

**An Overview Of**

# **MENIERE'S DISEASE**

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## **INTRODUCTION**

Meniere's disease or syndrome is common, occurring in one in a thousand people. It is generally thought to be caused by an imbalance of inner ear fluid pressure. Fluids of the inner ear are constantly being produced and absorbed. Any disturbance in this relationship that results in over-production or under-absorption of the fluids will cause a build-up of pressure (known as hydrops). This increased fluid pressure causes the hearing and balance sensory cells (known as hair cells) to respond erratically, thereby causing dizziness with attacks of vertigo, fluctuating hearing loss, ear pressure and tinnitus. This affects only one ear in the majority of cases. Up to 30% of cases can develop the problem in both ears.

A thorough evaluation is usually required to exclude other causes of these symptoms. In most cases a specific cause cannot be determined. However, circulatory, metabolic, dietary, toxic, allergic, immunologic, or emotional factors contribute to the symptoms of the disorder in many cases. As there are thought to be a number of causes, Meniere's disease is often referred to as a syndrome as opposed to a single disease process.

## **SYMPTOMS**

Meniere's syndrome is characterized by attacks of dizziness that vary from several minutes to several hours. Violent spinning, whirling and falling, associated with nausea and vomiting are common. The dizziness may occur suddenly and without warning. Hearing loss and head noise frequently accompany or precede the attacks. A sensation of pressure or fullness in the ear is common.

Attacks of dizziness occur at irregular intervals. The individual may be free of symptoms for years at a time. If the attacks do recur, they usually are less severe and of shorter duration than in the initial attack. The individual tends to remain free of symptoms between attacks. Occasionally, Meniere's syndrome may involve only hearing symptoms or only balance symptoms. Treatment for these variants of Meniere's syndrome are the same as for when Meniere's syndrome involves both hearing and balance.

## **EVALUATION**

Meniere's disease is not the only cause for symptoms described above. The diagnosis of Meniere's disease is made largely by history, but also by excluding other causes. Every patient with such symptoms must have a thorough history and examination by a physician that specializes in ear diseases and an audiometric (hearing) test. Based on the findings from these evaluations, additional testing for other causes may be necessary. Considerations include tumors on the hearing and balance nerve, loops of blood vessels compressing the balance nerves, syphilis infection, and rupture of inner ear membranes (known as a perilymph fistula). Testing for these problems may require radiographic studies (CT or MRI scans) and blood tests. Specific testing protocols may be required to adequately address these diagnostic concerns, so testing may need to be done at facilities familiar to your physician. Any previous hearing tests, blood work, or radiographic scans of the ear and brain may prove helpful in arriving at a diagnosis.

## MEDICAL TREATMENT

Most treatment is aimed at controlling the fluid pressure changes in the inner ear. Treatment varies with the individual patient according to the suspected cause, and the magnitude and frequency of symptoms.

**DIURETICS & LOW SALT DIET:** Meniere's syndrome is improved with diuretic (water pill) treatment and a low sodium diet in 75% of cases. Diuretics lower the body's sodium (salt) and water, including the inner ear fluids. Beware of side effects. Diuretics can waste some of the body's potassium which may cause the following symptoms: muscle cramping or weakness, fatigue, abdominal cramping. Generally the symptoms are avoided by including potassium in the diet ( $\geq 20\text{mEq}$  every day). Your doctor may put you on a diuretic that spares potassium wasting.

There is not one dose or type of diuretic that works for everyone. Your physician may choose to adjust your dose or try a second diuretic if the first is either not well tolerated or is ineffective at controlling symptoms.

When used as prescribed, diuretics are generally very safe. There is a potential for side effects, including low blood pressure, problems with other chemicals in the blood, liver problems, and problems with the white blood cells. Your primary care physician should know that you are on these medicines and determine the need for any tests to monitor for such side effects. Many diuretics are related to the “sulfa” class of antibiotics. Please let your physician know if you have a sulfa allergy and you have been prescribed a diuretic.

Appendix A reviews tips for low sodium diets. You are allowed 2,000 mg of sodium a day. A list of foods that are high in potassium, as well as a list of salt substitutes that are also high in potassium is included as Appendix B.

