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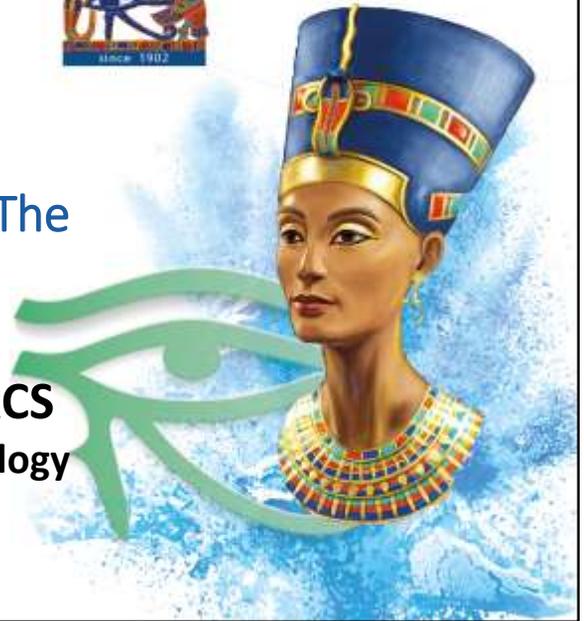
EGYPTIAN OPHTHALMOLOGICAL SOCIETY

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Botulinum Toxin Injection in The Treatment of Strabismus

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Introduction

- Botulinum toxin is a neurotoxin protein produced by Clostridium botulinum that causes presynaptic inhibition of the release of acetylcholine at the neuromuscular junction, creating short chemical denervation
- Treatment of strabismus by Botulinum toxin requires multiple injections under local or general anesthesia depending on different factors (e.g. age of the patient)



Materials and Methods

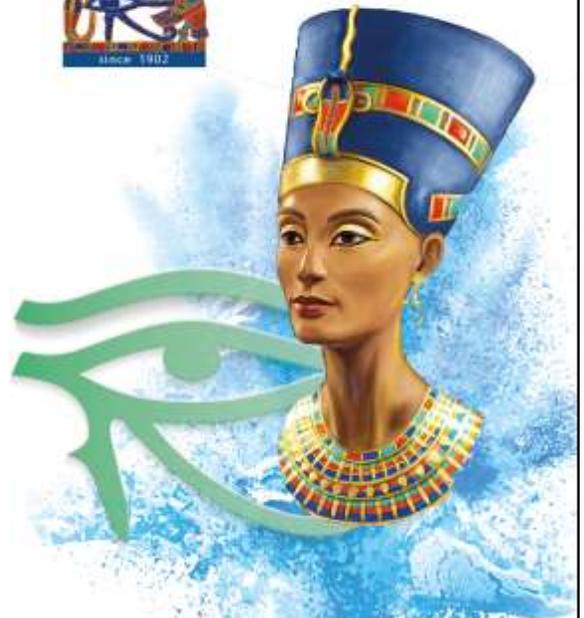
- We conducted A retrospective analysis at a tertiary hospital in Amman, Jordan, to identify 29 patients who received a single botulinum toxin injection as a treatment of strabismus between October, 2018 and October, 2019.
- Success: which indicates full control of angle of deviation or less than 10 PD.
- Partial: which indicates partial control of angle of deviation more than 10 PD and less than the original angle of deviation
- Failure: which indicates no change, or overcorrection more than 10 PD



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RESULTS



Demographic Characteristics and Clinical Features

- As table 1 shows, total number of patients in the study sample was 29
- Most of them were females , had esotropia , and aged less than six years at the time of treatment , and mean age was 7 yrs.
- Around 19 patients received botulinum toxin injection bilaterally
- For bilateral injection, the dose was 2.5 I.U per muscle.
- For unilateral injection, the dose was 5 I.U per muscle
- Patients were seen at 1 wk, 1 month, 4 months and 6 months.

