Combo Data Tool

Record ID _____

GENERAL INSTRUCTIONS

When you have finished, complete the form as "unverified."

Many of the variables collected in the survey are included in the TQIP database and can be abstracted directly from your trauma registry report. These are identified in the survey with [TR].

Refer to the accompanying instruction document for more information about each variable, and recommendations for performing chart abstraction in Epic.

Each survey section below starts with a SECTION HEADER which will include section-specific instructions as needed.

Each patient will be assigned a unique record ID in the REDCap database when you generate a new entry. This information should be updated in the 'linking document' for your site, to pair the record ID with a patient's medical record number (MRN). Each site will be responsible for maintaining this 'linking document' until all study activities are complete.

Select your institution.

DEMOGRAPHICS, INJURY DETAILS, PRE-EXISTING COMORBIDITIES & HOSPITAL EVENTS

Refer to your trauma registry report to complete the following section.

Did the patient receive at least two of the three following diagnoses?

1. Traumatic Brain Injury (TBI)
2. Blunt Cerebrovascular Injury (BCVI)
3. Blunt Solid Organ Injury (BSOI)

◯ Yes
◯ No

This patient should not be included in this study.

Provide the patient's age, in years [TR].

_____
(Numerical Entry, max of 89)

Select the patient's sex [TR].

◯ Male
◯ Female
◯ Non-binary

Select the patient's ethnicity [TR].

◯ Non-Hispanic
◯ Hispanic

Select the patient's race [TR].

◯ Asian
◯ Native Hawaiian or Other Pacific Islander
◯ Other Race
◯ American Indian
◯ Black or African American
◯ White

Select the primary mechanism of Injury for this hospital stay [TR].

◯ Blunt
◯ Penetrating
◯ Thermal

Complete the following table according to how your trauma registry database tracks AIS regions [TR].

Leave blank if AIS region not used.

Region AIS (*)
Head _____
Face _____
Neck _____
Head/Neck _____
Thorax _____
Abdomen _____
Spine _____
Upper Extremities _____
Lower Extremities _____
Upper & Lower Extremities _____
External Region _____
Unspecified _____

Enter the Injury Severity Score (ISS) [TR].

_____
(Numerical Entry)

Did the patient have any of the following pre-existing comorbidities [TR]?
Select all that apply.

☐ Chronic Obstructive Pulmonary Disease (COPD)
☐ Congestive Heart Failure (CHF)
☐ Current smoker
☐ Chronic Renal Failure
☐ Cirrhosis
☐ Advance directives limiting care

Did any of the following hospital events occur during this hospital stay [TR]?
Select all that apply.

- ☐ Acute Respiratory Distress Syndrome (ARDS)
- ☐ CPR
- ☐ CAUTI
- ☐ Deep Surgical Site Infection (SSI)
- ☐ CLABSI
- ☐ Deep venous thrombosis (DVT)
- ☐ Delirium
- ☐ Myocardial Infarction
- ☐ Organ Space SSI
- ☐ Osteomyelitis
- ☐ Pulmonary Embolism
- ☐ Pressure Ulcer
- ☐ Severe Sepsis
- ☐ Stroke/CVA
- ☐ Superficial SSI
- ☐ Unplanned ICU Admission
- ☐ Unplanned Intubation
- ☐ Unplanned OR
- ☐ Ventilator-Associated Pneumonia (VAP)

Did the patient have withdrawal of life sustaining therapy (WLST) [TR]?

- ◯ Yes
- ◯ No

Provide date of WLST [TR].

_____

Provide time of WLST [TR].

_____
(Report as HHMM military time)

Provide the ICU length of stay, in days [TR].
If none, enter 0.

_____

Provide the total ventilator days [TR].
If none, enter 0.

_____

ADMISSION & DISCHARGE

Refer to your trauma registry report to complete the following section.

Provide the admission date [TR].

_____

Provide the admission time [TR].

