**GUIDELINE ON THE CARE OF A CHILD / INFANT UNDERGOING A LIVER BIOPSY**

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### Document Review History

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## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>2.0</td>
<td>Definition of Guideline</td>
<td>3</td>
</tr>
<tr>
<td>3.0</td>
<td>Complications associated with liver biopsy</td>
<td>3</td>
</tr>
<tr>
<td>4.0</td>
<td>Types of Liver Biopsy</td>
<td>4</td>
</tr>
<tr>
<td>5.0</td>
<td>Management of a child pre and post liver biopsy</td>
<td>4</td>
</tr>
<tr>
<td>6.0</td>
<td>References</td>
<td>7</td>
</tr>
</tbody>
</table>
1.0 Introduction

The liver is the largest gland in the body, weighing between 1 – 2 kg (in adults). At birth, the liver constitutes 5% of the baby’s body weight and grows with the baby. The liver is situated in the upper right quadrant of the abdomen, under the diaphragm, just behind the lower portion of the ribs. It is described as having four lobes with the two most obvious being the right and left lobe on the anterior surface. The liver has many complex functions:

- Bile production – aids with intestinal absorption of fats and fat soluble vitamins A,D,E,K
- Storage – converts glucose to glycogen and stores for later use, stores iron, copper
- Detoxification – drugs, alcohol and other environmental toxins
- Metabolism – break down of nutrients into less harmful forms that can be used by the body
- Regulation - of hormones, insulin, glucagon, cortisol, aldosterone, sex hormones
- Synthesis – plasma proteins, albumin, clotting factors
- Phagocytosis – cleans blood of potentially infectious particles

2.0 Definition of Guidelines

Liver biopsy is a procedure that removes a small piece of liver tissue, using a needle which is inserted through the skin via a small incision site into the liver (reference). The liver tissue is then sent to the lab to be chemically tested and microscopically examined.

**Indications:**
- Diagnosis
- Disease Staging
- To assist in making therapeutic management decisions

3.0 Complications associated with liver biopsy:

- Pain
- Haemorrhage - Haemobilia (bleeding into the biliary tract), intraperitoneal, intrahepatic / subcapsular haemorrhage
- Bile Peritonitis
- Pneumothorax

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4.0 Types of Liver Biopsy:

- **Percutaneous**: this is type of biopsy is performed by using palpation/percussion to locate the liver, suction, cutting or spring loaded needles are used to obtain a sample of liver tissue. Ultrasound guidance is used in all children who have undergone liver transplant as the position of the new liver may be altered and this is the safest approach in preventing accidental puncturing of surrounding organs (Bander and Mitchell 2007)

- **Transvenous**: maybe transjugular or transfemoral. This involves percutaneous puncturing of the right internal jugular vein and the introduction, with use of fluoroscopy, of a catheter into the right hepatic vein and into the liver to obtain tissue samples. This method is considered the safest alternative in patients where there is: significant ascites (to prevent risk of peritonitis), a small hard cirrhotic liver (to prevent needle breakage) coagulopathy (biopsy is performed from within the vascular system which minimises the risk of bleeding), obesity (difficult access) (Arturo 2001)

- **Laparoscopic**: small incisions within the abdomen facilitate introduction of instruments to obtain biopsy specimens

- **Open Surgical**: a deep abdominal incision is made and a small wedge of liver tissue is excised via a needle or knife.

All liver biopsies in OLCHC are performed under general anaesthetic as the maintenance of a safe position and control of breathing is essential in minimising potential risks of needle laceration and bleeding.
5.0  Guidelines for: Management of a child pre and post liver biopsy

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| **PRE OPERATIVE CARE**  
Explain procedure to child/parents/carer  
Involve Play Therapist in pre procedural preparation  
Ensure informed consent is obtained  
**PRE PROCEDURAL LABORATORY INVESTIGATIONS:**  
Certain investigations **MUST** be performed prior to this procedure.  
Pre procedural bloods should be on the day before biopsy. If the child is unstable, bloods are performed on the day of the procedure.  
In some cases, bloods may be accepted if performed within 48 hours of biopsy – according to consultant decision.  
**LABORATORY INVESTIGATIONS to be performed**  
1.  **Full Blood Count**  
Platelets must be greater than 75  
2.  **Coagulation**  
INR/Prothrombin Time/Activated Partial Thromboplastin Time  
3.  **Group & Hold**  
**FASTING:**  
Ensure the child fasts as per hospital guidelines  
**NOTE:** Children with suspected metabolic liver disease need an individualised fluid and fasting plan agreed with family, nursing and medical staff before admission.  
**Medications:**  
Ensure the child’s medications are reviewed by the medical team. Certain medications may need to be restricted e.g. Non-Steroidal Anti Inflammatory Drugs and Blood Thinning agents (Aspirin, Warfarin) | Prepared children report less pain and show less distress.  
Proper preparation may reduce child’s anxiety and encourage cooperation. (Ball & Binder 2008)  
Children who receive therapeutic play preparation report lower anxiety levels and fewer negative emotions (Li 2007)  
To ensure patient safety (OLCHC SOP 2010)  
To ensure the child is safely prepared and any abnormalities / coagulopathies can be detected / addressed.  
The liver is a highly vascular organ (holds 13% of the total blood supply at any given moment) making bleeding a significant risk factor. People with liver disease often have clotting problems and are therefore at greater risk of bleeding. Specific bloods are ordered to determine clotting ability.  
To allow time for results to be available and reviewed by the medical team. Liver biopsy does not pose excessive risk if adequate homeostasis can be achieved prior to biopsy (Theodore 2004). Prompt detection and treatment of any abnormalities will assist with this.  
The GI team will individually assess each child to determine this.  
To identify platelet count as administration of fresh frozen plasma maybe necessary.  
Liaise with the GI team in relation to abnormal results to determine if it is necessary to administer clotting factors in order for to proceed with biopsy safely.  
Blood products need to be available in the event of bleeding.  
To ensure patient safety (OLCHC 2010). An empty stomach may reduce the risk of aspiration caused by potential nausea and vomiting (Muslim 2009). Postprandial hyperemia may increase portal flow and could increase risk of bleeding (Rockey et al 2009)  
To ensure individualised care and correct treatment is delivered. Management of specific drugs should be handled on an individual basis and the need to
Asprin: should be discontinued 5 days pre-liver biopsy, Warfarin: discontinued at least 3 days pre biopsy.

