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ARTICLE

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Prevalence, indications and demographic characteristics of Botulinum neurotoxin use in a tertiary oculoplastic centre

Ian De Silva[1]✉, Christina Lim[1], Mervyn Thomas[1,2], Antonella Berry-Brincat[1], Raghavan Sampath[1] and Joyce Burns[1]

OBJECTIVES: Over the past 40 years, Botulinum Neurotoxin (BoNT) treatment has been used in many presentations to the hospital eye service. There is little published on its practice in an ophthalmology setting. We aim to report on the prevalence of BoNT use, indications for treatment, age, gender, socioeconomic and ethnic variations observed, and dosages used.

METHODS: We performed a retrospective cross sectional observation study on the use of botulinum neurotoxin treatment in the oculoplastic department of a busy tertiary centre in the University Hospitals of Leicester, United Kingdom.

RESULTS: The prevalence of BoNT in the service was 13.7 per 100,000 people. Of the 145 cases identified, the commonest indications for treatment were hemifacial spasm (62% of cases) and blepharospasm (29% of cases). Proportionally, twice as many females than males received BoNT ($\chi^2 = 17.3$, $p < 0.0001$). For those >30 years of age, the prevalence increased with age with those >90 years having a seven times higher prevalence than the mean. Overall, no significant differences were found in ethnicity and median index of multiple deprivation rank between those with treatment and the general population although specific district council variations were noted.

CONCLUSIONS: These findings would assist commissioners in providing adequate resources to meet demand based on the demographics of their local population. Further qualitative and quantitative research is required to enhance our understanding of some of these trends.

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INTRODUCTION

Over the past 40 years, Botulinum Neurotoxin (BoNT) treatment has been used in many presentations to the hospital eye service [1, 2]. There is little published on its practice in an ophthalmology setting. We aim to report on the prevalence of BoNT use, indications for treatment and variations due to age, gender, socioeconomic and ethnic variations observed in a tertiary oculoplastic department at the University Hospitals of Leicester, United Kingdom.

METHODOLOGY

A retrospective cross sectional observation study was conducted to assess all patients receiving repeated BoNT treatment that reside in any of Leicestershire's 8 district councils. We calculated the prevalence of BoNT use as the number of patients having BoNT per 100,000 population for the whole study population and for each 5-year age group [3]. A chi-squared test (χ^2) was used to assess the difference in proportions of males and females in the study population compared to the general population in Leicestershire [3]. A comparison was made between the median index of multiple deprivation (IMD) rank between the treatment group and the general population [4, 5]. Ethnicity was classed as either minority ethnic or white British. All analyses were considered significant at a type 1 probability value of $p < 0.05$.

RESULTS

Repeated BoNT treatments were identified in 145 cases with an overall prevalence of 13.7 cases per 100,000 population. The mean age was 68.9 (SD 13.7, range 31–94). We found that women ($n = 98$) were twice as likely to require BoNT treatments compared to men ($n = 47$) ($\chi^2 = 17.3$, $p < 0.0001$).

The commonest indications for treatment were Hemifacial spasm (HFS) and blepharospasm accounting for 62.1% and 29.0% of all cases, respectively. Other indications included lacrimal gland BoNT use for gustatory epiphora (6.2%), aberrant regeneration (1.3%) and apraxia of eyelid opening (1.3%). The prevalence of BoNT treatment for HFS and Blepharospasm were 8.5 and 4.0 per 100,000 population, respectively.

Figure 1 illustrates the prevalence of requiring BoNT increased with age with the highest prevalence in those >90 years of age. Table 1 highlights that overall, there were no significant differences in the study group's median IMD rank or ethnicity to

[1]Department of Ophthalmology, University Hospitals of Leicester, Leicester Royal Infirmary, Leicester, United Kingdom. [2]The University of Leicester Ulverscroft Eye Unit, Department of Neuroscience, Psychology and Behaviour, University of Leicester, Leicester, UK. ✉email: iandsmail@aol.com