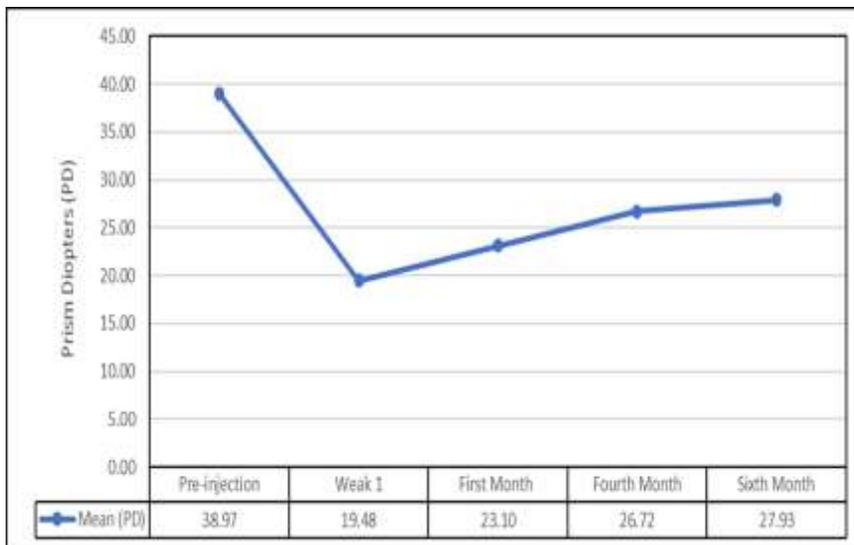


Demographic Characteristics and Clinical features	Results
Gender (n, %)	
• Male	13 (44.8%)
• Female	16 (55.2 %)
Age (Mean, SD)	7.22 (5.87)
Age (n, %)	
• Less than 6 Years	17 (58.6 %)
• 6-17 Years	9 (31.1 %)
• 18 Years and More	3 (10.3 %)
Type of strabismus	
• Esotropia	18 (62.1%)
• Exotropia	11 (37.9 %)
Pre-treatment deviation PD (Mean, SD)	38.89 (7.24)
Number of Injected Muscles	
• One Muscle	10 (34.5%)
• Two Muscles	19(65.5 %)
Total	29 (100%)



Angle of Deviation After Injection

- As figure 1 shows, mean angle of deviation of the whole group of patients decreased significantly during the first assessment visit, the first week post injection, from 38.97 PD to 19.48 PD (20 PD)
- The highest percentage of improvement in angle of deviation six months post injection was found among female patients , patients who aged less than six years , patients with esotropia , and patients who underwent injection in one muscle



Angle of Deviation After Injection

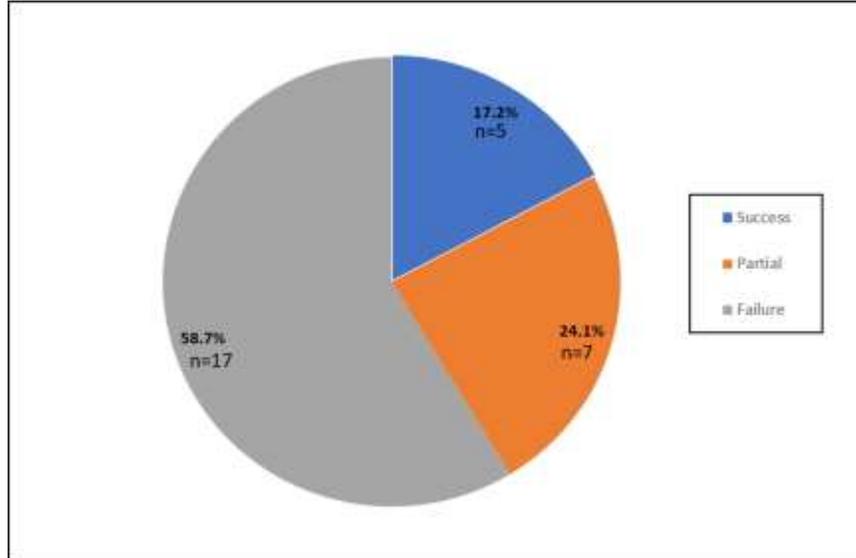
- The lowest percentage of improvement in the angle of deviation six months post injection was found among male patients , patients who aged 18 years and more , patients with exotropia , and patients who underwent bilateral injection



Treatment Effectiveness

- As figure 2 shows, five of twenty-nine patients had a successful treatment in the sixth month post injection (17%) while around 7/29 patients had partial improvement (24%) and 17/29 patients had no improvement (59%).





Adverse Effects

- Our study showed excellent safety profile
- Only 2 patients developed overcorrection (7%): one was a transient exotropia that resolved completely by the end of the follow up period and the other one developed large overcorrection that partially resolved by the end of the follow up period which necessitated surgical correction
- None of the patients developed ptosis after injection



Economic Profile (Costs in Jordan)

- Our analysis showed that the total average cost of treatment, including medical and non-medical costs, was 410 \$
- The cost of surgery was round 1200 \$.



Discussion

- Our results showed that there was a statistically significant difference in the average of angle of deviation values before injection and in the 6th month post injection
- Moreover, our results showed less success rates compared to other studies such as a systematic review and meta-analysis study that included nine studies which showed that the mean reduction of angle of deviation was 30.7 PD (compared to our study 20 PD reduction).



Discussion

- The difference in success rates may be due to the fact that most of the studies included in the analysis, discussed repeated botulinum toxin injections
- Although results in our study were statistically significant, but we think it was clinically unsatisfactory because patients with partial improvement as well as patients in the failure group both needed repeated injections (clinical failure of treatment).
- The accumulated cost of repeated injections as well as absence from work and other social factors may outweigh the cost of surgery.



Conclusion

- Botulinum toxin injection of extraocular muscles is a recognized and established modality of treating strabismus
- Our study concluded that the use of single botulinum toxin injection for treating strabismus achieved satisfactory results and was cost-effective compared to other treatment modalities with low complication rate
- There is a definite need for repeated injections to achieve good results
- It might be used as a temporary treatment while waiting for definitive surgery.



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Thank You

