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Spasticity treatment in Norwegian hospitals

SHORT REPORT

KRISTIN ØSTLIE

kristin.ostlie@sykehuset-innlandet.no
Department of Physical Medicine
and
Rehabilitation and Spasticity Clinic
Innlandet Hospital Trust
Kristin Østlie, MD PhD, specialist in physical medicine and rehabilitation, chief senior consultant at the Department of Physical Medicine and Rehabilitation and head of the Spasticity Clinic at Innlandet Hospital Trust. She is chair of the Norwegian Dystonia and Spasticity Association (NFDS), head of the Norwegian professional network for spasticity and member of the steering group of the Scandinavian Education Society for Dystonia and Spasticity Treatment (SkanDySpas).
The author has completed the ICMJE form and declares the following conflicts of interest: She has received fees from NFDS (sponsored by Desitin/Merz and Allergan/AbbVie) for holding workshops on spasticity treatment with focus on ultrasound-guided botulinum toxin injections, and received teaching fees from Desitin/Merz and AbbVie. She has also received remuneration for participation on an Ipsen Advisory Board in Oslo regarding spasticity treatment.

JELENA SIMIC

Spasticity Clinic
and
Department of Research
Sunnaas Rehabilitation Hospital
Jelena Simic, MD, PhD research fellow and specialist in physical medicine and rehabilitation, senior consultant and head of the Spasticity Clinic at Sunnaas Rehabilitation Hospital. She is member of the

Norwegian professional network for spasticity.
The author has completed the ICMJE form and declares the following conflicts of interest: She has taught at meetings and workshops under the auspices of Ipsen, Merz and Allergan/AbbVie without receiving personal remuneration. She is a member of the steering group for the Toxins Conference under the auspices of Ipsen and has participated on an Ipsen Advisory Board in Oslo regarding spasticity treatment without receiving personal remuneration.

TIINA REKAND

Department of Neurology, Haukeland University Hospital
and
Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg
Tiina Rekand, MD, professor and specialist in neurology, senior consultant and head of the Spasticity Clinic at Haukeland University Hospital. She is member of the Norwegian professional network for spasticity.
The author has completed the ICMJE form and declares the following conflict of interest: She has received remuneration for participation on an Ipsen Advisory Board in Oslo regarding spasticity treatment.

BACKGROUND

Spasticity is a frequent complication of diseases of and injuries to the central nervous system. Early treatment prevents further loss of function and spasticity-related complications. Basic spasticity treatment begins in the primary healthcare service and includes physiotherapy, occupational therapy and oral spasmolytics, while treatment with botulinum toxin and baclofen pump is carried out by the specialist healthcare services. The objective of the study was to obtain an overview of the availability and organisation of these specialised forms of spasticity treatment in Norway.

MATERIAL AND METHOD

We conducted a survey in which a digital questionnaire was sent to hospitals that offer spasticity treatment.

RESULTS

A total of 30 of 47 hospital departments/outpatient clinics (hereafter referred to as 'hospital units') distributed across all Norwegian health regions responded to the questionnaire. Spasticity treatment with botulinum toxin and baclofen pump was available in all of the health regions. Median time from first referral was 10 weeks (interquartile range 7 weeks). A total of 14 of 30 hospital units expressed a need for more treatment days to cover the local demand. Of the 30 hospital units, 23 had interdisciplinary teams with doctors, physiotherapists,

occupational therapists and/or nurses. For treatment with botulinum toxin, ultrasound was used as guidance in 22 of 26 hospital units, EMG was used in 15 units and electrical muscle stimulation was used in 11 units.

INTERPRETATION

The study suggests that there may be a need for improvements to specialised spasticity treatment in Norway to ensure good patient care pathways, interdisciplinary assessments, and safe and efficient performance of the practical interventions.

Main findings

All Norwegian health regions offered advanced spasticity treatment with botulinum toxin and baclofen pump, with a median time from referral to the first assessment of 10 weeks (interquartile range 7 weeks).