_____
(Report as HHMM military time)

Select the primary admitting service type. This should be the service that the admitting physician is affiliated with. This does not refer to consulting services or co-management models. Other surgical service (e.g. Orthopedic surgery, Urology, Vascular surgery, Neurosurgery, Plastic surgery, etc.) Non-surgical service (e.g. Hospital Medicine, Cardiology, Nephrology, Oncology, Pulmonology, etc.)	◯ Trauma ◯ Other surgical service ◯ Non-surgical service
Provide the discharge date [TR].	_____
Provide the discharge time [TR].	_____ (Report as HHMM military time.)
Provide the patient's discharge disposition [TR]. Bracketed numbers after each choice indicate designation in National Trauma Data Standard (NTDS) data dictionary 2023.	◯ Short-term general hospital for inpatient care [1] ◯ Intermediate Care Facility (ICF) [2] ◯ Home with home health services [3] ◯ Left against medical advice or discontinued care [4] ◯ Deceased/expired [5] ◯ Home or self-care [6] ◯ Skill nursing facility (SNF) [7] ◯ Hospice Care [8] ◯ Court/law enforcement [10] ◯ Inpatient (acute) rehabilitation unit [11] ◯ Long Term Care Hospital (LTCH) or Long-Term Acute Care (LTAC) [12] ◯ Psychiatric hospital or designated psychiatric unit of hospital [13] ◯ Another type of institution not defined elsewhere [14]
Was venous thromboembolism (VTE) chemoprophylaxis initiated during admission? [TR]	◯ Yes ◯ No
What type(s) of VTE chemoprophylaxis were administered during admission?	☐ Low molecular weight heparin (LMWH) ☐ Subcutaneous unfractionated heparin (SQH) ☐ Aspirin ☐ Direct oral anticoagulant (DOAC) ☐ Unfractionated heparin infusion
Provide the date of initial VTE chemoprophylaxis initiation [TR].	_____
Provide the highest shock index recorded during initial trauma evaluation.	_____

TRAUMATIC BRAIN INJURY (TBI) DIAGNOSIS & MANAGEMENT

This section will ask about any traumatic brain injury (TBI) which was diagnosed during admission. For the purposes of this study, TBI refers to head Abbreviated Injury Score (AIS) [3] 1, specific to the skull and/or brain (i.e. excluding the scalp, cranial nerves, and intracranial vessels).

Intracranial hemorrhage (ICH) is bleeding within the skull. Categorized into several subtypes based on location of the bleed:

Subtype Description
Epidural hematoma (EDH) Extra-axial hemorrhage, bleeding into the potential epidural space, occurs from arterial or venous source, typically in combination with skull fracture.
Subdural hematoma (SDH) Extra-axial hemorrhage, bleeding into the subdural/arachnoid space, typically occurs after vessel traversing brain and skull are stretched, broken or torn.
Subarachnoid hemorrhage (SAH) Intra-axial hemorrhage, bleeding into the subarachnoid space. Subcategorized as traumatic or non-traumatic.
Intraparenchymal hemorrhage (IPH) Intra-axial hemorrhage, bleeding into the brain parenchyma.
Intraventricular hemorrhage (IVH) Bleeding into the ventricular system where cerebrospinal fluid is produced and circulates toward subarachnoid space. May be primary, confined to the ventricular system, or secondary, resulting from expansion of an existing IPH or SAH.

Radiographic change is defined as any occurrence of CT head (CTH) or other head imaging progression (i.e. increased size of intracranial hemorrhage, worsening edema, new or worsening midline shift) during admission, according to radiology report.

