10th LCA Lung Clinical Forum

18th November 2015
Chair Update

Dr Elizabeth Hadley
Chair, LCA Lung Pathway Group
Update on protocols:
Patient preparation pre lung biopsy
Management of complications

Mary Roddie, Radiology,
Consultant Radiologist
Imperial College Healthcare NHS Trust
Image guided lung biopsy

BTS GUIDELINES
Guidelines for radiologically guided lung biopsy
A Manhire, Chairman, M Charig, C Clelland, F Gleeson, R Miller, H Moss, K Pointon, C Richardson, E Sawicka

Thorax 2003;58:920–936

BTS guidelines published in 2003
Image guided lung biopsy

Developments:
Core biopsy now routine
Biopsy of smaller lesions
Sub-solid nodules
Novel oral anticoagulants
Objective

Standardise patient preparation for radiologists performing lung biopsy in patients with suspected lung cancer

*Initially discussed in open forum in July 2015*
*Refined by LCA lung group September 2015*
*(more information on NOACs)*
Image guided lung biopsy

BTS guidelines

Check PT, INR, APPT, platelet count and lung function tests

PT or APPT ratio should be < 1.4
Platelet count should be > 100,000/ml
FEV1 should be >35% predicted
Image guided lung biopsy

BTS guidelines

‘There is no evidence to support stopping antiplatelet drugs before procedure’
Incidence of Bleeding After 15,181 Percutaneous Biopsies and the Role of Aspirin

Thomas D. Atwell¹
Ryan L. Smith²
Gina K. Hesley¹
Matthew R. Callstrom¹
Cathy D. Schleck³
W. Scott Harmsen³
J. William Charboneau¹
Timothy J. Welch¹

AJR 2010; 194:784–789
## Aspirin and PTLB

### Bleeding

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>No. of Patients With Bleeding</th>
<th>No. of Biopsies</th>
<th>% of Patients With Bleeding (95% CI)</th>
<th>( p^a )</th>
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</thead>
<tbody>
<tr>
<td>Lung biopsy</td>
<td>2</td>
<td>1,174</td>
<td>0.2 (0.0–0.6%)</td>
<td>1.0</td>
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<tr>
<td>Aspirin use</td>
<td>0</td>
<td>296</td>
<td>0.0 (0.0–1.2%)</td>
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<tr>
<td>No aspirin use</td>
<td>2</td>
<td>878</td>
<td>0.2 (0.0–0.8%)</td>
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</table>

**CONCLUSION.** The overall incidence of major bleeding after imaging-guided percutaneous core needle biopsy is low. Recent aspirin therapy does not appear to significantly increase the risk of such bleeding complications.
LCA check list pre lung biopsy

1) Parenteral anticoagulants

**Warfarin**: stop 3-5 days before biopsy and substitute short acting anticoagulation as appropriate (to be decided by clinical team depending on indication for anticoagulation)

**Low molecular weight heparin**: stop 24 hours prior to biopsy

Check INR on day of biopsy – must be < 1.4
LCA check list pre lung biopsy

2) Novel oral anticoagulants

Factor Xa inhibitors (Apixaban, Rivaroxaban)
Direct thrombin inhibitor (Dabigatran)

Have short half lives (5-17 hours)

Stop 24 hours before procedure (48-72) hours beforehand in patients with renal impairment)
# Rivaroxaban /Apixiban

<table>
<thead>
<tr>
<th>Creatinine clearance (ml/min)</th>
<th>Estimated half life (h)</th>
<th>Stop before biopsy</th>
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<tbody>
<tr>
<td>&gt; 30</td>
<td>12</td>
<td>1 day</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>unknown</td>
<td>2 days</td>
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## Dabigatran

<table>
<thead>
<tr>
<th>Creatinine clearance (ml/min)</th>
<th>Estimated half life (h)</th>
<th>Stop before biopsy</th>
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<tr>
<td>&gt; 80</td>
<td>13</td>
<td>1 day</td>
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<tr>
<td>50 - 80</td>
<td>15</td>
<td>1 – 2 days</td>
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<tr>
<td>30 - 50</td>
<td>18</td>
<td>2 – 3 days</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>27</td>
<td>4 days</td>
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</table>
LCA check list pre lung biopsy

