Commencement of fixed dose ICS of varying particle size as a predictor of pneumonia in COPD patients

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Introduction: Demographic and clinical characteristics have been used to identify predictive risk factors for pneumonia development in COPD patients.
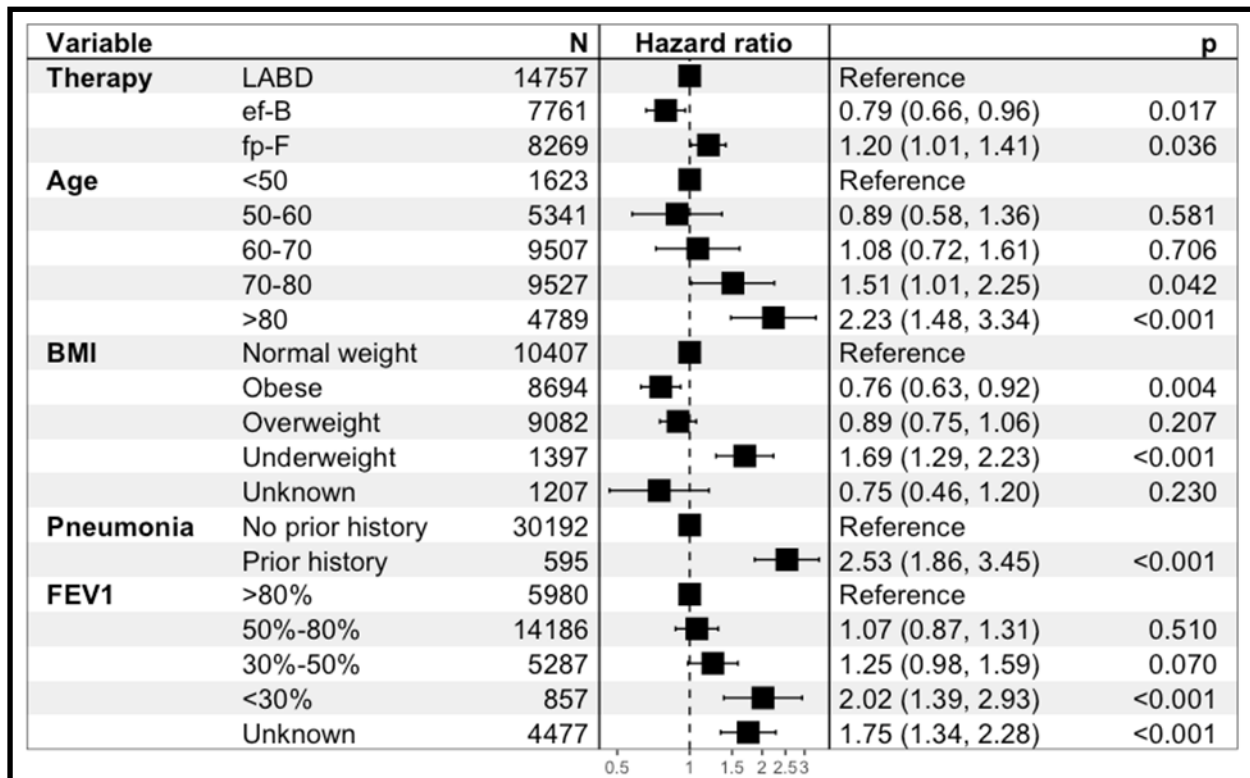
Aim: The present investigation extended this modelling to include commencing pharmacological therapies as a variable.

Methods: A historical, observational study using patients ≥40 years, with ≥1 year of continuous medical data and who were commencing a fixed dose of extrafine beclometasone (ef-B), fine particle fluticasone (fp-F) or long-acting bronchodilators (LABD) was conducted. Cox regression was used to develop the risk prediction model for time to pneumonia. Validation was undertaken using the hold-out method (80 development:20 validation cohort split). A time dependent receiver operating characteristic curve was used to assess performance.

Results: 38,484 COPD patients were evaluated. Older age, a low body mass index, low FEV1% predicted and a prior history of pneumonia were associated with an increased risk of pneumonia (Figure 1). Commencing ef-B was associated with a reduced risk of pneumonia when compared to LABD, whereas fp-F was associated with an increased risk. The model

achieved an area under the curve of 0.74 at one year after therapy initiation in the validation cohort.

Conclusions: Reduced pneumonia risk in COPD patients commencing ef-B is an important observation, particularly for individuals at high risk due to demographic and clinical factors.

Variable		N	Hazard ratio		p
Therapy	LABD	14757		Reference	
	ef-B	7761		0.79 (0.66, 0.96)	0.017
	fp-F	8269		1.20 (1.01, 1.41)	0.036
Age	<50	1623		Reference	
	50-60	5341		0.89 (0.58, 1.36)	0.581
	60-70	9507		1.08 (0.72, 1.61)	0.706
	70-80	9527		1.51 (1.01, 2.25)	0.042
	>80	4789		2.23 (1.48, 3.34)	<0.001
BMI	Normal weight	10407		Reference	
	Obese	8694		0.76 (0.63, 0.92)	0.004
	Overweight	9082		0.89 (0.75, 1.06)	0.207
	Underweight	1397		1.69 (1.29, 2.23)	<0.001
	Unknown	1207		0.75 (0.46, 1.20)	0.230
Pneumonia	No prior history	30192		Reference	
	Prior history	595		2.53 (1.86, 3.45)	<0.001
FEV1	>80%	5980		Reference	
	50%-80%	14186		1.07 (0.87, 1.31)	0.510
	30%-50%	5287		1.25 (0.98, 1.59)	0.070
	<30%	857		2.02 (1.39, 2.93)	<0.001
	Unknown	4477		1.75 (1.34, 2.28)	<0.001

0.5   1   1.5 2 2.53

Figure 1: Cox regression modelling of risk factors associated with pneumonia development in COPD patients. BMI, body mass index; ef-B, extrafine beclometasone; FEV1, forced expiratory volume in 1 second; fp-F, fine particle fluticasone; LABD, long acting bronchodilator.