A CLASSIC REBORN – CONE BEAM CT / FLUOROSCOPIC-GUIDED LUNG BIOPSY AS AN ALTERNATIVE TO CT-GUIDED BIOPSY

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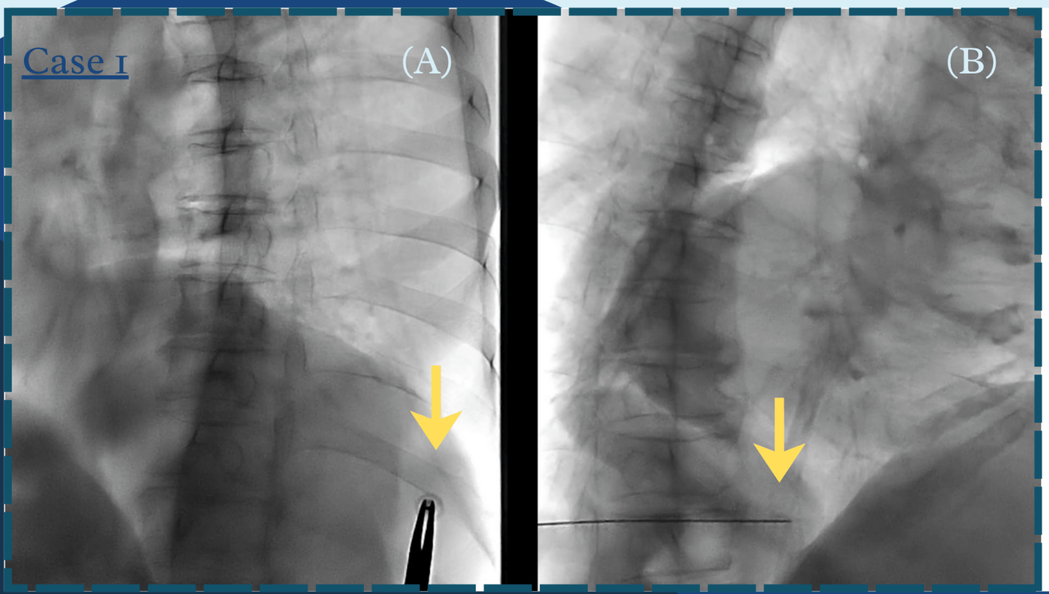
Introduction

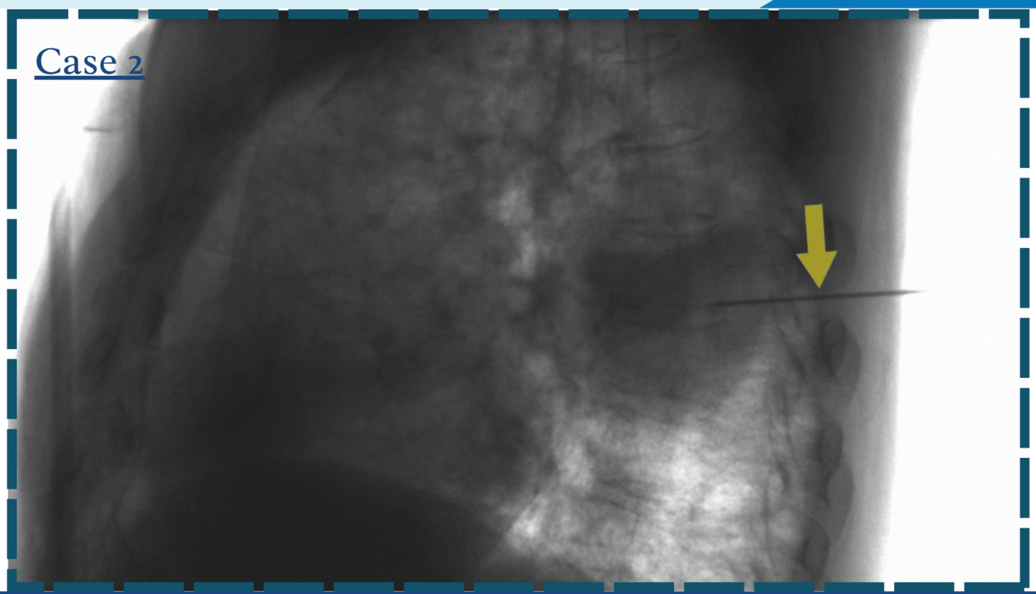
Lung cancer is the leading cause of cancer-related mortality in Hong Kong. Conventional computed tomography (CT)-guided biopsy has prolonged waiting times due to high demands for CT scanners. Cone beam CT (CBCT) combined with fluoroscopy offers precise lesion localization and needle placement comparable to CT guidance. The CBCT/fluoroscopic-guided lung biopsy service commenced in our centre in November 2022.

