Before Symptoms: The Impact of a Novel Lung Health Program to Evaluate Interstitial Lung Abnormalities on Time to Diagnosis of Interstitial Lung Disease

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PURPOSE

The identification of interstitial lung abnormalities (ILA) on chest CT scans can be an early marker of interstitial lung disease (ILD), even in individuals without known risk factors or symptoms. Research shows ILA is associated with worse outcomes, including increased mortality and reduced lung function[1-3]. This may occur because many patients with ILA already have undiagnosed ILD, which progresses without recognition. Since ILD is often diagnosed at a more advanced stage, when symptoms have appeared and treatment is less effective, early detection of ILA offers a chance to intervene sooner. **By systematically identifying and evaluating patients with ILA, this study aims to assess the impact of a novel lung health program on reducing delays in pulmonary referral and accelerating ILD diagnosis, which may improve patient outcomes by earlier treatment initiation.**

METHODS

We employed two study cohorts: Cohort A) Historical ILA cohort from the LHMC CT Lung Screening program from January 2012 to September 2014[4], and Cohort B) Lung Health Clinic pilot in which patients identified with ILA on CT scans from February to September 2022 were offered systematic evaluation for ILD. In both cohorts, the presence of ILA was determined according to Fleischner Society criteria[5]. The lung health clinic pilot included PCP and patient outreach for pulmonary referral and standardized diagnostic evaluation. For each cohort, we performed EMR review to obtain time from CT to pulmonary referral for ILA and to ILD diagnosis; and presence of symptoms, need for supplemental oxygen and FVC at time of ILD diagnosis. Statistical analysis was conducted with student's *t*-test and $p<0.05$ was considered significant.

RESULTS (See Table 1)

- **ILA IDENTIFIED**: 41 individuals in Cohort A and 45 in Cohort B, of which 24 (53.3%) were evaluated for ILD (Figure1).
- **ILD DIAGNOSED**: Of patients evaluated, 10 (24.4%) in Cohort A and 11 (45.8%) in Cohort B (Figure 2).
- **MEAN TIME to ILD DIAGNOSIS:** 4.47 ± 2.72 years in Cohort A vs 1.08 ± 0.28 years in Cohort B (p<0.001).
- **MEAN TIME to REFERRAL for ILD patients:** 4.09 ± 3.03 years in Cohort A and 0.95 ± 0.21 years (p<0.001) in Cohort B.

RESULTS (See Table 1)

Amongst those with ILD:

- **DYSPNEA presence**: 70% in Cohort A vs 18.2% in Cohort B (p=0.045)
- **SUPPLEMENTAL O2 need** at time of referral: 40% in Cohort A vs 0% in Cohort B (NS)
- **FVC % PREDICTED** at diagnosis: 70 ± 19.3% vs 77 ± 14.9% (NS) in the historical and pilot groups, respectively.

TABLE 1

Outcome	Cohort A (N) [Historical]	Cohort A (Mean±STD/%)	Cohort B (N) [Lung Health Pilot]	Cohort B (Mean±STD/%)	*p* value
# of ILA	41	--	45	--	--
ILA: Time to Pulmonary Referral (Years)	29	2.37 ± 2.87	24	0.95 ± 0.21	<0.0001
ILD: Time to Diagnosis (Years)	10	4.47 ± 2.72	11	1.08 ± 0.28	<0.0001
ILD: Time to Pulmonary Referral (Years)	10	4.09 ± 3.03	11	0.86 ± 0.26	<0.0001
Shortness of Breath at Referral	10	7 (70%)	11	2 (18.2%)	0.045
On Home Oxygen Therapy at Referral	10	4 (40%)	11	0 (0%)	NS
ILD: FVC % predicted	8	70 ± 19.3%	11	77 ± 14.9%	NS

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FIGURE 1: ILA, not diagnosed with ILD

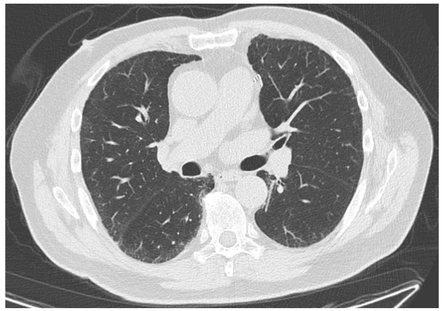
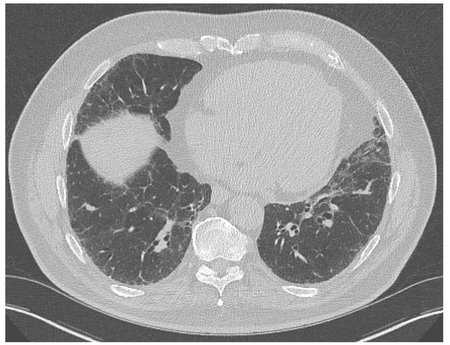


FIGURE 2: Patient with ILA, subsequent CT with progression, diagnosed with IPF, started on nintedanib



CONCLUSION and CLINICAL IMPLICATIONS

A systematic program of PCP and patient outreach and standardized pulmonary evaluation as performed in our lung health pilot program (Cohort B) **markedly reduced time to pulmonary referral and to ILD diagnosis** compared with a historical cohort in which there was no such structured process (though ILA/ILD prevalence may vary between the cohorts). However, there remains room to improve PCP and patient engagement. The pilot program also achieved ILD diagnosis before symptom onset in most patients.

Clinical Implications: *Patients with interstitial lung disease are commonly known to develop chest CT changes (ILA) before lung function decline, both occurring prior to symptom onset. A prospective opportunistic screening program that can identify individuals with ILA, complete referral and diagnostic evaluation earlier in the disease course can impact time to treatment initiation and potentially prognosis.*

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