3) Antiplatelet drugs

**Aspirin:**
No need for aspirin to be stopped.

**Dipyridamole:** same as aspirin

**Clopidogrel:**
Must be stopped 7 days prior to biopsy
Complications

PTX – rate of chest drain insertion falling

Haemoptysis – more common with subsolid nodules
Haemoptysis

Management:
Lie patient with bleeding lung down
Oxygen +/- tranexamic acid
Thank you
Best quality biopsy guidance

M. Angeles Montero Fernandez
Royal Brompton and Harefield NHS Foundation Trust
Percutaneous transthoracic biopsies (PTB)

PTB are performed either using:

- Fine-needle aspiration biopsy method: to obtain aspiration material, which is used for cytological examination
- Incisional or core biopsy method: to obtain a part of tissue from the lesion for histological diagnosis.

Indications include solitary and multiple pulmonary nodules, mass lesions, persistent focal infiltration, consolidation, cavities and abscesses, pleural lesions and mediastinal an hilar mass diagnosis

Main Goals:
- Diagnosis
- Molecular studies: current and future
HRCT- guided biopsy

Core-biopsies should be taken from:
- Areas with solid component (avoid areas of necrosis).
- at least 2 passes should be performed. Tissue should be fixed immediately in Formaline (10%): *avoid dilution with saline*.

After de biopsy:
- Several passes for cytology (ideally with a cytopathologist/BMS)
  - Fixation for liquid based cytology or in Cytorich red  OR
  - Spread the material on two slides: one air-dried for MGG and another alcohol based fixed for PAP.
References


Questions
Ambulatory lung biopsy with early discharge and outpatient management of pneumothorax: a new model for the NHS

Dr Sam Hare
Barnet Hospital
Royal Free London NHS FT
Background

• Lung cancer - leading cause of UK cancer mortality
• UK - 2nd lowest European survival rate
• Lung cancer 62-day treatment initiation target - worse than other major cancers (78.2%)
• Many advances in non-surgical Rx for lung cancer, especially beneficial for those with poor lung function -> rising demand for biopsy in more complex patients

http://www.erswhitebook.org/chapters/lung-cancer/
Lung biopsy practice

- Pivotal in lung cancer diagnosis and determining treatment
- Standard UK practice - day case procedure with routine 4-6 hours post-biopsy hospital admission
- Conventional management of post-biopsy lung collapse (pneumothorax) requires a minimum 24-48 hour hospital stay with the patient connected to a bulky chest drain
- Patients with poor lung function are often declined biopsy due to their higher risk of developing lung collapse - a paradoxical practice
The problems

- Bed requirement -> delay/cancellations; low throughput
- Fears of pneumothorax and subsequent compromise/prolonged admission, especially in frail patients -> delay/biopsy not performed
- Low lung function often seen as contraindication to biopsy (unfortunately most patients have emphysema...)
- Inpatient stay -> disruptive for patients; hospital acquired problems
- Cost of equipment and beds (~£400/day)
- Delays in diagnosis & treatment
Barnet Model

• Radiology led service
• Independent of beds
• No lung function requirement
• Biopsy performed as standard
• 30 min post biopsy CXR -> if normal then home vs If small pneumothorax -> repeat CXR at 60 mins
• 60 min CXR -> if stable, home.
• If symptomatic/enlarging pneumothorax -> small discrete chest drain + Heimlich valve (HVCD)
Barnet Model

Percutaneous lung biopsy

Radiograph at 30 minutes

No pneumothorax and clinically stable
  - Discharge with written advice

Small and/or asymptomatic pneumothorax
  - Insert chest drain connected to HV

Large or compromising pneumothorax
  - Discharge with written advice

Repeat radiograph at 60 minutes

Pneumothorax resolved
  - Discharge with written advice

Small/non-enlarging pneumothorax
  - Consider factors suggesting drain insertion may be beneficial *

