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The Roles of the Vitamin B12 in the Nerve Regeneration in the Redial Nerve in Dogs

Montaser M. Helal.

1Department of Surgery and Obstetrics and medicine/ College of Veterinary Medicine/ University of Tikrit

Montaser.helal1981@tu.edu.iq

Abstract

The nerve injury is one of the mean problem which effect the nerve and loss it the sensory and function of the target organ which innervate. Many protocols used to accelerate the nerve regeneration and healing of the nerve injury. Vitamin B12 one of the important materials which used in treatment the defect in the nervous system. Our study used sixteen dogs were divided into two equal group the control and the treated group the animal have the nerve injury in the radial nerve and given to the treated group along the 12 days Vitamin B12 orally and used the clinical evaluation and the sensory and the motor function with the NGF to evaluation the nerve regeneration. The result showed the faster response was seen in the treated group.

Kaywords: Nerve crash, nerve regeneration, Vitamin B12, NGF.

Introduction

The injury of the peripheral nerve lead to loss of the function and sensation of the organs(1). The stages of healing of the nerve in tow stage the degeneration which include the clearness of the fragment of the nerve and the myelin sheath which called Wallerian degeneration and the second step is the regeneration which include the rebuilding of the damage nerve and conduit the ends of the nerve to make bundle which allow the axon to reach to the target organs this proses called the Bunger bundle(2).

The ability of Schwann cells to nerve injury response is rapid. They activate Receptor tyrosine-protein kinase (ErbB2) receptors in the Schwann cell microvilli, which results in the activation of the mitogen-activated protein kinase (MAPK). The sensing is followed by decreased synthesis of myelin lipids and stops within 48 hrs. Schwann cells continue to clear up the myelin debris by degrading their own myelin, phagocytose extracellular myelin and attract macrophages to myelin debris for further phagocytosis. However, the macrophages are not attracted to the region for the first few days; hence the Schwann cells take the major role in myelin cleaning until then (3).

Schwann cells have been stimulating macrophages by release of cytokines and chemokines after

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sensing of nerve injury. The another source of macrophage is serum. Delayed macrophage stimulate was observed in B-cell deficient mice lacking serum antibodies (4). These signaling molecules together cause an influx of macrophages, which peaks during the third week after injury. While Schwann cells mediate the initial stage of myelin debris clean up, macrophages come in to finish the job (5).

All this proses achieved by the activity of the Schwann cells and microphages. Vitamin B12 have many function, increased the numbers of the Schwann cells and the microphages number in the body(6), the Vitamin B can increase the myelin sheath and the nerve fibers, and the diameter of axon effect by the Vitamin B therefore the roles of the Vitamin B 12 can increase the degenerative and the regenerative proses (7). The Vitamin B can effect on the reactive oxygen species and the neuroprotectant, and increase the expression of nerve growth factor neurotrophic factor (NGF) in injured nerves at both mRNA and protein levels, therefore promoting the regeneration and functional recovery of injured nerves through increasing NGF expression (8)

Material and Methods

Sixteen healthy dogs were used in this study, the animals were kept in health and clean cages and give the food and the water in the cages.

The animals were divided in two equal group eight animals in each group, the animal were had redial nerve crashing by used equal pressure in the right arm of all the animal in the mid of the redial nerve fore 20 second. The right arm was have laminas and dysfunction and loss of the sensation in the end of the arm. The control group leave without any type of treatment, the second group treated group were given vitamin B12 orally once daily for 12 days.

Evaluation of the sensory and motor function

The toe pinch and toe prick was used daily to evaluation the sensory and the function of the nerve.

Nerve growth factor (NGF)

NGF test was used daily to found the roles of vitamin B in the regeneration

Clinical evaluation

This clinical evaluation was used daily to evaluation the nerve regeneration.

Statistical analysis

GraphPad Prism 5 software (GraphPad Software Inc., La Jolla, USA) was used for analyzed data

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statistically for all the study.

Result

Table 1: showed the sensory and motor function of the animals in deferent days.

Groups	Toe pinch		Toe prick	
	Control	Treated	Control	Treated
Days	39+2	34+1	38+2	35+3

The result of the sensory and motor function showed the faster response were for the treated group which were given the Vitamin B12 in the water drink in the Toe pinch in day 34 and the control was on 39 days wail the toe prick in the treated group were 35 day and the control was in 38 days in(table 1)

Table 2: showed the clinical evaluation of the animals in days.

Groups	Control			Treated		
	Toe spread	walking on the planter	Alternative steps	Toe spread	walking on the planter	Alternative steps
Days	39	46	38	31	41	33

The result of the clinical evaluation showed the faster response was for the treated group comparative with the control group the result was measured according to disappear of the clinical signs, the result was in toe spread in control 39 and the treated group was 31, the walking on the planter the control was 46 and the treated was 41, and the alternative steps was recorded for the treated which was 33 days and the control was 38 days(table 2).

Table 3: showed the (NGF) of the animal in deferant periods in dog serum(pg/ml).

Group	Control	Treated
1 day	153+21	154+22
3 days	179+33	251+32
7 days	160+ 26	190+52
14 days	153+11	159+21

The result of the NGF in serum of the animals were shoes in)table 3) the level of the NGF in 1 day was equal between the control and the treated group, and in 3 days showed the increased in the level of the treated group comparative with the control group, in the 7 and 14 days the level

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of the NGF decreased but the treated group were more than the control group in the level of the NGF.

Discussion

The using of the Vitamin B12 in the nerve regeneration was very useful and give the good result in deferent nerve deses(9). The faster response of the motor and sensory function was for the ability of the Vitamin B12 to faster the dragging the Schwann cell to the site of nerve injury and faster the nerve regeneration, this our study agreed with(10). And the result of the clinical evaluation was agreed with (11) when he founf the treted group given the best result and the good role were recorded for the present of the Vitamin B12 in the body in high level and the ability of it to increase the nerve axon diameter and the ability of the Vita B12 to increase the reactive oxygen species, that agreed with (12).

The result of the NGF showed the good result was recorded to the treated group because the characterized of the Vita B12 which increase the number of the Schwann cells which can increase the level of the NGF in the site of the injury, this agreed with(13)

Our suggest of our result showed the good ability of the Vita B12 in the nerve regeneration and the faster response of the treated group comparative with the control was the high level of the Vita B12 in the body.

Conclusion

Our conclusion of this study that used of vitamin B12in peripheral nerve was very useful in the regeneration of the nerve.

Limitations and Future Studies

This research was special exertion

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