of the cervical spine on both extension and flexion view showing an evidence of cervical spine internal fixation at C 3-4 level (lime arrows).

Discussion

a) Overview: The current case is a middle-aged married male patient presented to the physician outpatient clinic with bilateral upper limb weakness within 7 days after using oral ciprofloxacin in typhoid fever.

b) The primary objective for the current case study was the presence of cervical spinal stenosis and bilateral upper limb paresis within 7 days after using oral ciprofloxacin.

c) The secondary objective for the case study was How would you manage cervical spinal stenosis and bilateral upper limb paresis?

d) The main differential diagnosis for the study case is cervical myelopathy.

e) After the exclusion of other possible triggers in the current case, the Naranjo probability scale was used to evaluates the association between oral ciprofloxacin and development of both cervical spinal stenosis and bilateral upper limb paresis. Naranjo probability scale in the current case study was 9. It is meaning that there was a definite relationship between these adverse drug reactions and the causing drug; oral ciprofloxacin (Table 2).

f) Finally, I reported the development of cervical spinal stenosis and bilateral upper limb paresis within 7 days after using oral ciprofloxacin in a 58-year-old male.

g) Indeed, the mechanism of oral ciprofloxacin inducing cervical spinal stenosis and bilateral upper limb paresis is unknown. The author thinks that the age may be a trigger factor. The cartilaginous damage and spinal osteoarthritis may interpret this complication.

h) This is the first case that reports these adverse drug reactions with oral ciprofloxacin. So, I can't compare this case with another case because there was no similar publicized case report.

i) Despite the drug-drug interactions (DDIs) or even drug-food interactions have a strong impact in inducing various serious drug adverse effects, but it was unviable in my case report. Absent of using drug combinations in the patient history may exclude the theory of drug-drug interactions.

j) Drug-induced diseases is a pivotal step in the diagnosis decision making of any medical problems.

k) Drug side effects are a sometimes-strong way for the diagnostic challenge in clinical medicine.

Table 2: Naranjo Algorithm-Adverse Drug Reaction (ADR) Probability Scale in the case report.

Question	Yes	No	Do Not Know	Score
1.Are there previous conclusive reports on this reaction?	1	0	0	1
2. Did the adverse event appear after the suspected drug was administered?	2	-1	0	2
3. Did the adverse event improve when the drug was discontinued, or a specific antagonist was administered?	1	0	0	0
4. Did the adverse event reappear when the drug was readministered?	2	-1	0	2
5. Are there alternative causes that could on their own have caused the reaction?	-1	2	0	2
6. Did the reaction reappear when a placebo was given?	-1	1	0	0
7. Was the drug detected in blood or other fluids in concentrations known to be toxic?	1	0	0	0
8. Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	1	0	0	0
9. Did the patient have a similar reaction to the same or similar drugs in any previous exposure?	1	0	0	1
10. Was the adverse event confirmed by any objective evidence?	1	0	0	1
	Total Score: +9			

Limitations of the study: There are no known limitations in the study.

Conclusions

a) Ciprofloxacin can induce bilateral upper limb paresis and cervical spinal stenosis.

b) So, attention must be taken on using ciprofloxacin. to reduce the risk of the development of these adverse drug reactions.

Conflicts of Interest

There are no conflicts of interest.

Acknowledgment

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