Diagnostic Adequacy of Non-targeted Liver Biopsies in Radiology-A Retrospective Audit

Lucy Milligan RN
Gemma Paterson CNS

Associate investigators: Dr Mark Goodwin, Associate Professor Ruth Lim, Julie Smith
Austin Radiology:

- Austin Health is a major tertiary hospital located in the northeast of Melbourne. The Austin is renowned for its specialist work in liver transplantation.

- The Radiology department performs a valuable Liver Biopsy service for Austin, where ALL biopsies are performed by radiologists and radiology registrars. We perform 15-20 liver biopsies/week.

- Radiology performs all percutaneous liver biopsies under ultrasound guidance.
Background:

An accurate liver biopsy provides important information about the diagnosis, prognosis, and treatment of a variety of liver diseases\(^1\).
Types of Liver Biopsies:

- Percutaneous Liver biopsies can be targeted or non-targeted:
  
  - A **TARGETED** liver biopsy is a sample of liver tissue that is taken from a lesion, to confirm malignancy
  
  - A **NON-TARGETED** liver biopsy is a general sample of liver tissue that is taken to assess parenchymal liver health, eg. viral hepatitis, rejection of transplanted liver, cirrhosis, Non-Alcoholic Steatohepatitis/Non-Alcoholic Fatty Liver Disease.
Other Types of Liver Biopsies:

- Transjugular liver biopsies are performed in patients who cannot safely have a percutaneous liver biopsy, eg. presence of ascites, abnormal clotting.

- Laparoscopic liver biopsies are performed when patient is undergoing surgery, eg. liver resection.
Rationale:

- Anecdotally reported ↑ in non-targeted liver Bx performed in Radiology insufficient for histology/diagnosis

- Insufficient samples may lead to repeat Bx

- Repeat Bx= ↑ discomfort and ↑ cost, ↑ risk of complications

- Important to provide efficient, cost-effective service, and an accurate diagnosis in majority of patients, as the Victorian liver transplant hospital.

- Literature review: samples were diagnostic in 98-99% ²⁻⁴.
Aims:

1. To determine number of non-targeted Liver Bx samples collected that are adequate and able to provide diagnosis compared with inadequate samples collected that resulted in no diagnosis.

2. To investigate possible reasons for poor biopsy samples:
   • Operator experience
   • Type/gauge of biopsy gun
   • Number of passes
   • Patient factors: eg. girth, co-morbidities, non-compliance.

3. To record post-biopsy complications
   Outpatients are required to recover for 4/24 in hospital
Methodology:

• Austin Ethics approval obtained

• Sample size=100 patients
  *Based on projected no. of non-targeted liver Bx performed over 6 months.

• We reviewed all non-targeted liver Bx from February-August 2015

• Information from:
  ➢ Radiology Information System-booking system
  ➢ Cerner- pathology/histology/radiology reports
  ➢ Scanned Medical Records-procedural forms, clinical notes post-biopsy
Methodology:

Information collected included:

- Pt. demographics- Age, sex, weight (where recorded), Inpatient/Outpatient
- Indication for Bx and Medical Hx
- Number of passes- more passes can ↑ complications⁵
- Quality of sample: length/fragmented. Sample length >20mm can provide more accurate information to grade/stage viral hepatitis¹
- Type/gauge of gun
- Level of experience* (1ˢᵗ yr Radiology Reg → Consultant Radiologist)

* Registrars are supervised by a radiologist
**Results:**

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total biopsies performed</td>
<td>100</td>
</tr>
<tr>
<td>Male</td>
<td>55%</td>
</tr>
<tr>
<td>Female</td>
<td>45%</td>
</tr>
<tr>
<td>Age range</td>
<td>21-80 years</td>
</tr>
<tr>
<td>Outpatient</td>
<td>71%</td>
</tr>
<tr>
<td>Inpatient</td>
<td>29%</td>
</tr>
</tbody>
</table>
Results:

- **Reasons for biopsy:**
  - Deranged LFTs – 54%
  - Query of rejection - 16%
  - Cirrhosis/fibrosis - 15%
  - AIH - 9%
  - Other - 6%

- **Relevant PMHx:** OLT (57%), HCV, HBV, Non-alcoholic Steatohepatitis (NASH)/ non-alcoholic fatty liver disease (NAFLD), AIH.

- Sample length range: 1-25mm, Mean length~15mm.
- Fragmented samples: 24 of 128 samples
- Abnormal clotting: 2/100, treated prior to biopsy

- Biopsy gun gauge: 14g-95%
  - 16g-3%
  - 17g co-axial -2%
Results:

- 97/100 adequate biopsy samples
- 3/100 biopsy samples were suboptimal, although diagnosis was still possible in 2 cases.
- Therefore, sample provided diagnosis in 99% of cases

Diagnostic samples:

- Diagnostic: 99%
- Non-diagnostic: 1%
Inadequate sample:

- Outpatient
- Reason for Bx-? AIH
- Performed by senior registrar
- 1 x sample collected
- 14g Achieve needle used, length not recorded
- Complications: mild pain
- **Histology report:** fragmented 10mm and 2mm (sample was not noted to have fragmented in rad report). Report states suboptimal for assessment, although findings suggest minor non-specific changes. Patient was a private referral-unable to ascertain if 2\(^{nd}\) biopsy was required. No further treatment at AH.
Number of biopsy passes made:

A second or third sample was taken where the first sample was noted to have fragmented or appeared insufficient.
Doctor years of experience:

- 1st year reg: 39%
- 2nd year reg: 22%
- 3rd year reg: 18%
- 4th year reg: 12%
- 5th year reg: 12%
- Fellow/consultant: 7%
- Other: 2%
Limitations:

- Retrospective audit = not all data recorded
- Potential confounding factors:
  - different biopsy equipment utilised
  - missing information - biopsy gun type/length frequently not recorded
  - No. of PT’s not recorded in histology report - not able to correlate with literature
- Single centre - difficult to generalize to other hospitals/institutions
- Small sample size
Conclusion:

- Results of the audit comparable to literature
- Austin Health Radiology is providing a valuable service
- Complication rates are low, and mainly associated with pain
- Quality Assurance activity within Radiology suggesting current practice is safe, and efficient
- Audit has led to an audit of targeted liver biopsies
References:


