

Comparison Between the Efficacy of Ginger and Sumatriptan in the Ablative Treatment of the Common Migraine

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Frequency and torment caused by migraines direct patients toward a variety of remedies. Few studies to date have proposed ginger derivatives for migraine relief. This study aims to evaluate the efficacy of ginger in the ablation of common migraine attack in comparison to sumatriptan therapy. In this double-blinded randomized clinical trial, 100 patients who had acute migraine without aura were randomly allocated to receive either ginger powder or sumatriptan. Time of headache onset, its severity, time interval from headache beginning to taking drug and patient self-estimation about response for five subsequent migraine attacks were recorded by patients. Patients' satisfaction from treatment efficacy and their willingness to continue it was also evaluated after 1 month following intervention. Two hours after using either drug, mean headaches severity decreased significantly. Efficacy of ginger powder and sumatriptan was similar. Clinical adverse effects of ginger powder were less than sumatriptan. Patients' satisfaction and willingness to continue did not differ. The effectiveness of ginger powder in the treatment of common migraine attacks is statistically comparable to sumatriptan. Ginger also poses a better side effect profile than sumatriptan. Copyright © 2013 John Wiley & Sons, Ltd.

Keywords: common migraine; ginger; sumatriptan.

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INTRODUCTION

Migraine, a periodic chronic neurologic disorder, is one of the most common causes of pain syndromes with a prevalence rate of 12%. This disorder imposes exorbitant expenditures and creates disadvantages on personal function. These can vary from minimally disturbed activities of daily living to complete, although temporary, incapacitation requiring total rest. Unfortunately, the wait-and-see approach often prolongs the symptoms constituting the disease, while also decreasing the effectiveness of the treatment.

Despite continuous improvements in the field of migraine treatment, which has provided further opportunities to select more specific and effective remedies, many patients prefer to relieve headaches by nonchemical (herbal) means or readily available over-the-counter (OTC) products. A part of this trend is a result of fears associated with adverse drug reactions and apprehensions of dependency. Patients often experience a loss of satisfaction from their usual medications which contributes to their unmet needs. Even the general chronic relapsing nature of migraine disease poses frustrations for sufferers that lead them to seek out alternative remedies.

Ginger is a native plant of southeastern Asia that has been widely cultivated in Jamaica, China, India, Nigeria, Sierra Leone, Haiti and Australia. These thick rhizomes, in dehydrated form, contain 40–60% carbohydrate, 10% protein, 10% fat, 5% fiber, 6% minerals, 10% water,

1–4% essential oil, 5–8% resin and mucilage (Langner *et al.*, 1998; Shri, 2003; Mascolo *et al.*, 1989; Mustafa *et al.*, 1993, Awang, 1992).

Ginger products have long been used in the management of motion sickness, dyspepsia, articular pain, local pains and vertigo (Grant and Lutz, 2000; Yarnell, 2002; Holtmann *et al.*, 1989; Riebenfeld and Borzone, 1999; Mickelfield *et al.*, 1999; Grøntved and Hentzer, 1986; Altman and Marcussen, 2001).

One of the most favorable aspects of ginger is that there are no serious or even frequent side effects reported with its use. Anecdotal reports even indicate a therapeutic role for ginger in vomiting, flatulence and memory problems (Ernst and Pittler, 2000; Yamahara *et al.*, 1989). Pharmacologic studies have revealed its effectiveness in the reduction of blood sugar, normalizing of blood pressure, strengthening of the overall cardiovascular system, inhibitory effects on prostaglandins and platelet aggregation, as well as lipid lowering properties and hyposecretion of gastric acid (Bordia *et al.*, 1997; Tjendraputra *et al.*, 2001; Guh *et al.*, 1995).

In a study performed by Cady *et al.*, Gelstat (an OTC drug which contains ginger extract) alleviated migraine headache completely in 48%, and partially in 34% of patients within 2 h of taking the drug (Cady *et al.*, 2005). Aurora *et al.*, performed a double-blinded placebo-controlled study demonstrating that the Gelstat-treated group also had a significantly higher pain relief rate 2 h following proper drug use, at 65% versus 36%, $p = 0.038$ (Aurora *et al.*, 2006).

In a case report review, a 42 year old woman with classic migraine achieved headache subsidence within a 30 min period of taking a 500–600 mg water-soluble ginger powder upon onset of visual aura. Patients, who continued

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consumption of ginger powder, every 4 h for a total of four days, reported both diminished headache severity and frequency (Mustafa and Srivastava, 1990).

Given the high frequency, the variability in treatment options, along with the diverse inclinations and satisfaction of the sufferer population, the purpose of this study is to determine the therapeutic effects of ginger powder on the attacks of migraine without aura and compare it with standard sumatriptan treatment.

METHODS AND MATERIALS

This is a double-blinded randomized controlled clinical trial comparing the efficacy of ginger to sumatriptan in the treatment of the common migraine. One hundred study participants who are sufferers of common migraine were enrolled after admission to the Neurology Clinic of Zanjan Vali-e-Asr Hospital. Participants were assigned to two coequal groups by way of simple, random nonprobability sampling; one group was blindly given ginger powder, while the other was given sumatriptan.