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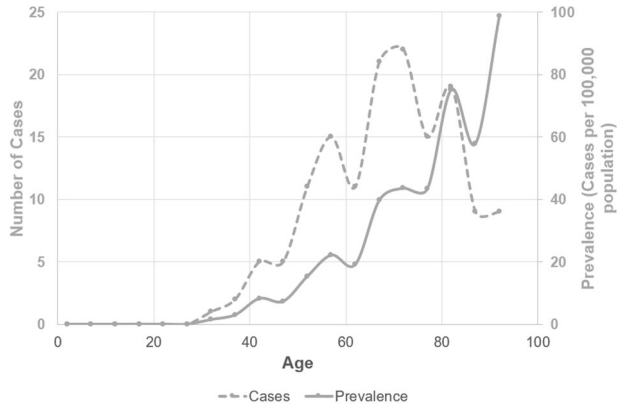

Fig. 1 Number of patients receiving regular BoNT treatment and prevalence for each 5-year age group. The points represent the number of BoNT cases (dotted line) and prevalence (full line) plotted at the mean of each 5-year age group. The last point on the right indicates all those >90 years of age. The overall study prevalence of BoNT treatment was 13.7 per 100,000 population. The figure illustrates a higher prevalence of BoNT treatment with increasing age.

that of the general population, although variations were noted in individual districts.

DISCUSSION

The commonest indication for BoNT was HFS and Blepharospasm accounting for over 90% of cases. The prevalence was higher with age and female gender. There was a seven-fold higher prevalence in those >90 years of age compared to the mean, and a two-fold higher prevalence in females. Overall, there was no significant differences in median IMD rank and ethnicity compared to the population of Leicestershire. Differences observed in Leicester city, may indicate an urban versus rural divide. Our findings would assist commissioners in providing adequate resources to meet demand. Further qualitative and quantitative research is required to enhance our understanding of the results.

Limitations of our study include underestimating cases that are self-managed, treated by other medical or surgical means and those managed by alternative services, such as within the neurology department or an alternative medical facility.

Summary

What was known before?

- Botulinum neurotoxin (BoNT) is used for the treatment of many general and ophthalmic disorders.
- It is most used in ophthalmology within the oculoplastic service.

What this study adds?

- The prevalence of BoNT treatment was 13.7 per 100,000 population with the majority used in the treatment of hemifacial spasm and blepharospasm.
- Age and gender were found to be significant variables in the prevalence.
- Although regional variations were observed, overall, there was no significant difference in the median IMD rank and ethnicity in those being treated with BoNT.

Table 1. Median index of multiple deprivation (IMD) rank and ethnicity of all cases of BoNT and that in each of the eight district council areas of Leicestershire.

District Council of Leicestershire	Median IMD Rank[a] Study Group	Median IMD rank[a] Population	P-Value	Minority Ethnic Cases (*n*)	White British Cases (*n*)	Minority Ethnic Population	White British Population	Prevalence rate per 100,000 population Minority Ethnic	Prevalence rate per 100,000 population White British
Leicester City	11,782	8,762	**0.0389**	29	13	175,270	178,953	16.5	7.3
Melton	20,669	23,423	0.4189	0	6	1,075	50,133	0.0	12.0
Oadby & Wigston	25,232	24,726	0.8363	2	4	15,382	41,626	13.0	9.6
Harborough	26,114	26,322	0.7644	1	12	4,465	89,341	22.4	13.4
Blaby	23,958	24,066	0.3212	0	20	9,147	92,378	0.0	21.7
Hinckley & Bosworth	22,892	23,086	0.9916	0	19	4,005	109,142	0.0	17.4
North West Leicestershire	21,333	21,997	0.9911	1	13	2,528	101,082	39.6	12.9
Charnwood	22,522	23,369	0.7606	1	20	23,491	162,378	4.3	12.3
Overall	21,145	19,851	0.4430	34	107	235,363	825,033	14.4	13.0

[a]Index Of Multiple Deprivation rank, 1-most deprived, 32,844- least deprived.

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AUTHOR CONTRIBUTIONS

IDS was responsible for study conceptualisation and design. IDS and CL were responsible for data collection. IDS, CL and MGT were responsible for data analysis and interpretation. IDS, CL and MGT contributed to literature review. IDS and MGT prepared the original draft of the manuscript. All authors contributed to critical review, editing and revisions of the manuscript.

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COMPETING INTERESTS

The authors declare no competing interests.

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