Did the patient have any evidence of a traumatic brain injury on initial neuroimaging?
- ◯ Yes
- ◯ No

What findings were noted on the initial neuroimaging, according to the radiology report? Definitions of each of the following findings provided above. Select all that apply.
- ☐ Mild or Moderate TBI without abnormal neuroimaging
- ☐ Intracranial hemorrhage
- ☐ Skull fracture
- ☐ Cerebral edema with midline shift
- ☐ Acute ischemia or hypoxia
- ☐ Other

What anatomic types of ICH were noted on initial neuroimaging? Definitions of ICH types provided above. Select all that apply.
- ☐ Epidural hematoma (EDH)
- ☐ Subdural hematoma (SDH)
- ☐ Subarachnoid hemorrhage (SAH)
- ☐ Intraparenchymal hemorrhage (IPH)
- ☐ Intraventricular hemorrhage (IVH)
- ☐ Other

Please provide the patient's Glascow Coma Scale (GCS) at arrival [TR]. _____

Please provide the patient's discharge Glascow Coma Scale (GCS). _____

Provide total number of CT head exams performed during admission.

Count all CT exams of brain including (1) non-contrast CT, (2) CT angiography and (3) CT venography. Do not include CT exams of nearby structures unless complete imaging of brain performed (e.g. C-spine, face, temporal bones). Do not include imaging performed at outside hospital prior to transfer.

_____

Did the patient have any radiographic progression of intracranial hemorrhage (ICH) during admission?

This refers to any new or worsening bleeding on head imaging performed during admission as compared initial neuroimaging.

◯ Yes
◯ No

What date did the radiographic progression of intracranial hemorrhage occur? If multiple occurrences, provide the date of the first occurrence.

_____

Briefly, describe the type of radiographic progression of intracranial hemorrhage described.

Use abbreviations or acronyms as appropriate (e.g. 'progression of SAH' or 'new EDH').

_____

Did the patient have any other radiographic progression on head imaging during admission? This refers to any new or worsening findings, excluding ICH, such as cerebral edema, midline shift, cerebral venous thrombosis, ischemia, etc. This does not include progression of blunt cerebrovascular injuries (BCVI).

◯ Yes
◯ No

What date did the other radiographic progression occur? If multiple occurrences, provide the date of the first occurrence.

_____

Briefly, describe the type of other radiographic progression described. (e.g. 'worsening cerebral edema with midline shift' or 'new ischemia')

_____

Did the patient have any acute neurologic changes during admission?

This includes any acute decline in neurologic exam, including new or worsening focal neurological deficits (e.g new weakness in LUE/LLE), persistent & reproducible change in alertness or orientation that cannot be attributed to delirium or sedating medication (e.g. no longer following commands, decline in GCS), or change in pupillary exam or neurological pupil index (NPI) score (e.g. L pupil fixed & dilated, NPI < 3.0).

◯ Yes
◯ No

What date did the acute neurologic change occur? If multiple occurrences, provide the date of the first occurrence.

_____

Briefly, describe the acute neurologic change. (e.g. 'new weakness in LUE/LLE', or 'no longer following commands', or 'L pupil fixed & dilated', or 'NPI < 3.0')	_____
Were any neurosurgical procedures performed during admission? This includes procedures performed for management of a TBI including craniectomy, decompressive craniotomy, or intracranial pressure (ICP) monitor placement.	◯ Yes ◯ No
Which of the following neurosurgical procedures were performed during admission? Select all that apply.	☐ Craniotomy ☐ Decompressive craniectomy ☐ ICP monitor placement [i.e. External ventricular drain (EVD) or Subarachnoid 'Bolt'] ☐ Other [e.g. Burr hole drainage, Subdural Evacuating Port System (SEPS) placement]
On what date was the craniotomy performed? If multiple occurrences, provide the date of the first occurrence.	_____
On what date was the decompressive craniectomy performed? If multiple occurrences, provide the date of the first occurrence.	_____
On what date was the ICP monitor placed? If multiple occurrences, provide the date of the first occurrence.	_____
On what date was the SEPS placed or the Burr hole drainage performed? If multiple occurrences, provide the date of the first occurrence.	_____

BLUNT CEREBROVASCULAR INJURY (BCVI) DIAGNOSIS & MANAGEMENT

This section will ask about any blunt cerebrovascular injury (BCVI) which was diagnosed during admission. This includes injuries to the carotid or vertebral arteries resulting from a blunt mechanism of injury diagnosed on initial CT angiography (CTA) head/neck.

