



California Pacific  
Medical Center

A Sutter Health Affiliate

Community Based, Not For Profit

# Hepatobiliary and Pancreas Surgery

## LIVER DISEASE MANAGEMENT & TRANSPLANT PROGRAM

At California Pacific Medical Center we are committed to bringing new and advanced diagnostic tools, medical treatments and surgical options to the physicians and patients we serve. Through this procedure profile, our physicians illustrate surgical capabilities and techniques that provide you with a window into their practice of diagnosis, treatment and patient follow-up.

For patient referrals:  
(888) 637-2762

[www.cpmc.org/liver](http://www.cpmc.org/liver)

### Surgical Capabilities

New diagnostic and surgical capabilities have enabled California Pacific's hepatobiliary team to better treat hepatobiliary and pancreatic carcinoma as well as other diseases affecting these organs. Our skilled hepatobiliary team—comprised of surgeons, interventional endoscopists, radiologists and hepatologists—works together to provide surgical treatment for the following problems:

#### Biliary

- Carcinoma of the gallbladder
- Malignant tumors of the bile duct
- Bile duct injuries and strictures
- Choledochal cysts
- Recurrent pyogenic cholangitis

#### Pancreas

- Pancreatitis
- Pancreatic pseudocyst
- Malignant neoplasms of the pancreas
- Cystic neoplasms of the pancreas
- Pancreatic islet cell tumors

#### Liver

- Hepatic trauma
- Metastatic neoplasms of the liver
- Benign tumors and cysts of the liver
- Portal hypertension (portasystemic shunts)

With the use of laparoscopy and endoscopic ultrasound (EUS), all patients with malignancies are staged pre-operatively. Following staging, our hepatobiliary team works in conjunction with the referring physician to determine the best treatment for the patient's condition. Because choosing a treatment plan is an important decision, we review all options with patients and family members as well as their referring physician, explaining the benefits and disadvantages of each option.

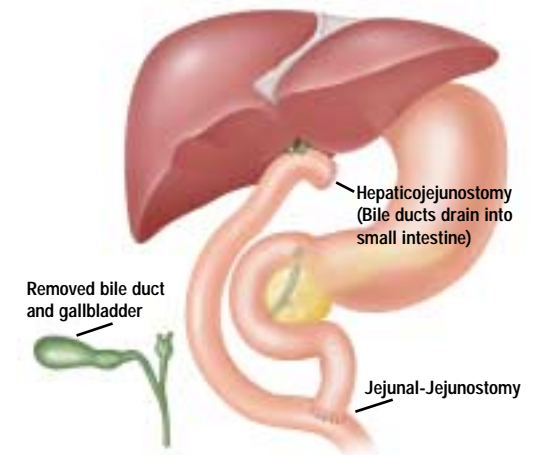
Among the surgical procedures we offer include:

### Biliary Tumors and Injuries

Biliary surgery is most frequently performed for stones, strictures and tumors. Among the treatment options available at California Pacific include:

#### • Resection of primary biliary neoplasms (cholangiocarcinoma)

Treatment of bile duct cancer usually requires removal of the bile duct and possibly portions of the liver, gallbladder, pancreas and small intestine. After resecting the neoplasms—either through open surgery or laparoscopically—the surgeon reconnects the bile ducts to the small intestine for proper biliary drainage (see illustration).



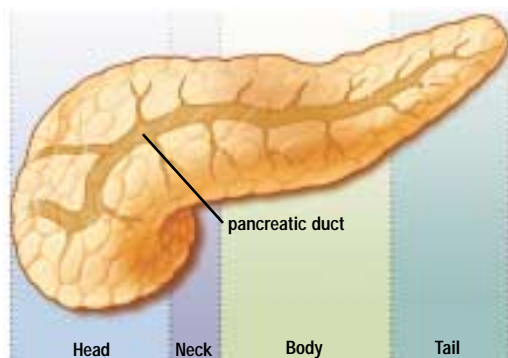
*Roux-en-Y Hepaticojejunostomy Procedure performed for injuries and cancer of the bile duct.*

#### • Biliary Drainage Procedures

Biliary drainage procedures are performed when the bile duct becomes blocked, narrowed or injured. During surgery, continuity of the biliary tree is usually re-established via a hepaticojejunostomy (see illustration).

## Diseases of the Pancreas— Surgical Options

Upon referral of a suspected pancreatic pathology, California Pacific's hepatobiliary team initiates a pre-operative work up which usually includes an evaluation of the pancreas via EUS. This evaluation helps to determine the location of the pathology in the head, neck, body or tail of the pancreas.



Pancreas sections used in defining tumor(s) location.

Subsequent treatment options include:

### • Pancreaticoduodenectomy (Whipple Procedure)

A pancreaticoduodenectomy, also known as a Whipple procedure, involves the removal of the pancreas head due to a tumor in the pancreas or bile duct, or pancreatitis.

