







The potential of chest X-ray Al in detecting missed lung cancer diagnosis in a community-based cancer centre in Thailand

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Introduction

Chest X-rays are among the most frequently performed radiological investigations. A study from tertiary medical hospital in Thailand reported that 80% of lung cancers were missed on chest radiographs¹. This study aims to evaluate the role of Artificial Intelligence (AI)-assisted chest X-rays in detecting previously missed lung cancer diagnoses at a community-based cancer centre, where chest X-rays are predominantly interpreted by general practitioners.

Methods

Review of chest X-ray image database from 1 Jan - 31 Dec 2022 for patients with diagnosed lung cancer

197 patients identified

Excluded (n=120) Chest X-rays images not available Incomplete data on time of diagnosis

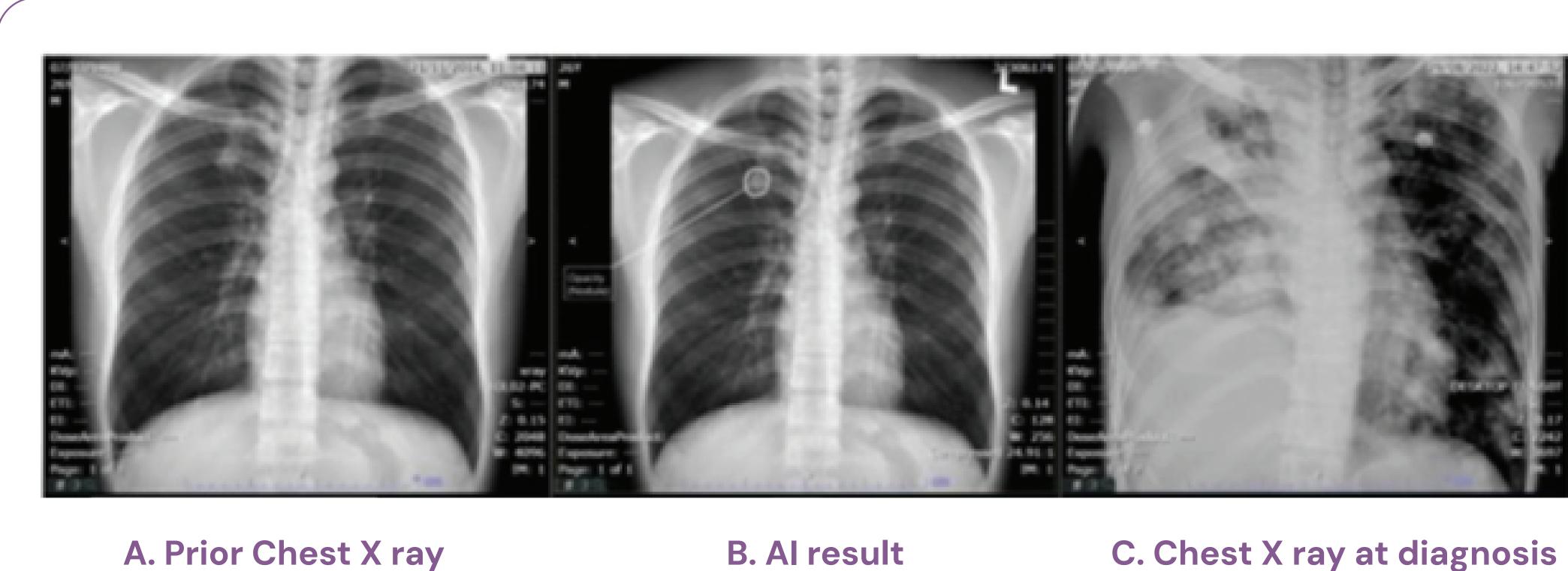
77 patients included (Chest X-rays taken >6 months before diagnosis)