**DIETARY MODIFICATION & SUPPLEMENTS:** Caffeine, chocolate, and alcohol intake can aggravate symptoms for some patients with Meniere's disease. A trial of avoidance should be considered. Many other homeopathic remedies, vitamins, and nutritional supplements have been promoted as having treatment benefits for patients with Meniere's disease. Unfortunately, only anecdotal evidence supports their use. Recent studies have suggested that consumption of specially processed cereals may reduce the frequency and severity of Meniere's attacks by increasing levels of certain substances in the bloodstream. These cereals are not yet available in the United States. In some cases, particularly atypical Meniere's disease, other treatment options directed at other causes (eg, low tyramine diet for migraine-variant), may be considered.

**VASODILATORS & VASOCONSTRICTORS:** In the past, vasodilating drugs, which expand blood vessels, were thought to increase fluid reabsorption and decrease fluid pressure. Examples included niacin and betahistine. Vasodilator drugs taken by mouth in addition to a diuretic are not always helpful in controlling the inner fluid pressure. Controlled studies have failed to show significant benefit with this therapy. Inhaled and intravenous medications are infrequently recommended. More importantly, vasoconstricting substances, which narrow blood vessels, may increase inner ear fluid pressure and should be avoided. Such substances include caffeine, found in coffee and chocolate, and nicotine (cigarettes).

**VESTIBULAR SUPPRESSANTS:** Vertigo and dizziness are the main causes of difficulty with daily activities for patients with Meniere’s disease. These attacks are caused by the fluctuating pressure in the inner ear and inconsistent function of the inner ear balance-sensory cells. If the imbalance between the inner ears is stabilized or the portions of the brain that are activated by the abnormal signals are suppressed, symptoms will generally improve. The medicine most commonly used to accomplish this is an antihistamine called meclizine (known as Antivert, by prescription, and Bonine, over the counter). Stronger medicines include promethazine (aka, Phenergan) and benzodiazepenes (eg, Valium). These chemicals all have a tranquilizer effect, so they are not routinely used to prevent attacks. Rather, they may be used to relieve an attack that is developing or one that is already underway.

**STEROIDS & IMMUNOSUPPRESSION:** Recent studies have suggested that a large percentage of people with Meniere’s disease have abnormal levels of antibodies that bind to the body’s own proteins (known as auto-antibodies). Normally, antibodies only bind to foreign organisms, such as bacteria and viruses. The finding of auto-antibodies in Meniere’s patients suggests that the cause may be “autoimmune,” or resulting from the body attacking itself—possibly triggered by an earlier viral infection. Although no well-controlled studies have proven the benefits of this treatment option, some patients with typical Meniere’s disease seem to respond to suppression of the body’s immune system. The most rapid and safest way to do this is with administration of corticosteroids. (Note that these are not the anabolic steroids used by body builders).

Steroids may be given by mouth or injected directly into the ear. Steroids taken by mouth have many, potentially serious side effects throughout the body (Appendix C), thus limiting their use. Steroids given into the inner ear have much less risk for these side effects, but a permanent hole may remain in the eardrum after treatment. These treatment options may be considered if other medical therapy fails, particularly in younger patients (more likely to get disease in both ears over time), and in patients with active disease in both ears.

Other immunosuppressive agents, such as methotrexate and cyclophosphamide, have shown promising early results, but again, no controlled studies have proven their efficacy. These drugs also have the potential for very serious side effects.

**MENIETT TREATMENT:** This is a relatively new treatment option that involves treating the affected ear with pressure waves. It requires that a small tube be placed in your eardrum. The device, purchased through Medtronic-Xomed (Jacksonville, FL; [www.meniett.com](http://www.meniett.com); Phone: 1-800-874-5797) after being prescribed by your physician. While you may need to pay for the device up front, you may be able to get insurance to reimburse this expense and the product is returnable if it is not effective.

## **SURGICAL TREATMENT**

Surgery is indicated when medical treatment fails to relieve the acute attacks of vertigo and the frequency and severity of the vertigo is disabling. The type of operation selected depends on the

individual's age, functional level, and degree of hearing impairment in both the affected ear and the opposite ear. Every effort is made to preserve functional hearing. In some cases the hearing may be improved following surgery and in others it may become worse, but usually it remains the same. Head noise may improve, stay the same, or be worse.