If a tumor exists in the head of the pancreas, it is usually necessary to remove the pancreas head, duodenum, gall-bladder and a portion of the bile duct (Figure 1).

Sometimes, part of the stomach is also removed. The end of a patient's bile duct and the remaining pancreas are then connected to the small bowel (Figure 2) to ensure flow of bile and enzymes into the intestines.

Figure 1

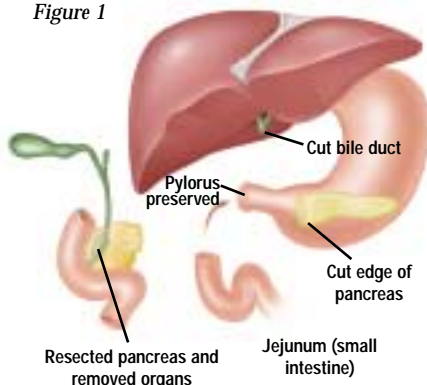
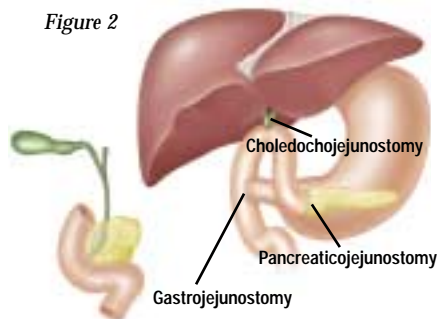
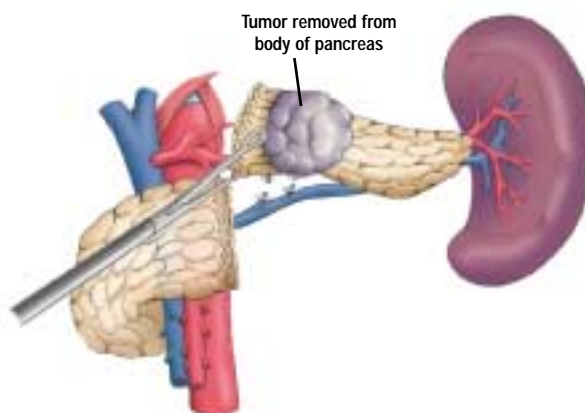


Figure 2



Whipple Procedure

### • Distal Pancreatectomy (laparoscopic or open)



Spleen-preserving Distal Pancreatectomy

Indicated for tumors in the body and tail of the pancreas, a distal pancreatectomy involves the removal of neoplasms either laparoscopically or with open surgery. With both laparoscopic and open distal pancreatectomy procedures, surgeons attempt to preserve the spleen. (see illustration)

### • Drainage Procedures

With chronic pancreatitis, a dilated pancreatic duct usually reflects obstruction. Procedures to improve ductal drainage include:

- **Longitudinal Pancreaticojejunostomy (Puestow Procedure)**  
The pancreatic duct is opened from the tail to the head of the pancreas and attached to the small bowel.
- **Distal Pancreaticojejunostomy (Du Val Procedure)**  
The pancreas is divided transversely at the neck, and the body and tail are drained via attachment to the small bowel.
- **Sphincteroplasty**  
When endoscopic sphincterotomy is unsuccessful, surgical sphincteroplasty may be required of the minor or major papilla.

### • Pancreas Transplantation

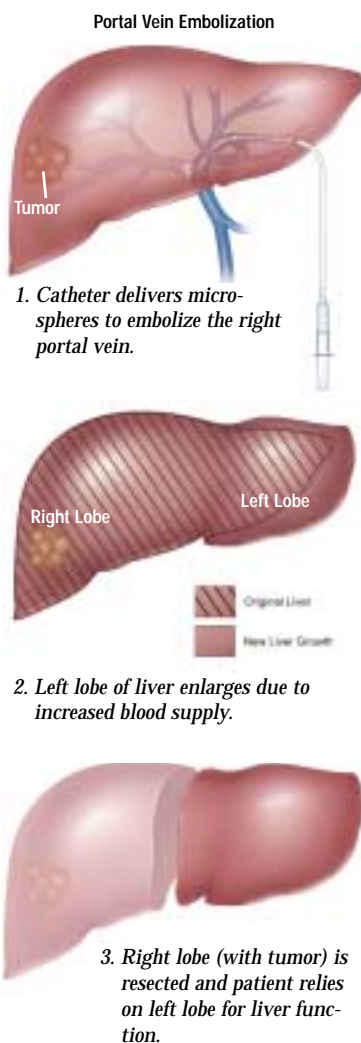
A pancreas transplant is indicated for patients with insulin-dependent diabetes.

