Blunt Abdominal Trauma, Splenectomy, and Post-Splenectomy Vaccination

Part of the Joint Trauma System (JTS) Clinical Practice Guideline (CPG) Training Series
Purpose

This CPG provides evidence–based guidelines for the management of blunt abdominal injury and provides post splenectomy vaccination recommendations.

This presentation is based on the JTS Blunt Abdominal Trauma, Splenectomy, and Post-Splenectomy Vaccination CPG, 13 May 2020 (ID:09). It is a high-level review. Please refer to the complete CPG for detailed instructions. Information contained in this presentation is only a guideline and not a substitute for clinical judgment.
Agenda

1. Summary
2. Background
3. Blunt Abdominal Trauma Flowchart
4. Splenectomy
5. OPSI Prevention
6. Vaccine Dosing
7. Performance Improvement (PI) Monitoring
8. Appendices
9. Contributors
Summary

- Patients with hemodynamic instability after blunt abdominal trauma and evidence of hemoperitoneum on FAST should undergo exploratory laparotomy immediately.

- Patients with active hemorrhage are best managed by splenectomy.
Background

- Blunt abdominal trauma provides a diagnostic and clinical challenge over penetrating trauma in the combat setting.
  - Surgical units often lack computed tomography (CT).
  - Providers will likely be dependent on physical and focused assessment with sonography for trauma (FAST) examinations.

- Unstable patients with an identified hemoperitoneum on FAST should undergo exploratory laparotomy.
Consider non-operative management if a facility can ensure adequate follow-up and evaluation (typically Role 3 or higher).

- No transfer until intraabdominal hemorrhage is assessed and controlled.
- Evolving peritonitis or require persistent blood products to maintain blood pressure warrant an exploratory laparotomy.

Use interventional radiology, if available, as an adjunctive procedure for blunt injury of visceral organs.
BAT (known or suspected)

- **Review CT of Abdomen or DPL +/- FAST**
- **ABCs and Resuscitation**
- **Radiographs as indicated**
- **Head injury require immediate neurosurgical evaluation?**
  - Yes
  - Unstable Despite Initial Resuscitation
    - Activate Massive Transfusion Protocol
  - No
  - Stable Suspect Injury
    - CT, FAST or DPL
      - Grade I-III
        - Indications for OR? (use liberal indications)
          - Yes
            - Consider Angiographic Embolization
          - No
            - CT Evidence of a Contrast Blush or Pseudoaneurysm
              - Yes
                - Observe
              - No
                - Exploratory Laparotomy
                  - Yes
                    - Non-Operative Management
                  - No
                    - Stable?
                      - Yes
                        - Non-Operative Management
                      - No
                        - Stable?
                          - Yes
                            - Non-Operative Management
                          - No
                            - Exploratory Laparotomy
  - No
  - Stable?
    - Yes
      - Consider Transfer
    - No
      - Laparotomy

Guidelines apply for Level II+ and Level III with surgical capability. Focused assessment with sonography for trauma (FAST) exam reliability is very operator dependent. Providers who rely on FAST exam must be mindful of risk of false negative exam. Only providers with personal experience of accurate findings should rely on the FAST exam as a screening tool for hemoperitoneum. If splenic preservation is to be attempted (including embolization), the patient should remain in the facility for a minimum of 48 hours of observation before being transported to another facility.
Perform splenectomy for all grade IV and V splenic injuries and any lacerated spleens with active hemorrhage encountered during laparotomy.

Consider non-operative management for grade III or below injuries without active extravasation, pseudo aneurysm, hemoperitoneum or other indications for laparotomy.

- Place patient under direct care of an experienced trauma surgeon.
- Monitor patient for 48 hours in a Role 3 facility prior to aeromedical evacuation out of theater.
- Obtain CT scan at the end of 48 hours to assess for complications.
Consider interventional radiology embolization of the spleen as an adjunct to non-operative therapy. Patients must be monitored for 48 hours following the procedure prior to aeromedical evacuation.

Failure of non-operative management include but are not limited to hypotension and requirements for blood transfusion.

Failure of non-operative management requires splenectomy.
Overwhelming Post-Splenectomy Infection (OPSI) is a devastating complication with mortality rates approaching 50%.

