

A GUIDE TO ENHANCING YOUR RECOVERY AFTER LIVER SURGERY

Massachusetts General Hospital
Center for **O**utcomes & **P**atient **S**afety in **S**urgery (**COMPASS**)

This pamphlet is designed to help you understand and prepare for your surgery.
Please review and ask any questions of your surgical team prior to the surgery.

◆◆◆ Information about my surgery ◆◆◆

Date of Surgery:	
Time of Surgery:	You must arrive 2 hours before scheduled surgery time

Your Surgeon	Office Number
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- **STOP ALL SOLID FOOD AT 10PM the night before surgery.**
- **You may have clear liquids (see below) up to no less than 2 hours before surgery**

On the day before surgery, follow your surgeon's prescribed diet. If you do not have one, please eat and drink as you normally would. Be sure you are well hydrated.

You can continue to drink clear liquids up to no less than 2 hours before surgery. Please see list of Clear Liquids below.

No less than 2 hours before your surgical time you must stop drinking completely. Do not have anything to drink at all.

If you have diabetes and your blood sugar is low or you start to feel symptoms of low blood sugar, drink a clear liquid with sugar, such as apple juice, grape juice or regular soda. If this does not help, drink or eat any liquid or fluid that will raise your blood sugar. No matter what, it is better to delay your surgery than to ignore low blood sugar.

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◆◆◆ Introduction ◆◆◆

This pamphlet is part of the Mass General Brigham Enhanced Recovery After Surgery (ERAS) program, which is now the standard practice for all surgical patients in the Mass General Brigham System and affiliated hospitals.

Why are we doing the ERAS approach to surgery?

This program is different from the traditional approach to surgery and has been shown to improve patient recovery after surgery, reduce complications and reduce the number of days you stay in the hospital after surgery. We want you, the patient, to also be an active participant in the recovery process. The overall goal is for you to have a better surgical experience and get back to normal as soon as possible. With your help, we can achieve these goals.

This program is designed to keep you actively involved in your recovery prior to and after your surgery.

Each stage of this program is tailored to minimize your pain, avoid complications, and allow for earlier resumption of food and activity.

How Long Will I Be in the Hospital?

If you are having a minor surgery and do not have any problems after your procedure, you may go home as soon as the next day after your surgery. Because we perform many types of surgery for many different reasons, your individual stay may be longer. Each day your surgical team will assess you for readiness, with the goal to be discharged home as soon as is possible.

◆◆◆ Before Surgery ◆◆◆

If you are taking aspirin, NSAIDs, or any type of anticoagulation, discuss this specifically with your surgeon before your surgery.

How Can I Prepare for My Surgery?

◆◆◆ Prior to Surgery

1. **Exercise** improves the body's response to stress and improves fitness, which aids in recovery. If you do not exercise regularly, it is advised to start slowly. Exercise does not need to be strenuous, even 30-45-minute walks daily are better than not exercising.
2. For 7-10 days prior to surgery, unless otherwise directed, follow a low calorie, low carbohydrate **diet** to soften your liver with the goal of increasing the safety of your operation.
3. It is strongly suggested that you **stop smoking** completely at least 3 weeks before your surgery. This will reduce the chances of lung complications during and after surgery and improve your recovery. If you would like more information on how to quit smoking, speak to your doctor, nurse or pharmacist.
4. Avoid consumption of **alcohol** at least 24 hours (ideally, a month) before your surgery.
5. **Plan ahead.** Arrange for someone to accompany you at the time of admission and at the time of discharge. Make prior preparations at home for your arrival after surgery. Make sure there is enough food and supplies. You should be able to walk and eat and care for yourself, but you may need some extra assistance initially from family or friends, especially to avoid strenuous tasks like laundry/cleaning/grocery shopping immediately after your surgery.

6. **Stay hydrated.** In the 72 hours prior to surgery, please make sure you hydrate frequently with water, Gatorade, Powerade, ClearFast, or other clear liquids.

Anesthesia Will Call You Prior to Surgery

Pre-Op Phone Calls

Before your surgery, you will receive **2 phone calls** by members of the surgical team who will go over different parts of your care:

1. **Phone call from a member of the anesthesia team:**

- ❖ This phone call will be scheduled ahead of time to ensure that you are available to take this call.

During this call, a provider will:

- Review which medications you should take on the day of your surgery and which, if any, need to be stopped prior to surgery.
- Ask questions to assess your health and explain the surgery process.

