



Study the Effect of Gabapentin on the Histology of Rats' Heart

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ABSTRACT

Gabapentin is a member of gabapentinoids group which include gabapentin and pregabalin, that are indicated in the treatment of partial seizure and pain of neuropathy. Gabapentin is one of gamma-aminobutyric acid (GABA) analogs. It is indicated in treatment of neuropathic pain; epilepsy; uremic pruritus and post-herptic neuralgia.

Adult male albino rats (weighting 190- 230 g) were used as an experimental model, had been treated orally with Gabapentin 100 mg/kg/day, control rats had been given distilled water.

The results of the histological study of the sections revealed no any change in the heart histology. These results found that gabapentin was safe and had no effects against the heart histology.

Keywords: Gabapentin, oral rout, heart, histopathology

INTRODUCTION

Gabapentin is a member of gabapentinoids group which include gabapentin and pregabalin, that are indicated in the treatment of partial seizure and pain of neuropathy. Gabapentin is one of gamma-aminobutyric acid (GABA) analogs. Pregabalin had also been approved by Food and Drug Administration (FDA), and European Medicines Agency (EMA) to treat fibromyalgia and generalized anxiety disorder. Recent Data from United States and Europe have shown that gabapentinoids' use has tripled over the last 15 years [1,2]. Large number of high quality studies including randomized and comprehensive controlled studies revealed the efficiency and reliability of gabapentin and pregabalin in the treatment of neuropathic pain, so considering them as the drug of choice in this treatment. These drugs are recommended because of their relative reliability, ease of use, lack of unwanted drug-drug interactions and good tolerance [3].

The mechanism of action for Gabapentin is to increase GABA concentration and decrease the concentrations of glutamate rather than binding to GABA receptors or binding to opioid; benzodiazepine; or cannabinoid receptors. its mechanisms as antiepileptic and analgesic are

not understood, however they may be due to decrease the release of opioid-induced hyperalgesia and pain-related peptides [4, 5, 6].

Gabapentin is widely indicated in the treatment of many diseases like different neuropathic pain conditions; insomnia; alcohol and drug addiction; bipolar disorder; anxiety; borderline personality disorder; menopausal conditions; pruritic disorders; vertigo in addition to migraines, because it has no potential for abuse. Reports showed that the estimated use of gabapentin is in the range of (83% - 95%) [7,8].

Materials and Methods

Twenty Adult albino male rats were obtained from the Animal House / College of Science/ University of Babylon and kept in the laboratory of Biology / College of Pharmacy. The animals were free for food and water, and were left for two weeks to adaptation. After adaptation, animals were divided into two groups; control group and gabapentin treated group, the used dose was (100 mg/kg/day PO) and was measured according to body weight, gabapentin was obtained from (actavis company/ United Kingdom) and given by using oral tube for gavage method; while control group animals were given distilled water [9].

The period of treatment was one month; then the animals were euthanized under general anesthesia in order to study the heart histology.

Results and Discussion

Results of histological study showed normal histology of the heart of treated rats when compared to the control group as shown in the figures (1 and 2) below.

Some studies reported a possible association between treatment by gabapentinoids especially pregabalin and decompensation of chronic heart failure [10,11].

Another study found that, gabapentin can modulate blood pressure and heart rate through centrally located nitric oxide synthase (NOS) in the nucleus tractus solitarius centrally located in the dorsal medulla of the brainstem (NTS). These findings suggest new approach in the regulation of blood pressure, and may be helpful for further developing therapy for cardiovascular diseases [12]. Also, in a case study; peripheral edema had developed on the day 14 during treatment with a dose of 300 mg/ day pregabalin, Since there were no history for other medications or chronic disease to explain the development of peripheral edema; so pregabalin was initially held to be responsible and its use was stopped. Because of the presence of postoperative story for the patient, dyspnea didn't be associated with this case

initially. Because of the absence of abnormalities in the kidney function tests and hemodynamic parameters; and regression in the peripheral edema, there were no requirements or further investigations or treatment. It can be concluded from the CT of thorax that pregabalin may cause peripheral as well as central edema [13].