Inclusion criteria used (International Headache Society Classification ICHD-II, Migraine, nd): (i) Confirmed diagnosis of migraine without aura by a neurologist, based on IHS criteria (ICHD-II), (ii) Aged ≥ 18 years, (iii) Education level high school diploma or higher, (iv) Headache frequency between 2 and 10 days/month.

Exclusion criteria were: (i) History of biliary calculus or peptic ulcer disease, (ii) Allergic reaction, (iii) Hemorrhagic diathesis or using anticoagulants, (iv) History of ischemic heart disease or Prinzmetal's angina, (v) Pregnancy or lactation, (vi) Headache after head trauma.

After completion of an introductory questionnaire, one sealed box containing five capsules (sumatriptan or ginger powder) was randomly delivered to each subject. Subjects were instructed to take only one capsule upon headache onset. Each ginger capsule contained 250 mg powder of ginger rhizome, while each Imegraz capsule contained 50 mg of sumatriptan.

All patients were committed to keeping up with their previous maintenance therapeutic regimens, and, with each attack they were required to fill out a questionnaire revealing: time of headache onset, headache severity (rated on a visual analog scale), timing of drug taking, response self-assessments following 30, 60, 90, 120 min and 24 h. Subjects also included any clinical adverse drug reactions within the questionnaire. This study was conducted for the duration of one month, at which point

patients evaluated their overall satisfaction with regards to treatment efficacy as well as their willingness to continue their respective treatments. All statistical analysis was performed by using SPSS for windows (version 16) software. Means of quantitative variables were compared by using student T-test between the two groups. In the case of categorical variables, Chi-square test was applied. Headache severity in the study groups, before and after intervention, was assessed with a paired samples T-test analysis. All P-values were two-tailed and a P-value < 0.05 was considered significant.

RESULTS

One hundred patients with common migraine were selected to take either sumatriptan or ginger (groups equally proportioned).

The mean age of patients was 35.1 ± 6.2 years old in the sumatriptan group and 33.9 ± 8.3 years old in the ginger group. Females comprised 68% (34 patients) sumatriptan subjects versus 74% (37 patients) ginger.

Average duration of migraine diagnosis was 7.3 ± 4.5 years in sumatriptan and 7.2 ± 4.6 years in ginger group. Average number of headache attacks in sumatriptan and ginger-treated groups were 5.8 ± 3.1 and 4.9 ± 2.7 attack/month, respectively. This frequency was 4.6 ± 0.9 attack/month during trial period in both groups. Average time interval from headache onset to drug intake was 24 ± 15 min (median: 21 min) for sumatriptan and 20 ± 11 min (median: 20 min) for ginger patients.

Figure 1 represents changes of mean headache severity in subsequent time intervals following consumption of either drug.

Before taking the medication, 22% of the sumatriptan group and 20% of the ginger group had severe headaches (VAS ≥ 8); mean values were 56% versus 48% for moderate severity ($5 \leq \text{VAS} \leq 7$) in the two groups, respectively (P = 0.527).

Frequency distribution of mean headache severity at 2 h after drug use demonstrated similar effectiveness for sumatriptan and ginger groups (P = 0.116) (Table 1). Comparing mean headache severity before and 2 h after treatment revealed a 4.7 unit reduction (according to VAS) in the sumatriptan group (P < 0.0001) and a 4.6 unit reduction in the ginger group (P < 0.0001).

In this study, 70% of sumatriptan-treated and 64% of ginger-treated patients showed favorable relief ($\geq 90\%$ decrease in headache severity) at 2 h following drug



Figure 1. Changes in mean headache severity after taking sumatriptan and Ginger during subsequent time intervals. This figure is available in colour online at wileyonlinelibrary.com/journal/ptr.

Table 1. Frequency of mean headache severity before each drug use and 2 h after its intake

Drug		Headache severity				Sum
		Free	Mild ^b	Moderate ^c	Severe ^d	
Sumatriptan	Before	0	22 (11)	56 (28)	22 (11)	100 (50)
	After	44 (22) ^a	48 (24)	8 (4)	0	100 (50)
Ginger powder	Before	0	32 (16)	48 (24)	20 (10)	100 (50)
	After	44 (22)	56 (28)	0	0	100 (50)
Sum	Before	0	27 (27)	52 (52)	21 (21)	100 (100)
	After	44 (44)	52 (52)	4 (4)	0	100 (100)

^aDigits outside and inside the brackets indicate percent and number of patients.

^bHeadache severity as $1 \leq \text{VAS} \leq 4$.

^cHeadache severity as $5 \leq \text{VAS} \leq 7$.

^dHeadache severity as $8 \leq \text{VAS}$.

$P = 0.116$.

use. Frequency of favorable relief according to gender, age group, duration of migraine history and maintenance regimen was compared between the sumatriptan and ginger groups and summarized in Table 2. These findings indicated that both the sumatriptan and ginger significantly impressed on pain relief and no significant differences were demonstrated in the headache subsidence between the sumatriptan- and ginger-treated groups.

