

Long-term Effects and Mechanism Exploration of Type A Botulinum Toxin in Cervical Dystonia Treatment

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Abstract

Objective: To explore the long term effect of type A botulinum toxin (LANTOX) in cervical dystonia (CD) treatment.

Method: By using type A botulinum toxin regional intramuscular injection in 21 cases of CD, followed up for 3 – 72 months and analyzed the effects.

Result: LANTOX had considerable short term effect to all of the cases in treating CD. It had satisfied long term effect in some cases and the longest one had been over 6 years. It was also effective for use of second time to recurrent cases.

Conclusion: LANTOX injection therapy is one of simple and effective ways in treating CD. The mechanisms that some patients had a satisfactory long term effects may include the following: i) The regional motivated neurons take in LANTOX and carry it to the central nervous system reversely which cause the latter irreversible changes; ii) The number of muscular cholinergic receptor decreases; iii) Some CD patients have poor psychological state which can be essentially improved when LANTOX eliminates clinical symptoms.

Key words: Botulinum toxin; Cervical dystonia; Long term effects

Cervical dystonia (CD) is one of the nervous system dystonia diseases, the cause is not cleared. Past therapies were mainly surgical removal of muscle or cut of nerves and oral taken of sedative medicines, but the effects were unsatisfied. Recently, regional intramuscular injection of LANTOX was quite welcome by both doctors and patients because of its unique effectiveness. The author used LANTOX in treatment of 21 cases of CD from April 1996 to May 1999, the long term effects are reported as follows.

Information and Method

1. Subject

All patients were volunteered to the LANTOX treatment from April 1996 to April 1999, among them 9 were males, 21 were females, aged from 16 – 74 years, with an average of 41.2 years, medical states varied from 4 months to 11 years, with an average of 4 years. Before coming to our hospital, the medical history included acupuncture and moxibustion, physiotherapy, medicine, surgery and sorcery, all gave up due to little

effectiveness or adverse effects. Among our cases, 3 cases had history of terror or pessimal mental stimulation before onset of disease, 1 case had history of neck injury. According to clinical types, the cases could be classified into low-head distortion, up-head distortion, side dump, hypsokinesis, antexed and mixed types. The Tsui's point system was 4 -17, with an average of 10 ± 4.35 .

2. Dosage and Method of LANTOX Injection

The LANTOX used was dissolved and diluted by saline to 50U/ml. The injected muscles included sternocleidomastoid muscle, scalene muscle, trapezius muscle, cervical splenius muscle, levator muscle of scapula, etc. Under monitor of electromyogram, 2 – 3 bands of muscles were selected for injection each time, the dosage was 50 – 250U, time interval was 7 – 21 days, 2 – 5 times of treatment were processed. Total dosage for each time was less than 250U. The dosage and number of locus for each band (group) of muscle were as shown in Table 1.

Table 1 The dosage and number of locus for each band (group) of muscle

Name of muscle (group)	Dosage (u)	No. of locus
Sternocleidomastoid	50 – 120	6
Cervical splenius muscle	50 – 120	6
Scalene muscle	50 – 100	4
Trapezius muscle	50 – 100	4
Levator muscle of scapula	40 – 60	3

3. Therapeutic Evaluation:

Refer to the table of Tsui's scores.

Result

After 4 weeks of LANTOX treatment, the Tsui's scores was 0 – 8, with an average of 3.41 ± 2.31 , 5 cases (23.8%) with obvious improvement, 26 cases (76.2%) with obvious remission.

Discussion

The well-known major mechanism of LANTOX to nerve muscle is that it acts on the presynaptic membrane of cholinergic nerve endings, inhibits release of acetylcholine, decreases the retractile force of muscle, thus eliminates symptomatic spasms. Foreign scholars^[2] reported this phenomenon lasted for 2 – 4 months, with a maximum^[3] of 9 months. Local scholars^[4] and our cases all had cases of over 2 years remission, which were hard to be explained by the above theory. The author thought that there may be

many mechanisms in the LANTOX treatment of CD. Long time remission or recovered cases may due to the following reasons: i) LANTOX is transported to the central nervous system and cytoplasm of motor neurons via axoplasm, produce permanent effect on them; ii) After reducing the release of acetylcholine of presynaptic membrane, the receptors of postsynaptic membrane (skeletal muscle) process an irreversible decrease, or decline in function, and repeated injection of LANTOX further strengthens this action; iii) Part of onsets of CD had mental factors. As LANTOX reduces or eliminates their symptoms, their mental state was substantively improved, and the mental and nerve muscles system rebuild a good coordinating relationship.

Conclusion

LANTOX treatment processes unique short term and long term effects and is a economic and convenient method. It worths further research and promotion.

References

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