A Prospective Study of Trends in Anthropometric Nutritional Indices and their Impact on Patients with Subarachnoid Hemorrhage

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Introduction

Despite the importance of nutritional status and adiposity, the utility of anthropometric nutritional indices have not been studied much in patients with subarachnoid hemorrhage.

Methods

Patients of spontaneous SAH were prospectively studied for triceps skin fold thickness (TSF), mid arm circumference (MAC), mid arm muscle circumference (MAMC), and other factors in relation to clinical vasospasm and mortality. Univariate and multivariate analyses were performed using SPSS21.

Results

Tab 1: Influence of baseline factors on admission anthropometric indices

Baseline factor	Admission MAC median (IQR) cm	P	Admission TSF median (IQR) cm	P	Admission MAMC median (IQR) cm	P
Total	29.3 (28-31)		3.5 (3-4)		18.4 (16.5-20.3)	
Age (correlation)		0.29		0.30		0.85
Sex						
Male	30.0 (27-31)	0.91	3.5 (3-4.3)	0.73	18.6 (15.8-20.3)	0.66
Female	29.0 (28-31)		3.5 (3-4)		18.4 (17-20)	
Serious systemic disease						
Absent	29.0 (28-31)	0.80	3.5 (3-4)	0.26	18.6 (16.7-20)	0.79
Present	29.5 (27-33)		3.5 (3.5-4)		17.4 (16.1-21.4)	
Hunt and Hess grade						
1	28.0 (NA)	0.41	4.5 (4-5)	0.12	13.9 (12.3-15.4)	0.08
2	29.0 (28-32)		3.0 (3-4)		19.1 (16.8-21.3)	
3	30.3 (29-31)		3.8 (3-4)		18.4 (16.5-19.9)	
4	29.0 (28.5-30)		3.5 (3.3-3.8)		18.0 (17.0-18.5)	
Fisher grade						
2	29.0 (27.8-29)	0.29	3.0 (2.8-3)	0.09	19.6 (18.1-20.4)	0.35
3	30.5 (28-32)		3.5 (3-4)		18.8 (16.7-20.8)	
4	29.8 (27.5-30.8)		3.5 (3-4)		17.5 (16.3-20)	
Ruptured aneurysm						
ACA	30.5 (28-32)	0.31	3.5 (3-4)	0.27	18.5 (16.4-20.5)	0.52
ICA	29.3 (29-30)		3.5 (3-3.5)		18.9 (17.6-20.6)	
MCA	28.3 (26.5-31)		3.0 (3-4)		17.3 (15.4-19.1)	
PICA	30.0 (NA)		3.0 (NA)		20.6 (NA)	
Aneurysm occlusion						
-	29.0 (28-31)	0.72	3.5 (3-4)	0.82	18.4 (16.3-20.3)	0.54
Clipping	30.5 (29.5-31)		3.3 (3-3.8)		20.3 (18.2-21.1)	
Coiling	29.5 (29-30)		3.5 (3.3-3.8)		18.5 (17.7-19.3)	

There were a total of 56 patients included in our study. The median MAC decreased significantly from 29.3 cm (IQR 28-31cm) at admission to 27 cm (IQR 26-29cm) at 1 week (p value < 0.001). The median TSF decreased significantly from 34 mm (IQR 30-40mm) at admission to 30 mm (IQR 25-35mm) at 1 week (p value < 0.001). MAMC values did not show significant change over 1 week.

Fig 1: Changes in anthropometric indices over 1 week

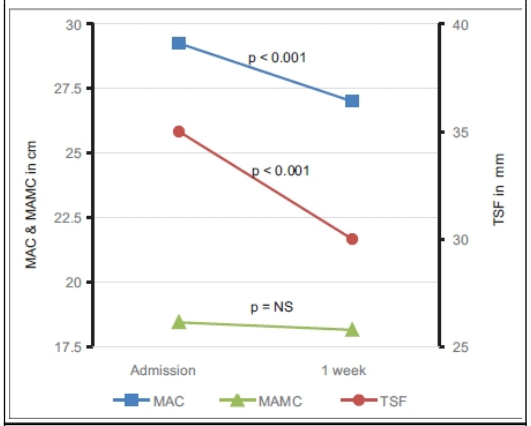


Fig 2: Differences in adm. TSF (a) & MAMC (b) between patients with respect to vasospasm

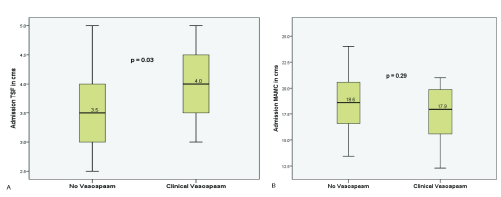
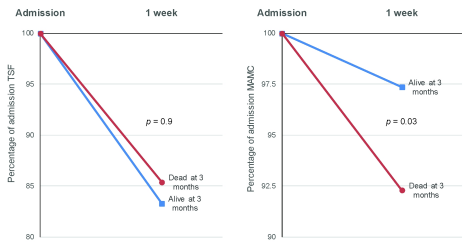


Fig 3: Fall in TSF (a) & MAMC (b) at 1 week between patients who were alive and those who were dead at 3 months



The patients who developed clinical vasospasm had significantly higher median admission TSF of 40 mm (IQR 35-45 mm), compared to the median admission TSF of 35 mm (IQR 30-40 mm) among those who did not develop vasospasm (p value 0.03). MAMC values did not differ significantly in relation to vasospasm. Patients who expired by 3 months had significantly greater fall in median MAMC values at 1 week (7.7% [IQR 5.2%-11.5%]), compared to the fall in median MAMC values at 1 week among those who were alive at 3 months (2.6% [IQR 2.1%-6.6%]) (p value 0.03). However the fall in TSF values did not differ significantly in relation to mortality. In multivariate analysis, only admission TSF, Hunt & Hess grade and Fisher grade had significant association with vasospasm, independent of other prognostic factors and of each other.

Tab 2: Impact of various factors on clinical vasospasm and mortality

Factor	Univariate *P* value		Multivariate *P* value for vasospasm
	Clinical vasospasm	Mortality	
Age	0.22	0.37	0.29
Gender	0.17	1.00	0.39
Systemic disease	0.25	0.15	0.09
Hunt and Hess grade	0.23	0.003	0.05
Fisher grade	0.58	0.47	0.02
Aneurysm occlusion	1.00	0.001	NA
Admission TSF	0.03	0.70	0.04
Admission MAMC	0.29	0.33	0.81
Percentage fall in MAMC 1-week	0.58	0.03	NA

Conclusions

Excess adiposity of patients measured as TSF is significantly associated with clinical vasospasm independent of other prognostic factors, while fall in MAMC indicating somatic protein catabolism has some impact on mortality.

Learning Objectives

To be able to: 1)Describe the relevance of adiposity or Triceps Skin Fold thickness in SAH, 2)Discuss mechanisms of vasospasm linked with excess adiposity, 3)Discuss the importance of MAMC as a measure of somatic protein catabolism on mortality after SAH.

References

Dhandapani S, Kapoor A, Gaudihalli S, et al. Study of trends in anthropometric nutritional indices and the impact of adiposity among patients of subarachnoid hemorrhage. Neurology India 63(4), 2015