2. **Phone call from Surgeon's Surgical Coordinator:**

- ❖ 1-3 days prior to surgery you will receive a call to finalize your surgery time and confirm exactly what time you need to arrive to check in.

If you still have additional questions after reviewing these instructions, please contact your surgeon's office.

7-10 days prior to surgery: Liver Pre-Op Diet

Daily Goals

- 800-1000 calories
- 60-100 grams protein. For BMI greater than 50, protein goal is 80-100 grams.
- 80-100 grams carbohydrate
- 48-64 ounces of calorie free, caffeine free fluids per day

Why Do I Need to Follow this Diet?

By following a strict diet, your body reduces its glycogen stores (glycogen is a form of sugar stored in the liver and muscles for energy). With each ounce of glycogen, the body stores 3-4 ounces of water. So, when you follow a very strict diet - especially one that is low in starch and sugar - your body loses its glycogen stores and some water. The liver shrinks, as it has less glycogen in it. **By slightly reducing the size of the liver, surgery can be performed more safely.**

A special note for lactose intolerant patients

It is recommended that you choose Boost Diabetic for your protein shake meal replacement because it is lactose free. You will see meal options including yogurt, low-fat string cheese, and low-fat cottage cheese. Most lactose intolerant individuals can consume yogurt without experiencing gas or bloating but will likely need to take the lactase enzyme with cottage cheese.

A special note for diabetic patients

This diet will most likely be quite a reduction from your normal intake of carbohydrates and calories. If you are taking medication for diabetes (insulin, metformin, glipizide, etc.) you must contact your diabetes clinician to discuss your blood sugar management before starting this diet. Monitor your blood sugar carefully and have your doctor adjust your medication as needed. Consult your doctor as needed for any concerns you may have. The goal is to decrease your insulin to keep your blood sugar normal, not to increase your food. However, if your blood sugar does drop too low (<60), each of the following provides 15g of carbohydrates and may be used in the event of a low blood sugar reaction:

- 4 oz (1/2 cup) 100% fruit juice (no sugar added)
- 8 oz (1 cup) fat free skim milk
- 1 Tbsp regular jelly or 1 ½ Tbsp Polaner All Fruit
- 1 Tbsp honey

Rule of 15: Have 15g of carbohydrate (chose from above). Wait 15 minutes and re-check your blood sugar. Consume 15g of carbohydrate every 15 minutes until your blood sugar reaches 60.

	Option 1	Option 2	Option 3	Option 4
Break fast	<ul style="list-style-type: none"> • 1 cup Kashi GoLean Original cereal • 8 oz skim or soy milk <p>230 Calories 21g Protein 42g Carbohydrate</p>	<ul style="list-style-type: none"> • Protein drink • ½ cup fruit <p>240 Calories 20g Protein 20g Carbohydrate</p>	<ul style="list-style-type: none"> • 1-2 eggs • Light English muffin • 1 slice (1 oz) low fat cheese <p>200 Calories 18g Protein 25g Carbohydrate</p>	<ul style="list-style-type: none"> • ¾ cup plain Greek yogurt • ½ cup berries <p>160 Calories 18g Protein 14g Carbohydrate</p>
Lunch	<ul style="list-style-type: none"> • ¾ cup low fat cottage cheese • ½ cup fruit <p>195 Calories 21g Protein 20g Carbohydrate</p>	<ul style="list-style-type: none"> • Protein drink • ½ cup fruit <p>240 Calories 20g Protein 20g Carbohydrate</p>	<ul style="list-style-type: none"> • 1 Lean frozen meal (Lean Cuisine, Smart Ones, Healthy Choice) <p>300 Calories 18g Protein 30g Carbohydrate</p>	<ul style="list-style-type: none"> • 3 oz turkey • ½ whole wheat pita • 1 tsp mustard • 1 cup non-starchy veggies <p>255 Calories 28g Protein 27g Carbohydrate</p>
Dinner	<ul style="list-style-type: none"> • 3 oz lean meat • 2 cups salad • 1 T low fat dressing • ½ cup potato, peas, corn, winter squash or 1/3 cup rice or pasta <p>275 Calories 28g Protein 25g Carbohydrate</p>	<ul style="list-style-type: none"> • Protein drink • ½ cup fruit <p>240 Calories 20g Protein 20g Carbohydrate</p>	<ul style="list-style-type: none"> • ¾ cup plain Greek yogurt • ½ cup berries <p>160 Calories 18g Protein 14g Carbohydrate</p>	<ul style="list-style-type: none"> • 3 oz canned tuna (packed in water) • 2 cups salad greens • 1 T dried cranberries • 1 T low fat dressing <p>255 Calories 28g Protein 27g Carbohydrate</p>
Snack	<ul style="list-style-type: none"> • 2 sugar free popsicles • 2 low fat string cheese <p>190 Calories 14g Protein 8g Carbohydrate</p>	<ul style="list-style-type: none"> • Protein drink • 2 sugar free popsicles • ½ cup fruit <p>240 Calories 20g Protein 20g Carbohydrate</p>	<ul style="list-style-type: none"> • ¾ cup plain Greek yogurt • ½ cup berries <p>160 Calories 18g Protein 14g Carbohydrate</p>	<ul style="list-style-type: none"> • ½ cup low fat ricotta cheese • Small serving of fruit <p>2200 Calories 14g Protein 19g Carbohydrate</p>
Total	890 Calories 84g Protein 95g Carbohydrate	930 Calories 80g Protein 73g Carbohydrate	935 Calories 82g Protein 94g Carbohydrate	895 Calories 85g Protein 88g Carbohydrate