Enlarging or symptomatic pneumothorax
  - Insert chest drain connected to HV

Discharge with written advice
Heimlich “flutter” valve

- Not widely used in UK, although well established in other centres (eg Ottawa) for post-biopsy pneumothorax
- Significantly smaller than standard underwater seal drains used currently in UK
- Allows safe home treatment of pneumothorax
- Cheap (~£25/device)
- Can be placed intra-biopsy allowing safe biopsy of difficult cases – rather than abandon biopsy if PTx occurs

Improved patient experience at a fraction of the cost
Barnet experience

- 489 outpatient lung biopsies/4 years
- >99% successful early discharge rate, even with PTx
- 52 patients were treated with HVCD, with 5/52 proceeding to biopsy with HVCD in-situ
- 38/52 (73.1%) had drain removal at 24 hours and 14/52 (26.9%) at 48 hours, with none requiring HVCD greater than 48 hours
- 4/489 patients were admitted – primarily social issues
- 98 % of patients received a diagnosis and were successfully discharged early at 30-60 minutes, without incident

*Thorax Published Online First: 14 July 2015
doi:10.1136/thoraxjnl-2015-207352*
Current

- ~140 lung biopsies in 4 months
- Most institutions average 30-40 per year

- A saving per biopsy of at least 3.5-5.5 bed hours in uncomplicated biopsy
- A saving of at least £394 in cases of significant lung collapse
- Productivity – 10 fold increase in number of biopsies
- Referral of patients declined biopsy elsewhere

Earlier lung cancer diagnosis with cost savings
Benefits

• Patients:
  – Safe early discharge
  – Improved patient experience
  – No routine hospital admission
  – Lower morbidity
  – Earlier lung cancer diagnosis
  – More tissue gained at 1 biopsy sitting
Benefits

• Respiratory service:
  – Access to an expeditious, self-sufficient lung biopsy service
  – Significant time and resource savings
  – Eliminated delays in biopsy scheduling due to lack of bed availability
  – Respiratory inpatient bed day savings
  – Safe biopsy even in more complex patients
**Benefits**

- **Radiologist:**
  - Allows more complex biopsies to be performed safely, even in frail, comorbid patients
  - HVCD shifts mindset from avoiding pneumothorax to ensuring tissue diagnosis for patients and clinicians – a game-changer in lung biopsy
  - Greater role in patient care
Benefits

• NHS:
  – World class, state of the art lung biopsy practice
  – Improved patient experience
  – 90% direct cost-saving using outpatient HCVD (£36) versus standard inpatient management (£394)
  – Increased productive capacity and operational efficiency, achieved with cost and resource savings
  – Improved patient flows through freeing up of medical inpatient beds
  – Shorter operating times (frozen section takes ~45 minutes)
  – Reduced Referral to Treatment times (RTT) for lung cancer
NHS 5-year Forward View
“What will the future look like?”

• “Networks of care” - Scaleable practice
• “Out of hospital care needs to become a much larger part” - Ambulatory outpatient PTx management at home
• “Integrate services around patient; best experience for patients” - Patient-led and patient-centred management reduces psychological burden
• We should learn much faster from the best examples, not just from within the UK but internationally” - Pioneered in Ottawa (Canada) but this is a European first
• “best value for money” - 90% cost savings vs. standard practice; strongly positive patient feedback
London

• Cancer remains the leading cause of premature death across the capital.
• Earlier diagnosis is key to improving survival rates but there is also variation in access to and outcomes from the capital’s cancer service
• Patients report a poorer experience of care in London than elsewhere in the country for their hospital care
• Londoners deserve world-class cancer care – as do all NHS lung cancer patients
• Early diagnosis is key to improving survival rate

Opportunity for London to set the benchmark in earlier lung cancer diagnosis

London Clinical Senate Forum April 2015
Summary

• Current lung biopsy practice is contributing to poorer outcomes
• Early discharge and ambulatory use of HVCD to treat pneumothorax are both safe
• Huge cost and bed savings can be made
• Patient experience is much better
• Earlier diagnosis and diagnosis in more complex patients, often declined lung biopsy
Next steps?
Radiosurgery: Guidance for MDTs to aid Patient selection, best referral practice