Surgery is successful in relieving acute attacks of dizziness in most patients but varies according to the procedure used. Unsteadiness, however, may persist for a period of several weeks to months, until the opposite ear is able to stabilize the balance system. This may be dependent on other factors such as age and problems in other balance centers, such as the brain.

In the event that a hearing conservation operation does not relieve the attacks of dizziness, a second operation may be necessary.

The operative procedures are as follows:

***GENTAMICIN INJECTION:*** Gentamicin is an antibiotic that is toxic to the inner ear. In the treatment of Meniere's disease, this drug is injected either through a needle or through a tube that has been surgically placed through the tympanic membranae. The drug is administered until the diseased balance system is destroyed (see instructions in Appendix D). Treatment is stopped if the hearing is affected. **Vertigo is controlled in 80 to 90%** of patients and hearing is lost in 10%. Some persistent imbalance, usually mild, is common after the treatment. Many patients choose this treatment option, because it is the least invasive, with treatment being done on an outpatient basis, little risk, and a high chance of successful control of vertigo.

***ENDOLYMPHATIC SAC SURGERY:*** This operation is thought to work by reducing inner ear fluid pressure. It usually requires general anesthesia and is done on an outpatient basis. A skin incision is made behind the ear. The endolymphatic sac is approached through the mastoid air cells behind the ear canal. The endolymphatic sac is decompressed from the surrounding bone. The sac may be opened and drained to reduce inner ear fluid pressure by placing a plastic shunt or stint in the sac. Endolymphatic sac decompression and sac shunting have been reported to be **successful in 65 - 75%** of patients. Endolymphatic sac surgery is an option when hearing is serviceable in the involved ear and when there is a significant chance of developing Meniere's in the opposite ear (typically younger patients). Further loss of hearing occurs in one percent of cases. Many patients choose this option because it doesn't "burn any bridges," though its chance of success is slightly lower.

***LABYRINTHECTOMY:*** This operation requires general anesthesia and hospitalization for up to one week. A skin incision is made behind the ear. The vestibular labyrinth (ie, the ear's balance canals) is approached through the mastoid air cells. The balance canals are surgically removed and the balance nerve cells are destroyed. Labyrinthectomy **eliminates attacks of vertigo in 95%** of cases. The operation generally causes severe dizziness that usually resolves within several days. Unsteadiness may continue for several weeks or months until the balance system compensates for the loss of balance function in one ear. The amount of dizziness after surgery depends on the amount of residual balance function in that ear prior to surgery. This operation causes total hearing loss in the operated ear (except in certain experimental procedures). Therefore, labyrinthectomy is generally recommended for patients with no useable

hearing in the involved ear. As this procedure requires a surgery and the benefits are only slightly better than those observed with gentamicin therapy, this procedure has become much less common since the introduction of gentamicin therapy.

**VESTIBULAR NERVE SECTION:** This procedure requires a general anesthetic and one week of hospitalization. The surgery involves an incision either behind or above the ear. A window of bone next to the brain is removed (later replaced) and the brain is gently moved to the side to expose the balance nerves. The balance nerves are cut as they run between the brain and the inner ear. The hearing nerve is usually preserved. Rarely, some patients have severe hearing loss after surgery. Dizzy **attacks are eliminated in 90-95%** of cases. The operation may cause severe dizziness which improves over several days. Unsteadiness may persist for weeks to months after surgery until the balance system can compensate for the loss of balance function in one ear. This treatment option has also become less common since the introduction of gentamicin therapy, as the results are similar and the latter does not require surgery next to the brain. This treatment option should, however, be considered by younger patients that are more critically dependent on their hearing for their daily activities (eg, musicians).

## **RISKS AND COMPLICATIONS OF SURGERY FOR VERTIGO**

**Vertigo and Dysequilibrium:** All surgery for vertigo is marked by a certain failure rate (ie, vertigo may persist), as described above. Furthermore, removal or destruction of the ear that has been damaged by Meniere's disease does not restore the entire balance system to normal. A certain degree of imbalance or dysequilibrium, usually mild, can be expected after any of these procedures. This is primarily a problem when, for example, trying to balance in the dark, while standing on soft carpet. Occasionally, such imbalance can be frustrating for patients. This symptom is often improved with physical therapy.

