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Original Study

Ultrasound and Electrical Stimulator-Guided Obturator Nerve Block With Phenol in the Treatment of Hip Adductor Spasticity in Long-Term Care Patients: A Randomized, Triple Blind, Placebo Controlled Study

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A B S T R A C T

Objective: To evaluate the effectiveness of ultrasound-guided phenol nerve block in the treatment of severe hip adductor spasticity in long-term care patients.
Methods: Double-blind placebo-controlled trial with a 9-month follow-up period.
Setting: A 250-bed long-term care hospital and the infirmary units of 5 regional hospitals.
Participants: Twenty-six long-term care patients with bilateral severe chronic hip adductor spasticity affecting perineal hygiene and nursing care.
Interventions: Patients were randomized to 2 groups that received ultrasound and electrical stimulator guided obturator nerve block using either 5% phenol in aqueous solution or saline.
Main Outcome Measures: The primary outcome measure was the Modified Ashworth Scale, which reflected the severity of hip adductor spasticity. Secondary outcomes included Goal Attainment Scale (GAS), hygiene score, distances between the knees during fast and slow passive hip abductions; passive range of movement for hip extension and knee extension. Pain was assessed using the Pain Assessment in Advanced Dementia Scale.
Results: Twenty-six patients (7 males; mean age = 77, standard deviation = 14) were recruited. At week 6 post-injection, 12/16 (75%) patients in the treatment group vs 1/10 (10%) patients in the control group had at least 1-point reduction of Modified Ashworth Scale ($P = .001$) on both hip adductors. There was also significant improvement in the GAS, as well as the hygiene score, resting position, and distances between the knees during fast and slow passive hip abductions in the treatment group, which persisted until week 36. No significant difference in the Pain Assessment in Advanced Dementia Scale was found between the 2 groups. No serious phenol nerve block related adverse effects were reported.

The authors declare no conflicts of interest.

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Conclusions: Obturator neurolysis with 5% aqueous phenol as guided by both ultrasound and electrical stimulation can safely and effectively reduce hip adductor spasticity, thus, improving hygiene scores and patient-centered outcomes measured by the GAS in affected long-term care residents.

Hip adductor spasticity is a common cause of joint deformity, pain and functional disability in long-term care patients.[1] The resultant hip deformity renders patients unable to sit, making them bedbound. Spasticity also produces scissoring of the hips, which prevents maintenance of perineal hygiene leading to skin breakdown and infection.[2] Moreover, the risk of osteoporotic bone fractures is markedly increased during daily care procedures.[3]

Despite its significant impact on patient wellbeing, there is a paucity of research regarding successful treatment of severe hip adductor spasticity in long-term care patients. The efficacy of oral antispasticity drugs is supported by weak evidence.[4] Both intrathecal baclofen and surgery are expensive and invasive and, thus, impractical treatment options for long-term care patients. Although some studies show that botulinum toxin injection is effective in treating hip adductor spasticity, [5,6] it requires multiple needle injections to the hip muscles and the effectiveness is limited by the ceiling dose. Moreover, high dose of botulinum toxin is required for treating hip adductors as these are large muscles, and the resultant high cost is prohibitive for most long-term care patients, who are usually financially disadvantaged.

Phenol acts by denaturing proteins, destroying the myelin sheath and axon. The effects are local and are sustained for several months to 2 years.[7] Obturator nerve block with phenol was first reported 50 years ago as a low-cost and effective treatment option for patients with severe hip adductor spasticity.[8] Nevertheless, all of the previously published studies are either case reports or small case series reports,[8–13] and high quality randomized controlled trials are lacking. Moreover, despite the fact that ultrasound guidance has been used to locate the obturator nerve for anesthetic purpose with reportedly high success rates,[14–17] the role of ultrasound guidance in obturator nerve block for the treatment of hip adductor spasticity has not yet been studied.

The aim of this study was to evaluate the effectiveness of ultrasound-guided obturator nerve block using phenol for treating severe hip adductor spasticity in debilitated long-term care patients when given in addition to the conventional physiotherapy and occupational therapy programs.

Methods

Participants

Patients were recruited from a 300-bed long-term care hospital, and the infirmary units of 5 regional hospitals in Hong Kong.

Inclusion criteria (all of the following criteria must be fulfilled):

(1) Age >18 years.
(2) Suffering from hip adductor spasticity (>1 year) because of underlying diffuse or focal cerebral and spinal pathologic conditions including stroke, spinal cord injury, cerebral palsy, multiple sclerosis, traumatic brain injury, and dementia.
(3) Both hip adductors spasticity severity >2 on the Modified Ashworth Scale (MAS).[18]
(4) At least moderate difficulty in nursing care with hygiene score ≥2.[6]
(5) Able to tolerate limb stretching exercises and hip abduction splints for treating spasticity.

Exclusion criteria (patients will be excluded if they have 1 of the following criteria):

(1) Established severe contracture of the hip adductors.
(2) Unstable medical conditions and an estimated survival of less than 6 months.
(3) Received recent treatment with botulinum toxin (within 6 months), phenol injection (within 24 months).

Primary Outcome

MAS of bilateral hip adductors (scale 0–5).

Secondary Outcomes

(1) Hygiene score, which measures the difficulty of changing napkin and cleaning the perineum of individual patient. Each item is rated by the caregiver of the patient on a 6-point Likert scale from 0 to 5 as follows:
    0. Independent with cleaning and catheterization
    1. One person is able to clean and catheterize with ease
    2. One person is able to clean and catheterize with effort
    3. One person is able to clean and catheterize only with major difficulty
    4. Two people are required, but together they can clean and catheterize easily
    5. Two people clean and catheterize with difficulty
(2) Goal Attainment Scale (GAS).[19]
(3) Distance between the knees immediately after passive hip abduction in a stretch velocity as fast as possible (V3), the stretch will be stopped immediately after a catch is felt.
(4) Maximal distance between the knees after passive hip abduction in a stretch velocity as slow as possible (V1).
(5) Passive joint range of hip extension and knee extension (by using a protractor goniometer with the patient in the supine position).
(6) Pain assessment using the Pain Assessment in Advanced Dementia (PAINAD) Scale[20] observed during basic nursing care procedures.
(7) Incidence of long bone fracture, pressure sores and fungal or bacterial skin infections in the affected limbs.

Study Design

This was a triple blind placebo-controlled trial with 5% phenol in aqueous solution vs saline. We had obtained ethics approval from independent research ethics committees at each investigational site.

Randomization

The treatment assignment was randomly permuted within the 6 study centers.

Blinding

All assessments were done by the geriatricians looking after the patients in each study center, and they were blinded to which drug treatment patients had received. To optimize the reliability of the measurement of MAS of hip adductors, this was done by 2