Methodology

This study evaluates the diagnostic performance and patient outcomes of CBCT/fluoroscopic-guided versus CT-guided biopsy approach.

A retrospective analysis was conducted on 764 patients who underwent imaged-guided lung biopsy from 2022 to 2024. Patient demographics, lesion characteristics, diagnostic yield, complication rates and procedure duration were compared.





Case 1: Fluoroscopic images during needle insertion in Bulls' eye view (A) and progress view (B) to confirm the correct needle trajectory.

Case 2: The use of CBCT to confirm the needle position within target lesion before biopsy.

Results

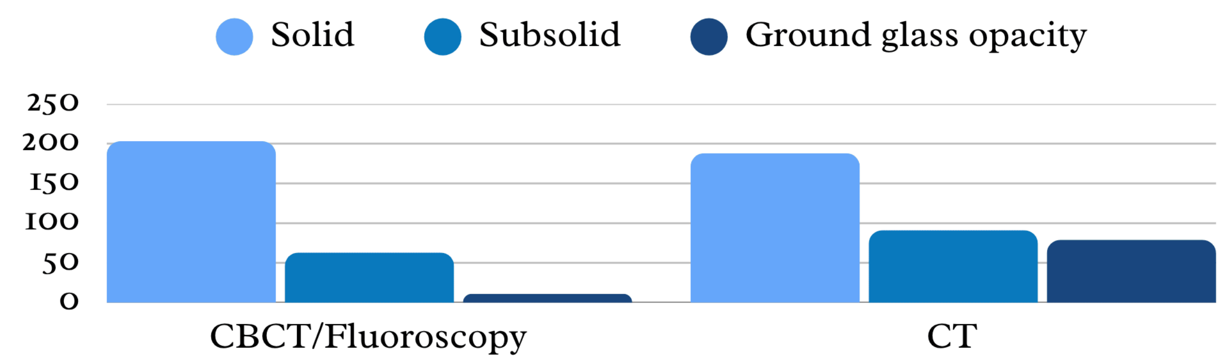
Of 635 biopsies performed by 26 operators between November 2022 and November 2024, 277 (43.6%) used CBCT/fluoroscopy guidance and 358 (56.4%) used CT guidance.

No significant demographic differences were noted (Median age 70 vs. 71, p=0.62; Male 56.0% vs. 54.8%, p=0.09, for CBCT vs CT).

The lesions for CBCT/fluoroscopy were larger and more solid.

Table 1 and 2: Lesion characteristics

	CBCT/Fluoroscopic-guided biopsy (N=277)	CT-guided biopsy (N=358)	P-value
Median lesion size (cm)	2.6	2.2	p <0.05



Subgroup analysis focused on solid and part-solid lesions ⩾1.5cm was performed, which demonstrated comparable diagnostic yields and procedure durations. Complication rates were similarly low.

Table 3: Diagnostic yield for solid and part-solid lesions ⩾1.5cm

CBCT/Fluoroscopic-guided biopsy (N=233)	CT-guided biopsy (N=219)	P-value
226 (97.0%)	214 (97.7%)	p=0.63

Table 4: Median procedure time for solid and part-solid lesions ⩾1.5cm

CBCT/Fluoroscopic-guided biopsy (N=233)	CT-guided biopsy (N=219)
21 mins	21 mins

Table 5: Major complication rates for solid and part-solid lesions ⩾1.5cm

	CBCT/Fluoroscopic-guided biopsy (N=233)	CT-guided biopsy (N=219)	P-value
Pneumothorax requiring chest drain insertion	9 (3.9%)	11 (5.0%)	p=0.55
Hemoptysis requiring intervention	0 (0%)	3 (1.4%)	/
Others	1 case of hemothorax	/	/

Conclusion

The CBCT/fluoroscopic-guided lung biopsy technique provides real time guidance for accurate lesion localisation, and allows a flexible biopsy approach. It is shown to be a robust alternative to CT-guided approach with equivalent diagnostic yield, procedural efficiency, and complication rates.

References

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