Biffl Grade Findings on CT angiography (CTA)

Grade I Intimal irregularity or dissection with < 25% luminal narrowing.

Grade II Dissection or intramural hematoma with ³ 25% luminal narrowing, intraluminal clot, or a visible intimal flap.

Grade III Pseudoaneurysm or hemodynamically insignificant arteriovenous fistula.

Grade IV Complete vessel occlusion.

Grade V Transection with active extravasation (hemorrhage) or hemodynamically significant arteriovenous fistula.

Did the patient have Blunt Cerebrovascular Injury (BCVI) diagnosed during admission? This includes any definite or probable BCVI noted in the radiology report of initial CTA head/neck.	◯ Yes ◯ No
What BCVI arteries were injured? This includes any carotid or vertebral arteries with definite or probable BCVI on initial CTA, according to the radiology report. Select all that apply.	☐ Carotid artery, left ☐ Carotid artery, right ☐ Vertebral artery, left ☐ Vertebral artery, right
What was the Biffl injury grade of the left carotid artery?	☐ Biffl I ☐ Biffl II ☐ Biffl III ☐ Biffl IV ☐ Biffl V
What was the Biffl injury grade of the right carotid artery?	☐ Biffl I ☐ Biffl II ☐ Biffl III ☐ Biffl IV ☐ Biffl V
What was the Biffl injury grade of the left vertebral artery?	☐ Biffl I ☐ Biffl II ☐ Biffl III ☐ Biffl IV ☐ Biffl V
What was the Biffl injury grade of the right vertebral artery?	☐ Biffl I ☐ Biffl II ☐ Biffl III ☐ Biffl IV ☐ Biffl V
For the left carotid artery, was antithrombotic therapy initiated during admission for BCVI management? This includes antiplatelet agents (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) or systemic heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) initiated for the treatment of BCVI.	◯ Yes ◯ No
For right carotid artery, was antithrombotic therapy initiated during admission for BCVI management? This includes antiplatelet agents (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) or systemic heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) initiated for the treatment of BCVI.	◯ Yes ◯ No
For the left vertebral artery, was antithrombotic therapy initiated during admission for BCVI management? This includes antiplatelet agents (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) or systemic heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) initiated for the treatment of BCVI.	◯ Yes ◯ No

For the right vertebral artery, was antithrombotic therapy initiated during admission for BCVI management? This includes antiplatelet agents (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) or systemic heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) initiated for the treatment of BCVI.	◯ Yes ◯ No
For the left carotid artery, which antithrombotic therapy was initiated during admission for BCVI management? Select all that apply.	☐ Antiplatelet agent (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) ☐ Systemic Heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) ☐ None
For the right carotid artery, which antithrombotic therapy was initiated during admission for BCVI management? Select all that apply.	☐ Antiplatelet agent (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) ☐ Systemic Heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) ☐ None
For the left vertebral artery, which antithrombotic therapy was initiated during admission for BCVI management? Select all that apply.	☐ Antiplatelet agent (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) ☐ Systemic Heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) ☐ None
For the right vertebral artery, which antithrombotic therapy was initiated during admission for BCVI management? Select all that apply.	☐ Antiplatelet agent (e.g. Aspirin 325mg daily, Clopidogrel 75mg daily) ☐ Systemic Heparin (unfractionated heparin infusion titrated to goal aPTT or anti-Xa) ☐ None
For the left carotid artery, on what date did the patient begin to receive antiplatelet therapy to treat their BCVI?	_____
For the right carotid artery, on what date did the patient begin to receive antiplatelet therapy to treat their BCVI?	_____
For the left vertebral artery, on what date did the patient begin to receive antiplatelet therapy to treat their BCVI?	_____
For the right vertebral artery, on what date did the patient begin to receive antiplatelet therapy to treat their BCVI?	_____
For the left carotid artery, on what date did the patient begin to receive systemic heparin therapy to treat their BCVI?	_____
For the right carotid artery, on what date did the patient begin to receive systemic heparin therapy to treat their BCVI?	_____
For the left vertebral artery, on what date did the patient begin to receive systemic heparin therapy to treat their BCVI?	_____

For the right vertebral artery, on what date did the patient begin to receive systemic heparin therapy to treat their BCVI?

