Embrace Splenic Trauma Guideline

Reference: 1789v1
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Purpose
Safe management of splenic trauma, including transfer to a paediatric Major Trauma Centre, conservative measures and rare indicators for surgical intervention

Intended Audience
Embrace clinical staff
1. Introduction

Blunt abdominal trauma occurs in 15% of injured children.\(^1,2\) Discrepancies exist in the management of children presenting with splenic trauma\(^3\), despite the lifetime risk of overwhelming post-splenectomy infection (OPSI), largely because of anxiety about the management of major haemorrhage.\(^4,5\) Splenectomy in children is associated with a 5% lifetime risk of death from overwhelming post-splenectomy infection (OPSI). Non-operative management of paediatric splenic injury in children is accepted safe practice.\(^6,7\)

The critical period is 4-36 hours after injury, with the risk of bleeding declining rapidly thereafter. The group most at risk of continued bleeding are children with multiple injuries. Education and early communication between referral, transport, and tertiary teams facilitates safe patient observation with surgical and/or intensive care if required.

2. Intended Audience

Embrace staff supporting paediatricians, emergency departments and adult general surgeons, especially those from District General Hospital Trauma Units, (DGH TU) as they are often the first to see children with blunt abdominal trauma. These children can present the day following the injury and may not have obvious clinical signs of a significant underlying splenic injury, so a high index of suspicion is required during the diagnostic period. Call-conferencing between referral, transport and tertiary teams facilitates early communication and collaborating with surgical networks and regional network hospitals and facilitates targeted and timely best care.
3. Guideline Content

Presentation and emergency management

Patients often do not present immediately after injury and the majority are taken to District General Hospital Trauma Unit (DGH TU). They may not have obvious clinical signs of a significant underlying splenic injury.

- Management of airway, breathing and circulation is priority at presentation.

- Ensure the patient is well oxygenated, avoiding acidosis (pH>7.25), kept normothermic (T>36°C) and has adequate analgesia (e.g. morphine titrated to need).

- Two ports of IV access should be obtained, along with baseline blood tests, including blood count, urea and electrolytes, clotting, group & save, blood gas. Repeated blood tests may be required.
- On admission, take a detailed history of the mechanism of injury and site of impact.

- Assess the abdomen for signs of rigidity, lacerations, penetrating wounds, bruising, distention and tenderness.

- The majority of injuries will not have obvious clinical signs. Repeated reassessment is required.

Early recognition of significant trauma using clinical indicators, CT scans and a high index of suspicion can result in prompt discussion and optimal treatment with splenic preservation.

- Monitor for signs of intra-abdominal bleeding, such as tachycardia, hypotension, prolonged capillary refill time (CRT), decreased urine output and conscious level.

- CT Scanning is an important part of diagnosis. FAST scanning is not an appropriate investigation in paediatric trauma. C-spine, chest and pelvic x-rays may be required depending on clinical situation.

- Precise fluid and coagulopathy management is required:
  - Insert a nasogastric tube and a urinary catheter if signs of cardiovascular compromise
  - Record fluid balance
Red blood cells (type-specific or O-negative)
- Target Hb 8-10g/dl

Maintenance fluid (IV) and fluid boluses (10ml/kg 0.9% Sodium Chloride)

Tranexamic Acid (15mg/kg, then 2mg/kg/hr for 8 hours or until bleeding stops)

Platelets (10 – 20ml/kg)
- Target Plts >75 x 10^9/L

Fresh frozen plasma (20ml/kg)
- Target PT/APTT ratio <1.5

Cryoprecipitate (5 – 10ml/kg)
- Target fibrinogen >1g/L
All children with Major Trauma should be referred to the Paediatric Major Trauma Centre (MTC) Emergency Department Consultant via Embrace.

Time critical transfer by the referring team to the MTC will be required.

Call 0845 147 247 2
Press ‘1’ for Major Trauma

After providing basic details you will be connected to the Paediatric MTC Emergency Department ‘Red Phone’ for a ‘Call and Send’ discussion.

The Paediatric MTC Emergency Department Consultant will accept the patient for transfer.

All children with splenic injuries who present late and do not fall into the category of Major Trauma should be discussed with the regional paediatric surgeons via Embrace.

In very rare cases, following discussion with the MTC via Embrace, damage control surgery in the DGH TU may be indicated. Possible indications include:

- Refractory shock
- Bowel perforation
- Penetrating injuries

Non-surgical management of splenic injury is best practice and safe for the vast majority of children.
**Conservative management in the DGH TU**

**All children with splenic injury in association with Major Trauma should be transferred to the Paediatric MTC**

Children with isolated splenic injury may rarely be cared for in the paediatric HDU at a DGH TU with close monitoring, following discussion with the Paediatric MTC. Ensure that the local surgical team are aware of the patient.

Conservative management consists of:

- Bed rest
- Close observation with frequent observation of vital signs and immediate response to any signs of deterioration.
- Insert a nasogastric tube and a urinary catheter if signs of cardiovascular compromise
- Record fluid balance

Any signs of instability including need for fluid resuscitation, transfusion of blood or coagulation support would indicate the need for immediate discussion with the Paediatric MTC via Embrace and transfer for on-going surgical care.

**Frequent communication regarding changes in patient status with the MTC teams via Embrace is crucial.**
Injury classification  

<table>
<thead>
<tr>
<th>CT Grade</th>
<th>Injury</th>
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| I        | Laceration(s) <1cm deep  
Subcapsular haematoma <1cm diameter |
| II       | Laceration(s) 1 – 3 cm deep  
Subcapsular/central haematoma 1 – 3 cm diameter |
| III      | Laceration(s) 3 – 10cm deep 
Subcapsular/central haematoma >10cm diameter |
| IV       | Laceration(s) > 10cm deep  
Subcapsular haematoma > 10cm diameter |
| V        | Splenic tissue maceration/devascularisation |

Best rest vs. activity recommendations  

<table>
<thead>
<tr>
<th>CT grade</th>
<th>ICU stay</th>
<th>Hospital stay</th>
<th>Activity restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0 days</td>
<td>2 days</td>
<td>3 weeks</td>
</tr>
<tr>
<td>II</td>
<td>0 days</td>
<td>3 days</td>
<td>4 weeks</td>
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<tr>
<td>III</td>
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<td>4 days</td>
<td>5 weeks</td>
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<tr>
<td>IV</td>
<td>1 day</td>
<td>5 days</td>
<td>6 weeks</td>
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It is recommended that patients have bed rest until their abdomen is no longer tender.
Post-splenectomy considerations

Immunisation\textsuperscript{10,11}

Please refer to the Green Book for immunisation recommendations.

There are no contraindications in regards to the routine childhood immunisation schedule.

Prophylaxis\textsuperscript{10}

Life-long prophylaxis in the form of Phenoxyethylpenicillin or Erythromycin should be prescribed.

Patients and their families should be provided with written information about the need for prophylaxis, risk of post-splenectomy septicaemia and need to seek medical advice at the onset of an infection.

A medical alert card/bracelet should be recommended.

It is important to discuss considerations pre-overseas travel and need for immunisation.

Clear communication with their GP and other healthcare professionals in regards to splenectomy and post-operative recommendations is required.
4. References