## Liver Cancer - Surgical Options

When determining treatment options for tumors of the liver, the hepatobiliary team reviews the results of one's pre-operative evaluation and overall health to recommend appropriate treatment options. Treatments offered at California Pacific for tumors of the liver include:

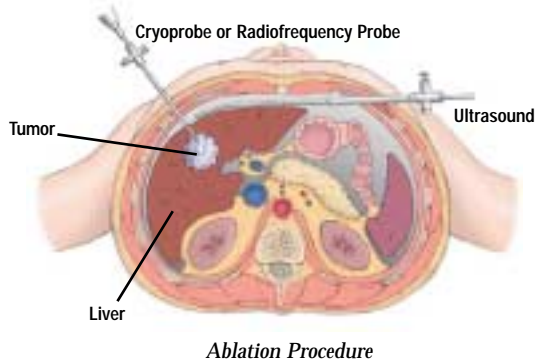
### • **Surgical Resection (Tumor Removal)—Open or Laparoscopic**

Typically, surgeons can safely remove up to 70% of the liver (if there is no fibrosis) and expect full regeneration. During resection, the surgeon first uses ultrasound to determine the tumor(s) proximity to hepatic structures and then removes it with as little liver as possible, while ensuring a margin free of tumor. For patients who may not have enough liver reserve, portal vein embolization is used pre-operatively (see illustration). This technique, which involves the insertion of tiny microspheres into the portal vein, blocks blood flow to the portion of the liver containing tumor(s), and results in the enlargement of the remaining liver segments on which the patient will depend after resection.



### • **Liver Transplantation**

While a liver transplant represents the best cure for most patients with non-metastatic liver cancer, the limited organ supply may make this option unattainable. The eligibility criteria for transplantation is the presence of a single hepatoma 5 cm or less in diameter, or three or fewer tumor nodules, each 3 cm or less in diameter. Both living-related and cadaveric liver transplants are options for patients at California Pacific.



### • **Ablation (Radiofrequency or Cryoablation)**

Patients who are not candidates for resection or transplantation due to inadequate liver reserve, large or multiple lesions in multiple lobes, fibrosis or cirrhosis can benefit from treatments such as CT-guided, laparoscopic or open radiofrequency or cryoablation. With new radiofrequency (RF) ablation technology, liver tumors up to 7 cm in diameter can be treated. The ideal patient for RFA generally has no more than three lesions that are no greater than 5 cm in size. RF ablation delivers radiofrequency energy to the tumor, heating it to temperatures above 113° F and thereby destroying the lesion. During cryoablation, argon gas is delivered through probes inserted into the liver, creating an ice ball that freezes the tumor and destroys its cells (see illustration).

### • **Percutaneous Ethanol Injection Therapy (PEIT)**

Another option for patients who are not surgical candidates, PEIT involves the injection of alcohol into the tumor, causing immediate dehydration of the cytoplasm with consequent coagulation, necrosis and fibrous reaction. PEIT results in complete ablation in up to 75% of selected patients with hepatocellular carcinoma.

### • **Hepatic Arterial Pumps**

Indicated for patients with metastatic colon cancer, hepatic arterial pumps deliver chemotherapy to the liver through a catheter placed in the hepatic artery. The catheter is typically inserted via laparoscopic or open surgery and a pump, which delivers the chemotherapy, is implanted subcutaneously. The pump is generally filled with chemotherapy once a month.

# Hepatobiliary and Pancreas Surgery

## Why Choose Us?

California Pacific's Center for Complex Digestive Disease offers comprehensive specialty care for diseases of the liver, pancreas and bile duct. We emphasize ongoing communication with referring physicians and incorporate them in the decision process of their patient's medical management. Following treatment, we follow up our care with an organized discharge report to the referring physician.

For patients requiring hospitalization, we have a dedicated hepatobiliary critical care unit, a hepatobiliary hospitalist, physician assistants, on-call anesthesia staff and a specialized O.R. nursing team. At California Pacific, our focus is on providing experienced, personalized care for all patients.

With the use of advanced technology and surgical methods, patients now have more options than ever for the treatment of hepatobiliary disease. Our physicians are actively involved in clinical research and offer multiple studies in areas such as hepatocellular carcinoma, gastroenterology and viral hepatitis. Additionally, our hepatobiliary team offers outreach clinics in local communities throughout Northern California and Nevada, providing pre- and post-operative hepatobiliary care close to home.

We welcome your inquiries regarding treatment options, research, outreach locations or referrals.

## For more information

For surgical information, contact

**Robert Osorio, M.D.**

Surgical Director  
Center for Complex Digestive Disease  
California Pacific Medical Center  
2340 Clay Street, 4th Floor  
San Francisco, California 94115

(415) 600-1010 *tel*

(415) 600-1012 *fax*

[www.cpmc.org/liver](http://www.cpmc.org/liver)

For referrals, contact

**California Pacific Specialty Referral Program**

1 (888) 637-2762 *tel*

1 (415) 923-6595 *fax*