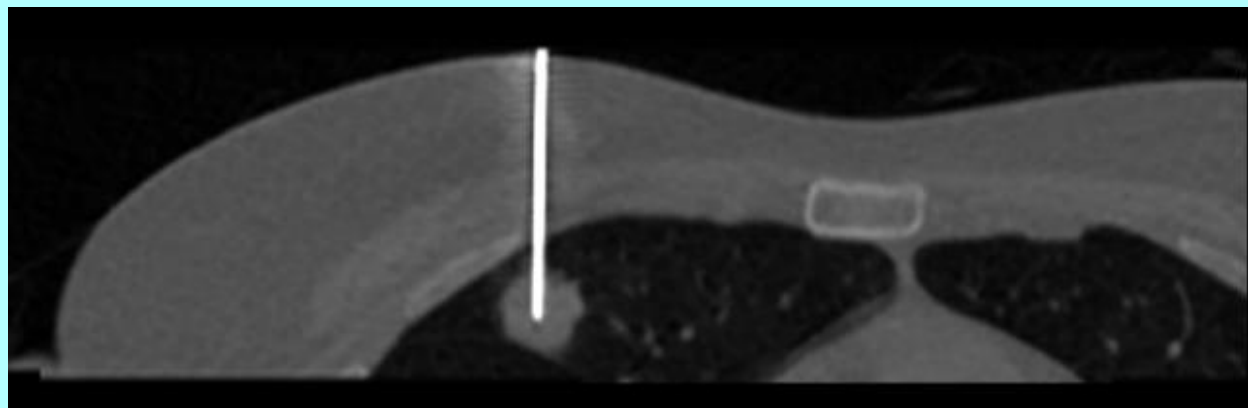


Autologous Blood Patch Improves Lung Biopsy Performance: A Quality Improvement Project

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Introduction

- CT-guided lung biopsy is essential for the diagnosis of lung cancer.
- Key complications include pneumothorax, bleeding, air embolism and death.
- Aim:** Improve safety while maintaining diagnostic adequacy.
- Intervention:** Introduction of autologous blood patch technique.



Method

1st audit: 131 CT-guided lung biopsies over 12 months.

2nd audit: Autologous blood patch introduced. 112 biopsy cases audited.

Data sources: Soliton, PACS and PowerChart.

Outcomes: Pneumothorax, chest drain insertion, inpatient stay and diagnostic adequacy.

Statistical tests: Chi-square, Mann-Whitney and unpaired t-test.

What is autologous blood patch technique?