**Hearing Loss:** All surgery for vertigo carries a certain risk for worsening hearing loss. However, hearing loss in patients with Meniere's disease tends to fluctuate and progress, regardless of most treatments.

**Tinnitus:** Tinnitus (head noise) usually is not affected by surgery. Tinnitus usually changes with hearing, so that if hearing is improved tinnitus is improved, and if hearing is worse tinnitus is worse.

**Taste:** Taste disturbance may occur for several weeks following surgery. In five percent of cases taste disturbance is prolonged.

**Facial Weakness:** The facial nerve travels through the temporal (ear) bone in close association with the hearing and balance nerves. Temporary weakness of one side of the face may occur after surgery because of nerve swelling. This occurs in about one percent of patients who have a vestibular nerve section. It is rare in other types of surgery for vertigo. Facial function usually returns within several weeks. However, should it persist for longer periods, a minor procedure on the eyelids may be necessary to prevent eye complications.

**Cerebrospinal Fluid Leak:** Endolymphatic sac surgery, labyrinthectomy, and vestibular nerve

section may result in a communication between the spinal fluid and the ear. This communication is closed prior to the completion of surgery. Occasionally, the communication reopens and spinal fluid drainage or further surgery may be required to close it.

***Infection:*** Infection is extremely uncommon. If infection occurs in the presence of a cerebrospinal fluid leak, then a serious infection of the spinal fluid spaces may occur, or meningitis. This would require treatment with intravenous antibiotics and would prolong the hospital stay.

***Hematoma:*** A hematoma (blood clot) occurs rarely. Reoperation to remove the clot may be necessary to allow healing.

***Neurologic:*** In addition to the above, any surgery performed adjacent to the brain may have additional, rare complications of bleeding, stroke, or even risk to life.

## CARE INSTRUCTIONS FOLLOWING VERTIGO SURGERY

Please call the ENT clinic if you experience:

- clear, watery drainage from your incision or nose;
- redness, swelling or infected drainage from your incision;
- pain, cramping or swelling in the legs;
- fevers (>101<sup>0</sup>F);
- severe headache or neck stiffness.

**MEDICATIONS:** Your surgeon will commonly prescribe a medicine to relieve pain for the first few days after surgery. Antibiotics to be taken by mouth are not routinely used, but may be indicated in certain circumstances. If a tube has been inserted for gentamicin treatment, the medication will need to be purchased through certain pharmacies. The nursing staff at the Ear, Nose, and Throat Clinic can teach you how to inject the medicine as prescribed by your physician.

**EAR DRESSING:** A cotton or a plastic and cotton pressure dressing is commonly used to protect the ear after sac surgery, labyrinthectomy, or nerve section.. This may be removed after one to two days. A cotton ball is kept in the bowl of the outer ear to catch drainage from the ear canal. This should be changed with fresh cotton as it becomes saturated. Under the cotton ball, foam packing may be seen. This should not be disturbed. It is normal for some of this packing to fall out with cotton ball changes. This packing will be removed by your surgeon during your postoperative visits. No dressing is usually used after gentamicin surgery.

**BATHING & SWIMMING:** Washing the hair may be resumed 2 or 3 days following sac surgery or labyrinthectomy. This is usually delayed by 5 – 7 days after gentamicin tube placement or nerve section. Any external incisions (eg, behind the ear), if any, may get wet at this time. Avoid scrubbing the incision. If a small area of the incision behind the ear opens or bleeds after bathing, simply clean it daily with hydrogen peroxide on a cotton ball. It is important to avoid contamination of the ear canal with water until the ear drum is healed (usually < 4 weeks after removal of the gentamicin tube). As earplugs are far from perfect, submersing the head, such as with swimming, is not recommended until the eardrum is healed.

**NOSE BLOWING & SNEEZING:** Raising pressure in the back of the nose by nose blowing or sneezing with the nostrils obstructed and mouth closed can lead to build-up of pressure in the middle ear, forcing air into the inner ear or around the brain. Avoid nose blowing and sneeze with your mouth open until cleared by your surgeon.

