



INTERNATIONAL
IV NUTRITIONAL THERAPY
GLOBAL PHYSICIAN EDUCATION

DMSO / MSM / HCL

International IV Nutritional Therapy for
Physicians

DMSO and MSM are formed in the atmosphere and return to earth in rainfall, then are taken up by plants and concentrated up to one hundred times. Both compounds are present in small amounts in certain fruits, grains, vegetables and beverages such as milk. All Commercially available DMSO and MSM are manufactured, since the small amounts in plants makes extraction impractical. It remains an indisputable fact that both molecules are found in nature and are therefore natural.

© IVNTP

2

MSM and DMSO are naturally occurring sulfur compounds. They originate as an end product of the sulfur cycle that begins in the ocean.

Algae and phytoplankton produce sulfur compounds known as tertiary dimethyl sulfonium salts, and these salts are transformed to dimethyl sulfide, DMS, a highly volatile compound. When exposed to ozone and high-frequency ultraviolet light, DMS is converted into DMSO and MSM, both of which are water soluble

© IVNTP

3

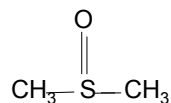
DMSO

Dimethyl Sulfoxide

© IVNTP

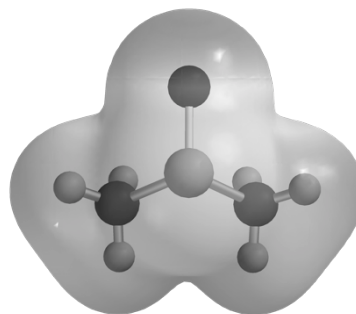
4

DMSO Molecule



© IVNTP

5



© IVNTP

6

- DMSO is both water and lipid soluble
- An efficient solvent for water-insoluble compounds
- a hydrogen bond disrupter.
 - a hydrogen bond disrupter decreases inflammation by preventing or decreasing oxygen or hydrogen peroxide reactions with cellular structures

© IVNTP

7

- Biological properties first introduced to the scientific community by Stanley W. Jacob, MD in 1963
- Potent antioxidant and free-radical scavenger
- Anti inflammatory
 - Prevents the oxidation of lipoproteins

© IVNTP

8

- Anti- microbial, fungal, bacterial and viral
 - Increases sensitivities to pharmaceuticals when used synergistically
 - Enhances resistance and decreases susceptibility to infection
- Cholinesterase inhibition
- Cryoprotective

© IVNTP

9

- Is metabolically converted to MSM within the body

© IVNTP

10

Indications for DMSO

- Atherosclerosis
- Interstitial Cystitis
- Scleroderma
- Raynaud's Disease
- Lupus (SLE)
- Rheumatoid Arthritis

© IVNTP

11

- Degenerative Arthritis
- Ulcerative Colitis
- Chronic Obstructive Pulmonary Disease
- Reflex Sympathetic dystrophy
- Diabetic Ulcerations
- Burns
- Scar Tissue (increasing circulation)
 - Adjunct in Plastic Surgery

© IVNTP

12

- Close Head injuries, edema
- Strokes- inhibits platelet aggregation
- Fibromyalgia, polymyalgia used in conjunction with MSM (DMSO₂)
- Chronic prostatitis
- Dermatologic diseases
- Schizophrenia
- Alzheimer's disease
- Chemical exposures (i.e. chloroform, bromobenzene)
- Pain

© IVNTP

13

Side effects

- Characteristic odor described as sulfur, garlic and described as creamed corn, rotten artichokes or eggs.
 - “I didn’t know a human could smell that bad”
- Topical
 - Dry skin, itching, occasional burning

© IVNTP

14

Potential side effects at high doses

- | | |
|-----------------|--|
| • Nausea | • Bradycardia |
| • Vomiting | • pulmonary edema |
| • Diarrhea | • Bronchospasm |
| • Hemolysis | • Cardiac arrest |
| • Hypertension | • Heart block |
| • Rashes | – rarely |
| • Renal failure | • Anaphylaxis |
| | (flushing and rashes) * |
| | * due to high concentration and rate of infusion |