A total of 23 of 30 hospitals that assess and treat spasticity reported that they had interdisciplinary teams.

A total of 14 of 30 hospitals expressed a need for more treatment days to cover the local demand.

A total of 22 of 26 hospitals that treated patients with botulinum toxin used instrumental guidance in the form of ultrasound, electromyography (EMG) and/or electrical muscle stimulation.

Spasticity is a frequent complication of diseases of and injuries to the central nervous system. For patients who have suffered their first stroke with paresis, the estimated prevalence is around 40%; for patients with spinal cord injuries and multiple sclerosis, it is around 65%; and for patients with cerebral palsy around 85 % (1, 2).

All spasticity treatment begins with basic measures to reduce muscle tone, such as stable and predictable surroundings and management of triggering or aggravating factors such as sores, pain and infections. Other measures include exercise, orthoses, physiotherapy and occupational therapy, oral spasmolytics, intramuscular injections with botulinum toxin and intrathecal baclofen administered via a baclofen pump. These measures are often combined. If basic measures to reduce muscle tone and other non-invasive forms of treatment do not provide adequate symptom relief, botulinum toxin is the treatment of choice for focal, multifocal and segmental spasticity, while a baclofen pump should be considered in cases of regional or generalised spasticity. Basic spasticity treatment is carried out by the primary healthcare service. Treatment with botulinum toxin and baclofen pump is carried out in the specialist healthcare service and requires multiple consultations over time (2–4).

A baclofen pump is implanted subcutaneously (3). When it needs to be refilled, it is identified by palpation and, if necessary, also an applicator. The use of instrumental guidance such as ultrasound, EMG and/or electrical muscle

stimulation is required to ensure that botulinum toxin is correctly deposited (5).

Existing international guidelines and expert consensus emphasise the importance of early treatment of spasticity to prevent further loss of function and complications (2–4). Recent evidence suggests that starting treatment with botulinum toxin as early as 6–12 weeks following a stroke can provide a permanent reduction of muscle overactivity (6, 7). Repeated botulinum toxin injections are recommended at intervals of approximately three months (2, 3). Spasticity treatment is briefly mentioned in the Norwegian national professional guideline for treatment and rehabilitation of stroke (8), but apart from this, Norway has no national guidelines for the assessment and treatment of spasticity.

The objective of the study was to obtain an overview of the availability, organisation and content of spasticity treatment with botulinum toxin and baclofen pump in Norway.

Material and method

We conducted a survey in the period 25 August 2020–30 November 2020. A digital questionnaire prepared by the authors was sent to the heads of Norwegian hospital units that offer spasticity treatment (see Appendix). By coordinating the authors' contacts with the contacts of the companies Medtronic, Allergan and Desitin, 47 relevant hospital units were identified. Medtronic is the sole supplier of baclofen pumps in Norway, while Allergan and Desitin together held a market share of 98 % for botulinum toxin in Norway in 2020 (9). The recipients were, in addition, asked to notify the authors if they knew of other hospital units that ought to be invited to participate.

An overview of the availability of treatment with botulinum toxin and baclofen pump was obtained through questions regarding the participants' geographical location (place and hospital), type of department, who provided the referrals and time from referral until the first treatment. Furthermore, we asked for the monthly number of patients treated with botulinum toxin and/or baclofen pump respectively, the average interval between treatments for patients receiving botulinum toxin, and the therapists view of the number of available treatment days in relation to the local demand.

An overview of the organisation and content of the treatment was obtained by questions about whether the activities were carried out in an outpatient clinic or a hospital ward, which professions were included in the assessment team, the use of instrumental guidance for botulinum toxin treatment (electrical muscle stimulation, EMG and ultrasound), which professions carried out the procedures, and which other treatment measures were considered.

The responses were processed anonymously using SPSS statistics software. The central tendency and the variation of the variables were reported as median and interquartile range. An overview of the participants and their contact information was stored separately from the data collected in the survey. The

Regional Committee for Medical and Health Research Ethics South East Norway deemed that the study did not require an application for approval (ref. no. 229568).