_____

For the left carotid artery, were any procedures performed for the management of severe BCVI or BCVI-related complications? This includes (1) open vascular or endovascular interventions performed for severe BCVI and (2) open vascular or endovascular interventions performed, or lytic therapy administered for management of BCVI-related complications.

◯ Yes
◯ No

For the right carotid artery, were any procedures performed for the management of severe BCVI or BCVI-related complications? This includes (1) open vascular or endovascular interventions performed for severe BCVI and (2) open vascular or endovascular interventions performed, or lytic therapy administered for management of BCVI-related complications.

◯ Yes
◯ No

For the left vertebral artery, were any procedures performed for the management of severe BCVI or BCVI-related complications? This includes (1) open vascular or endovascular interventions performed for severe BCVI and (2) open vascular or endovascular interventions performed, or lytic therapy administered for management of BCVI-related complications.

◯ Yes
◯ No

For the right vertebral artery, were any procedures performed for the management of severe BCVI or BCVI-related complications? This includes (1) open vascular or endovascular interventions performed for severe BCVI and (2) open vascular or endovascular interventions performed, or lytic therapy administered for management of BCVI-related complications.

◯ Yes
◯ No

For the left carotid artery, what procedures were performed for management of severe BCVI or BCVI-related complications? Select all that apply.

☐ Open vascular intervention
☐ Endovascular intervention
☐ Lytic therapy

For the right carotid artery, what procedures were performed for management of severe BCVI or BCVI-related complications? Select all that apply.

☐ Open vascular intervention
☐ Endovascular intervention
☐ Lytic therapy

For the left vertebral artery, what procedures were performed for management of severe BCVI or BCVI-related complications? Select all that apply.

☐ Open vascular intervention
☐ Endovascular intervention
☐ Lytic therapy

For the right vertebral artery, What procedures were performed for management of severe BCVI or BCVI-related complications? Select all that apply.

☐ Open vascular intervention
☐ Endovascular intervention
☐ Lytic therapy

For the left carotid artery, on what date did the patient undergo open vascular intervention?

_____

For the right carotid artery, on what date did the patient undergo open vascular intervention?

_____

For the left vertebral artery, on what date did the patient undergo open vascular intervention?

_____

For the right vertebral artery, on what date did the patient undergo open vascular intervention?	_____
For the left carotid artery, on what date did the patient undergo endovascular intervention?	_____
For the right carotid artery, on what date did the patient undergo endovascular intervention?	_____
For the left vertebral artery, on what date did the patient undergo endovascular intervention?	_____
For the right vertebral artery, on what date did the patient undergo endovascular intervention?	_____
For the left carotid artery, on what date did the patient undergo lytic therapy?	_____
For the right carotid artery, on what date did the patient undergo lytic therapy?	_____
For the left vertebral artery, on what date did the patient undergo lytic therapy?	_____
For the right vertebral artery, on what date did the patient undergo lytic therapy?	_____
For the left carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the right carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the left vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the right vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No

For the left carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the right carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the left vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the right vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the left carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the right carotid artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the left vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No

For the right vertebral artery, did the patient experience a stroke after BCVI? This includes both (1) BCVI-related strokes defined as ischemic stroke in the vascular distribution of the BCVI artery and (2) non-BCVI-related strokes defined as ischemic strokes in the absence of BCVI or in a vascular distribution not consistent with BCVI.	◯ Yes ◯ No
For the left carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the left vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the left carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the left vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the left carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right carotid artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the left vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____
For the right vertebral artery, what date did the stroke occur? This is the date when radiographic diagnosis of stroke with either CT or MRI occurred.	_____

BLUNT SOLID ORGAN INJURY DIAGNOSIS & MANAGEMENT

This section will ask about any blunt injuries of the spleen, liver or kidney diagnosed during admission.