Important notes

- Drink at least 64 oz of fluid a day (sugar free, 10 calories or less per serving).
- If not already taking a complete multivitamin, please start.
- Begin taking sennosides/docusate (Senokot-S) 8.6-50mg. Take 2 tablets by mouth daily.

Discontinue if bowel movements become too loose or too frequent. Alternatively, you can drink Smooth Move® tea.

Additional Information for Pre-Op Surgical Diet

Track daily intake to be sure you are within your daily goals. Nutrition information can be found on nutrition labels and online using the following sites:

- www.calorieking.com
- www.fitday.com
- www.myfitnesspal.com

The following are acceptable **protein drink options** (available at GNC, Walmart, grocery stores, online. Ready-to-drink and powder forms are both acceptable):

- Slim Fast Low Carb
- Carnation Instant Breakfast (no sugar added)
- Atkins Advantage Shakes
- Boost Glucose Control
- Ensure High Protein
- EAS Advantage Carb Control
- Pure Protein
- Isopure Zero Carb
- Unjury
- Premier Protein
- Protica Proasis Protein Shot

Meal and snack options may be mixed and matched each day, as long as goals are met for calories, protein and carbohydrates.

Non-starchy vegetables include all those except peas, corn, and winter squash.

Lean meats include

- Beef: round, sirloin, tenderloin
- Pork: Canadian Bacon, tenderloin, center loin chops
- Poultry (Chicken or Turkey): white or dark meat without skin
- Fish

Use **spices and non-caloric sweeteners** to add flavor to food as needed.

If you have diabetes and/or are taking diuretics (for example, Lasix and/or hydrochlorothiazide), schedule a visit with your primary care provider prior to starting this diet, as it can lead to low blood sugars and dehydration if medications are not properly adjusted.

2 days prior to surgery

Stay hydrated

Please drink water, Gatorade, Powerade, or Pedialyte throughout the day.

1 day prior to surgery

Eat a healthy well-balanced breakfast, lunch, and dinner,

but you must stop eating by 10:00 pm. This minimizes your chance of anesthesia complications. We ask that all patients stop eating at 10 pm the night before your surgery.

Even if you are not eating solids, you may continue to drink clear liquids until no less than 2 hours before your scheduled surgical start time. A clear liquid is any liquid you can see through (Dairy drinks, including milk and yogurt-based, and orange juice are **NOT** clear fluids.)

In addition, we specifically ask that you hydrate throughout the day with Gatorade, water, or other clear liquids listed below.

Before going to bed, drink 20 to 24 oz of Pedialyte or Gatorade (no red).

NOTE: Please follow these instructions carefully. If you consume solid foods, or drink milk within 8 hours of surgery, your surgery will generally be cancelled.

On the Morning of Surgery

Take your medicine as discussed on your Anesthesia Phone call.