Dr Merina Ahmed
Clinical Oncologist
The Royal Marsden Hospital
Selection of patients with stage I/II NSCLC for SABR in the LCA

- Why look at pathway

- First definitive treatment hence important to streamline pathway

- 62 day breaches in several trusts are related to those patients referred for SABR
Considerations for the MDT:

- A Clinical Oncologist and Thoracic surgeon should be present at the MDT when the decision for SABR is made. If no thoracic surgeon is present and a decision for SBRT is made, then the MDT should ensure patient has been deemed inoperable based on local or regional surgical guidelines.

- Early stage non small cell lung cancer Stage I and II is optimally managed with definitive surgical resection and is considered standard of care.
Not for surgery?

Medically inoperable

- Medical co morbidities
- Contraindications to surgery may include:
  - poor pulmonary function based on objective criteria:
    - Baseline FEV1 <40% predicted;
    - Postoperative predicted FEV1 <30% predicted;
    - Diffusion capacity, <40%, predicted;
    - Baseline hypoxemia [<70 mmHg] and/or hypercapnia [>50 mmHg] or exercise, oxygen consumption <50%, predicted; or severe pulmonary hypertension,
    - diabetes mellitus with severe end-organ damage,
    - severe cerebral, cardiac, or peripheral vascular disease, or severe chronic heart disease.

Inoperable

- Inoperable for technical reasons or declined surgery

Consider SABR
Local MDT discussion must satisfy criteria

- MDT diagnosis of NSCLC based on findings of positive histology

- **OR** positive PET scan with evidence of growth on serial CT scans and MDT consensus view that lesion is NSCLC on radiological grounds

- Performance status 0-2

- (not bronchoalveolar NSCLC carcinoma)

- Not for surgery

- Most patients can manage SABR with FEV1 as low as 25%

- Poor Lung function is not a barrier to SABR unless considering fiducial marker insertion
The London Cancer Alliance

No fly zone

- T1-T2a N0 M0 ($\leq 5\text{cm diameter}$) or T3N0M0 by virtue of chest wall invasion and $\leq 5\text{cm diameter}$ Clinical stages of T1 N0 M0 or T2 ($\leq 5\text{cm}$) N0 M0 or T3 ($\leq 5\text{cm}$) N0 M0

- Peripheral lesions, defined as tumour edge outside a 2cm radius of main airways and proximal bronchial tree ie the no fly zone
If within no fly zone and considering SABR

• Refer for LungTECH trial:
  – Guys & St Thomas (Dr Shareen Ahmad)
  – Royal Marsden (Dr Merina Ahmed)
The London Cancer Alliance

Referral pathway

Decision has been made @ local MDT for SABR

Was SABR oncologist present?

YES

Refer direct to SABR oncologist present @ MDT

NEEDS MDT co-ordinator input at both sites

Needs PET, CT brain, lung function performed

FAST TRACK REFERRAL and all necessary information

NEEDS MDT co-ordinator input at both sites

NO

Refer direct to designated SABR oncologist
Names should be in SOP/peer review document
Cyberknife pathway

- Meet patient in clinic
- Discussion at SABR MDT up to 1 week
- Fiducial insertion.....Wait 7 days-10 days
- Planning CT
- 14 days to treatment
Linac SABR pathway

- Meet patient in clinic
- Discussion @ SABR MDT 1 week
- Planning CT 1 week
- 14-21 days
Considerations for each lung unit

• Identify times from referral to start of treatment

• Review local MDT documentation –

• Arrange streamlined process of referral with rapid information transfer from referring centre to SABR centre

• Referral should include essential information ie MDT report, histology, PET, CT brain, lung function +/- bronchoscopy, EBUS
• Thank you

• Questions

• SUGGESTIONS.....
Break
STRAIGHT TO CT for suspected Lung Cancer referrals

Dr Elizabeth Hadley
Chair, LCA Lung Pathway Group
Consultant Chest Physician, PRU
Straight to CT