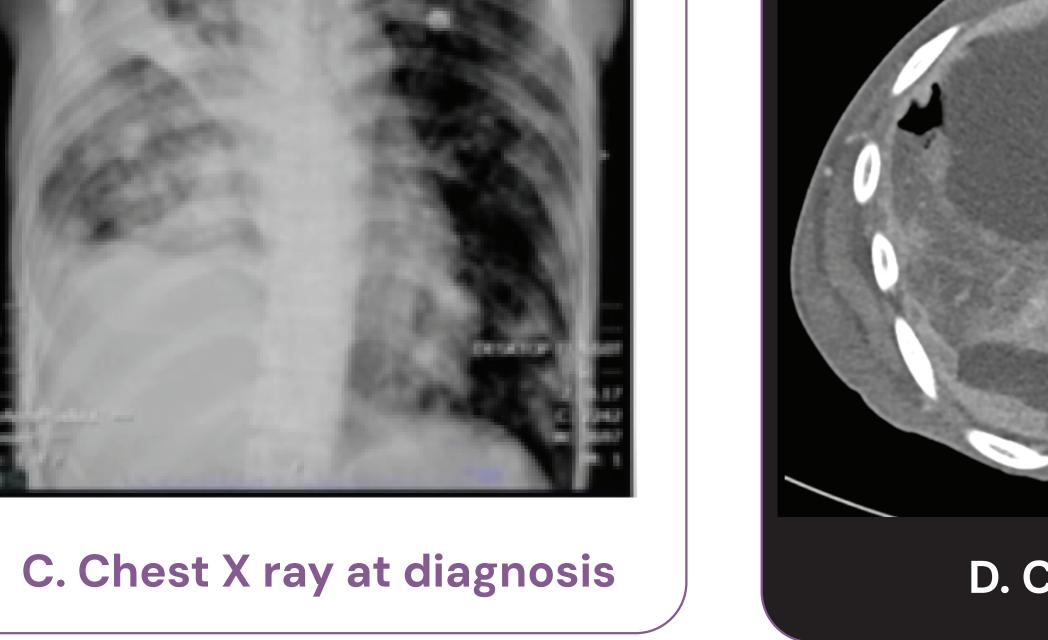
Missed lung cancer Dx 14(18%)

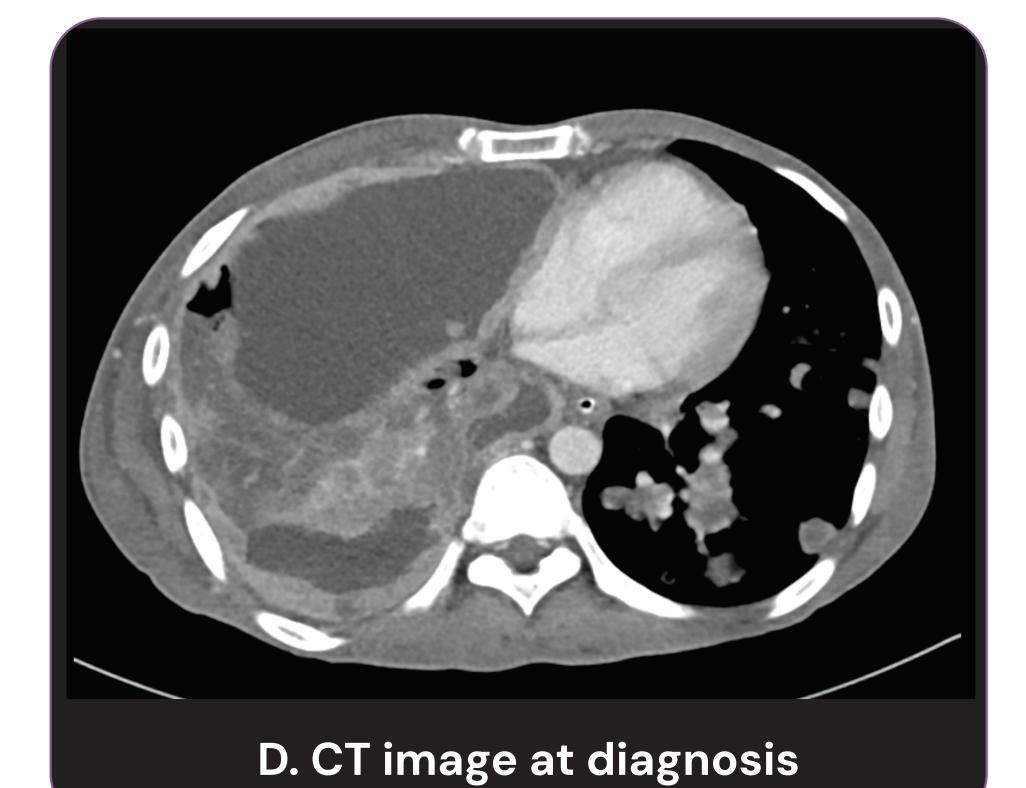
Stage IV 42.9% Stage III 21.1%

Chest X-ray images processed by Al

This retrospective study on newly diagnosed lung cancer patients was conducted at Phrapokklao Cancer Centre of Excellence, Thailand (Fig 1). The chest X ray images were evaluated using qXR, a chest X-ray Al software developed by Qure.ai. Missed lung cancer (mLC) diagnoses were defined as the presence of suspicious abnormalities on chest X-rays six months prior to a definitive lung cancer diagnosis. We assessed the mean time of mLC diagnosis.