These may be taken with Pedialyte, Gatorade (no red), or water

Task Checklist

7-10 Days Before Surgery	
Follow liver pre-op diet	
Two Days Before Surgery	
Stay Hydrated	
One Day Before Surgery	
OK to eat breakfast, lunch and dinner	
<p>At 10 pm</p> <ul style="list-style-type: none"> • Stop eating all solid foods or dairy products • Stop chewing gum and stop eating candy <p>From now on you will drink CLEAR LIQUIDS ONLY- See allowed Clear Liquids Below</p> <p><input type="checkbox"/> Keep drinking clear liquids throughout the evening, stay hydrated</p>	
<p><u>ALLOWED</u></p> <p>Water Juices (clear and without pulp) Black Tea or Black Coffee (No Milk/Cream) Pedialyte Gatorade (no red)</p>	<p><u>NOT ALLOWED</u></p> <p>Solid Foods / Milk / Yogurt Dairy Based Drinks (Smoothies) / Cream Orange Juice / Soy Milk Almond/Nut Milk</p>
<p>Before going to bed</p> <p><input type="checkbox"/> Drink 20 - 24 ounces of Pedialyte or Gatorade (no red)</p>	
Day of Surgery	
<p>No less than 2 hours before your scheduled surgery:</p> <p><input type="checkbox"/> You must stop drinking completely.</p> <p><input type="checkbox"/> If you have forgotten to drink clear liquids, that is OK. Do not drink anything at this time, we will give you clear liquids through an IV when you arrive to the hospital</p>	

When You Arrive at the Hospital

- **Admission process:** Please enter through the main hospital entrance or Wang Ambulatory Care Center entrance. Proceed to the 3rd floor of the Wang building. You will be checking in at the Center for Peri-operative Care (CPC). Once you have checked in someone will bring you to the pre-operative holding area.
 - The nurse will measure your vital signs and possibly a glucose level.
 - You will also meet the nurse who will be with you in the operating room.
- 1. **Anesthesia team:**
 - Will give medications by mouth to help prevent pain, nausea and vomiting.
 - Insert an IV line into your vein to give fluids, medications or blood needed during or after surgery.
 - Review options for pain management during and after surgery.
- 2. **Surgical team:**
 - Discuss your procedure and answer any questions or concerns.
 - Finalize any paperwork needed.

The Anesthesiologist is responsible for looking after your vitals (heart rate, blood pressure, temperature and breathing), fluid and blood replacement if needed, as well as your general comfort during your surgery.

When you arrive at the hospital (cont.):

Operating room: You will be helped onto the operating room table by the team and made comfortable as we continue to prepare you for surgery.

- **IV lines** – another IV may be placed to help with administration of medications needed for surgery. These medications include antibiotics, pain medication, nausea medication etc.
- **Urinary catheter** - A urinary catheter will be inserted into your bladder to drain urine. The catheter will be in place after surgery, but your surgical team will remove it as soon as it is appropriate.
- You will be given anesthetic and put to sleep.
- Some patients receive an epidural or nerve block, to help with pain management during and after surgery. This will be discussed with you by your anesthesiologist and surgeon prior to your surgery.

An epidural involves injecting pain medication into an area near the spinal cord. This is done by the anesthesiologist. These medications work by numbing your nerves to provide pain relief in certain areas of your body. Epidurals are sometimes used during surgery in combination with sedatives and anesthetic as well as on their own.

◆◆◆ After Surgery ◆◆◆

Important: The following guidelines can and will vary based on your individual surgery, recovery, and surgeon preference.

Recovery Room/PACU

When your surgery is over, you will be transported by the team to the post anesthesia recovery unit (PACU). You will likely still feel quite sleepy and disoriented. This is normal and related to the anesthesia you received during surgery. It will take some time for these medications to wear off.

You will spend at least 1-2 hours in the recovery room being monitored after surgery. During this time, you can expect most of the following:

- Nurses checking your vital signs frequently – blood pressure, heart rate, breathing, temperature, blood glucose level, as well as your wound and dressing.
- Anesthesia team checking on your pain level.
 - You may have an epidural in place for pain control and/or a special nerve block that covers the surgical incision
- Being kept on oxygen – either through your nose or a face mask
- Being attached to an IV for fluids and pain medications

Once you are settled in the PACU, 1-2 family members/friends may be allowed to visit for a short time. When the team feels that you are ready, you will be transferred out of the recovery room to your assigned room on the floor. Some patients will spend the night in the recovery room. As early as a few hours after surgery, recovery room nurses will ask you to stand, move to a chair, or walk. There is a large amount of evidence that patients who move early in their postoperative course recover faster and better.

To help our patients and their families receive restorative sleep, visiting hours end at 9pm.

Pain Control

Good pain control is an important part of the recovery process. You should expect to encounter some pain after surgery. There is no way to completely eliminate pain, but there are ways to help manage your pain. Please let your nurse or doctor know if you are in any pain or discomfort. Our goal is for you to have a pain score of 3 or less after surgery (see below).