Results

We received responses from relevant therapists at 30 of the 47 hospital units invited to the survey, distributed across the following medical specialties: physical medicine and rehabilitation (11 of 12), neurology (13 of 23), neurosurgery (3 of 6), internal medicine (1 of 3), paediatric neurology (1 of 1) and neurohabilitation (1 of 1). There was no response from one invited department of orthopaedic surgery. All the Norwegian health regions were represented.

The respondents reported that referrals were provided by general practitioners (25 of 30), doctors in other medical specialties (27 of 30), physiotherapists (12 of 30) and occupational therapists (1 of 30).

The median time from referral until the first assessment, for the 23 participants who responded to this question, was 10 weeks (interquartile range 7 weeks). There was a relatively wide variation within all medical specialties (Table 1).

Table 1

Time from received referral until first assessment of spasticity in Norwegian hospitals.

Department (medical specialty)	Median time (interquartile range)
Physical medicine and rehabilitation (*n* = 8)	9 weeks (11 weeks)
Neurology (*n* = 10)1	12 weeks (11 weeks)
Other (neurosurgery, internal medicine, paediatric neurology and paediatric habilitation) (*n* = 5)	8 weeks (6 weeks)
Total for all units (*N* = 23)	10 weeks (7 weeks)

[1]One department (neurology) reported having a freeze on admissions.

A total of 14 of 30 hospital units responded that spasticity treatment was carried out at outpatient clinics only, while 15 of 30 reported that this was provided both at outpatient clinics and to patients admitted to hospital wards. One hospital unit did not respond to this question.

A total of 26 of 30 hospital units treated patients with botulinum toxin (Table 2). The median number of patients who received such treatment per month was 20 (interquartile range 22). The median interval between treatments reported by the 19 hospital units who responded to this question was 12 weeks (interquartile range 0.5 weeks). In addition, four hospital units reported varying treatment intervals. A total of 20 of 30 hospital units treated patients with baclofen pumps (Table 2). The median number of patients treated with

baclofen pumps per month was 7 (interquartile range 7). A need for more treatment days to cover the local demand was expressed by 14 of 30 hospital units.

Table 2

Treatment with botulinum toxin and baclofen pump in Norwegian hospitals.

Department (medical specialty)	Botulinum toxin	Baclofen pump
Physical medicine and rehabilitation (*n* = 11)	11	3
Neurology (*n* = 13)	13	12
Neurosurgery (*n* = 3)	0	3
Other (internal medicine, paediatric neurology and paediatric habilitation) (*n* = 3)	2	2
Total (*n*/*N*)	26/30	20/30

Doctors were responsible for all treatment with botulinum toxin, while one hospital unit reported that a nurse was solely responsible for refilling and adjustment of baclofen pumps. For botulinum toxin treatment, ultrasound was used as guidance in 22 of 26 hospital units, EMG was used in 15 units and electrical muscle stimulation in 11 units. A combination of several types of instrumental guidance was used in 15 of 26 hospital units. Moreover, 11 hospital units reported using a textbook for guidance when administering botulinum toxin injections, and one hospital unit used only this.

Interdisciplinary assessment of spasticity was offered by 23 of 30 hospital units. The professions involved were doctors (30 of 30), physiotherapists (21 of 30), occupational therapists (12 of 30) and nurses (11 of 30). Nine of the hospital units had an assessment team consisting of two professions; this was most common in neurology departments (5 of 9). Assessment teams consisting of three or more professions were reported in 14 of the hospital units. This was most common in physical medicine and rehabilitation (8 of 14).

A total of 29 of 30 hospital units considered other treatment measures in addition to botulinum toxin and/or baclofen pump: 25 gave advice on oral spasmolytics, 22 assessed the need for orthoses and 21 provided guidance on relevant exercises.