· Non-operative management (NOM) is defined as non-surgical management of the solid organ injury with or without endovascular intervention with angiography/embolization of the injured organ.

· Operative management is defined as open repair (splenorrhaphy, hepatorrhaphy, or renorrhaphy) or removal (splenectomy, partial hepatectomy or nephrectomy) of the damaged organ within 4 hours of hospital arrival.

· Failure of non-operative management (fNOM) is defined as delayed surgical intervention for a blunt solid organ injury (spleen, liver, or kidney) after an initial trial of non-operative management (NOM) regardless of whether angiography/embolization was attempted.

Tip for identifying fNOM: Look for patients who underwent operative management of the solid organ injury > 4 hours after arrival to hospital or after attempted endovascular intervention. If this delay was due to the need for more urgent procedures (e.g. decompressive craniectomy for severe TBI) or external hospital delays (e.g. OR or surgeon availability) do not count these as fNOM. Focus on cases where the operative management was prompted by progression or failure of the attempted NOM.

· Indication for operative intervention:

o Hemorrhagic shock: Includes patients who present with hemodynamic instability with evidence or suspicion for active bleeding (e.g. intraabdominal bleeding on ultrasound or CT imaging, transient hemodynamic response to blood transfusion)

o Concern for non-hemorrhagic injury: Includes patients who present evidence or suspicion for non-hemorrhagic intraabdominal injury on physical exam or imaging that require operative intervention such as blunt hollow viscous injury or pancreatic injury (e.g. peritonitis or seatbelt sign on abdominal exam, imaging with free air or concern for transection injury of pancreas, ureters, etc.)

Did the patient have a blunt solid organ injury of the spleen, liver or kidney diagnosed during admission? This includes any definite or probable blunt organ injury noted in the radiology report of initial CT abdomen/pelvis or during surgical or endovascular intervention of the abdomen (i.e. exploratory laparotomy, diagnostic laparoscopy, endovascular angiography/embolization).

◯ Yes
◯ No

What organs were diagnosed with blunt solid organ injury during admission? This includes any definite or probably blunt solid organ injury of the spleen, liver or kidney on initial imaging or surgical or endovascular intervention, according to the radiology or operative report. Select all that apply.

- ☐ Spleen injury
- ☐ Liver injury
- ☐ Kidney injury

AAST Spleen Injury Scale

Grade

AIS Severity Imaging Criteria Operative Criteria
I 2 Subcapsular hematoma < 10% surface area Parenchymal laceration < 1cm depth Capsular tea Same
II 2 Subcapsular hematoma 10-50% surface area Intraparenchymal hematoma < 5cm Parenchymal laceration 1-3c Same
III 3 Subcapsular hematoma >50% surface area Ruptured subcapsular or intraparenchymal hematoma ³5cm Parenchymal laceration >3cm depth Subcapsular hematoma >50% surface area or expanding Ruptured subcapsular or intraparenchymal hematoma ³5cm Parenchymal laceration >3cm depth
IV 4 Any injury in the presence of a splenic vascular injury or active bleeding confined within splenic capsule Parenchymal laceration involving segmental or hilar vessels producing >25% devascularization Parenchymal laceration involving segmental or hilar vessels producing >25% devascularization
V 5 Any injury in the presence of a splenic vascular injury with active bleeding extending beyond the spleen into the peritoneum Shattered spleen Hilar vascular injury with devascularization of the spleen Shattered spleen
Vascular injury is defined as a pseudoaneurysm or arteriovenous fistula and appears as a focal collection of vascular contrast that decreases in attenuation with delayed imaging. Active bleeding from a vascular injury presents as vascular contrast, focal or diffuse, that increases in size or attenuation in delayed phase. Vascular thrombosis can lead to organ infarction. Grade based on highest grade assessment made on imaging, at operation or on pathologic specimen. More than one grade of splenic injury may be present and should be classified by the higher grade of injury. Advance one grade for multiple injuries up to grade III.