© IVNTP

15

- If Side Effects or concern for patient tolerance:
Slow infusion rate, or give in a greater volume of NS or D5W at a slower rate

© IVNTP

16

Treatment protocols

- Courtesy of Stanley Jacob, MD; Oregon Health & Science University (OHSU), Portland, Oregon

© IVNTP

17

Treatment protocols

- Oral:
 - 2%,
 - 4% or
 - 10% concentrations diluted in water
- Curcumin /DMSO oral rinse
- Dosage: 1 teaspoon t.i.d. with meals

© IVNTP

18

Treatment protocols

- Topical:
- Penetrates the cell membrane, causing an increase in osmolality both inside and outside the cell preventing any significant hemolysis due to the formation of an osmotic gradient

© IVNTP

19

- 50% concentration diluted in water for head area
- 70% concentration diluted in water for all other body and extremity areas
- skin should be clean and dry
- apply 5-15 ml b.i.d. or q.i.d prn

© IVNTP

20

- addition of urea (10%) reduces skin irritation and odor
- commercially available with a rose scent
- To eliminate odor in the office etc
 - Hydrogen peroxide spray

© IVNTP

21

- IV:
- Given in NS or D5W in less than 10% concentration
- Dosage should not exceed 0.3 gm/kg of body weight calibrating on a 70kg (150 lb) person
- *note that if >150lb or 70K/11 stone: the dosage does not exceed this amount

© IVNTP

22

- 2 grams has been given successfully for closed head injuries or strokes (CVA)
- Administration: 1-5 times weekly over a 30 minute period for extended periods of time (months).

© IVNTP

23

Side effects:

- greater than 10% leads to hemolysis
- nausea due to high concentration and rate of infusion
- Slow infusion rate, or give in a greater volume of NS or D5W with a reduced rate of infusion.

© IVNTP

24

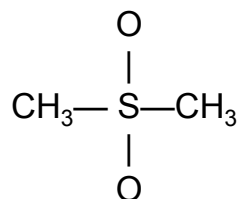
MSM

Methylsulfonylmethane

© IVNTP

25

MSM Molecule



© IVNTP

26

- Pure commercial MSM is produced by reacting H_2O_2 with DMSO and then distilling off the impurities.
- MSM produced by crystallization often contains considerable impurities.

© IVNTP

27

Toxicity

- The LD50 of MSM is so large that the value is meaningless when applied to this substance
- 18,000 patients have been treated at OHSU Hospital with doses up to 100 grams per day without serious side effects
- Long-term toxicity studies in rodents with oral doses of 8 g/kg/day showed no toxic effects.
 - The equivalent in humans would be 1.2 pounds per/d

© IVNTP

28

Toxicity

- Acute oral toxicity studies used 20g/kg/d and no animals died
- LD50 study in rats found dose was $\geq 17\text{g/kg}$ body wt, equivalent to 2.6 lbs per day in humans
- Ocular and dermal irritancy was the lowest score that can be achieved by any compound.

© IVNTP

29

Drug and Nutrient Interactions

- There have been no documented interactions between any pharmaceutical or nutraceutical compound and MSM
- May have an aspirin-like effect on platelet aggregation, but not as strong
 - Nausea reported in high doses (6,000-20,000mg)
- 6 reports of menorrhagia with MSM supplementation
- No significant interactions with vitamins, minerals, or botanicals have been reported.