Medications that should not be held include anti-rejection medications, anti-convulsant treatment, insulin.

**POST OPERATIVE CARE:**

Close observation of the child including:

- Temperature, Pulse, Respiration, Oxygen Saturation, Blood Pressure measurements.
- 5 mins x 15mins
- 15 mins x next 2 hours
- 30 mins x next 2 hours
- 1 hourly thereafter until discharge

**Pulse and BP**

**Respiration and Oxygen Saturation**

**Temperature**

Ensure the IV cannula remains insitu until discharge, check patency regularly.

Assess the child’s level of pain using appropriate assessment tools.

Ongoing pain, change in vital signs or any nursing concerns indicate the need for medical review.

**Positioning**

Encourage child to rest, preferably lying on right side. If this position is not tolerated the supine position is acceptable.

Encourage bed rest for at least 2-3 hours post procedure. Children can mobilise to toilet under supervision 3-4 hours after returning to ward or can be offered bedpan.

**Wound Site**

A pressure dressing is applied in theatre and this should be left in situ for 24 hours.

Observe the wound site when monitoring vital signs. Monitor wound site for excessive redness and tenderness. Report excessive bleeding at site to medical team immediately

**Diet**

Observe for any nausea/vomiting

Check the post-operative instructions in the child’s notes for specific care. Usually children can drink 1-2 hours after the procedure, a light snack after 4 hours and then regular diet after 6 hours post procedure.

Document all nursing care in the child’s notes

hold medications in the pre procedural period must be weighed against risk.

To reduce the risk of bleeding.

To ensure effective and safe care.

To detect any abnormalities and ensure prompt treatment.

Intraperitoneal haemorrhage is the most serious bleeding complication associated with percutaneous liver biopsy and can be the result of accidental penetration of the hepatic artery or portal vein (Rockey 2009)

Severe bleeding is most likely to occur within 2 – 4 hours post procedure but late hemorrhage can occur up to several days later (Arturo et al 2001).

Delayed bleeding can be caused by premature clot dissolution due to liver disease hyperfibrinolysis Tachycardia and hypotension are suggestive of bleeding and the child will require prompt medical evaluation.

Deterioration in respiratory status may be indicative of Pneumothorax or Haemothorax caused by accidental penetration of the lungs or introduction of air into the chest cavity during procedure.

All invasive procedures carry a risk of opportunistic infection. In children with biliary tract anomalies and Roux en Y anastomosis where there is close proximity to the bowel there is a further predisposition to infection.

Treatment of bleeding may require urgent fluid, blood or platelet infusion so immediate IV access is necessary.

As per local guidelines (OLCHC 2004). Mild pain often occurs in right upper quadrant or shoulder for a short duration and can be managed by analgesics that do not interfere with clotting (Soykan 2002).

Severe persistent pain particularly in right hypochondrium may indicate subcapsular haematoma or pneumothorax. Sudden onset of severe pain may suggest biliary peritonitis and the child will require review by the medical team.

To detect and treat any abnormalities promptly.

This position allows liver to rest against the lateral abdominal wall and reduce risk of bleeding and bile leakage (Hyun 2004)

To reduce the risk of bleeding
**PRIOR TO DISCHARGE**

Ensure the child’s medications are reviewed as certain medications may be recommenced.

Ensure child/parent are prepared adequately for discharge.

Ensure that appropriate discharge advice is given including Liver Biopsy Leaflet. Allow time for questions.

A dressing is used to apply pressure and help prevent bleeding.

To detect any bleeding or infection

Any haematemesis should be reported to the medical team

To ensure accuracy (ABA 2002)

Prolonged withholding of medication may be harmful to the child

Results of biopsy are usually not available for a few days. Children admitted electively need to have a clinic visit booked to discuss the results. Children remaining as inpatients can expect the results after approximately 2 days. The Consultant will relay these results to parents.

Parent Information leaflet will give written reinforcement of signs to observe at home that are suggestive of complications.

### 6.0 References


*Nurse Practice Committee*


Our Lady’s Children’s Hospital (OLCHC) (2010) SOP on patient preparation and admission to operating theatre, OLCHC, Dublin.


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