Image 1

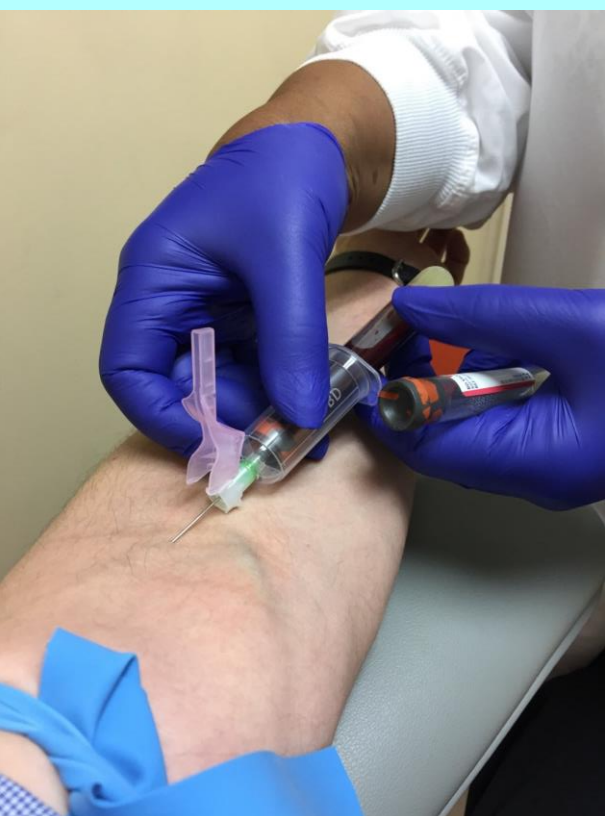
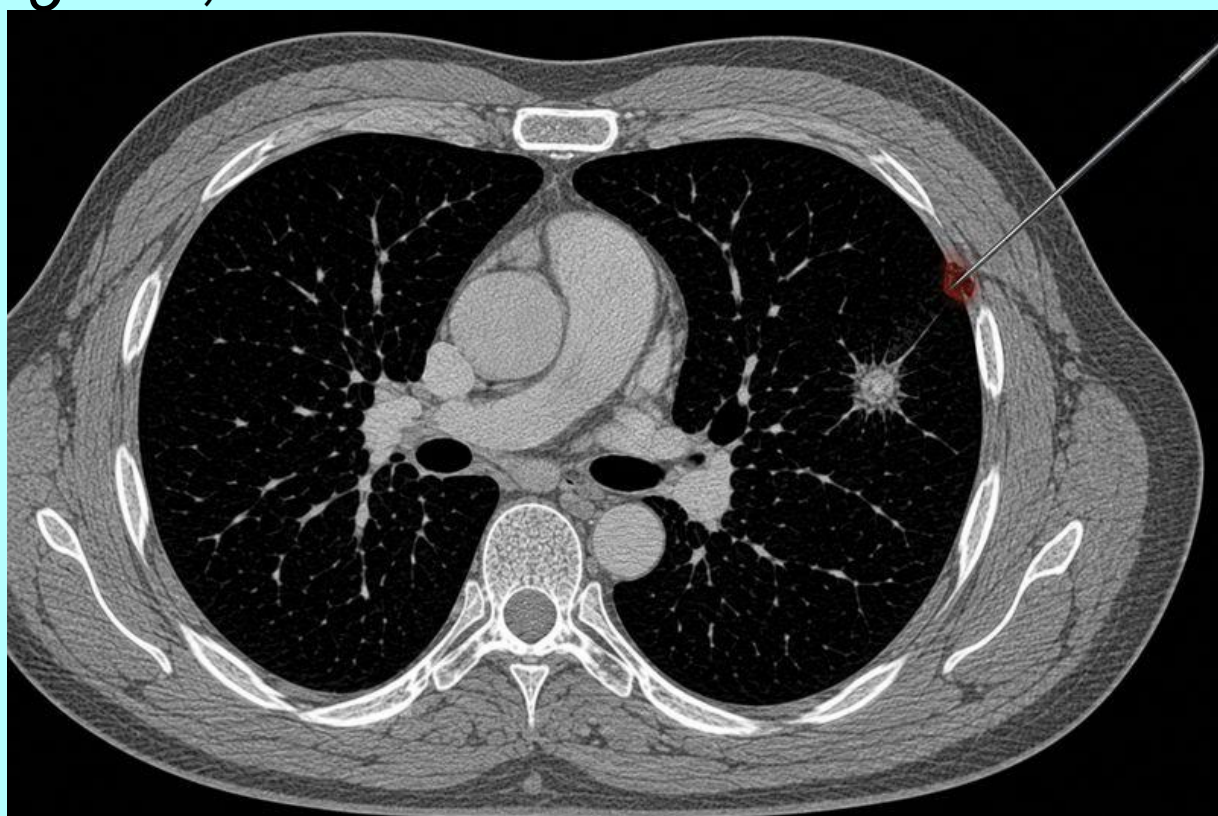


Image 2 (Image generated using generative artificial intelligence.)



