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Stellate Ganglion Blockade Provides Relief from Menopausal Hot Flashes: A Case Report Series

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ABSTRACT

Objective: **To investigate whether standard C6 stellate ganglion blockade (SGB) might provide relief from hot flashes associated with menopause.**

Methods: **Six women were referred for severe menopausal hot flashes and elected to undergo standard SGB (5 ml 0.375% Marcaine, Abbott Labs, Abbott Park, IL) to evaluate a novel intervention for hot flash relief. Hot flashes were assessed by self-reporting before and after stellate ganglion block.**

Results: **Initial SGB (SGB1) was successful in all 6 subjects, as evidenced by a positive Horner's syndrome and anhydrosis. Successful SGB caused complete alleviation of hot flashes for times ranging from 2 to 5 weeks. Patients returned for follow-up SGB after mild hot flashes returned. A second SGB produced additional asymptomatic periods of relief ranging from 4 to 18 weeks. In each case, repeated block provided hot flash relief equal to or greater than that of the initial block. Two patients who submitted for a third SGB reported 15 and 48 weeks of relief.**

Conclusion: **Successful SGB appears to be related to relief of hot flashes. Repeat SGB results in efficacious multiple week relief of severe hot flashes associated with menopause.**

INTRODUCTION

HOT FLASHES ARE THE MOST COMMON symptom associated with menopause and have been reported to occur in 68%–82% of naturally menopausal women.[1] Surgical menopause is associated with increased incidence and severity of hot flashes compared with natural menopause.[2] As reviewed by Freedman,[1] surgical menopause causes hot flash incidence as high as 90%. Hot flashes have been reported in 21%, 30%, and 36% of women during premenopause, menopause, and postmenopause, respectively.[2] Importantly, these results were reported in women not taking hormone therapy, for whom symptoms are likely to be minimal. Independent of etiology, hot flashes have been reported to occur daily in as many as 87% of symptomatic women, and over one third of these women reported more than 10 hot flashes per day.[3] Hot flashes have been reported to occur as early as 2 years prior to menopause, and >50% of women experience hot flashes for up to 5 years. In addition, a small subset of women experience hot flashes for the duration of their life (reviewed in ref. 4).

Hot flashes are the most common reason women seek hormone therapy.[5] Although hormone therapy results in an 80%–90% reduction in the

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occurrence of hot flashes in symptomatic women, complications with hormone therapy include headache, nausea, water retention, premenstrual irritability, and withdrawal vaginal bleeding, all of which affect quality of life.[6] In fact, withdrawal bleeding is the most common reason women discontinue hormone therapy.[7] Additionally, the fear of cancer has been reported to cause apprehension toward beginning hormone therapy and has also been listed as a major reason for discontinuing hormone therapy.[8] Also of note, hormone therapy use has decreased since the Women's Health Initiative (WHI) reported conflicting results about its efficacy.[9] These factors have led women to seek out alternative, nonhormone-based therapies for hot flash relief.

Recent reviews of nonhormonal treatments for hot flashes concluded that phytoestrogens and black cohosh are both ineffective in providing symptomatic relief and are potentially dangerous.[4,6,10,11] Other methods (including lifestyle intervention and vitamin E therapy) are only marginally more effective than placebo in relieving hot flashes. The most promising nonhormonal therapy, selective serotonin reuptake inhibitors (SSRIs), have been reported to reduce hot flash scores (reviewed in ref. 11), but SSRIs appear to be much less effective than hormone therapy. These factors highlight the need for novel, nonhormone-based therapies for hot flash relief.

Hot flashes are marked by sweating in the face, head, neck, and chest and generally last 1–5 minutes. Symptomatically, hot flashes appear similar to hyperhidrosis, a condition for which sympathectomy has been used successfully as treatment.[12] Because hot flashes typically occur during a discrete time frame surrounding the menopausal period, sympathetic block may provide a nonhormonal alternative for hot flash relief during the symptomatic period, without removal of any sympathetic ganglia. Thus, we hypothesized that a sympathetic block at the level of the stellate ganglion would provide relief from severe hot flashes associated with menopause.

MATERIALS AND METHODS

Participants

Six menopausal women (aged 48–58 years) with severe hot flashes were included in this case study. Women were referred by their gynecologists for evaluation of stellate ganglion block (SGB) as an intervention for hot flash relief. Participation in the study group was elective, and all women provided written consent. Women who were medically unstable, on hormone therapy, had a blood clotting disorder, or had an American Society of Anesthesiologists (ASA) physical status score of P3 or higher were excluded from the study (P1, no disease; P2, mild [one systemic disease]; P3, moderate disease [more than 1 systemic disease]; P4, severe disease; P5, life-threatening disease).