What was the AAST Organ Injury Scale (OIS) grade of the spleen injury?

- ☐ Grade I
- ☐ Grade II
- ☐ Grade III
- ☐ Grade IV
- ☐ Grade V
- ☐ Not specified

AAST Liver Injury Scale

Grade

AIS Severity Imaging Criteria Operative Criteria
I 2 Subcapsular hematoma < 10% surface area Parenchymal laceration < 1cm depth Capsular tea Subcapsular hematoma < 10% surface area Parenchymal laceration < 1cm depth Capsular tear
II 2 Subcapsular hematoma 10-50% surface area Intraparenchymal hematoma < 10cm Laceration 1-3cm in depth and ≤ 10cm length Same
III 3 Subcapsular hematoma >50% surface area Ruptured subcapsular or parenchymal hematoma Intraparenchymal laceration >10cm depth Laceration >3cm depth Any injury in the presence of a liver vascular injury or active bleeding contained within liver parenchyma Subcapsular hematoma >50% surface area or expanding Ruptured subcapsular or parenchymal hematoma Intraparenchymal laceration >10cm depth Laceration >3cm depth
IV 4 Parenchymal disruption involving 25-75% of a hepatic lobe Any bleeding extending beyond the liver parenchyma into the peritoneum Parenchymal disruption involving 25-75% of a hepatic lobe
V 5 Parenchymal disruption >75% of hepatic lobe Juxtahepatic venous injury to include retrohepatic vena cava and central major hepatic veins Same
Vascular injury is defined as a pseudoaneurysm or arteriovenous fistula and appears as a focal collection of vascular contrast that decreases in attenuation with delayed imaging. Active bleeding from a vascular injury presents as vascular contrast, focal or diffuse, that increases in size or attenuation in delayed phase. Vascular thrombosis can lead to organ infarction. Grade based on highest grade assessment made on imaging, at operation or on pathologic specimen. More than one grade of liver injury may be present and should be classified by the higher grade of injury. Advance one grade for multiple injuries up to grade III.

What was the AAST Organ Injury Scale (OIS) grade of the liver injury?	☐ Grade I ☐ Grade II ☐ Grade III ☐ Grade IV ☐ Grade V ☐ Not specified

AAST Kidney Injury Scale

Grade

AIS Severity Imaging Criteria Operative Criteria
I 2 Subcapsular hematoma and/or parenchymal contusion without laceration Nonexpanding subcapsular hematoma Parenchymal contusion without laceration
II 2 Perirenal hematoma confined to Gerota fascia Renal parenchymal laceration £1cm depth without urinary extravasation Nonexpanding perirenal hematoma confined to Gerota fascia Renal parenchymal laceration ≤1cm depth without urinary extravasation
III 3 Renal parenchymal laceration >1cm depth without collecting system rupture of urinary extravasation Any injury in the presence of a kidney vascular injury or active bleeding contained within Gerota fascia Renal parenchymal laceration >1cm depth without collecting system rupture of urinary extravasation
IV 4 Parenchymal laceration extending into urinary collecting system with urinary extravasation Renal pelvis laceration and/or complete ureteropelvic disruption Segmental renal vein or artery injury Active bleeding beyond Gerota fascia into retroperitoneum or peritoneum Segmental or complete kidney infarction(s) due to vessel thrombosis without active bleeding Parenchymal laceration extending into urinary collecting system with urinary extravasation Renal pelvis laceration and/or complete ureteropelvic disruption Segmental renal vein or artery injury Segmental or complete kidney infarction(s) due to vessel thrombosis without active
V 5 Main renal artery or vein laceration or avulsion of hilum Devascularized kidney with active bleeding Shattered kidney with loss of identifiable parenchymal renal anatomy Same
Vascular injury is defined as a pseudoaneurysm or arteriovenous fistula and appears as a focal collection of vascular contrast that decreases in attenuation with delayed imaging. Active bleeding from a vascular injury presents as vascular contrast, focal or diffuse, that increases in size or attenuation in delayed phase. Vascular thrombosis can lead to organ infarction. Grade based on highest grade assessment made on imaging, at operation or on pathologic specimen. More than one grade of kidney injury may be present and should be classified by the higher grade of injury. Advance one grade for multiple injuries up to grade III.

