The Effect of Erythropoietin on Regeneration in Peripheral Nerve Damage: An Experimental Study

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Background:

Administration of EPO results in angiogenesis, myogenesis, increased oxidative enzyme activity as well as anti-apoptotic and anti-inflammatory reactions(1-2-3).

Objective:

The aim of the current study was to determine the impact of EPO on avulsion and crush type injuries of peripheral nerves in an experimental rat model and to investigate whether erythropoietin can constitute a safe and effective therapeutic measure in such circumstances.

Methods:

Seventy female Wistar-Albino rats were allocated randomly in one control and six study groups. Crush or avulsion type peripheral nerve injuries were created on their sciatic nerves and suture repair was made on avulsion group. Erythropoietin was administered either locally or via intraperitoneal route. After 6-week follow-up period, nerve tissues exposed to experimental injury were obtained and analyzed in terms of macroscopic, histopathological and biochemical features. Therefore, groups were compared with respect to inflammation, degeneration, necrosis, fibrosis and vascularity as well as levels of interleukin-1ß (IL-1ß) and tumor necrosis factor-a (TNF-a).

Results:

For both avulsion and crush type injuries, inflammatory changes and vascularity was more obvious in groups receiving local or systemic administration of erythropoietin. Similarly, levels of IL-1ß and TNF-a were increased more significantly in case of erythropoietin administration. In contrast, degenerative alterations were noted more frequently in the sham group.

Conclusion:

Results of the current study suggest that systemic or local administration of EPO promotes functional recovery and enhances nerve regeneration of the sciatic nerves in rats after avulsion or crush type injuries.

TABLE 1

	Groups	Homogeneous Groups	*P-value*
Inflammation	Sham	A	<0.001*
	IIA	B	
	IIB	A	
	IIC	B	
	IIIA	B	
	IIIB	A	
	IIIC	B	
Degeneration	Sham	A	<0.001*
	IIA	B	
	IIB	B	
	IIC	B	
	IIIA	B	
	IIIB	B	
	IIIC	B	
Vascularity	Sham	A	<0.001*
	IIA	BC	
	IIB	B	
	IIC	C	
	IIIA	BC	
	IIIB	B	
	IIIC	C	

(Hint: *: statistically significant)

Homogeneous groups for inflammation, degeneration and vascularity.

Table 2

	Groups	Homogeneous Groups	*P-value*
TNF-α	Sham	A	<0.001*
	IIA	D	
	IIB	B	
	IIC	C	
	IIIA	D	
	IIIB	B	
	IIIC	CD	
IL-1β	Sham	A	<0.001*
	IIA	C	
	IIB	B	
	IIC	BC	
	IIIA	C	
	IIIB	B	
	IIIC	BC	

(Hint: *: statistically significant)

Homogeneous groups for levels of TNF- ve IL-1.

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