**ACTIVITIES:** Most daily activities will not affect your outcome with surgery. Light activities, such as walking, are encouraged. Balance critical activities should not be performed until cleared by your physician.

**TRAVEL:** You should have someone drive you from the hospital. Driving is permissible the day after surgery if there is no difficulty with head movements (eg, dizziness). Air travel is permissible 48 hours after surgery.

***POSTOPERATIVE CLINIC VISITS:*** The first visit to your surgeon will generally be between 1 and 3 weeks after surgery. Keeping these scheduled visits is important to ensure optimal healing and prompt treatment of any problems. Subsequent visits are commonly scheduled at 4 – 8 week intervals until healing is complete and balance is stabilized.

### ***GENERAL COMMENTS***

Whether you choose treatment with surgery or medications, it is advisable to have careful hearing tests and ear examinations repeated at least once a year. Other, more serious problems may cause symptoms like Meniere's disease. Only with ongoing monitoring can such problems be identified.

Should any questions arise regarding your hearing impairment, feel free to call or write us at anytime.

## Appendix A

### LOW SODIUM DIET

#### FOODS TO AVOID

<u>Meats</u>	<u>Other Foods</u>	<u>Seasonings</u>
Bacon	Bouillon	Catsup
Bologna and other cold cuts	Canned soups	Celery Salt
Chipped beef	Frozen soups	Chili sauce
Corned beef	Pretzels	Commercial meat extracts
Frankfurters	Salted potato chips	Lemon pepper
Ham	Salted popcorn	Meat tenderizers
Kosher meat	Salted crackers	Monosodium glutamate
Luncheon meat	Salted nuts	Olives
Sausage	Salted snack foods	Pickles
Salt codfish	Sauerkraut	Prepared mustard
Salt pork	Soup mixes	Soy sauce
		Worcestershire sauce

Any canned, corned, salted, or smoked meats, fisher; anchovies, caviar, herring, sardines, etc.

#### SHOPPING DO'S & DON'T'S

Read package labels carefully to spot hidden sources of sodium. Sodium, in one form or another, is the second most commonly used food additive. Sodium benzoate, sodium propionate, disodium sulfite and monosodium glutamate are only a few examples of sodium containing additives.

Buy fresh fruits and vegetables instead of canned or other processed items. Fresh produce is lower in sodium and an important source of vitamins A and C as well as potassium.

Buy fresh meat instead of processed luncheon or delicatessen meats. Cook a roast or whole chicken and freeze slices in small packages for use in sandwiches.

#### IN PLACE OF SALT

You can limit sodium and calories while increasing the vitamin C value of vegetables and salads by flavoring them with lemon instead of salt or salad dressing.

Be careful not to use onion or garlic salt when cooking. Replace them with onion and garlic powder or their fresh form for an even stronger flavor.

Experiment with a variety of green herbs and spices in place of salt. Most are very low in sodium and can add creativity to your cooking, at the stove or on the table.

Try to cut back on the salt in cooking and baking by at least one-half. Most recipes have been written for people with a taste for salt. If you've already started to limit your sodium intake, you probably won't miss the extra salt.

## **EATING AWAY FROM HOME**

When picking up a quick snack while "on the go", choose an apple or an orange rather than a salty snack such as a twist pretzel or potato chips.

When you do eat out, avoid foods prepared with sauces and gravies. Instead, order plain broiled or baked pieces of meat and bring your own mixture of low sodium herbs and spices from home. If you want to sample a sauce or gravy, ask for it on the side.

When you eat at other's homes, offer to bring a fresh vegetable or fruit platter. Your host or hostess will welcome the hors d'oeuvres and there will be something other than salty snack foods to nibble on before dinner.

## SEASONING WITH HERBS

Excerpted from an article by the Department of Health and Human Services.

Herbs can provide creative, tasteful alternatives to salt for flavoring foods. Through the skillful use of herbs and spices, imaginative flavors can be created and simple foods made into gourmet delights. Herbs and spices differ only in that herbs tend to be plants grown in temperate areas while spices grow in tropical regions. Many people prefer to grow their own herbs to have a fresh supply throughout the growing season thereby assuring top quality. Professional cooks prefer fresh herbs, if available, but fresh herbs are less concentrated and two to three times as much should be used if a recipe calls for dried herbs.

