

Table 1. WSES liver trauma classification ¹

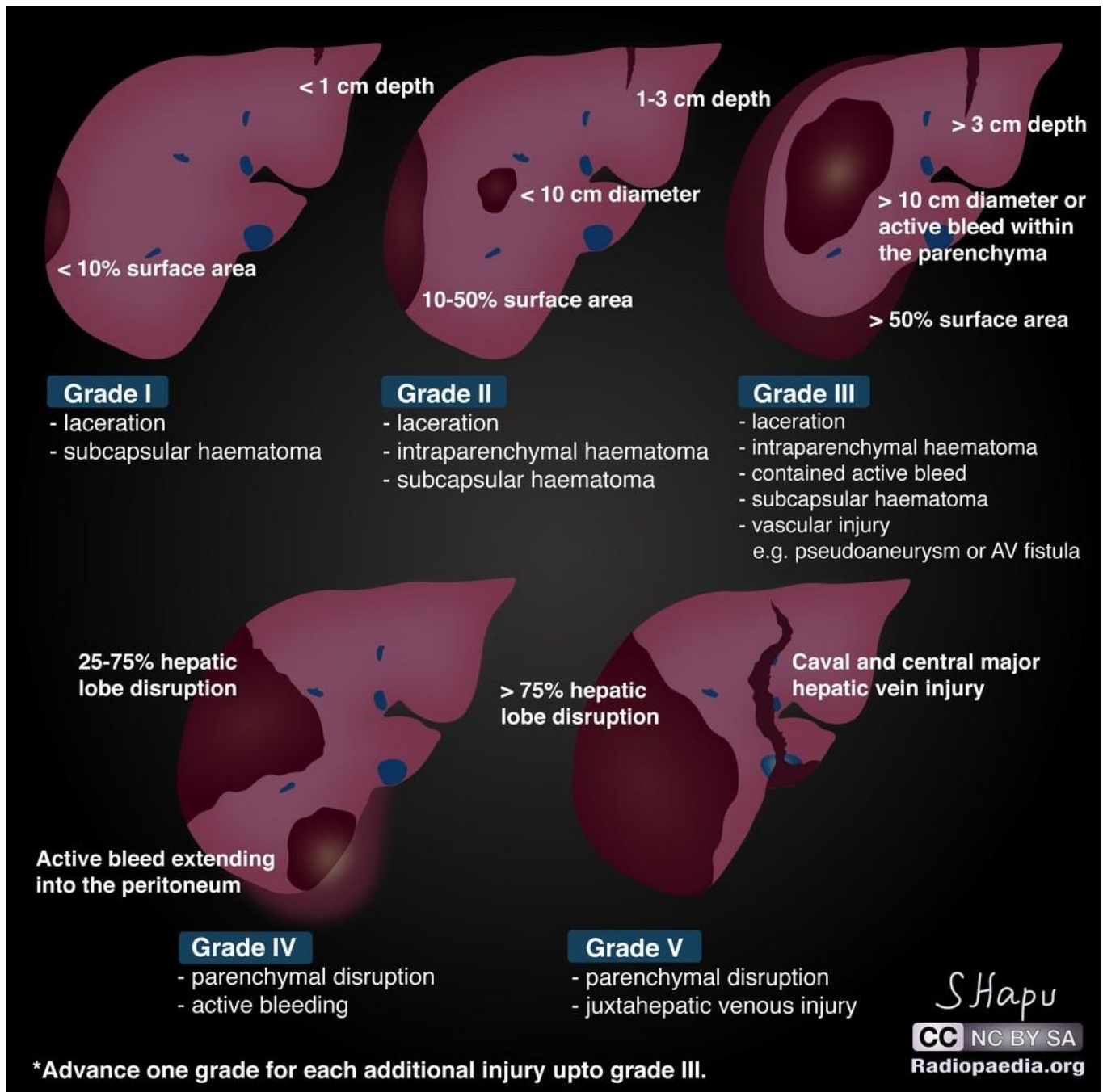
	WSES grade	AAST	Hemodynamic
Minor	WSES grade I	I–II	Stable
Moderate	WSES grade II	III	Stable
Severe	WSES grade III	IV–V	Stable
	WSES grade IV	I–VI	Unstable

Table 2. AAST liver trauma classification ¹

Grade	Type of injury	Description of injury
I	Haematoma	Subcapsular < 10% surface
	Laceration	Capsular tear < 1cm parenchymal depth
II	Haematoma	Subcapsular 10-50% surface area; intraparenchymal, < 10cm diameter
	Laceration	1-3cm parenchymal depth, < 10 cm in length
III	Haematoma	Subcapsular > 50% surface area or expanding, ruptured subcapsular or parenchymal haematoma. Intraparenchymal haematoma > 10cm
	Laceration	> 3cm parenchymal depth
IV	Laceration	Parenchymal disruption 25-75% of hepatic lobe
V	Laceration	Parenchymal disruption involving > 75% of hepatic lobe
	Vascular	Juxtavenous hepatic injuries i.e retrohepatic vena cava/central major hepatic veins
VI	Vascular	Hepatic avulsion

Advance one grade for bilateral injuries up to grade III.