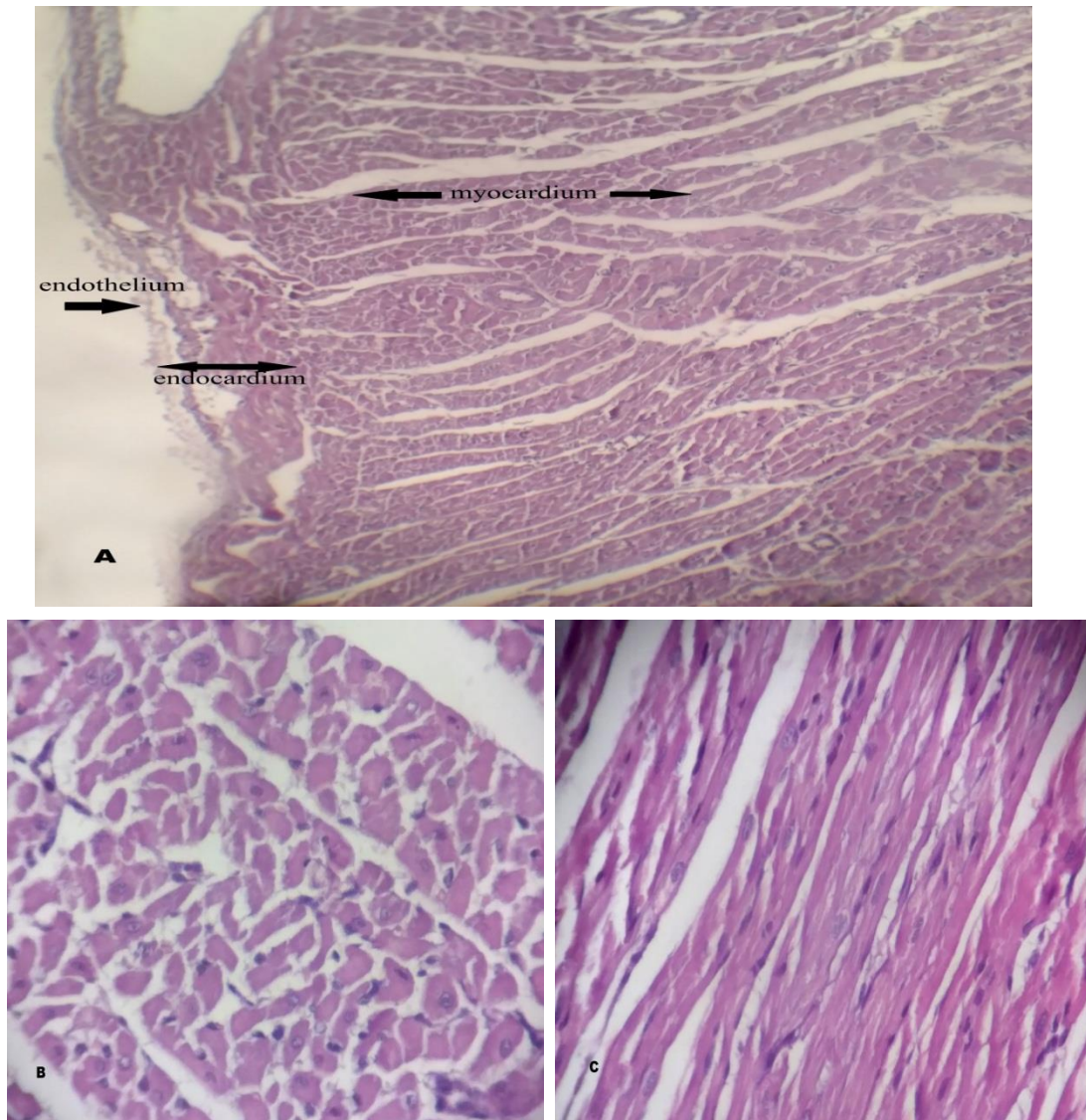


Figure (1): Cross section of heart histology of control group rats, shows a normal histology.
A: 10X, B and C: 40X