If growing herbs for drying, the harvesting should be done in the morning after the dew has evaporated but before the sun is very bright. The essential oils in herbs will evaporate into the atmosphere during the day, so it is important to collect them when flavor is at its peak. Cut only the amount to be used in one day. The herbs should be dried in bunches or laid on screens in a warm, dark, well-ventilated spot. An attic is ideal although closets or dry basements will suffice. Ideally, the temperature should not be over ninety degrees. If it's too hot, the herbs will cook. The length of time required for drying will vary according to the thickness of the plant parts. Herbs should be stored away from direct sunlight to prevent bleaching. Be sure they're well labeled. Most dried herbs will keep for at least one year in glass or plastic containers. But eventually they lose most of their potency and should then be thrown out. Certain herbs, such as chives, parsley, French tarragon, mint, basil, lavender and sorrel, keep well in the freezer. Put them into individual plastic bags or small plastic jars and freeze them.

There are no strict limits to the use of herbs. A good general rule is to not mix two very strong herbs together, but rather one strong and one or more milder flavors to complement both the stronger herb and the food.

### *Tips for Cooking with Herbs and Spices*

\*In general, the weaker the flavor of the main staple item, the lower the level of added seasoning required to achieve a satisfactory balance of flavor in the end product.

\*Dried herbs are stronger than fresh, and powdered herbs are stronger than crumbled. A useful formula is: 1/4 teaspoon powdered herbs = 3/4 to 1 teaspoon crumbled = 2 teaspoons fresh.

\*Leaves should be chopped very fine because the more cut surface exposed the more flavor will be absorbed.

\*A mortar and pestle can be kept in the kitchen to powder dry herbs when necessary.

\*Scissors are often the best utensil for cutting fresh herbs.

\*Be conservative in the amount of an herb used until you're familiar with its strength. The aromatic oils can be strong and objectionable if too much is used.

\*The flavoring of herbs is lost by extended cooking. Add herbs to soups or stews about 45 minutes before completing the cooking. But for cold foods such as dips, cheese, vegetables and dressings, herbs should be added several hours or overnight before using.

\*For casseroles and hot sauces, add finely chopped fresh or dried herbs directly to the mixture.

\*To become familiar with the specific flavor of an herb, try mixing it with butter and/or cream cheese, let it set for at least an hour and spread on a plain cracker.

\*Beware when purchasing herbal salt blends. Many are merely herbs added to salt. Read the ingredients carefully or just blend your own combinations.

\*Dried herbs should be stored in plastic bags, boxes or tins rather than cardboard containers. Keep the containers out of the direct sunlight (because that will bleach their color and reduce their strength) and don't place them too near the stove (to avoid the high humidity).

### **Strengths of Herbs**

Strong or Dominant Flavors: These should be used with care since their flavors stand out - approximately one teaspoon for six servings. They include bay, cardamom, curry, ginger, hot peppers, mustard, pepper (black), rosemary and sage.

Medium Flavors: A moderate amount of these is recommended - one to two teaspoons for six servings. They are basil, celery seed and leaves, cumin, dill, fennel, French tarragon, garlic marjoram, mint, oregano, savory (winter and summer), thyme, and turmeric.

Delicate Flavors: These may be used in large quantities and combine well with most other herbs and spices. This group includes burnet, chervil, chives and parsley.

### **Herb Blends**

Herbs can be combined for specific foods. Having the combinations on hand will speed cooking and enhance one's reputation as a gourmet. They can be added loosely or wrapped in cheesecloth and removed before serving. Following are some suggested herb blends:

Egg herbs: basil, dill weed (leaves), garlic, parsley

Fish herbs: basil, bay leaf (crumbled), French tarragon, lemon thyme, parsley

(options: fennel, sage, savory)

Poultry herbs: lavender, marjoram (two parts), sage (three parts)

Salad herbs: basil, lavender, parsley, French tarragon

Tomato sauce herbs: basil (two parts), bay leaf, marjoram, oregano, parsley  
(Options: celery leaves, cloves)

Vegetable herbs: basil, parsley, savory

Italian blend: basil, marjoram, oregano, rosemary, sage, savory, thyme

Barbecue blend: cumin, garlic, hot pepper, oregano

French herbal combinations

\*Fine herbs: Parsley, chervil, chives, French tarragon (sometimes adding a small amount of basil, fennel, oregano, sage or saffron)

\*Bouquet garnish mixtures: Bay, parsley (two parts), thyme. The herbs may be wrapped in cheesecloth or the parsley wrapped around the thyme and bay leaf.