© IVNTP

30

MSM Protocols

Courtesy of Stanley Jacob, MD; Oregon Health & Science University (OHSU) Portland, OR

- **IV**
- 15% in deionized water, sterile for parenteral use, 100 ml
- 100 ml 15% MSM is admixed with 100 ml of D5W
- Administered over 12-15 min.
- Drip Rate: 15ml/min
 - To achieve this rate consider a 22-20g needle/catheter as this rate is not attainable with a 24g angiocath

© IVNTP

31

- When adding MSM to other nutrients (Vits/Min), a rate suitable for the infusion of the other nutrients should be utilized, and this depends on their concentration within the IV and the resultant osmolarity

© IVNTP

32

Protocols

- **Oral** MSM
- Liquid oral MSM is absorbed better than MSM in capsules
 - 15% in deionized water, 8 ozs.
- Dose: 1/5 tsp with breakfast and lunch
- Can be mixed with water, juice, milk and coffee.
- Do NOT mix with alcohol
- MSM increases GI motility, resulting in increased stool frequency, this decreases over time
 - Increase dose gradually
- > 100gms have been administered orally

© IVNTP

33

Protocols

- **Topical** MSM gel
- 15% MSM
- 6-8 drops over painful areas bid
- Can be used hourly
- May leave a white residue on the skin
 - Remove with water
- Absorbed well topically
- Not a carrier/synergist like DMSO

© IVNTP

34

Protocols

- **Urological**
- 15%, sterile, 50 ml
- Effective: interstitial cystitis, prostatitis, irritable bladder syndrome
- Instill with #10 french cath. With a 60 ml catheter tip syringe (trained professional)
- Pts can be self taught to perform this using a new sterile catheter each time
- Instilled MSM is retained in the bladder until the patient feels the urge to void
- Often retained over night if instilled at bedtime

© IVNTP

35

Indications for MSM

- **Interstitial Cystitis**
 - 90% improvement with MSM when pt compliant with protocol
 - IV tx 5x week for 2 wks
 - Decrease to 2x wk for 2 months
 - Oral tx concurrent with IV
 - 11/2 tsp 2 x/day increase as tolerated
 - Topical gel apply over perineum/bladder

© IVNTP

36

Indications for MSM

Interstitial Cystitis

- **Bladder Instillation Protocol**
 - 50mls of 15% MSM 5x/wk x 1 month
 - 50mls of 15% MSM 4x/wk x 1 month
 - 50mls of 15% MSM 3x/wk x 1 month
 - 50mls of 15% MSM 2x/wk x 1 month
 - 50mls of 15% MSM 1x/wk x 1 month
 - 50mls of 15% MSM weekly thereafter
- Do NOT stop irrigations until reasonable comfort level is obtained
 - Weekly tx prn/indefinitely

© IVNTP

37

Protocol

- **Trigger point injections**
- 5 ml IV MSM mixed with 5 ml 0.5% lidocaine
- Can be given s.c. or i.m.
- Inject trigger point or areas of pain 3 days per week

© IVNTP

38

Indications for MSM

- **Scleroderma**
- If the patient has esophageal and internal organ involvement they should be started with five IV txs weekly for 6 weeks
- After 6 wks a noticeable improvement in swallowing solid foods is noted.
- Topical MSM gel several times weekly, oral as tolerated
- At 6 weeks, reduce to 2x/wk for several months increasing oral dose to tolerance

© IVNTP

39

Indications for MSM

- Back Pain including Discogenic
- IV txs 5x week x 2 wks
 - Decrease to 2x wk for months as required
- Follow with oral and topical MSM
- Increase Oral as tolerated
- Trigger pts as indicated

© IVNTP

40

Indications for MSM

- **Rheumatoid arthritis**
- IV's 1-2x/wk quicker and better results
- Oral 1/5 tsps with breakfast and lunch
- Topical apply on affected area
- 2 months tx, reassess, may notice need to reduce pharm. txs

© IVNTP

41

Indications for MSM

- Fibromyalgia
- Note: tx x 2 mos before benefit noticed
- IV treatments 5x week for 2 wks
 - Decrease to 2x wk for several months
- After 2 wks start oral and topical MSM
- Trigger pts as described