- Life long risk with incidence in trauma patients <0.5%

Clinical presentation includes:

- Initial flu-like symptoms
- Rapid progression to sepsis
- Consumptive coagulopathy
- Bacteremia
- Death within 12-48 hours

Causative organisms are typically encapsulated including: *Streptococcus pneumonia* (pneumococcus), *Hemophilus influenzae* type B, and *Neisseria meningitidis* (meningococcal).
Vaccinations used to prevent OPSI

- **Pneumococcal:**
  1. Prevnar 13® (PCV13) AND Pneumovax 23® (PPSV23) are recommended.8
  2. Give single dose of PCV13 to patients who have not previously received PCV13.
  3. Give PPSV23 8 weeks after PCV13 for those who have not previously received PPSV23.
  4. Administer one-time revaccination of PPSV23 5 years after the first dose.

- **Haemophilus influenza type B (HIB):**
  - Single dose of any Hib conjugate vaccine (PedvaxHIB®, ActHIB®, or Hiberix®) is recommended for those not previously vaccinated for Hib.
Meningococcal:

- Vaccination for serogroup B (MenB) as well as serogroups A, C, W, and Y (MenACWY) is recommended.

- For those not previously vaccinated for MenB, either Bexsero® (2 dose series) or Trumenba® (3 dose series) may be given.

- For those not previously vaccinated for MenACWY, either Menveo® or Menactra® should be administered as a 2 dose primary series. After the primary series, a booster dose is recommended every 5 years.

- For those that have been vaccinated for MenACWY within 5 years, no booster is needed. If vaccinated beyond 5 years, a booster dose should be administered.

- If Menactra® is the only MenACWY vaccine available and the patient also is recommended to get Prevnar 13®, Menactra® should be administered 4 weeks after Prevnar 13®.

- Vaccinations indicated for all splenectomized patients and those deemed to be functionally asplenic (<51% normal architecture and/or vascularization)
OPS1 Prevention (4)

- All patients should be administered all three vaccinations in the immediate postoperative period at the first facility that can do so.

- Important to document administration of vaccines or explaining why one or more were not administered.
  - Documentation: include date, time, dose, lot number/lot sticker, manufacturer and nurse signature
  - Documentation: electronic medical record preferred

- After aeromedical evacuation of patients, Role 3 and Role 4 facilities should not assume vaccines were given without documentation.
# Vaccine Dosing

## Guide for the Vaccine Naïve Patient

*(If patient has previously received one or more of the listed vaccines, see text for guidance.)*

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Vaccine</th>
<th>Dose and Timing*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Streptococcus pneumoniae</strong></td>
<td>Prevnar 13®</td>
<td>Single Dose</td>
</tr>
<tr>
<td></td>
<td>Pneumovax 23®</td>
<td>One dose ≥8 weeks after Prevnar 13®</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second dose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 years after first dose</td>
</tr>
<tr>
<td><strong>Nesseria meningitidis</strong></td>
<td>Bexsero® or Trumeba® (serogroup B)</td>
<td>Dose #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dose #2 one month after first dose</td>
</tr>
<tr>
<td></td>
<td>Menactra® or Menveo® (serogroups A, C, W, and Y)</td>
<td>Dose #1 (if using Menactra®, give 4 weeks after Prevnar 13®)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dose #2 one month after first dose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Booster dose given every 5 year interval</td>
</tr>
<tr>
<td><strong>Haemophilus influenza type b</strong></td>
<td>PedvaxHIB® or ActHIB® or Hiberix®</td>
<td>Single Dose</td>
</tr>
</tbody>
</table>

*Vaccines should be administered as soon as the patient is clinically stable post-operatively*
Intent (Expected Outcomes)

- Hemodynamically unstable (SBP<90) blunt trauma patients with positive FAST undergo laparotomy (unless documented reason to delay/avoid)
- All patients with grade IV and V splenic injuries requiring long-range evacuation undergo splenectomy or reason for non-operative management is documented.
- Selective non-operative management of hemodynamically stable Grade I-III blunt splenic injury is performed at Role 2E, 3 or 4.
- All patients who undergo splenectomy receive splenectomy vaccinations.

Data Source

- Patient Record
- DoD Trauma Registry
**Performance/Adherence Measures**

- Number and percentage of patients in population of interest with SBP <90 and positive FAST on arrival to a surgical capability who undergo exploratory laparotomy at the same level of care.

- Number and percentage of patients with grade IV and V splenic injuries who undergo splenectomy.

- Number and percentage of patients with each grade of splenic injury who are managed non-operatively.

- Number and percentage of patients who undergo splenectomy who have documentation of pneumococcal and *HAEMOPHILUS* influenza vaccines.
Appendices

- **Appendix A**: Algorithm for Evaluating Blunt Abdominal Trauma
- **Appendix B**: Additional Information Regarding Off-label Uses in CPGs
Contributors

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