

EFFECTS OF TENS ON DIABETIC BLADDER DYSFUNCTION IN DIABETIC RATS

Hypothesis / aims of study

To investigate the effects and mechanism of Transcutaneous Electrical Nerve Stimulation(TENS) on the diabetic bladder in diabetic rats.

Study design, materials and methods

diabetic cystopathy rat was established by the injection of STZ in abdominal cavity. The rats were randomized into the DM ES group(DM with electrical stimulation, n=15), DM(diabetes mellitus, n=15) group and normal control group(n=15). TENS was performed on rats in the stimulation group(stimulation parameter :intensity—31V density—31Hz; two pairs of electrode was place on the projective area on the abdomen of the bladder respectively) , but those in the control group underwent sham operation. The group were going to receive the stimulation in the 10th week after the establishment of diabetic rats. From then on the stimulation was continuing for 3 weeks in which the changes of the urodynamics and the detrusor strip contractility were detected . Bladders were examined histologically for changes occurring with partial obstruction. Then bladder weight, cystometrogram test result were compared among the groups. The expression of CGRP was analyzed at the mRNA and protein levels by RT-PCR and Western blotting.

Results

After stimulation for 3 weeks, Histopathological studies showed that the detrusor cells expressed compensatively hypertrophy, intracellular collagen fibers increased obviously and mitochondria swelled in the bladder muscle ultrastructure of diabetic rats. the bladder wet weight, volume threshold for micturition and PVR were significantly higher in the diabetic rats of DM group than those in NC group, while V% and cAMP content of bladder were significantly lower in DM group. TENS treatment significantly reduced the bladder wet weight, bladder capacity and PVR as well as increased V% and cAMP content of bladder in the diabetic rats. The contractility of the muscle strip has been improved after the TENS in DM group. The content of the mRNA of CGRP in DRG of DM ES group is enhanced than that in DM group. The expression levels of CGRP of Bladder and DRG in DM ES group is increased than that in DM group.

Interpretation of results

TENS may enhance the expression levels of CGRP of DRG and bladder in DCP, Which react in the bladder through the effective conduction, improve the bladder fullness, restore the initiate factor of the micturition. Otherwise TENS also ameliorate the configuration and function of ultrastructure, regulate the intracellular Ca²⁺ concentration to facilitate bladder contractility. TENS maybe accelerate the restoration of the nerver through enhance. The expression levels of NGF or the injury/regeneration related gene.

Concluding message

These experiment result demonstrate that TENS can significantly improve the urine contractility of diabetic bladder in DM rats and can also ameliorate the feeling of bladder fullness. TENS may enhance the expression levels of CGRP of DRG and bladder in DCP, Which react in the bladder through the effective conduction, improve the bladder fullness, restore the initiate factor of the micturition

References

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Disclosures

Funding: Medical development Science Foundation of Nan Jing (ZKX06016) **Clinical Trial:** No **Subjects:** ANIMAL **Species:** RAT **Ethics Committee:** The Second affiliated Hospital of Nanjing medical University