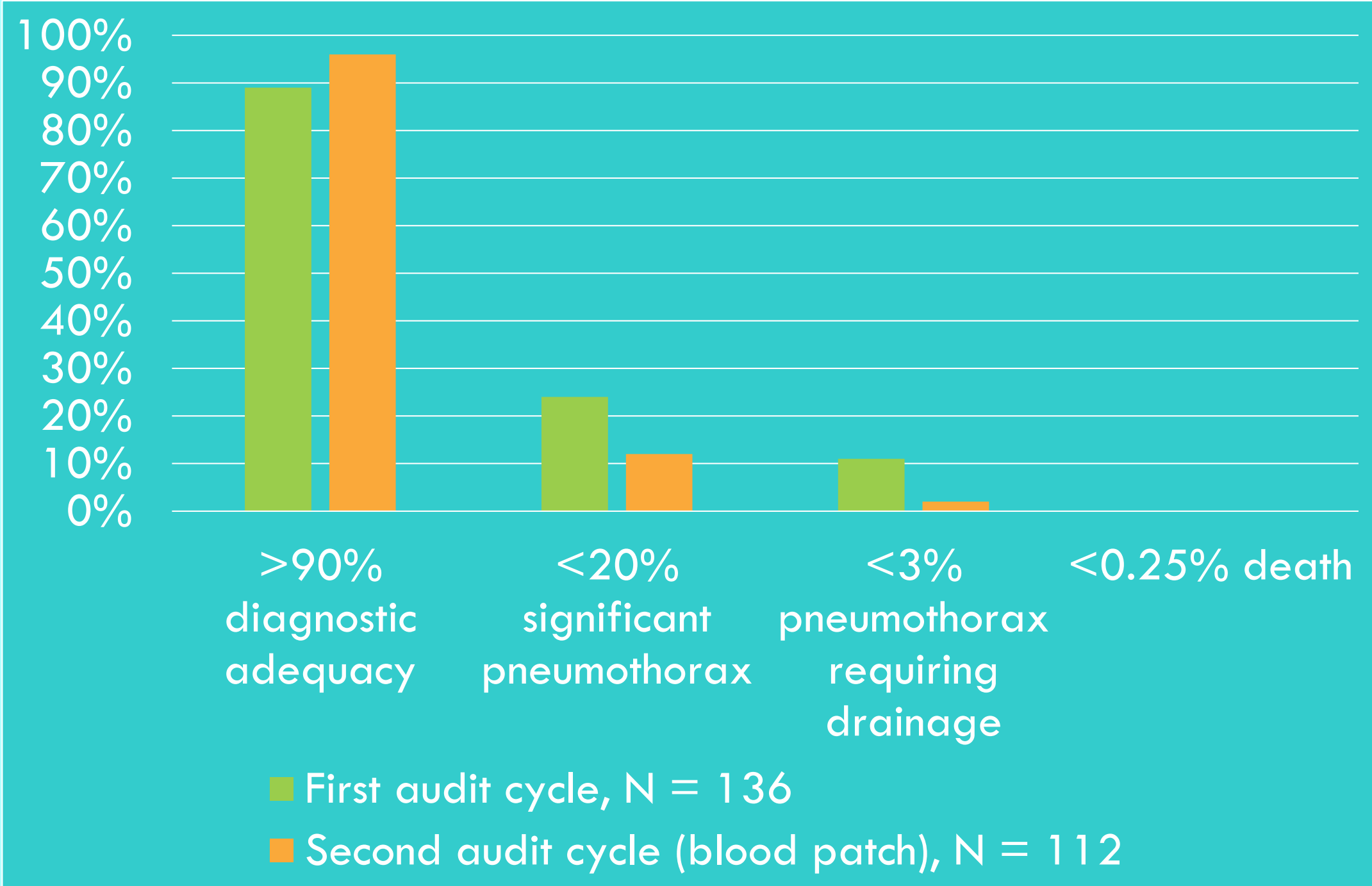
- (Image 1) A sample of venous blood is obtained from the patient before procedure
- (Image 2) After the biopsy, the same venous blood is injected along the biopsy tract and at the site of pleural puncture.
- The purpose of the blood patch is to seal the puncture site, rapidly form a clot and reduce the risk of pneumothorax.

Key Findings

- Significant pneumothorax reduced from 24% to 12% (p = 0.01).
- Chest drain insertion reduced from 11% to 2% (p = 0.005).
- Inpatient stay reduced from 0.7 to 0.2 days per procedure (p = 0.006).
- Significant savings of 56.4 expected inpatient nights over 18 months.

Results

Variable	Category	1 st Audit Cycle [n=131]	2 nd Audit Cycle (Blood Patch) [n=112]	P-value
Significant pneumothorax	No	100 (76%)	99 (88%)	0.01
	Yes	31 (24%)	13 (12%)	
Intercostal chest drain insertion	No	117 (89%)	110 (98%)	0.005
	Yes	14 (11%)	2 (2%)	
Inpatient stay	No	108 (82%)	105 (94%)	0.008
	Yes	23 (18%)	7 (6%)	
Inpatient days		0.7 ± 2 (92 days)	0.2 ± 0.7 (22 days)	0.006
Diagnostic adequacy	Inadequate	16 (12%)	4 (4%)	0.03
	Adequate	115 (88%)	108 (96%)	