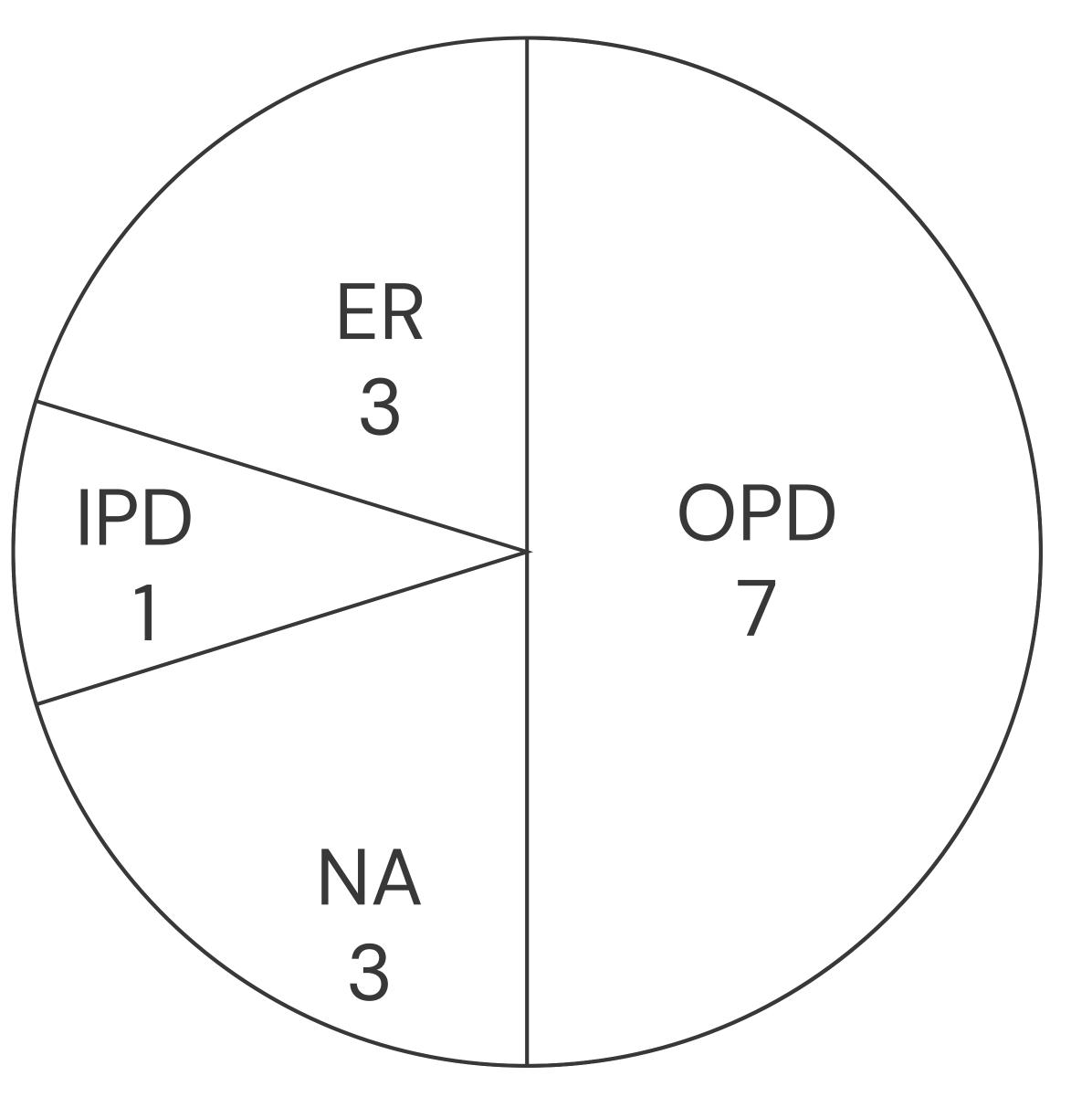






Results

Among the 77 patients analysed, 14 (18.18%) were found to have mLC diagnoses. The mean duration from initial chest X-ray to mLC diagnosis was 31.4 months (95% CI: 18 – 45 months), with a maximum of 97 months and a minimum of 7 months. Of the 14 mLC patients, six were diagnosed with stage IV lung cancer, while three were diagnosed with stage III lung cancer. Eight out of the 14 (57%) patients had chest X-rays taken for non-respiratory symptoms or as part of a health check-up (incidental detection)(Fig. 2 - 4).





