

## What Are Solid Organ Injuries?

The solid organs of the abdomen are generally considered to be the liver, the spleen, and the two kidneys. These organs are injured most frequently by strong blows to the abdomen, back, or flank regions such as may occur in automobile accidents, ATV crashes, and contact sports. Because these organs are solid, they tend to tear or crack when struck with significant force. These tears have a tendency to bleed due to the large amount of blood flow these organs receive. In some cases, the bleeding is life threatening.

## How Are These Injuries Treated?

The severity of the injury, the severity of associated injuries, along with the patient's vital signs and laboratory work guide the decision of how a solid organ injury is treated. Injuries are formally graded on a scale of 1-5 (1-6 for the liver) with lower numbers representing less severe injuries. Higher grade injuries are more likely to require surgical intervention and require hospitalization. Patients are often observed in the hospital for multiple days. During this time, blood counts are followed closely, activity is limited, frequent clinician examinations occur, vital signs are monitored, and repeated imaging studies may be required (such as CT scans).

## What Should I Watch For After Discharge?

Patients with solid organ injuries are at risk for delayed bleeding. This is thought to occur due to the clot which initially formed at the injury site starting to soften during the normal healing process. This area can then "re-bleed". This bleeding can be life threatening. Symptoms associated with bleeding include worsening abdominal pain, dizziness, feeling faint, rapid heart beat, shortness of breath, weakness, recurrence of blood in the urine, or an inability to urinate. These symptoms necessitate emergency medical evaluation.

Blows to the abdomen which are severe enough to injure the solid organs can damage the other organs (e.g. intestines, pancreas) in the abdomen as well. These injuries are often difficult to see with imaging studies, and can take multiple days to cause symptoms. These injuries may first manifest themselves after being discharged home with symptoms such as worsening abdominal pain, fevers/chills, and increasing abdominal distension/bloating. These symptoms necessitate emergency medical evaluation.

## What Restrictions Do I Have?

Restrictions after discharge are guided by the grade of the injury. Generally, patients are instructed to avoid strenuous activities, contact sports, and "jostling" activities (horseback riding, motorcycle/ATV riding, etc) for time frames dependent on the injury grade and overall recovery. It may be as long as 3 to 6 months before you are cleared to return to "normal" activities.

## Follow Up

Follow-up is critical to ensure complete recovery. Follow-up with a Trauma surgeon and/or the Trauma Clinic will be recommended after discharge. Depending on the injury and subsequent symptoms, repeat CT scans may be required. The Trauma Clinic office number is (801) 357-2137.

## Organ Injury Scale for Spleen, Liver, and Kidney

### Spleen

I	Hematoma	Subcapsular, < 10% surface area
	Laceration	Capsular tear, < 1 cm parenchymal depth
II	Hematoma	Subcapsular, 10% to 50% surface area; intraparenchymal, < 5 cm in diameter
	Laceration	Capsular tear, 1 to 3 cm parenchymal depth that does not involve a trabecular vessel
III	Hematoma	Subcapsular, > 50% surface area or expanding; ruptured subcapsular or parenchymal hematoma; intraparenchymal hematoma 5 cm or expanding
	Laceration	> 3 cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration involving segmental or hilar vessels producing major devascularization (> 25% of spleen)
V	Hematoma	Completely shattered spleen
	Laceration	Hilar vascular injury devascularizes spleen

### Liver

I	Hematoma	Subcapsular, < 10% surface area
	Laceration	Capsular tear, < 1 cm parenchymal depth
II	Hematoma	Subcapsular, 10% to 50% surface area; intraparenchymal, < 10 cm in diameter
	Laceration	Capsular tear 1 to 3 cm parenchymal depth, < 10 cm in length
III	Hematoma	Subcapsular, > 50% surface area of ruptured subcapsular or parenchymal hematoma; intraparenchymal hematoma > 10 cm or expanding
	Laceration	> 3 cm parenchymal depth
IV	Laceration	Parenchymal disruption involving 25% to 75% hepatic lobe or 1 to 3 Couinaud's segments
V	Laceration	Parenchymal disruption involving > 75% of hepatic lobe or > 3 Couinaud's segments within a single lobe
	Vascular	Juxtahepatic venous injuries, i.e., retrohepatic vena cava/central major hepatic veins
VI	Vascular	Hepatic avulsion

## Kidney

I	Contusion	Microscopic or gross hematuria, urologic studies normal
	Hematoma	Subcapsular, nonexpanding without parenchymal laceration
II	Hematoma	Nonexpanding perirenal hematoma confirmed to renal retroperitoneum
	Laceration	< 1.0 cm parenchymal depth of renal cortex without urinary extravasation
III	Laceration	> 1.0 cm parenchymal depth of renal cortex without collecting system rupture or urinary extravasation
IV	Laceration	Parenchymal laceration extending through renal cortex, medulla, and collecting system
	Vascular	Main renal artery or vein injury with contained hemorrhage
V	Laceration	Completely shattered kidney
	Vascular	Avulsion of renal hilum that devascularizes kidney