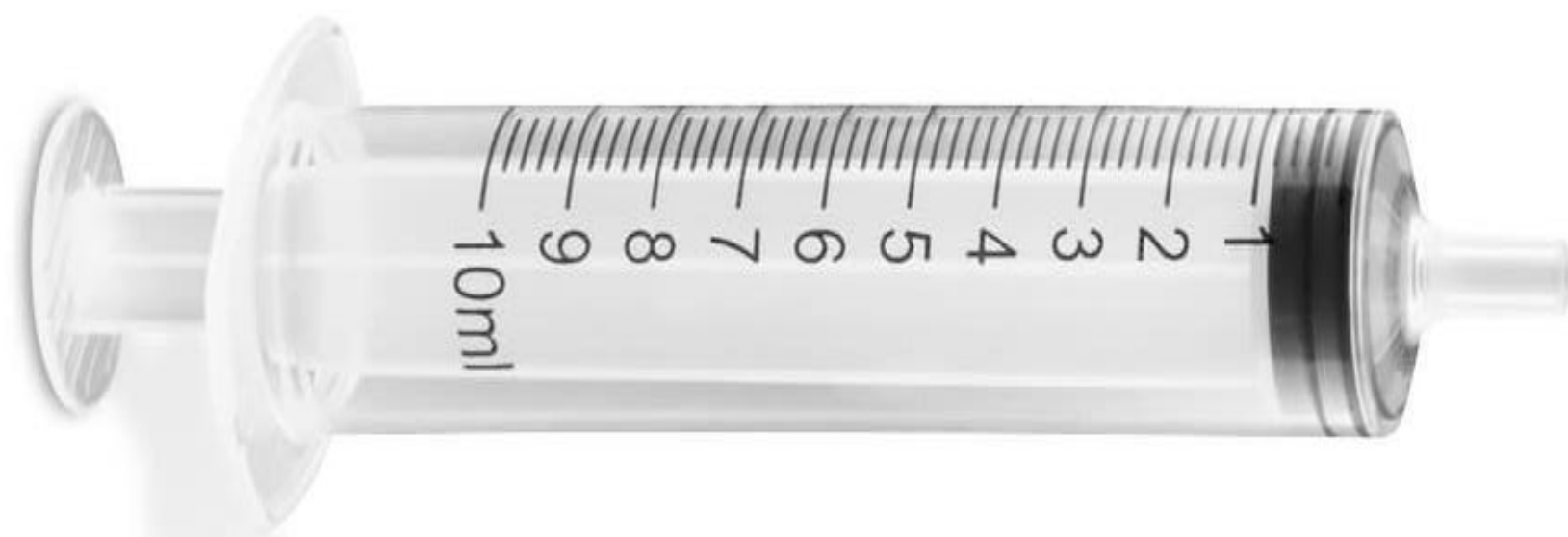


RCR standards	First audit cycle, N = 136	Second audit cycle (blood patch), N = 112
>90% diagnostic adequacy	89%	96%
<20% significant pneumothorax	24%	12%
<3% pneumothorax requiring drainage	11%	2%
<0.25% death	0%	0%

Improvements, but at what cost?

- Total cost for a blood patch
→ 10 mLs syringe (22 p) + plastic bung (6 p) = 28p
→ 28 p x 112 procedures = £31.36
- 0.7 inpatients days per case reduced to 0.2
→ 56.4 expected inpatient nights saved **over 18 months**
- 56.4 nights at £450 per night → £25,380.00
→ £25,380.00 - £31.36 (cost of blood patch)

→ CUH saved **£25,380.00.**



Conclusion

Following the introduction of autologous blood patch injections, CUH radiology demonstrates excellent lung biopsy performance exceeding RCR standards.

Blood patch injection reduces risk of pneumothorax (12% vs. 24%, p = 0.01) and reduces inpatient days per procedure (0.2 compared 0.7, p = 0.006).

While autologous blood patch injection is not formally part of BTS or RCR guidance, given the statistically significant improvements, it is now standard practice at CUH Radiology.

Action Plan

- ✓ Communicate findings at local CG and CUH R&D day
- ✓ Formalise a written SOP for lung biopsy
- ✓ Contact vendor for upgrade on current biopsy devices
- ✓ Re-audit in 18 months

References

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