© IVNTP

42

References

- MSM: the definitive guide. A Comprehensive Review of the Science and Therapeutics of methylsulfonylmethane. Stanley Jacob, MD and Jeremy Appleton, ND. Freedom Press, Topanga, CA, 2003
- Protocols on the Proper Administration of MSM. Stanley Jacob, MD. Oregon Health & Science University (OHSU), Portland, Oregon. 2003

© IVNTP

43

Hydrochloric Acid

© IVNTP

44

Hydrochloric Acid

- Dilute form used
 - 1:500 – 1:1000 concentration
 - In medical literature in the 1920's-1940's as an antibiotic
- IV of 10 cc SLOW push given
 - Stimulates WBC's
 - Used in Viral and some aggressive Bacterial conditions
 - Chemotherapy compromised
 - **Contraindicated in any infection that cannot drain!**
 - Skull, Jaw or Brain abscess...

© IVNTP

45

Hydrochloric Acid

- Know your dilution form
- When to high:
- **IF PUSHED TOO QUICKLY WILL SCLEROSE THE VEIN!**

© IVNTP

46

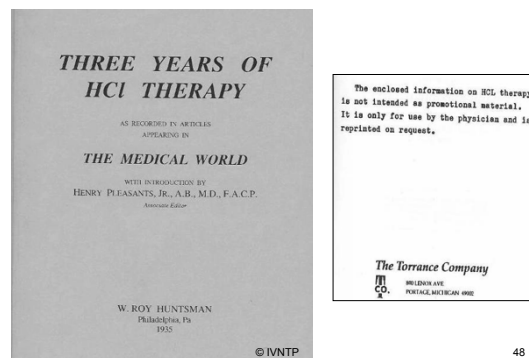
Hydrochloric Acid

- Dose and Administration:
 - Typical dose is 10 cc daily for 3 to 12 days for acute infection
 - Given as a slow push – or -
 - Used as an adjunct to Immune formulae (**given through side port of the IV line**)
 - **If diluted in a high volume IV it is only going to act as a pH adjuvant.**

© IVNTP

47

The only source for the original HCl data. Very interesting and informative.



© IVNTP

48

Claimed Success of Uses of IV HCL

- Iritis
- Sinusitis
- Wound infection
- Bronchial infection
- Staph & Strep
- Hepatitis with jaundice
- Tuberculosis
- Kidney infection
- Malaria
- Elephantiasis
- Leprosy
- Cerebrospinal meningitis
- Typhus
- Typhoid
- Smallpox
- Anthrax in animals
- Asthma
- Fungal Infections
- Given before elective surgery to reduce infection

© IVNTP

49

Contraindications

- Tooth abscess
 - Infected Appendix
- Caution
- Sinus infection
 - Middle ear infection
 - Myelogenous leukemia (raises WBC)
 - Can cause temporary fever

© IVNTP

50

How does it work?

- Transitory extracellular acidosis.
– Known to activate variety of immune cells

- Arch Surg.1986 Oct;121(10):1195--8
PMID:3767651
- J Leukoc Biol. 2001 Apr;69(4):522--30.
PMID:11310837 J Immunol 2006;176:1163--1171
PMID:16394005 And many more citations

© IVNTP

51

Clinical Research

Case 1:

24 hours

32% Increase Neutrophils

14% Increase Lymphocytes

12% Increase in B-cells

53% Increase in NK Cells

- Cells continued to remain elevated well into 72 hours after infusion.

Thanks to Dr. Davis Lamson, ND

© IVNTP

52

Clinical Research

Case 2:

24 hours

14% Increase Neutrophils

68% Increase Lymphocytes

68% Increase in NK Cells

- Cells continued to remain elevated well into 72 hours after infusion.

Thanks to Dr. Davis Lamson, ND

© IVNTP

53

Clinical Research

Case 3:

6 hours

Increase in all cell types 26-71% except NK Cells

24 hours: Cells returned to baseline

Thanks to Dr. Davis Lamson, ND

© IVNTP

54