Lung functions in poorly controlled type 1 Saudi diabetic children and adolescents

To the Editor

I have 3 comments on the interesting study by Al-Saadi et al[1] on the lung functions in poorly controlled type 1 Saudi diabetic children and adolescents.

First, diabetic microangiopathy targets the lung as it does other organs. Even though respiratory dysfunction in most patients with diabetes mellitus (DM) is subclinical and rarely the presenting complaint, there are several reasons why pulmonary assessment is important: 1. Pulmonary function testing noninvasively quantifies physiological reserves in a large microvascular bed that is not clinically devastated by DM. 2. Subclinical loss of pulmonary reserves becomes overtly debilitating under conditions of stress, such as with aging, chronic hypoxia due to lung disease or high altitude exposure, or volume overload secondary to cardiac and renal failure. 3. Unlike myocardial or skeletal muscle function, pulmonary indices are largely independent of physical fitness. 4. Interpretation of pulmonary function indices is not complicated by secondary sequelae of diabetic end-organ failure or prior therapy. Lung function could provide useful measures of the progression of systemic microangiopathy. 5. Chronic use of inhaled insulin may affect long-term pulmonary function, while preexisting pulmonary dysfunction might alter the absorption and bioavailability of inhaled insulin.[2]

Second, Al-Saadi et al[1] stated that pulmonary function in children with type 1 diabetes mellitus (T1DM) showed significant lower mean values of actual lung function parameters, namely forced vital capacity (FVC), peak expiratory flow, and maximum mid expiratory flow rate compared to their predicted values. However, there was no significant reduction in the actual forced expiratory volume in the first second (FEV1), and FEV1/FVC% compared to their predicted values. It is well-known that normal lung function tends to be population-specific. According to my knowledge, no normal reference spirometric values for Saudi children and adolescents are present. Though Al-Saadi et al[1] did not address prediction equations applied in their study, it seems that they referred to equations specific for the Caucasian population. Recently, normal reference spirometric values for Omani children and adolescents[3] have been constructed that could be considered for use in neighboring Arab countries, including Saudi Arabia. Applying these references might alter the data addressed by Al-Saadi et al.[1]

Third, interestingly, Al-Saadi et al's study[1] supports the view that the lung is functionally involved in children with T1DM early on in the course of the disease.[4] It, therefore, seems justifiable to regularly assess pulmonary functions in children with T1DM for early detection of any dysfunction. Portable spirometers could provide measurements that are highly comparable to those obtained from "gold standard" laboratory spirometers and high quality tracings could be achieved both at home and in the office setting. They could provide all curve waveforms that could be stored and available for visual inspection.[5,6] Accordingly, it might be recommended to provide every T1DM child with a portable spirometer with the purpose of regularly monitoring pulmonary functions at home.

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Reply from the Author

We would like to thank Prof. Al-Mendalawi for his interest in our article.[1] We agree with Prof. Al-Mendalawi on the possible effects of diabetic microangiopathy on the lung that he nicely highlighted. Prof. Al-Mendalawi has raised concerns regarding the normal reference spirometric values for children adolescents and the prediction equations applied in our study. We are aware that local and regional reference values are available.[7,8] We appreciate that local or regional reference values may be more relevant in view of similar population characteristics. However, we opted to use UK reference and prediction values as this is the reference values health care professionals in Saudi Arabia are familiar and comfortable with and have accumulated experience with it.[9] We agree with Prof. Al-Mendalawi that children who suffer from type 1 diabetes should have their lung function tested, however, we respectfully disagree with his recommendation of offering portable spirometer to every child with type 1 diabetes for the purpose of regularly monitoring pulmonary functions at home. We believe that this approach is not cost-effective. Furthermore, it requires labored training of the parents and it would possibly divert the family attention from the core issues of diabetes care, which may affect the effort and the dynamic families looking after children with diabetes. Compared to portable spirometers, hemoglobin A1C (HbA1c) monitoring is religiously needed on a regular basis for optimum management of diabetes. Although the HbA1c mini device is available, yet it is not recommended to be offered to families even in developed countries.[10] We believe that lung function tests for children with type 1 diabetes would be better

carried out in health facilities under direct supervision of heath care professionals. We believe that ongoing lung function monitoring of children with diabetes should be individualized and high-risk patients should be targeted for frequent follow up. Moreover, we would like to report that we are in a process of gathering data on normal lung function values of Saudi age, gender, and regional based populations. Once again, we thank and appreciate prof. Al-Mendalawi's interest in our article.

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Related topics

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