Basic herb butter: One stick unsalted butter, one to three tablespoons dried herbs or two to six tablespoons fresh herbs, 1/2 teaspoon lemon juice, and white pepper. Combine ingredients and mix until fluffy. Pack in covered container and let set at least one hour. Any of the culinary herbs and spices may be used.

Herb Vinegars: Heat vinegar in an enamel pan and pour it into a vinegar bottle and add one or several culinary herbs (to taste). Do not let the vinegar boil. Let the mixture set for two weeks before using. Any type of vinegar may be used, depending on personal preference.

### **Herb Blends To Replace Salt**

These can be placed in shakers and used instead of salt

Saltless surprise: 2 teaspoons garlic powder and 1 teaspoon each of basil, oregano, and powdered lemon rind (or dehydrated lemon juice). Put ingredients into a blender and mix well. Store in glass container, label well and add rice to prevent caking.

3 teaspoons basil, 2 teaspoons each of savory (summer savory is best), celery seed, ground cumin seed, sage and marjoram and 1 teaspoon lemon thyme. Mix well, then powder with a mortar and pestle.

Spicy saltless seasoning: 1 teaspoon each of cloves, pepper, and coriander seed (crushed), 2 teaspoon paprika, and 1 tablespoon rosemary. Mix ingredients in a blender. Store in airtight container

### **What Goes With What**

Soups: bay, chervil, French tarragon, marjoram, parsley, savory rosemary

Poultry: garlic, oregano, rosemary, savory, sage

Beef: bay, chives, gloves, cumin, garlic, hot pepper, marjoram, rosemary, savory

Lamb: garlic, marjoram, oregano, rosemary, thyme (make little slits in lamb to be roasted and insert herbs)

Pork: coriander, cumin, garlic, ginger, hot pepper, pepper sage, savory, thyme

Cheese: basil, chervil, chives, curry, dill, fennel, garlic chives, marjoram oregano, parsley, sage, thyme

Fish: chervil, dill, fennel, French tarragon, garlic, parsley, thyme

Fruit: anise, cinnamon, coriander, cloves, ginger, lemon verbena, mint, rose geranium, sweet cicely

Bread: caraway, marjoram, oregano, poppy seed, rosemary, thyme

Vegetables: basil, curnet, chervil, chives, dill, French tarragon, marjoram, mint, parsley, pepper, thyme

Salads: basil, borage, burnet, chives, French tarragon, garlic chives, parsley, rocket-salad, sorrel (these are best used or added to salad dressing. Otherwise, use herb vinegars for extra flavor).

## Appendix B

### POTASSIUM SUPPLEMENTS

Most patients treated with diuretics do not need potassium supplements. The usual amount of potassium needed in the diet to prevent potassium depletion is about 20 milliequivalents per day. If the patient is potassium depleted, then the amount of potassium should be increased from 40 to 100 milliequivalents per day.

### SOURCES OF POTASSIUM

<u>Source</u>	<u>Amount</u>	<u>mEq of potassium</u>
Peaches, dried, uncooked	1 cup	39
Raisins, dried, seeded	1 cup	31
Dates, dried, cut, pitted	1 cup	29
Apricots, dried, uncooked	17 large halves	25
Figs, dried, medium	7	23
Prune juice, canned	1 cup	15
Watermelon	1 slice (6" x 1 1/2")	15
Banana	1 medium	14
Beef round, stew meat, raw	4 oz.	14
Cantaloupe	1/2 (5")	13
Orange juice, fresh	1 cup	13
Turkey, roasted	3 1/2 oz.	13
Klotrix Tabs	1 tablet	10
Kaon C1-10	1 tablet	10
Milk, whole, 3.5% fat	1 cup	9
Slow-K	1 tablet	8
Kaon-C1	1 tablet	6.7

<u>Salt Substitutes</u>	<u>Potassium (mEq)</u>
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Adolph's 1 packet	11.0
CoSalt 1 g	11.5
Diasal 1 g	11.3
Nu Salt 1 g	10.4
Salfree 1 g	14.1
Morton's Salt Substitute	12.6

Lite salt is not included because it contains a substantial amount of sodium chloride (unlike the other salt substitutes).