Liver trauma grading diagram



Source: https://radiopaedia.org/cases/51390/studies/73834?lang=gb&referrer=%2Farticles%2FLiver-trauma%3Flang%3Dgb%23image_list_item_44955209

Table 3. Statements summary ¹

Statements	
Diagnostic procedures	<ul style="list-style-type: none"> • The diagnostic methods on admission are determined by the hemodynamic status (GoR 1A). • E-FAST is rapid in detecting intra-abdominal free fluid (GoR 1A). • CT scan with intravenous contrast is the gold standard in hemodynamically stable trauma patients (GoR 1A).
Non-operative management (NOM)	<ul style="list-style-type: none"> • NOM should be the treatment of choice for all hemodynamically stable minor (WSES I) (AAST I–II), moderate (WSES II) (AAST III), and severe (WSES III) (AAST IV–V) injuries in the absence of other internal injuries requiring surgery (GoR 2A). • In patients considered transient responders with moderate (WSES II) (AAST III) and severe (WSES III) (AAST IV–V) injuries, NOM should be considered only in selected settings provided the immediate availability of trained surgeons, operating room, continuous monitoring ideally in an ICU or ER setting, access to angiography, angioembolization, blood and blood products, and in locations where a system exists to quickly transfer such patients to higher level of care facilities (GoR 2B). • A CT scan with intravenous contrast should always be performed in patients being considered for NOM (GoR 2A). • AG/AE may be considered as a first-line intervention in hemodynamically stable patients with arterial blush on CT scan (GoR 2B). • In hemodynamically stable children, the presence of contrast blush on CT scan is not an absolute indication for AG/AE (GoR 2B). • Serial clinical evaluations (physical exams and laboratory testing) must be performed to detect a change in clinical status during NOM (GoR 2A). • NOM should be attempted in the setting of concomitant head trauma and/or spinal cord injuries with reliable clinical exam, unless the patient could not achieve specific hemodynamic goals for the neurotrauma and the instability might be due to intra-abdominal bleeding (GoR 2B). • Intensive care unit admission in isolated liver injury may be required only for moderate (WSES II) (AAST III) and severe (WSES III) (AAST IV–V) lesions (GoR 2B). • In selected cases where an intra-abdominal injury is suspected in the days after the initial trauma, interval laparoscopic exploration may be considered as an extension of NOM and a means to plan patient management in a step-up treatment strategy (GoR 2C). • In low-resource settings, NOM could be considered in patients with hemodynamic stability without evidence of associated injuries, with negative serial physical examinations and negative imaging and blood tests (GoR 2C).

Statements	
Operative management (OM)	<ul style="list-style-type: none"> • Hemodynamically unstable and non-responder patients (WSES IV) should undergo OM (GoR 2A). • Primary surgical intention should be to control the hemorrhage and bile leak and initiation of damage control resuscitation as soon as possible (GoR 2A). • Major hepatic resections should be avoided at first and only considered in subsequent operations, in a resectional debridement fashion in cases of large areas of devitalized liver tissue done by experienced surgeons (GoR 2B). • Angioembolization is a useful tool in case of persistent arterial bleeding after non-hemostatic or damage control procedures (GoR 2A). • Resuscitative endovascular balloon occlusion of the aorta (i.e., REBOA) may be used in hemodynamically unstable patients as a bridge to other more definitive procedures for hemorrhage control (GoR 2B).
Short and long-term follow-up	<ul style="list-style-type: none"> • Intrahepatic abscesses may be successfully treated with percutaneous drainage (GoR 2A). <ul style="list-style-type: none"> • Delayed hemorrhage without severe hemodynamic compromise may be managed at first with AG/AE (GoR 2A). • Hepatic artery pseudoaneurysm should be managed with AG/AE to prevent rupture (GoR 2A). • Symptomatic or infected bilomas should be managed with percutaneous drainage (GoR 2A). • Combination of percutaneous drainage and endoscopic techniques may be considered in managing post-traumatic biliary complications not suitable for percutaneous management alone (GoR 2B). • Lavage/drainage and endoscopic stenting may be considered as the first approach in delayed post-traumatic biliary fistula without any other indication for laparotomy (GoR 2B). • Laparoscopy as initial approach should be considered in cases of delayed surgery, so as to minimize the invasiveness of surgical intervention and to tailor the procedure to the lesion (GoR 2B).

**Thrombo-prophylaxis,
feeding, and
mobilization**

- Mechanical prophylaxis is safe and should be considered in all patients with no absolute contraindication (GoR 2A).
- LMWH-based prophylaxis should be started as soon as possible following trauma and may be safe in selected patients with liver injury treated with NOM (GoR 2B).
- In those patients taking anticoagulants, individualization of the risk-benefit balance of anticoagulant reversal is suggested (GoR 1C).
- Early mobilization should be achieved in stable patients (GoR 2A).
- In the absence of contraindications, enteral feeding should be started as soon as possible (GoR 2A).