Subjective side effects arose from sumatriptan including dizziness, a sedative effect, vertigo and heartburn. The only reported clinical adverse effect of ginger was dyspepsia. Prevalence rate of clinical complaints was 20% for sumatriptan in contrast with only 4% for ginger ($P=0.028$). 86% of subjects reported high or superior satisfaction from the sumatriptan-treated group as compared to 88% in ginger group ($P=0.736$). Eighty-eight percent of sumatriptan users and 72% of ginger recipients were inclined to continue their randomly assigned drug for the abortion of migraine attacks ($P=0.139$).

DISCUSSION

The current study reveals that both sumatriptan and ginger powder decrease mean severity of common migraine attacks in within 2 h of use. A comparison of efficacy in headache alleviation and patients' contentment does not show any significant difference amongst the two drugs. However, subjective side effects due to ginger powder were significantly less than sumatriptan.

Despite availability of multiple drugs specifically for the abortion of migraine attacks (such as ergots and triptans), as well as advances in pharmacologic and alternative therapies, problems including poor satisfaction of drug efficacy as well as varied side effects persist. Challenges also include the chronic and recurrent nature of the disease; these can cause patients to constantly reevaluate their treatment needs, a delay or interruption in self management, and a tendency to take OTC and herbal medications.

Anecdotally, oral ginger has been used for migraine headache, nausea and vomiting (Kemper, 1999). The essential oil of ginger has also been used topically as an analgesic (Srivastava and Mustafa, 1989). For migraine, 500 mg ginger taken at onset, repeated every 4 h up to 1.5–2 g per day, for 3–4 days has been recommended (Mustafa and Srivastava, 1990).

Researchers at the city of London Migraine Clinic found that feverfew also eliminated about two-thirds of migraines in a selected group of headache patients, which is similar to the effectiveness of most migraine drugs. While some people experience a pronounced effect, others may have none at all (Hylands *et al.*, 1985; Murphy *et al.*, 1988).

The amount that has been shown to prevent migraine attacks in research studies ranges from 50 to 114 mg per day. Though most practitioners use capsules containing 250 mg of a standardized potency feverfew.

Mustafa *et al.* reported a 42-year-old woman, with a 16 years history of migraines, experienced enormous relief after supplementing her diet with 1.5–2 g of dried ginger daily.

Table 2. Frequency of $\geq 90\%$ reduction in headache severity after 2 h following each drug use compared based on some features of subjects

Variable		Drug		
		Sumatriptan	Ginger powder	PV
Sex	Male	68.8 (11) ^a	69.2 (9)	0.978
	Female	70.6 (24)	62.2 (23)	0.453
Age group	<35	72 (18)	61.3 (19)	0.400
	≥ 35	68 (17)	68.4 (13)	0.976
Duration of migraine history	<5	73.3 (11)	62.5 (10)	0.519
	≥ 5	68.6 (24)	64.7 (22)	0.733
Maintenance therapy	With	78.1 (25)	78.6 (22)	0.967
	Without	55.6 (10)	45.5 (10)	0.525

^aDigits outside and inside the brackets indicate percent and number of patients.

In double-blinded placebo-controlled study of Aurora *et al.*, Gelstat (ginger extract) relieved migraine headache more significantly than placebo within 2 h of taking the drug. There was no meaningful difference in relief rate of headache by Gelstat and placebo (19% versus 7% respectively).

In the present study, ginger powder reduced mean headache severity up to 4.6 units in relation to before taking drug.

Cady *et al.* performed an open-label study enrolling 30 patients that were treated in the mild pain phase with Gelstat Migraine (a combination of ginger and feverfew). Two hours after treatment, 48% were pain-free with 34% reporting a headache of only mild severity. Twenty-nine percent reported a recurrence within 24 h. Side effects were minimal, and 59% of subjects were satisfied. 41% preferred Gelstat Migraine or felt it was equal to their pre-study medication. In our study, 2 h after ginger intake, 44% of subjects became pain free with 56% reporting a headache of only mild severity. Clinical adverse reactions occurred in 4% of ginger group, and 88% of patients rated headache relief as great or excellent, and 72% preferred this drug for long-term therapy.

The present investigation demonstrated an overall 44% palliation in all headache attacks 2 h following treatment with sumatriptan or ginger powder. In conjunction with evidence from other studies, it is anticipated that increasing the total amount of ginger intake per attack can greatly enhance migraine relief rate.

CONCLUSION

Consequently, ginger products are a favorable choice for treatment of acute migraine without aura when compared with sumatriptan. Therefore, it is recommended for migrainous patients who are uneasy or poorly responsive to other medications or in general simply tend to use herbal remedies. It is suggested a more extensive placebo-controlled study which can measure the effectiveness of various doses of ginger-based medications with differing types and severities of migraine is examined.

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Conflict of Interest

The authors have declared that there is no conflict of interest.

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