

The use of Mid Upper Arm Circumference in the Nutritional assessment of the Critically Ill patient

The assessment of nutritional status has become a must as part of the care of hospitalised patients in Scotland (1). Nutritional status has been shown to have significant effects on health and recovery from illness or injury (2). Malnourished patients benefit most from timely nutritional support (3)

The case for nutritional screening in hospitalised patients has been proven but its use within the ICU setting is problematic. The screening tool of choice in Scotland is Malnutrition Universal Screening tool (MUST) (4). This tool relies heavily on actual weight and BMI, two measures which are not routinely recorded in Scottish ICU's (5). Therefore another parameter has been put forward, which will aid our nutritional assessment in critically ill patients – Mid Upper Arm Circumference (MUAC).

Estimating body mass index (BMI) category

If neither height nor weight can be measured or obtained, BMI can be estimated using the mid upper arm circumference (MUAC) (4)

Measuring mid upper arm circumference (MUAC)

- The subject should be traditionally be standing or sitting. Triceps skin fold thickness and arm circumference can be measured accurately, reproducibly and comparably in the supine position when the patient is unable to assume the recommended upright stance.⁽⁶⁾
- Use left arm if possible and ask subject to remove clothing
- Locate the top of the shoulder (acromion) and the Point of the elbow (olecranon process)
- Measure the distance between the 2 points, identify the mid point and mark on the arm.
- Ask subject to let arm hang loose and with tape measure, measure circumference of arm at the mid point. Do not pull the tape measure tight - it should just fit comfortably round the arm.

If MUAC is less than 23.5 cm, BMI is likely to be less than 20 kg/m²

I.e. subject is likely to be underweight.

If MUAC is more than 32.0 cm, BMI is likely to be more than

30 kg/m² i.e. subject is likely to be obese.

Weight change over time

- MUAC can also be used to estimate weight change over a period of time and can be useful in subjects in long term care.
- MUAC needs to be measured repeatedly over a period of time,

preferably taking 2 measurements on each occasion and using the average of the 2 figures.

If MUAC changes by at least 10% then it is likely that weight and BMI have changed by approximately 10% or more.

The use of MUAC as a predictive measure

Work by Ravasco (7) concluded that in intensive care most nutritional assessment methods are useless; whereas MUAC is simple to measure, feasible in the ICU setting and if classified by percentiles(8) may prove to have prognostic value, in identifying those most at nutritional risk.

In a small study, of 44 patients, MUAC when classified into percentiles was considered to be predictive of mortality and major complications. Muscle depletion as determined by Mid Arm Muscle Circumference (MAMC), agreed with MUAC. Mortality was higher in patients with MUAC < 5th percentile; while MUAC < 15th percentile was able to predict mortality and major complications.

As this paper was based in a respiratory Intensive care unit I feel it deserves more work with other groups of ICU patients.

References

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- 3) Benefits of supplementary tube feeding after fractured neck of femur; a randomized control trial Bastow et al BMJ 1983;287(6405);1589-92
- 4) "A Guide to the Malnutrition Universal Screening Tool (MUST) for Adults" British Association for Enteral and Parenteral Nutrition
- 5) Audit on nutritional practices in Scottish ICU's on behalf of the Scottish Intensive Care Society, unpublished
- 6) "A comparison of triceps Skinfold and Upper arm circumference measurements taken in standard and supine Positions". Terri et al JPEN; 5:6,519-521
- 7) "A Critical approach to nutritional assessment in critically ill patients." Ravasco et al Clinical Nutrition (2002)21(1):73-77
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