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The level of specialist assessment of adult asthma is influenced by patient age

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Summary
Background: Late onset asthma is associated with more severe disease and higher morbidity than in younger asthma patients. This may in part relate to under recognition of asthma in older adults, but evidence on the impact of patient age on diagnostic assessment of asthma in a specialist setting is sparse.
Aim: To examine the impact of patient age on the type and proportion of diagnostic tests performed in patients undergoing specialist assessment for asthma.
Methods: Data from a clinical population consisting of all patients consecutively referred over a 12 months period to a specialist clinic for assessment of asthma were analysed.
Results: A total of 224 patients with asthma or suspected asthma were referred during the 12 month period; 86 adults aged <35 years, 95 aged 35–55 years and 43 aged >55 years. Symptom characteristics were similar, but adults >35 years had a lower lung function than younger adults, and were more frequently smokers. However, a regression analysis showed that older age was associated with a lower likelihood of diagnostic assessment with a reversibility test, a bronchial challenge test, or measurement of exhaled NO, independently of a known diagnosis of asthma, smoking habits and lung function at referral.
Conclusion: A lower level of diagnostic assessment was observed already after the age of 35 years, indicating a risk for under diagnosis of asthma at an earlier patient age than previously thought.

Abbreviations: FeNO, fraction of exhaled nitric oxide; SABA, short-acting beta-2-agonist; SPT, skin prick test; AHR, airway hyperresponsiveness; PRF, patient record form.

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Introduction

Diagnostic assessment of asthma is the starting point of asthma management: International Guidelines recommend that a diagnosis of asthma is based on symptom history combined with objective measures of variable airflow obstruction, e.g. reversibility to beta-2-agonist, peak flow variability or airway hyperresponsiveness [1,2]. The next step is to assess asthma control to determine the need for commencing treatment, and a baseline assessment from which the effect of treatment may be determined [1].

In patients with known asthma and insufficiently controlled asthma symptoms, obtaining objective disease evidence may furthermore be important, to differentiate asthma symptoms from non-specific symptoms that may relate to other factors such as poor fitness or hyperventilation. Finally, measurement of markers of the asthma phenotype, such as allergic sensitisation or eosinophilic airway inflammation, may aid in targeting treatment to the individual patient [3–5].

Under diagnosis of asthma, and under recognition of the severity of asthma, has significant adverse impact on the treatment of asthma: In a Danish population sample of 10,877 adults aged 18–44 years, only 50% of asthma cases had previously been diagnosed, and among the previously undiagnosed cases, 74% had persistent symptoms (>2/week) indicating a significant unmet need for treatment [6].

Older asthma patients have a higher morbidity than younger asthma patients, in terms of a lower lung function and more severe exacerbations [7–10]. This may in part relate to an under recognition of asthma by physicians as well as patients [11–14]: In a community sample of 4581 persons >65 years old from the Cardiovascular Health Study, only half of those with asthma like symptoms had a previous diagnosis of asthma [11]. Similarly, in a retrospective study of 98 individuals with asthma onset after the age of 65 years, only 43% had a spirometry performed in relation to having the diagnosis made [14].

However, there is limited evidence of whether specialists assess asthma in older adults differently to younger adults within the same clinical setting. Given that late onset asthma is generally reported to be associated with irreversible airflow obstruction [14,15], clinicians could be less likely to test older adults for reversibility or airway hyperresponsiveness. Furthermore, since that late onset asthma is more often non-atopic [16,17], it may be that the use of additional diagnostic tests to aid in a phenotypic characterisation of asthma, such as measurement of exhaled nitric oxide (FeNO) and skin prick testing for allergy is used less frequently in the older patients. Finally, it is unclear whether specialists have a different approach to adult asthma patients already earlier on, i.e. after the age of 35–40 years.

We hypothesized that in a specialist clinic, the level of diagnostic assessment of adult asthma is influenced by patient age. Hence, we compared the number and type of diagnostics tests performed in a clinical cohort of patients consecutively referred for assessment of asthma over a 12 month period, and compared young, middle aged and older adults.

Methods

A complete population of all patients consecutively referred to a specialist asthma clinic for either suspected or known asthma, over a 12 months period in 2010, were studied at the outpatient clinic at the Department of Respiratory Medicine at Bispebjerg University Hospital, Copenhagen, Denmark. A retrospective design was purposefully chosen to avoid observer bias, as the outcome of interest was the pattern of specialist assessment of older versus younger adults.

Data was obtained from patient record forms (PRF), including physician notes on asthma symptoms, including characterisation of symptoms, asthma medications used and diagnostic tests requested. The study was approved by the Danish National Health Board (Jr Nr 7-604-04-2/279/KWH), as this retrospective study did not require approval from the Ethics Committee.

The following was registered, regarding the level of diagnostic assessment:

Symptoms:

- *Symptoms assessed*: Did the physician *record* the following asthma symptoms at rest and during exercise: Shortness of breath, tightness of the chest, wheezing and cough?
- *Symptoms reported*: If recorded, did the patient *report* any of above asthma symptoms?

Diagnostic tests performed:

- Reversibility of FEV_1 to short-acting beta-2-agonist (SABA)?
- Bronchial challenge with either methacholine or mannitol?

Additional tests performed:

- Measurement of exhaled nitric oxide (FeNO)?
- Skin prick test (SPT) to a standard panel of inhalation allergens.

Description of the diagnostic methods

- Spirometry (Jaeger MasterSceen Pneumo spirometer, CareFusion, Yorba Linda, CA): best of two measurements of FEV_1, FVC and FEV_1/FVC ratio according to ERS recommendations [18]. Reversibility test 20 min after inhalation with terbutaline sulphate (1.5 mg).
- Exhaled NO (FeNO) (NIOX, Intra Medic, Denmark) average of 3 measurements (flow rate 50 ml) was measured according to the ATS/ERS guidelines [19].
- Mannitol provocation test (osmohale™ Mannitol, pharmaxis, UK): inhalation of ascending dosages 0, 5, 10, 20, 40, 80, 160, 160, 160 mg [20]. A positive test was defined as a 15% fall in FEV_1 or more and resulted in termination of test.
- Methacholine provocation test with the Yan method (Jaeger device, nebulised fluid: methacholine bromide): Inhalation of isotonic saline, thereafter five successively