

Cystic Fibrosis Research News

Title:

Arm muscle area for the longitudinal assessment of nutritional status in paediatric patients with cystic fibrosis - a single centre experience

Lay Title:

Arm muscle area as an early indicator of worsening nutritional status in children - a single centre experience

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What was your research question?

Which values identify a worsening nutritional development at an early stage in childhood and adolescence?

Why is this important?

If left untreated, children with CF would be skinny and grow more slowly due to the diseased pancreas which cannot help with normal digestion of food. Then the body lacks not only fat but also muscle. Muscles are particularly important for breathing. If the breathing muscles, including the diaphragm are too weak, it is hard to breathe. Guidelines recommend that body mass index is calculated from measurements of weight and height. However, this provides no information about the child's muscle mass. Therefore, we regularly calculated upper arm muscle area by measuring upper arm circumference and triceps skin fold.

What did you do?

We evaluated our patient database, which contains information on every outpatient and inpatient visit. For children and adolescents between 2 and 17 years of age, we analysed all

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values from 1995 to 2018 that are related to nutritional status. All data were compared with reference values for healthy boys and girls. We described the long-term course of each measured value throughout childhood and adolescence in comparison to healthy children.

What did you find?

The database contained information on 4,862 evaluable patient contacts from 161 children with CF, 78 of which were girls. On average, we analysed 8.1 years of follow-up per patient. Compared to healthy people, most children and adolescents had stable and favourable results for weight, height, body mass index and skin fold thickness. Only upper arm muscle area developed unfavourably and dropped gradually over the years, suggesting a decrease in muscle mass. Upper arm muscle area was also the earliest sign of a deteriorating nutritional status because it dropped significantly earlier than body mass index or weight.

What does this mean and reasons for caution?

In our outpatient clinic, upper arm muscle area was the most sensitive measurement to detecting a worrying change in nutritional status at an early stage. The results represent the largest long-term evaluation of such measurements in childhood, albeit only from a single CF centre. Muscle depletion in spite of normal body mass index has been described by previous authors. Further long-term evaluations would be beneficial to verify the usefulness of upper arm muscle area as an additional measurement in routine CF care.

What's next?

In our CF centre, we will continue to routinely measure upper arm circumference and skin folds. In a smaller group of patients, we will compare skin folds and upper arm circumference with bioelectrical impedance analysis, which determines muscle mass and fat mass quite reliably.

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