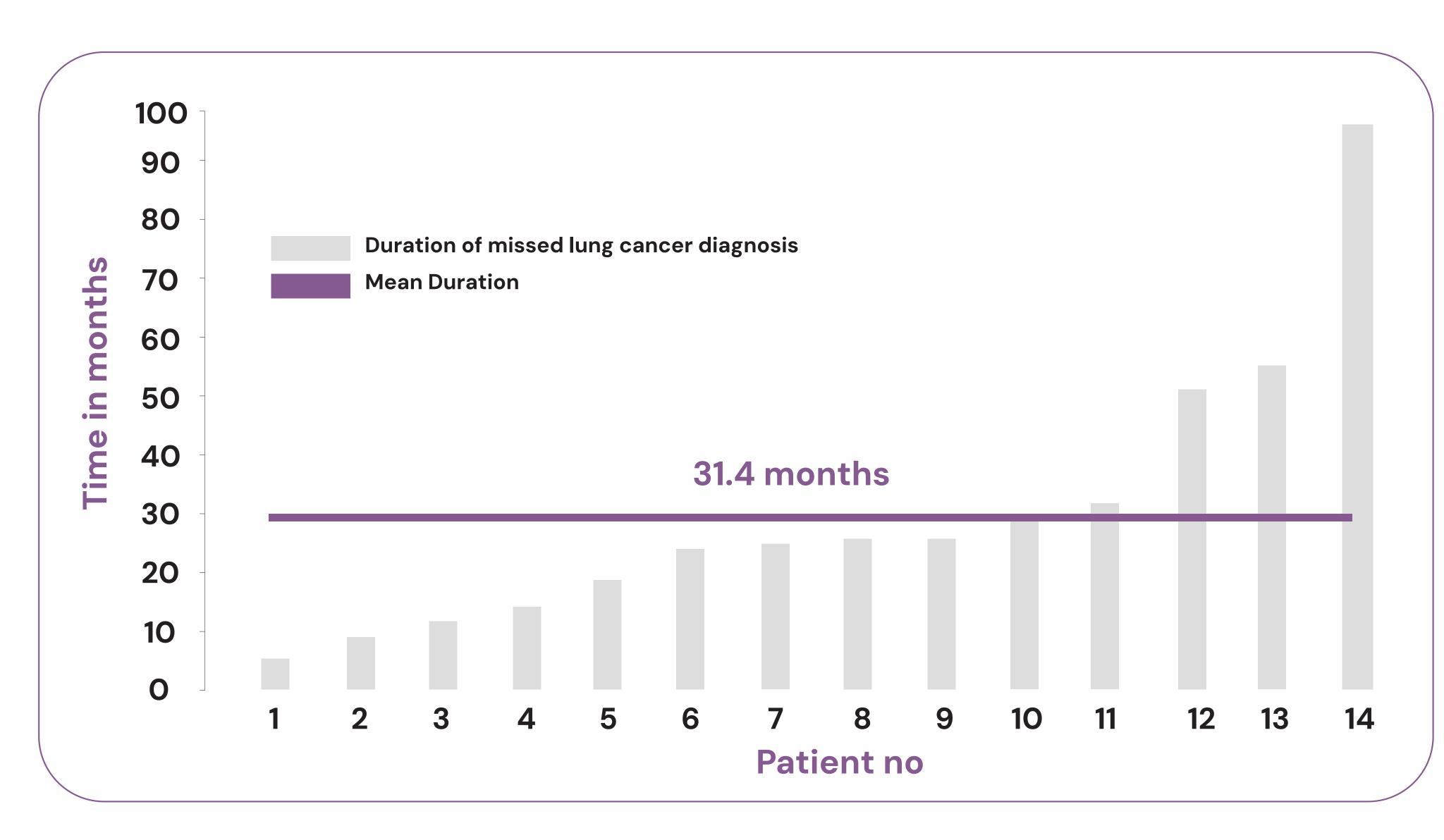


Fig 4: Delay in diagnosis of lung cancer from the time of detection of lesion by AI Chest X-ray

GONGUSIONS

Fig 2: A case of maximum missed lung cancer diagnosis duration of 97 months

The findings highlight Al's potential in detecting previously missed lung cancers. Integrating Al into community-based healthcare centres presents a promising opportunity to reduce missed lung cancer diagnoses, enabling earlier detection and improved survival rates. Additionally, Al can significantly assist general practitioners and physicians in interpreting incidental lesions.

References

1. Chutivanidchayakul F, Suwatanapongched T, Petnak T. Clinical and chest radiographic features of missed lung cancer and their association with patient outcomes. Clin Imaging. 2023 Jul;99:73-81.



