

Impact of *Wentong Huoxue Cream* (温通活血乳膏) on p-AKT Protein Expression in Dorsal Root Ganglia in Rats with Diabetic Peripheral Neuropathy

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ABSTRACT Objective To examine the impact and the possible mechanism of *Wentong Huoxue Cream* (温通活血乳膏) for external use on nerve conduction velocity of rats with diabetic peripheral neuropathy (DPN). **Methods** Ten in 53 Wistar rats were randomly selected as the blank group. Other rats were made DPN models with high glucose and high fat feed combined with one-off intraperitoneal injection of small dose streptozotocin. After successful modeling, the rats were divided into a model group [blank cream applied on the hind limbs (0.8 g/rat and distilled water 1 ml/100 g by gavage)], a metformin group [blank cream applied and metformin 0.18 g/(kg · d) by gavage], a capsaicin + metformin group [Compound Capsaicin Cream applied 0.2 g/rat and metformin by gavage], and a *Wentong Huoxue Cream* + metformin group [*Wentong Huoxue Cream* applied 0.8 g/rat and metformin by gavage]. Treatment was given once each day for 4 weeks. The sciatic nerve (including motor nerve and sensory nerve) conduction velocity of rats in each group was detected. The dorsal root ganglia pathological structure was examined by hematoxylin and eosin (HE) stain. The protein expression levels of dorsal root ganglia protein kinase B (AKT) and phosphorylated Protein Kinase B (p-AKT) in rats were detected. **Results** Compared with those in the blank group, the motor nerve conduction velocity of rats in the model group slowed, with shorten latent period; and the latent period of sensory nerve was prolonged, with slowed conduction velocity ($P < 0.05$ or $P < 0.01$). Under the light microscope, neuron cell body was atrophy in dorsal root ganglia, with dissolved Nissl body in cytoplasm and partial nuclear dissolution and gone. The expression of p-AKT protein in dorsal root ganglia was decreased ($P < 0.05$). Compared with those in the model group, the sciatic nerve conduction velocity in the *Wentong Huoxue Cream* + metformin group was accelerated, with improved dorsal root ganglia structure. The expression of p-AKT protein in dorsal root ganglia was increased ($P < 0.05$ or $P < 0.01$). Compared with those in the metformin group and the capsaicin + metformin group, the sciatic nerve conduction velocity in the *Wentong Huoxue Cream* + metformin group was accelerated ($P < 0.05$ or $P < 0.01$). There was no significant difference in AKT protein expression in rats' dorsal root ganglia between groups ($P > 0.05$). **Conclusion** *Wentong Huoxue Cream* might improve DPN nerve conduction velocity by up-regulate the expression level of p-AKT protein in dorsal root ganglia.

Keywords diabetic peripheral neuropathy; nerve conduction velocity; protein kinase B; *Wentong Huoxue Cream*

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