A Randomized, Double-Blind, Placebo-Controlled Pilot Study Assessing the Efficacy and Safety of a Transdermally Delivered Sodium Bicarbonate Menthol Lotion for Reducing the Pain Associated with Acute Gout Flares

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BACKGROUND

Gout is characterized by deposition of urate crystals in and around the joints.[1] Urate crystal formation and dissolution is affected by pH.[2] There are reports in the literature of the use of alkalization agents, such as sodium bicarbonate, to treat gout.[3] Hypothetically, an alkalinizing agent such as sodium bicarbonate may increase the systemic and/or local pH and may allow pH-sensitive uric acid crystals to dissolve, resulting in temporary pain relief and shortened duration of gout flares; however oral sodium bicarbonate use causes intolerable gastrointestinal side-effects.[4] In addition, menthol is known to have a soothing effect and provide temporary pain relief.

PURPOSE

The purpose of this study was to determine if an alkalinizing lotion containing sodium bicarbonate and menthol in a patented transdermal drug delivery system can effectively and safely reduce pain and shorten duration of an acute gout flare. This transdermal delivery system effectively administered sodium bicarbonate in prior animal and human studies.[5]

METHODS

This was a prospective, double-blinded, randomized, placebo-controlled pilot study. Study subjects were female and male subjects (*N*=24) who were ≥18 years old with a clinical diagnosis of gout and a history of plasma uric acid >6.8mg/dL on a stable medication regimen. Enrolled subjects presented in clinic within 36 hours of an acute gout attack and were prescribed colchicine 0.6 mg daily. Exclusion criteria included >stage 3 kidney disease, and recent or concurrent initiation of other pain medications (e.g., NSAIDs, corticosteroids).

Subjects were randomized to receive placebo lotion or sodium bicarbonate transdermal lotion (33% sodium bicarbonate and 0.5% menthol) and instructed to apply to the entire limb of up to three affected joints (target joint and up to two other joints). Outcome measures included pain assessed with a visual analog scales (0-10); time to pain resolution, defined as a 50% reduction in pain; range of motion (ROM) and subject satisfaction. Assessments were made at baseline and 15 and 30 minutes and 1, 2, 4, 6, 8, 10, 12 and 14 days post-treatment. Statistical analysis was performed using repeated measures ANOVA.

RESULTS

Overall, the mean pain scores of active treatment subjects were approximately 1.3 points lower than the placebo subjects (p=0.004) (Table 1). The percent reduction in pain scores over time in the target joint is shown in Figure 1. The secondary joint (n=9 for both groups also had a significant reduction in pain with mean scores 1.2 points lower than control (p=0.04).

Among subjects in the active treatment group, the mean time to resolution was 2.2 days vs. 4.1 days for the placebo group. The mean time to resolution for the secondary joint was 1.6 days in the active treatment group vs. 2.8 days in the placebo group.

Among subjects who achieved improved ROM, the mean time to improvement was 1.7 days in the active treatment group vs. 2.5 days in placebo group.

No treatment-related adverse events were reported.

CONCLUSION

The use of a topical transdermal sodium bicarbonate lotion resulted in significant pain reduction as soon as 15 minutes after application and may speed resolution of acute gout attacks and improvement of range of motion. A Phase 2 study is scheduled to begin at the end of this year.

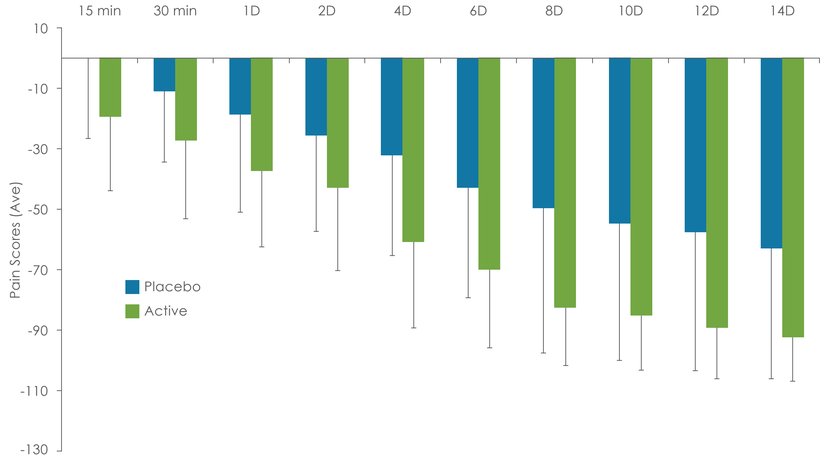
Limitations include the use of colchicine of 0.6mg/day throughout trial period in both groups, which may confound results, small sample size and initiation of treatment and data collection within 36 hours.

TABLE 1. QUICK ONSET OF ACTION

	Patients With 50% Reduction in Pain			
	30 mins	**Day 1**	**Day 2**	**Day 3**
Control	9%	18%	27	36%
Bicarbonate Lotion	25%	42%	58%	58%

Rapid Pain Mitigation

FIGURE 1. Change in Target Joint Pain Severity



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