What was the AAST Organ Injury Scale (OIS) grade of the kidney injury?	☐ Grade I ☐ Grade II ☐ Grade III ☐ Grade IV ☐ Grade V ☐ Not specified
What was the initial management of the spleen injury? Definitions of non-operative management (NOM) and operative management are provided above. Select all that apply.	☐ Non-operative management (NOM) without angiography/embolization ☐ Non-operative management (NOM) with angiography/embolization ☐ Operative management
What was the initial management of the liver injury? Definitions of non-operative management (NOM) and operative management are provided above. Select all that apply.	☐ Non-operative management (NOM) without angiography/embolization ☐ Non-operative management (NOM) with angiography/embolization ☐ Operative management
What was the initial management of the kidney injury? Definitions of non-operative management (NOM) and operative management are provided above. Select all that apply.	☐ Non-operative management (NOM) without angiography/embolization ☐ Non-operative management (NOM) with angiography/embolization ☐ Operative management

Did failure of non-operative management (fNOM) of the spleen occur? This includes any delayed operative management of the injured organ. Definition of fNOM provided above.	◯ Yes ◯ No
Did failure of non-operative management (fNOM) of the liver occur? This includes any delayed operative management of the injured organ. Definition of fNOM provided above.	◯ Yes ◯ No
Did failure of non-operative management (fNOM) of the kidney occur? This includes any delayed operative management of the injured organ. Definition of fNOM provided above.	◯ Yes ◯ No
Was selective angiography/embolization of the spleen performed? This includes endovascular angiography of the spleen, liver or kidney with or without embolization.	◯ Yes ◯ No
Was selective angiography/embolization of the liver performed? This includes endovascular angiography of the spleen, liver or kidney with or without embolization.	◯ Yes ◯ No
Was selective angiography/embolization of the kidney performed? This includes endovascular angiography of the spleen, liver or kidney with or without embolization.	◯ Yes ◯ No
Provide the total number of blood transfusions administered during admission. This includes any units of whole blood or blood components: packed red blood cells (pRBC), fresh frozen plasma (FFP), platelets, cryoprecipitate.	_____

Participating Institution Information

Please only complete this survey for the first record your site submits to this database.

Select the trauma level for your facility:	◯ I ◯ II ◯ III
Select the approximate total annual trauma admissions at your facility:	◯ < 1000 ◯ 1000 - 2000 ◯ 2000 - 3000 ◯ 3000 - 4000 ◯ > 4000
Select the approximate total annual trauma activations at your facility:	◯ < 1000 ◯ 1000 - 2000 ◯ 2000 - 3000 ◯ 3000 - 4000 ◯ > 4000
Does your institution have any specific institutional protocols or clinical practice guidelines for blunt organ injury?	◯ Yes ◯ No
Briefly describe your institution's existing protocols or clinical practice guidelines as they relate to blunt organ injury.	_____
Does your institution have any specific institutional protocols or clinical practice guidelines for traumatic brain injury?	◯ Yes ◯ No
Briefly describe your institution's existing protocols or clinical practice guidelines as they relate to traumatic brain injury.	_____
Does your institution have any specific institutional protocols or clinical practice guidelines for blunt cerebrovascular injury?	◯ Yes ◯ No
Briefly describe your institution's existing protocols or clinical practice guidelines as they relate to blunt cerebrovascular injury.	_____