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Botulinum Toxin and Its Effects - A Study on Patient Population to Know Conditions to Which it is Frequently Applied an Observational Cohort Study

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Abstract
Botulinum toxin is a neurotoxin and the biologic product of the actions of anaerobic bacterium, Clostridium botulinum. The toxin is one of the deadly poisons. It is an extremely potent neuromuscular blocking agent when injected into the motor point. It is approved by FDA for the treatment of strabismus, blepharospasm , facial and cervical dystonia13 but these days, Botox serves more purposes than only treating facial wrinkles and fine lines. It's also used to treat a variety of problems with other body parts, such as the foot.

Introduction

Patients can treat common issues like foot discomfort and excessive sweating with Botox injections. This technique is popular since it is comparatively quick, straightforward, and requires little downtime. Botox for foot pain may be an option to consider if you have a history of foot pain from bunions and edema. By lessening the activity of the nerve that transmits pain signals to the brain, it reduces discomfort. Botox for feet can also lessen sensitivity, which lessens pain and discomfort. Additionally, ladies who have bunions or calluses may use Botox to stop the worsening of these conditions, especially when wearing heels.

Botox for sweaty feet provides a remedy by focusing on the underlying cause of excessive sweating—overactive sweat glands. The toxin efficiently lowers the amount of sweat generated by blocking the chemical impulses that activate these sweat glands. Overall, you can improve your quality of life, keep dry, and receive long-lasting comfort from this injection. Generally a dose effect relationship exists such that the greater toxin load per muscle results in higher degree of weakness so the dose should be individualised in this study we made every possible effort for the same. This allows you to enjoy the summer, wear your beautiful shoes, and exercise without having to worry about having sweaty feet. Patients with plantar fasciitis may become completely disabled. However, new research has indicated that Botox for Plantar Fasciitis is a successful treatment for the ailment. It relieves pain by relaxing the painful tendons and muscles of the foot. The tension and irritation lessen when these muscles unwind. Patients have less cramping and pain reduction as a result.

Van Kuijk et al. 12Studied in 2002 reported that botulinum toxin treatment in post stroke spasticity was effective in reducing muscle tone and in improvement of joint range as also in our study we find similar findings as some participants having the similar condition.

We studied these patients coming to our PMR OPD to understand which disorder is commoner amongst.

Materials and Methods

We have used Botox Type A toxin in variety of foot conditions in 50 patients who presented to PMR OPD of GSVM Medical College And LLR Hospital. The study was carried out from February 2023 to march 2024. It was done to find out condition requiring most botox injection and to find currently which diseased condition presented to us the most. It was an observational study. Exclusion criteria including lactating and pregnant females history of reaction to albumin or toxin , psychological instability.

Result

The manufacturer of botox recommends not to exceed 6 units / kg body weight upto a maximum of 360 units in a 3 month period however in clinical practice higher dosages have been used. A European consensus14 on the use of Botulinum toxin Type A in adults recommends not exceeding 600 units of botox per treatment session as also in our study we have used 500 units at a stretch in all of these diseased conditions. Out of 50 patients ,10 came in due to foot

hyperhidrosis , 15 came in for spastic toes ,20 came in for plantar fascitis and remainder due to Equinus foot and gait difficulties.

Discussion

- Nowadays the Botulinum toxin and its effects are widely understood but in patients coming to OPD for a relatively new department in LLR Hospital in Kanpur Uttar Pradesh , India is a huge achievement for us and this study was to find out diseased conditions to which it can be effectively used. The toxin irreversibly inhibits the release of acetylcholine from the pre-synaptic membrane and paralyzes muscles by blocking the neurotransmission pathway or It works by blocking nerve signals, preventing muscle contractions, creating a temporary "chemical denervation and this Effect typically appear within days, peak in a few weeks, and last 3-4 months and There are seven types (A-G), but types A and B are used therapeutically13.

Type A has several formulations, including onabotulinumtoxinA (Botox), abobotulinumtoxinA (Dysport), and incobotulinumtoxinA (Xeomin). In our study onabotulinum toxin A (botox) was used. The heavy (H) chain of the toxin binds selectively and irreversibly to high affinity receptors at the presynaptic surface of cholinergic neurones, and the toxin-receptor complex is taken up into the cell by endocytosis. The disulphide bond between the two chains is cleaved and the toxin escapes into the cytoplasm. The light (L) chain interact with different proteins (synaptosomal associated protein (SNAP) 25, vesicle associated membrane protein and syntaxin) in the nerve terminals to prevent fusion of acetylcholine vesicles with the cell membrane resulting in action.
Botulinum toxin induces weakness of striated muscles by inhibiting transmission of alpha motor neurones at the neuromuscular junction. This has led to its use in conditions with muscular overactivity, such as dystonia. Transmission is also inhibited at gamma neurones in muscle spindles, which may alter reflex overactivity as used in our study in patients with spastic toes and hyperhidrosis (The toxin also inhibits release of acetylcholine in all parasympathetic and cholinergic postganglionic sympathetic neurons. This has generated interest in its use as a treatment for overactive smooth muscles (for example, in achalasia) or abnormal activity of glands (for example, hyperhidrosis). A survey of american physicians reported 30 births after exposure to therapeutic botulinum toxin during pregnancy with 27 normal deliveries , 2 miscarriages and 1 premature delivery that is the reason also in exclusion criterion we not used these patients who are pregnant8. In our study , patients who suffer from plantar fascitis , spastic toes, hyperhidrosis , equinus deformity and gait disturbances. As , also Pittock etal. 2 Demonstrated effects of botox in the treatment of spastic equinus deformity after a stroke. We successfully treated these patients and all the patients had been followed up until now fully compliant. Also , therapy must be individualised for each patient taking into account the body weight , muscle size and location of muscle

LIMITATIONS

since there were only 50 patients in the study. We advocate that future studies should atleast include 100 or more patients so there shall be less follow up problem as in our study few 4 patients didnt followed or showed up

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Institutional Review Board Statement
Not applicable.

Informed Consent Statement
consent were taken from all patients who participated in the study.

Data Availability Statement
The data presented in this study are available within the text.

Conflicts of Interest

The authors declare no conflicts of interest.

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