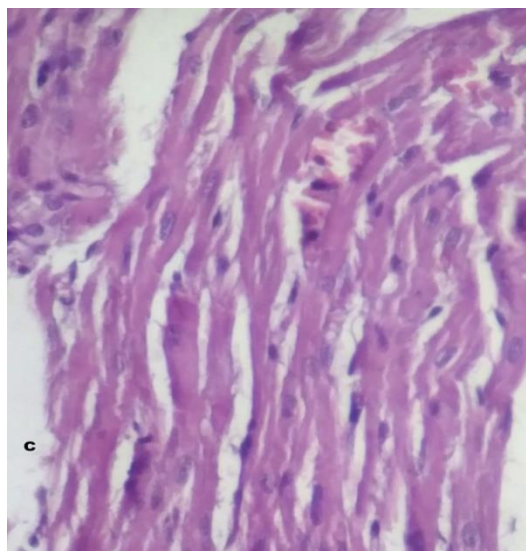
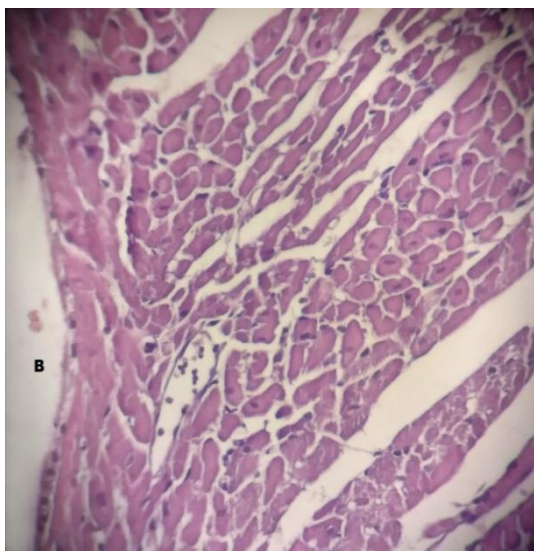
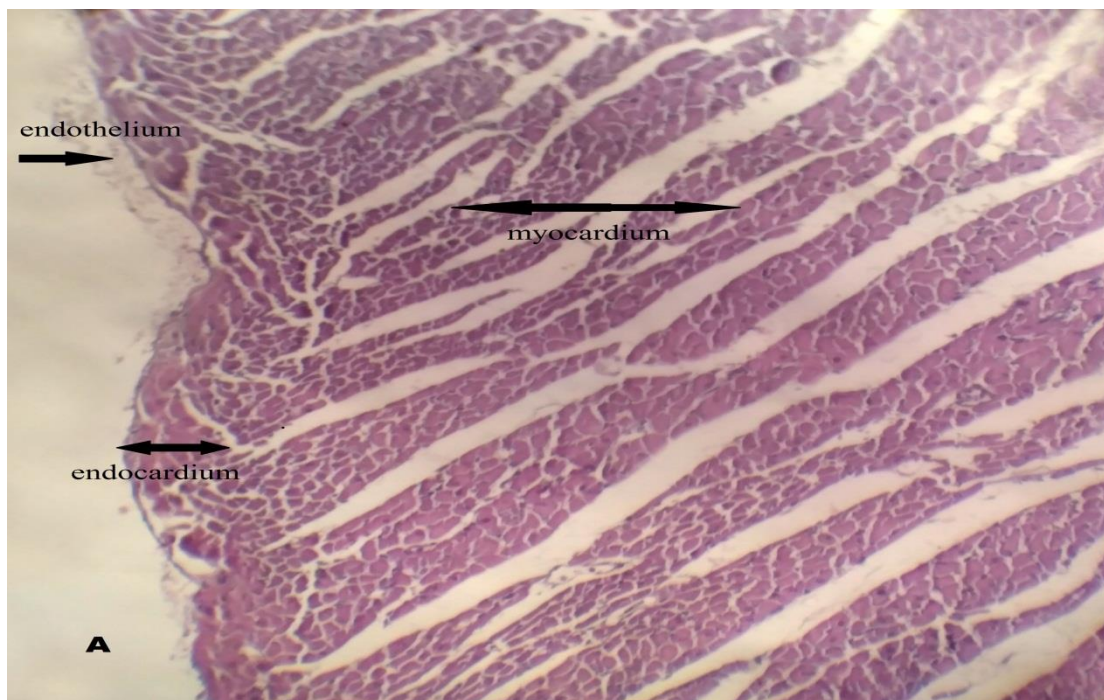


Figure 2: Cross section of heart histology of treated group, showed a normal heart histology.
A: 10X, B and C : 40X

CONCLUSIONS

In conclusion, there is no any adverse effects of Gabapentin 100 mg/kg/day regarding the Histology of The Heart of the white male rats.

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