

DMSA Challenge Test for Heavy Metal Poisoning*

* **Warning:** The DMSA test must be administered under the supervision of a physician and requires a physician prescription for DMSA (Chemet). Severe serious side-effects may occur with DMSA usage.

Dimercaptosuccinic acid (DMSA) is a drug (CHEMET) approved for use in the treatment of lead poisoning. It is a chelating agent that binds to heavy metals such as lead and mercury, which are then eliminated in the urine as the DMSA is excreted. A significant benefit is that it does not remove substantial amounts of other beneficial metals such as iron, calcium, magnesium and zinc. In addition to the therapeutic use of DMSA, a brief administration of DMSA followed by measurement of heavy metals in the urine is used as an indicator of the body burden of heavy metals. The greater the body burden of toxic metals, the greater the amount excreted after DMSA.

The approach to this test is that any increase in heavy metals after DMSA challenge is considered significant. The patient is then treated with DMSA treatment until the toxic metals in the urine are within the normal range after a DMSA challenge. An additional complication for children is that even a six-hour urine collection may be difficult. Therefore, a single urine sample collection after DMSA may sometimes be used.

DMSA Dosing Chart for challenge test:

Body Weight (lbs)	Dose (mg)	No. Capsules
18-35	100	1
36-55	200	2
56-75	300	3
76-100	400	4
>100	500	5

1. Immediately after awaking, empty the bladder completely. Do not eat any food for one hour except for small amount of food needed to take the DMSA.
2. Obtain DMSA capsules in the proper dosage from the chart above by filling a prescription from your doctor. Take the DMSA capsule with an 8-ounce glass of water or other fluid immediately after the bladder is emptied. The capsules may be opened up and added to the food for children or adults who have difficulty in swallowing capsules.
3. Collect all urine in the plastic collection jug for six hours after taking the DMSA capsule.
 - You may eat breakfast one hour or more after taking the DMSA capsule.
 - Drink only a moderate amount of fluid during the 6-hour collection period.
4. At the end of the 6-hours, empty the bladder of all urine into the collection jug one last time.
5. If you know from experience that you cannot collect the urine for six hours or you try to collect six hours of urine but are unsuccessful, mark the requisition with the number hours you were able to collect.
6. Follow the regular instructions for shipping urine samples.

Side effects of DMSA

The Physicians Desk Reference lists a number of side effects associated with DMSA usage. The side effects affect between 1-20% of the individuals affected. It might be expected that a single dose of DMSA would cause fewer side effects than a long-term treatment with DMSA.

Side effects of DMSA (continued)

Gastrointestinal side effects include nausea, vomiting, stomach pain, and abdominal pain and diarrhea.

Hematological (blood) side effects include neutropenia, eosinophilia, and increased platelets.

Other side effects include elevated liver enzymes, drowsiness, dizziness, sleepiness, rash, decreased urination, cardiac arrhythmia, leg and knee pain, and flu-like symptoms.

Treatment if challenge test is abnormal

If the challenge test is abnormal, then a treatment plan needs to be implemented. The most important aspect of the treatment plan is the removal of any current source of heavy metal poisoning. If the child's house is contaminated with lead-based paint, the parents may have to move or have the lead removed from the house. If the child is chewing on pajamas containing antimony-containing flame-retardant, they may have to be replaced. If the child has significant mercury from vaccines containing the mercury compound thimerosal, non-mercury vaccines should be used in the future. Excessive fish intake may also cause mercury toxicity.

DMSA

The next step is the use of agents to remove toxic metals. The most commonly used agent is DMSA. Despite some side-effects DMSA is considered the safest prescription agent. It is fairly expensive with a treatment cost that may range from \$12 -\$25 per day with an average treatment course of 19 days and may need to be repeated if a significant heavy metal burden remains after treatment.

Certain nutritional supplements may also be used to remove heavy metals. In addition, supplementation with beneficial metals such as calcium, magnesium, and zinc may also be helpful since these metals may compete with toxic metals and reduce heavy metal toxicity.

Lipoic acid

The vitamin lipoic acid has two sulfhydryl groups that readily bind to mercury and result in its elimination. This vitamin has no toxicity at doses used as a vitamin supplement and is sometimes used as an adjunct to DMSA therapy. Lipoic acid is available in any health food store.

PCA

Peptidyl clathrating agent (PCA) is a dietary supplement and not a drug. According to John Wilson, M.D. who has extensive experience in the removal of heavy metals, PCA is an extract of marine algae and barley grass, cell wall components of olive leaf, colloidal silica, minerals, and components from certain bacteria. Lipoic acid is high in this product and it is possible that the major active agent in this product is its lipoic acid. A number of different mechanisms of action are claimed for this product. Animal studies as well as clinical experience with humans seem to indicate that this agent is more effective and less toxic than pharmaceutical chelating agents such as DMSA and DMPS. Furthermore, PCA like DMSA does not remove beneficial elements. PCA is available from Timothy Ray OMD in Los Angeles at 310 473-1813.

References

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