

# DIMETHYL SULFOXIDE (DMSO) IN THE TREATMENT OF TROUBLESOME GENITOURINARY DISORDERS: A PRELIMINARY REPORT

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IN 1964, Jacob, Bischel, and Herschler<sup>1</sup> described the rather remarkable medicinal properties of dimethyl sulfoxide (DMSO), a versatile commercial solvent. Although DMSO was synthesized as early as 1867, and today is available as a by-product of the paper-pulp industry, it has so far been used chiefly as an industrial solvent. When applied to intact human skin, the drug penetrates rapidly and exerts a combination of antiinflammatory, local analgesic, and bacteriostatic properties.<sup>2, 3</sup> As a result, the drug was widely employed during the last year, before it was withdrawn from the public market, in the treatment of a variety of musculoskeletal disorders, including arthritis, bursitis, acute musculoskeletal trauma, scleroderma, Dupuytren's contracture, and various postoperative pain syndromes.<sup>4-6</sup>

This report presents the preliminary results of the topical treatment with DMSO of 34 patients with troublesome genitourinary conditions, including interstitial cystitis, Peyronie's disease, and unexplained pain syndromes.

## METHOD

Liquid dimethyl sulfoxide\* was applied liberally to the skin surface over the area of pain with cotton applicators, twice daily by the patient. The solution was initially used in a 50 percent concentration, and was increased by 10 percent every few days until either the symptoms were relieved or an excessive local skin reaction developed. The duration of therapy depended upon the clinical response.

## RESULTS

A summary of the results of topical treatment with DMSO for the various genitourinary conditions is presented in *Table 1*.

*Interstitial cystitis.* Dimethyl sulfoxide was applied over the suprapubic region twice daily in 12 patients with interstitial cystitis. The diagnosis had been previously established by cystoscopic examination in each patient, and each had had recurrent frequency and suprapubic pain, requiring hydrodilatation and/or chemofulguration of the bladder every few months. Since DMSO is primarily excreted in the urine, it was hoped that the com-

\* Supplied through the courtesy of Richard D. Brobyn, M.D., Merck Sharp & Dohme, West Point, Pennsylvania.

**Table 1.**—*Summary of results of topical treatment with DMSO in patients with genitourinary disorders*

Disease entity	Patients, total no.	Results of therapy		
		Excellent	Fair	Poor
Interstitial cystitis	12	2	1	9
Peyronie's disease	5	1	3	1
Atypical pain syndrome	17			
Flank	3	3	0	0
Suprapubic	8	0	2	6
Genital	4	0	1	3
Renal colic	2	0	2	0

bination of local and systemic effects would relieve the symptoms of interstitial cystitis.<sup>7</sup>

After the course of DMSO treatments, only two patients had definite relief of symptoms; yet in both cases relief was dramatic and lasted the full six months the patients were on therapy. Neither of these patients had any side effects or used other medication, and one patient applied the drug only every few days when mild discomfort or frequency developed. A third patient remained free of symptoms three months after a one-month course of DMSO, but has not returned for subsequent examination.

Nine patients, on the other hand, had no benefit from the treatment and stopped the medication after from one to four months. Although symptoms were transiently better in some patients, for them the unpleasant side effect of odorous breath far outweighed any slight amelioration of symptoms. It is interesting to speculate whether or not some of these patients might be significantly improved by the direct intravesical instillation of DMSO at various time intervals. This could well be done as an outpatient procedure, and further investigation into this route of application seems definitely indicated.

*Peyronie's disease.* Of five patients using twice-daily applications of DMSO to the penis, four noted lessening of pain and deformity with erection. In one patient the response was truly impressive; the pain disappeared entirely within two days, and penile deformity was eliminated after two months. The plaque itself was no longer palpable by three months, and the patient has remained free of symptoms some four months after discontinuation of therapy. Aside from slight odor to the breath, he had suffered no side effects during treatment.

*Unexplained pain syndromes. Flank pain.* Three patients suffered from persistent incisional flank pain several months after various operations upon the kidney. All incisions were well healed without drainage. Pain was relieved completely in all three patients in from two to four weeks after be-

ginning twice-daily applications of DMSO to the area of pain. To date, none of the patients has returned with recurrent pain, and all have now discontinued therapy for from four to six months.

*Renal colic.* Two patients received DMSO topically applied to the flank and lower abdomen during episodes of acute renal colic secondary to obstructing calculi. Although the pain was lessened somewhat in both patients, it did not regress completely and additional analgesics were required. Further experience with relief by DMSO of this type of pain is needed before definite conclusions can be drawn.

*Suprapubic pain.* Eight patients with unexplained suprapubic pain received DMSO twice daily to the painful area. Three of the patients had vertical midline incisions from previous gynecologic procedures, and two had undergone procedures for repair of hernia. Results from complete urologic, gynecologic, and neurologic examinations were normal or negative in all patients, and in most instances their pain was thought to be functional. Except for two patients who had partial relief of pain during a three-month course of topical treatment with DMSO, none of the patients were significantly relieved of their pain. In all these patients therapy was discontinued after a trial of from one to five months.

*Genital pain.* Four male patients with unexplained genital pain applied DMSO twice daily to the area of pain. One patient, who had pain at the base of the penis after undergoing transurethral prostatectomy, was partially relieved after treatment with DMSO for one month. None of the three remaining patients had any relief of pain. One patient had testicular pain after undergoing orchidopexy; another had perineal and genital pain after insertion of a Berry prosthesis for stress incontinence, and one had psychogenic diffuse genital pain.

### TOXICITY

In nearly all patients the typical garlicky odor to the breath developed after cutaneous application of DMSO. The patients whose pain was relieved by treatment were willing to endure this annoying side effect, especially when the course of treatment was not of long duration. The patients whose pain was not relieved were emphatic in their denunciation of this odor, and discontinued the use of the drug as much because of its side effect as for its inability to relieve the primary symptoms.

Seven patients noted a transient rash at the site of application. This was probably caused by the histamine-liberating effect of DMSO on the mast cells in the skin, and the rash usually disappeared after two or three weeks when the stores of histamine in the mast cell were depleted. In only one patient did the drug cause a serious dermatitis, and this was over the scrotum of a patient receiving topical DMSO and 5-fluorouracil; recovery was complete after cessation of therapy.

One patient acquired a staggering gait soon after beginning therapy, and because of this side effect, after one month discontinued the treatments with the drug. There were no permanent sequelae.

No other side effects were observed. Results of renal and hepatic function studies remained normal in all patients so tested during treatment.

According to recent experimental studies, however, a change occurs in the index of refraction in the eyes of animals treated with high doses of DMSO over considerable periods of time. Because of this ocular change, the drug recently was withdrawn from the public market, and further clinical studies here have been discontinued. At this time there has been no evidence of ocular injury in any of the patients in this series treated with DMSO, and it is hoped that the drug will soon be released again for further clinical investigation.

#### SUMMARY AND CONCLUSIONS

Dimethyl sulfoxide (DMSO) certainly has not proved to be a 'miracle' drug in the treatment of certain troublesome genitourinary disorders. The majority of patients with interstitial cystitis, Peyronie's disease, or unexplained genitourinary pain syndromes were not in the least improved by cutaneous application of this compound in therapeutic doses. Yet, several patients had rather dramatic relief of symptoms after topical therapy with DMSO for various periods of time. So far, it has not been possible to predict in advance which patients will respond and which will not.

It seems fair, then, to recommend at least a trial of DMSO in all patients of this type in whom conventional methods of therapy have failed, provided that further toxicity studies by the manufacturer confirm the safety of this drug so that it can again be released for clinical use.

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