Discussion

The study shows that spasticity treatment with botulinum toxin and baclofen pump is available in all Norwegian health regions. Referrals came from by both the primary and specialist healthcare services, indicating that this treatment is used in both early and late-stage rehabilitation. The median time from first referral and intervals between botulinum toxin treatments reported by the respondents were in accordance with existing guidelines and expert consensus

(2–4). There was, however, wide variation between hospital units in regard to the number of patients treated per month. A reported need for more treatment days by roughly half of the hospital units indicates that this cannot only be ascribed to differences in the local population base.

Good clinical care pathways for patients who require specialised spasticity treatment should be secured by establishing and strengthening robust professional teams that cooperate closely. Sufficiently broad professional teams will also help to satisfy the need for interdisciplinary competence in spasticity assessment, in line with international recommendations (2, 4).

Best practice for botulinum toxin treatment implies using instrumental guidance with ultrasound, EMG and electrical muscle stimulation (5). This type of equipment was in use in the majority of the hospital units, but the study revealed an improvement potential in ensuring safe and accurate injection treatment for all patients in Norway. The establishment of professional teams with adequate expertise and opportunities for training would be a positive step in this direction.

Basic spasticity-reducing measures such as orthoses, stretching, exercise, appropriate oral medication and the management of triggers should, as a rule, be assessed and implemented by the primary healthcare service, but are also important as supplements to treatment with baclofen pump and botulinum toxin (2–4). In line with this, most of the hospital units in the study also provided advice on these forms of treatment.

The study has some limitations. There may be relevant hospital units unknown to the authors that were not contacted, even though the high market share of the companies that contributed with information indicates that this is unlikely to be many. Of the 47 invited hospital units, 17 did not respond to the questionnaire. The response rate varied within the different medical specialties, and some questions received few responses. It is likely that the hospitals that have the greatest interest in interdisciplinary specialised spasticity treatment have prioritised responding. Nevertheless, we see that we have included participants from all parts of the country and that all of the major regional hospital trusts are represented. Therefore, we consider the findings to be representative for the current situation in Norway.

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This article has been peer-reviewed.

REFERENCES

1. Zeng H, Chen J, Guo Y et al. Prevalence and Risk Factors for Spasticity After Stroke: A Systematic Review and Meta-Analysis. Front Neurol 2021; 11: 616097. [PubMed][CrossRef]

2. Dansk Neurologisk Selskab. Behandling af spasticitet: oversigt. https://nnbv.dk/behandling-af-spasticitet-oversigt/ Accessed 8.4.2023.

3. Biering-Sørensen B, Stevenson V, Bensmail D et al. European expert consensus on improving patient selection for the mangament of disabling spasticity with intrathecal baclofen and/or botulinum toxin type A. J Rehabil Med 2021; 53: jrm00236.

4. Royal College of Physicians. Spasticity in adults: Management using botulinum toxin. https://www.rcplondon.ac.uk/guidelines-policy/spasticity-adults-management-using-botulinum-toxin Accessed 8.4.2023.

5. Grigoriu A-I, Dinomais M, Rémy-Néris O et al. Impact of Injection-Guiding Techniques on the Effectiveness of Botulinum Toxin for the Treatment of Focal Spasticity and Dystonia: A Systematic Review. Arch Phys Med Rehabil 2015; 96: 2067–78.e1. [PubMed][CrossRef]

6. Lindsay C, Ispoglou S, Helliwell B et al. Can the early use of botulinum toxin in post stroke spasticity reduce contracture development? A randomised controlled trial. Clin Rehabil 2021; 35: 399–409. [PubMed] [CrossRef]

7. Picelli A, Santamato A, Cosma M et al. Early Botulinum Toxin Type A Injection for Post-Stroke Spasticity: A Longitudinal Cohort Study. Toxins (Basel) 2021; 13: 374. [PubMed][CrossRef]

8. Helsedirektoratet. Hjerneslag. https://www.helsedirektoratet.no/retningslinjer/hjerneslag Accessed 8.4.2023.

9. Farmastat. Norske markedsdata. https://www.farmastat.no Accessed 7.5.2023.

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