Procedures

Patients underwent a standard SGB performed on the anteriolateral aspect of the C6 vertebra on the right side. Current indications for SGB include complex regional pain syndrome 1 or 2 of the upper extremities, atypical facial pain, and complex regional pain syndrome 1 or 2 of the chest. The use of SGB in the current study may be considered by some to be off-label use of this approved technique; however, no information clarifying this issue could be located on the Food and Drug Administration (FDA) website. Therefore, the authors contend that SGB should be performed only by board-certified anesthesiologists with visualization via fluoroscopy.

Briefly, following local analgesia (2% lidocaine), 2 ml iohexol (180 mg/ml) (Omnipaque, Sanofi Winthrop, New York, NY) was injected to visualize the ganglion and confirm needle placement via radiography. Marcaine (5 ml of 0.375%) (Abbott) was then injected into the stellate ganglion to produce a sympathetic block. Efficacy of the SGB was confirmed by the presence of Horner's syndrome and anhidrosis (absence of facial sweat). Horner's syndrome consists of enophthalmos (sinking of the eyeball into its cavity), ptosis (droopy upper eyelid), swelling of the lower eyelid, miosis (abnormal contraction of the pupil), and heterochromia (difference in eye color). All these signs signify block of the sympathetic nervous system as it supplies the eye on the effected side of the head. SGB carries the risks of infection, bleeding, seizures, and spinal cord trauma; however, all can be effectively minimized with the use of contrast dye and fluoroscopic guidance.

Analysis of self-reporting

Information about frequency and severity of hot flashes before and after SGB was obtained

via consultation with the anesthesiologist (E.L.). Symptoms were self-monitored, and patients returned for additional SGB when hot flashes elevated past a level considered mild, as defined by the patient. Moderate to severe hot flashes were defined as 7–10 hot flashes per day that caused interruption of daily activities. All women in this study experienced more than 10 hot flashes per day. Four of six women reported two or more hot flashes during the night that interrupted sleep. Patients were called prior to submission of this paper to confirm current relief status. The data contained in this paper are the result of an extended case study in 6 individuals and should be interpreted as such.

RESULTS

Stellate ganglion block

Patient information and the results of SGB are shown in Table 1. Initial SGB (SGB1) was successful in all 6 patients, as evidenced by a positive Horner's syndrome and anhidrosis. Repeat SGB (SGB2) was successful in 5 of 6 patients. Patient 2 displayed a delayed Horner's syndrome and lack of anhidrosis following SGB2, indicating the lack of a successful SGB and thus serving as an internal control. Patient 2 submitted for an additional SGB (SGB3). SGB3 produced a positive Horner's syndrome and anhidrosis, indicating a successful SGB.

Relief of hot flash symptoms

The effects of SGB on relief of hot flashes are summarized in Table 2. Relief effects were present on the day of block. Patients experiencing interrupted sleep all reported cessation of these problems beginning on day 1 of treatment. For all patients, SGB1 caused asymptomatic periods of 2–5 weeks, followed by a period of intermittent relief. Patients returned for SGB2 at their discretion (i.e., when subjective hot flash symptoms elevated past mild). Successful SGB2 brought about asymptomatic periods of 4–18 weeks, all of which were equal to or greater than the period of relief following SGB1. Patient 2, in whom SGB2 was unsuccessful, did not experience any relief of hot flash symptoms after the procedure. SGB3 was successful in Patient 2 and has provided 15 weeks of symptomatic relief to date. Thus, Patient 2 provided an internal control for this study, demonstrating that successful SGB is requisite for hot flash relief. Patient 5 also underwent SGB3 and reported 48 weeks of asymptomatic relief. We do not believe that SGB cured this patient's hot flashes but assume that the extended relief period overlapped with the natural time course of hot flash cessation in this patient.

DISCUSSION

The present case study demonstrates that SGB produces significant relief of severe hot flashes associated with menopause. The data in this paper represent an extended case study with 6 women. Although the patient population is small and homogeneous, these results provide a basis for investigation of SGB as a nonhormonal treatment strategy for women who suffer from severe menopausal hot flashes. As an SGB may be considered by some to be invasive, we suggest that this intervention strategy be reserved for women in whom hormone therapy is contraindicated.

Hot flashes are the most common symptom associated with menopause, occurring in 68%–82%

Table 1. Patient Information and Efficacy of Stellate Ganglion Block

			Results of SBG1		*Results of SBG2*		*Results of SBG3*	
Patient	*Age*	*Race*	*Positive Horner's*	*Anhidrosis*	*Positive Horner's*	*Anhidrosis*	*Positive Horner's*	*Anhidrosis*
1	52	Caucasian	Yes	Yes	Yes	Yes	[a]	[a]
2	48	Caucasian	Yes	Yes	Delayed	No	Yes	Yes
3	54	Caucasian	Yes	Yes	Yes	Yes	[a]	[a]
4	49	Caucasian	Yes	Yes	Yes	Yes	[a]	[a]
5	56	Caucasian	Yes	Yes	Yes	Yes	Yes	Yes
6	58	Caucasian	Yes	Yes	[a]	[a]	NA[b]	NA

[a]Patient has not returned for additional SBG.
[b]NA, not applicable.

