Cryobiopsy: finding the way with real-time C-arm based tomography navigation

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Introduction

The boundaries of interventional pulmonology are continuously expanding to keep innovating diagnostic procedures in a safe and cost-effective way. We report our preliminary use of a novel real-time endoscopic navigation technique that correlates computed tomography (CT-scan) images with conventional C-arm based tomography (CABT), allowing to confirm that a target lesion has been reached and to optimize the correlation between histology and radiological patterns, the latter possibly being of great advantage in the diagnosis of diffuse interstitial lung disease (D-ILD).

Methods

We used BodyVision® C-arm based tomography (CABT) technology. A CT-scan is loaded into the system beforehand, and the target area is selected on these images.

During the procedure, the software merges the spatial information of the CT-scan with multi-plane x-ray images acquired with a conventional C-Arm to intraoperatively show the exact location of the target area and thus effectively navigating the biopsy procedure.
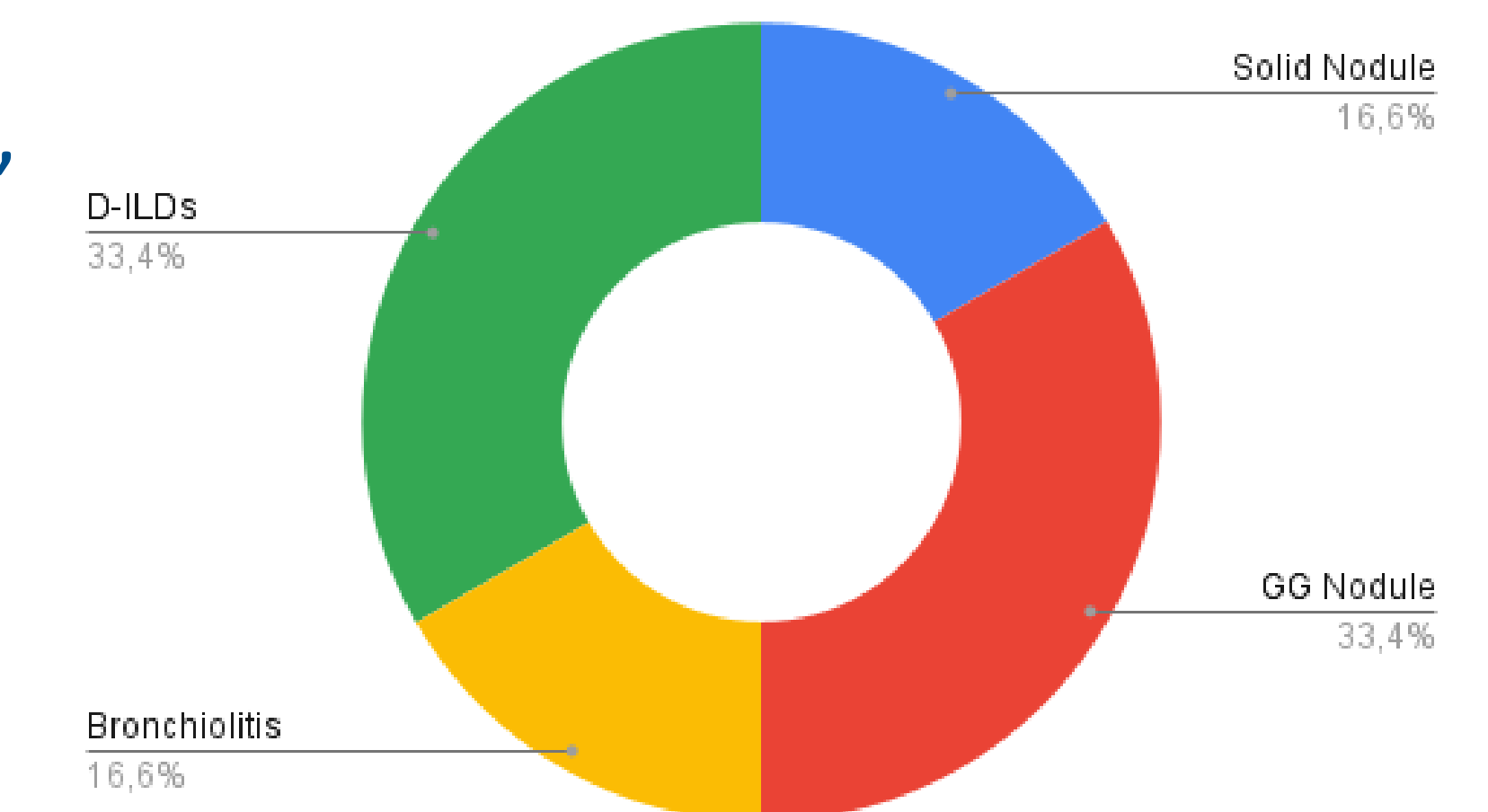

Main Finding

BodyVision® navigation is feasible and cost-effective, as it applies a modern software to CABT, already largely available, and does not require significant additional personnel or training.

Results

We tested this technology in six different cryobiopsy procedures, with 1.1 mm or 1.7 mm cryoprobe, freezing time 8-11 seconds, patients aged 52-74 years, four males and two females.

We sampled one solid nodule, two ground-glass (GG) nodules, a suspected bronchiolitis and two D-ILDs, one with patchy GG opacities and one with a reticular pattern.

None of the nodules had bronchus sign and all were <1 cm in size.

We obtained a definite diagnosis in three cases: smoke related interstitial lung-disease with organizing pneumonia in the patchy GG opacities, mucinous adenocarcinoma in a GG, sarcoidosis in the reticular ILD.

No Diagnosis	SRIF/OP	Sarcoidosis	Adenocarcinoma
50%	16,6%	16,6%	16,6%

Conclusion

This kind of navigation is feasible and cost-effective, as it applies a modern software to CABT, already largely available, and does not require significant additional personnel or training. Using this technique, we hope to significantly improve sampling accuracy and to achieve precise correlation between histology and radiological patterns in diffuse interstitial lung disease.