Case for change

• What is “Straight to CT” – abnormal chest x ray straight to CT
  – suspicion of lung cancer on x ray
  – journey is complex and time consuming
  – early, good quality CT imaging is key to improving the patient’s experience

• Supporting evidence
  – Lung cancer TWR
  – 62 day
  – Commissioning intentions for 16/17
  – Findings of LCA audits in 2015

• Demand and capacity
  – Information pack to support providers in delivering this change
NICE urgent referral guidance - 2015

Refer people using a suspected cancer pathway referral (for an appointment within 2 weeks) for lung cancer if they:

- have chest X-ray findings that suggest lung cancer or
- are aged 40 and over with unexplained haemoptysis. [new 2015]

GPs can also offer an urgent chest X-ray (to be performed within 2 weeks) to assess for lung cancer if they present with 2 or more of the NICE defined symptoms. These are not 2ww referrals.
Case for change

• NICE guidance June 2015
• Performance cancer waiting times standard
• Patient experience
• Commissioning intention 2016-17
• LCA 62 day timed pathway
• Triage / appropriate cohort
Commissioning Intentions 16/17

• All lung cancer services will be commissioned in line with best practice through a timed pathway

• Compliance quality indicators:
  
  – CT prior to first OPA - Threshold 95%
  – CT scan prior to bronchoscopy - Threshold 80%
Audit findings: recommendations

1. The referral will be triaged by an appropriately skilled individual* to ensure that a CT is required and safe to perform

2. Agree appropriate CT scanning protocols based on triage information

3. CT must be reported **before** the patient is seen in OPD

* Define who
Conclusion

1. All trusts are required to implement straight to test

2. Currently provision of “Straight to CT” has wide variation across the LCA

3. Additional challenges to address include:
   - Quality of 2ww referrals (pan- London 2ww work)
   - Understanding radiology capacity and demand for CT scans
   - Reporting turnaround for CT scans
   - Clinical triage - clarification of patient cohort to be excluded*
*Clinical triage - patient cohort to be excluded

1. Those with a CXR showing consolidation and not repeated after antibiotics
2. Normal CXR - under 40 and/or inadequate history provided
3. Those who cannot be contacted by phone, including history of dementia and no next of kin contact details
4. Patients with recent (6-12 months) lung CT excluding lung malignancy
Next Steps

Feedback from the LCA Lung Pathway Analysis Questionnaire, July 2015 requested LCA support for:

1. Improving the diagnostic pathways

2. LCA Lung timed pathway
Next Steps (2)

• LCA has collated the evidence to support implementation and delivery of straight to CT

• The LCA Lung Pathway Group have developed an LCA Lung timed pathway

• All delegates have received a copy of the draft ‘Lung 62 Day pathway and Straight to CT’ resource pack prior to today’s Lung forum

• Delegates with their MDT teams should review the information and email any suggested comments by 30th November 2015 to falguni.raja@nhs.net

• Clinical leadership locally is required to accelerate continued implementation of straight to CT and reduce variation

• LCA available to support implementation challenges
LCA Lung Pathway group recommends:

- All provider organisations implement a straight to CT pathway for patients with suspected lung cancer and an abnormal chest XR

- Lung MDTs use the evidence provided in the resource pack and work with senior managers to implement the straight to CT pathway as a priority to improve patient experience and improve performance against CWT standards

- Trust to undertake an analysis of demand and capacity to estimate the required weekly number of CT slots that will be required

- All provider organisations to implement the LCA Lung 62 day pathway

- Examples of best practice at provider organisation are identified and are shared across the system
Break Out discussion and action planning

1. What actions are required to implement straight to CT pathway for patients with suspected lung cancer and an abnormal chest Xray

2. What actions are required to undertake an analysis of demand and capacity to estimate the required weekly number of CT slots that will be required

3. What actions are required to implement the LCA Lung 62 day pathway

4. Those who have implemented all the above to share best practice today with others who haven't
Summary and Close