Table 2. Timeline of Hot Flash Relief in (Weeks) Following Stellate Ganglion Block (SGB)

	SBG1		*SBG2*			*SBG3*		
Patient	*Asymptomatic*	*Mild HF*[a]	*Time since SGB1*	*Asymptomatic*	*Mild HF*	*Time since SGB2*	*Asymptomatic*	*Mild HF*
1	3	4	7	4	18	[b]	NA	NA
2	4	0	4	NA	NA	2	15	NA
3	5	1	6	6	[c]	[b]	NA	NA
4	2	2	4	18	NA	[b]	NA	NA
5	2	2	4	4	0	4	48	4
6	3	NA	[b]	NA	NA	[b]	NA	NA

[a]HF, hot flashes; NA, not applicable.
[b]Patient has not returned for additional SBG.
[c]Patient moved out of state; no follow-up available.

of naturally menopausal women[1] and >90% of surgically menopausal women.[1] For women averse to hormone therapy (or in women for whom hormone therapy is contraindicated), there are few options. The overwhelming evidence suggests that herbal remedies do not provide relief above that of placebo, and lifestyle interventions are only moderately more effective than placebo (reviewed in refs. 4, 6, 10, and 11). Although SSRIs have proven to be moderately effective (reviewed in ref. 11), women with severe hot flashes need viable alternatives that provide adequate symptomatic relief.

Given the marked similarity in symptomatic presentation of hyperhidrosis and hot flashes and the effectiveness of sympathectomy for relief of hyperhidrosis, we investigated the possibility that SGB would provide relief from hot flashes for significant durations of time. Our results demonstrate effective relief from severe hot flashes in menopausal women. SGB produced an asymptomatic period ranging from 2 to 5 weeks, followed by a period of mild symptoms lasting an additional 1–4 weeks. Repeat SGB produced equal or greater periods of relief. To our knowledge, there are no previous reports investigating SGB for relief of menopausal hot flashes. One case study describes the use of SGB to relieve similar symptoms in a man. Hendy et al.[13] reported a case of a 77-year-old man with severe episodes of flushing and sweating following testicular infarct. SGB reduced the frequency and severity of these events in this patient.

The actual mechanism responsible for hot flashes remains elusive, although significant progress has been made. According to Freedman et al.,[1,14,15] hot flashes likely result from a narrowing of the thermoneutral zone, which increases the susceptibility of the heat dissipation response to small fluctuation in core temperature (T_c). The thermoneutral zone is the area where T_c fluctuates between the shivering threshold and the sweat threshold. Hot flashes are preceded by a rise in T_c that begins approximately 17 minutes before the hot flash. During and after the hot flash, at which point T_c crosses the sweat threshold, sweat rates increase. Following the heat dissipation response, T_c falls below the sweat threshold and reenters the thermoneutral zone. Often, T_c falls below the shivering threshold, causing reflex shivering and further illustrating the reduced size of the thermoneutral zone. Hot flash frequency varies according to a circadian oscillation, with a nadir in the morning hours and a peak in the late afternoon.

Current evidence suggests that norepinephrine plays a central role in the etiology of hot flashes. Freedman[15] demonstrated an increase in plasma 3-methoxy-4-hydroxyphenylglycol (the main metabolite of central norepinephrine) levels following hot flashes. Estrogen, the most potent antihot flash agent, has been shown to increase hypothalamic norepinephrine.[16] Drummond and Finch[17] reported relief of facial temperature elevations and sweating in 9 patients with reflex sympathetic dystrophy following SGB, indicating the passage of sympathetic vasodilator fibers through the stellate ganglion. Ikeda et al.[18] reported the relief of climacteric psychosis following SGB with a concomitant decrease in plasma norepinephrine. In the current study, SGB ameliorated hot flashes in menopausal women. Taken

together, these data suggest that the stellate ganglion may be involved in the mechanisms controlling hot flashes.

CONCLUSIONS

Current evidence suggests that the most effective intervention for relief of hot flashes associated with menopause is hormone therapy; however, hormone therapy is associated with adverse side effects and has come under scrutiny following the results of the WHI study. Given the lack of efficacy associated with herbal remedies and the limited results using nonhormone drug therapies (e.g., SSRIs), the current study presents a novel nonhormone-based intervention for severe hot flash relief. Our results demonstrate significant immediate relief of hot flashes following SGB. In addition, multiple-week relief of severe menopausal hot flashes was accomplished after repeat SGB.

These results suggest the need for additional research to evaluate the efficacy of this treatment strategy. Ideally, a randomized, controlled trial including placebo injections and extensive symptom reporting to produce level 1 evidence should be conducted to accept or refute the results of this multiple case study. At this point, we cannot recommend the adoption of this methodology in practice until further studies have been conducted. SGB does carry associated risk, but these can be effectively avoided by the use of C-arm fluoroscopy by board-certified anesthesiologists.

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