Note: 1 teaspoon = 5 g, 1 mEq K - 39 mg, 1 mEq Na = 23 mg

\*Adapted from JAT Pennington and HN Church, Food Values of Portions Commonly Used, New York: Harper & Rowe, 1980.

## Appendix C

### SYSTEMIC CORTICOSTEROID THERAPY

#### PRECAUTIONS WHILE USING THIS MEDICINE

Do not stop using this medicine without first checking with your doctor. Your doctor may want you to follow a low-salt or potassium-rich diet. Tell the doctor in charge that you are using this medicine before having skin tests, before having any kind of surgery (including dental surgery) emergency treatment, or if you get a serious infection or injury while you are being treated with this medicine, and after you stop taking do not have any immunizations without your doctor's approval. Diabetic patients: Check with your doctor if you notice a change in your blood sugar levels. Children should avoid close contact with anyone who has chickenpox or measles. Tell the doctor right away if you think the child has been exposed to chickenpox or measles.

#### POSSIBLE SIDE EFFECTS OF THIS MEDICINE

Side Effects That Should Be Reported To Your Doctor

**LESS COMMON** - Decreased or blurred vision; frequent urination; increased thirst.

**RARE** - Confusion; excitement; false sense of well-being; hallucinations; mental depression; mistaken feelings of self-importance or being mistreated; mood swings; restlessness.

**WITH LONG-TERM USE** - Abdominal or stomach pain or burning; continuing acne or other skin problems; bloody or black tarry stools; filling or rounding out of face; irregular heartbeat; menstrual problems; muscle cramps, pain, or weakness; nausea; pain in back, hips, ribs, arms, shoulders, or legs; reddish purple lines on skin; swelling of feet or lower legs; thin shiny skin; unusual bruising; unusual tiredness or weakness; vomiting weight gain (rapid); wounds that will not heal.

#### SIDE EFFECTS THAT USUALLY DO NOT REQUIRE MEDICAL ATTENTION

These possible side effects may go away during treatment; however, if they continue or are bothersome, check with your doctor, nurse, or pharmacist.

**MORE COMMON** - Increased appetite; indigestion; loss of appetite (triamcinolone only); nervousness or restlessness; trouble sleeping.

After you stop using this medicine, your body may need time to adjust. During this

time, check with your doctor immediately if any of the following side effects occur: Abdominal, stomach ache, or back pain; dizziness; fainting; fever; loss of appetite (continuing); muscle or joint pain; nausea; reappearance of disease symptoms; shortness of breath; unexplained headaches (frequent or continuing); unusual tiredness or weakness; vomiting; weight loss (rapid). Other side effects not listed above may also occur in some patients. If you notice any other effects, check with your doctor, nurse, or pharmacist.

The information in this leaflet has been selectively abstracted from USP DI for use as educational aid and does not cover all possible uses, actions, precautions, side effects, or interactions of this medicine. It is not intended a medical advice or individual problems.

### **Reference**

1994 The United States Pharmacopeial Convention, Inc. April 1994, Corticosteroids (Oral) 50-03.

## **Appendix D**

### **GENTAMYCIN PERFUSION GUIDELINES**

- Be sure to take medication out of the refrigerator 1 hour before putting it in the tube.
- Wipe the tip of the catheter before inserting the needle each time (before putting medication in and taking medication out).
- Instill medicine very slowly and this may cause temporary discomfort.
- Keep head turned and lay flat for 30 minutes after the medication has been put in ear. This is very important to insure most effectiveness from medication.
- It may or may not cause unpleasant taste, but this is normal.
- Take old medication out before instilling the next dose. Be sure to use a new needle and syringe each time you put medicine in or take medicine out.
- Medication may come out of ear when you sit up, this is normal.
- No water can be allowed in ear for one month after treatment has been done, unless the doctor tells you otherwise.
- If there is a great amount of hearing loss noticed, this needs to be reported to your physician as soon as possible.