Pain Intensity Scale

1	2	3	4	5	6	7	8	9	10
No Pain				Moderate Pain					Worst Possible Pain

Our goal is to keep your pain at a level that allows you to sleep and rest better, breathe more easily, and start walking sooner. This is important as it helps to prevent complications like blood clots and pneumonia. Walking can also be helpful for the return of bowel function and puts you on the road to recovery.

Activity: When Can I Start Moving, Sitting, and Walking?

You can start moving as soon as you wake up; however, it is best to always progress slowly. Therefore, you should initially start with some basic leg exercises like wiggling your toes, stretching your legs out straight and rotating your feet. Do these for a few minutes every half hour. It will help you get on your feet sooner. If this causes pain, stop doing it and let your nurse or doctor know. Your medical team will want you to at least stand within 8 hours of your surgery.

Avoiding movement and lying in bed for an extended period can lead to complications like clots, bed sores and muscle weakness. This will impede your recovery. Your team will constantly monitor whether you are getting out of bed.

- **3-8 hours after surgery:** You should expect to sit on the edge of the bed, stand, or move to a chair within 8 hours after surgery. Your nurse will help you, especially the first time you are getting up. You may also be able to take a short walk if you are feeling well. It is important to always have someone close by for assistance as you may be weak and unsteady on your feet.
- **On the day after surgery:** Starting the day after surgery, your goal is to be out of bed at least 3 or 4 times a day and to take walks in the hallway. We also expect you to be sitting in a chair for meals. There will be someone to help you do this in the beginning until you are strong enough to get up on your own.

After open surgery, your bowel may stop moving for a short time. If this happens, you may feel nauseated and bloated and it may prolong your recovery. You can avoid this by walking frequently.

- **Breathing exercises:** It is important to take deep breaths after surgery to prevent lung infections. The nursing staff will show you some breathing exercises that are helpful. It is also good to take a few deep breaths during each commercial break while you are watching TV. Practice these brief breathing exercises at least 5-10 times an hour while you are awake.

Diet: When Can I Start Eating?

If all is going well:

- Day of Surgery: Sips of water
 - Post-Operative Day 1: Clear liquids or Full liquids
 - Post-Operative Day 2: Full liquids
 - Post-Operative Day 3-4: Soft full diet, as tolerated
-
- For a laparoscopic liver resection, you may be discharged on Day 1-3.
 - Your physician will decide when it is appropriate to advance to the next step. As a general rule, your IV fluids will be stopped as soon as you can tolerate at least 10 ounces of clear liquid by mouth.

When Will My Urinary Catheter Be Removed?

- Most patients have their Foley removed the second day after surgery. Occasionally, the Foley may remain longer.
- Once the urinary catheter is removed, you are free to go to the bathroom to urinate. You can expect it to take 4-8 hours before you feel the need to urinate. This is normal.

Leaving the catheter in longer than necessary can lead to a urinary tract infection.

Symptoms of a urinary tract infection include:

- *Pain with urination,*
- *Frequent urination,*
- *Feeling the need to urinate despite having an empty bladder,*
- *Fever and pain in your side.*

Let your nurse or physician know immediately if you experience any of these symptoms.

When can I go home?

To be ready for discharge from the hospital, you must be doing all things listed below:

- Pain well-controlled with oral medications
- Able to take in enough fluids to keep hydrated

Once your pain is well-controlled and you are drinking enough, you will be discharged to home. Otherwise, you will be observed in the hospital until these goals are achieved. Your surgical team will want to discharge you as soon as you are tolerating enough fluids, moving well, and have your pain well controlled. Patients who stay in the hospital for too long have higher risks of post-operative complications like infection.

Generally, it is NOT required for you to pass gas or have a bowel movement before you are discharged, though in certain scenarios your surgeon may want this to happen.

Note:

Plan appropriate arrangements for transportation from the hospital and care at home. Your team will let you know the day prior to discharge if they think you are ready. Check out time is at 10:00 am. If your ride unable to be at MGH at this time, don't worry. We will help you get comfortable in one of our waiting rooms to await their arrival.

What happens when I go home?

Your surgeon's nurse will call you the day after you are discharged.

Your discharge paperwork will include your prescriptions, how to take them, things to watch for and all the relevant contact information. If you have a question during routine business hours, please call the clinic number provided and ask to speak to a nurse. If you have an emergency and it is after hours, you can either page the physician on call or come to the emergency room to be seen.

Pathology reports come back within 7-10 business days after surgery. The office will contact you with these and your treatment plan.

While we know that having surgery is stressful, we are honored to be your care team. We look forward to working with you to make your surgery the best experience possible. Should you have any questions or concerns after reading this book, please contact your surgeon's office.