



Cardiothoracic Ratio Association with Nutritional Status in Hemodialysis Patients

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Introduction

The cardiothoracic ratio (CTR) is determined by dividing the maximal horizontal width of the heart by the horizontal inner width of the rib cage. It's an easy parameter available from chest radiographs. The CTR independently correlates with the left ventricular mass (LVM) and nutritional status.

Objective

To evaluate whether CTR is a good indicator of nutritional status on hemodialysis (HD) patients or not?

Subjects and Methods

All study patients were recruited from the HD centers at the Taipei Medical University Hospital. This longitudinal observational study included 68 patients. Exclusion criteria were malignancies, obvious infection disease, hospitalization, surgery or renal transplantation within the three months preceding the investigation. Patients who met the inclusion criteria were classified into 2 groups according to their CTR. And we collected subjects' anthropometric, biochemical and dietary data.

Results and Discussion

Total 68 patients (35 men and 33 women) with a mean HD duration of 46 months were enrolled in this study. Thirty eight of subjects had CTR more than 50%. Table 1 lists the characteristic, anthropometric, biochemical and dietary data. Subjects with CTR more than 50% were significantly elder and lower serum creatinine and hemoglobin ($p < 0.05$). The CTR was positively correlated with age, but negatively correlated with serum creatinine and hemoglobin ($p < 0.05$).

The serum creatinine levels represent the muscle bulk and reflect the nutritional status in the dialysis patients. A higher serum creatinine level indicates a larger muscle mass and a better nutrition. Studies also showed that HD patients with cardiomegaly (CTR > 50%) were elder, required more erythropoietin treatment to meet target hematocrit level.

Conclusion

CTR could be an indicator to evaluate HD patient's nutritional status.

Table 1. Subjects' characteristic, anthropometric, blood pressure, biochemical data and dietary data of hemodialysis(HD) patients, by cardiothoracic ratio(CTR)(n=68).¹

Variables	CTR > 50 (n=38)	CTR ≤ 50 (n=30)	p-value
Age	71.7 ± 12.5*	56.1 ± 10.8	<.0001
Male(n, %)	21, 55.3	14, 46.7	0.481
Dialysis vintage (month)	36.7 ± 28	58.7 ± 68.4	0.591
BMI (kg/m ²)	23.1 ± 3.7	22.7 ± 2.9	0.595
Alb (g/dL)	4 ± 0.3	4.2 ± 0.4	0.105
Cr (mg/dL)	8.9 ± 2.5	10.8 ± 2.4*	0.007
Hb (mg/dL)	10.6 ± 1.1	11.3 ± 1.3*	0.01
TP (g/dL)	7.1 ± 0.6	7.3 ± 1.1	0.097
WBC (10 ³ /uL)	6.6 ± 2.2	6.7 ± 1.8	0.791
TC (mg/dL)	168.4 ± 36.8	187.9 ± 47.2	0.126
TG (mg/dL)	149.8 ± 83.8	171.5 ± 88.7	0.21
AC-sugar (mg/dL)	139.4 ± 90.1	113.1 ± 48.2	0.37
Kt/V	1.5 ± 0.2	1.5 ± 0.2	0.612
SBP (mmHg)	142.1 ± 28.8	145.7 ± 18.8	0.757
DBP(mmHg)	72.5 ± 12.1	77.8 ± 11.3	0.022
Calorie(kcal)	1366 ± 393	1405 ± 472	0.877
Carbohydrate(g)	179.6 ± 54.7	187.8 ± 62.7	0.591
Protein(g)	58.1 ± 23.9	57.7 ± 26.2	0.716
Fat(g)	46.8 ± 23	48.2 ± 22.1	0.725
Dietary fiber(g)	9.2 ± 3.3	9.3 ± 4.0	0.975

¹Values are Mean ± SD. BMI=Body Mass Index, Alb=Albumin, Cr=Creatinine, Hb=Hemoglobin, TP=Total Protein, WBC=White Blood Cell, TC=Total Cholesterol, TG= Triglyceride, AC-sugar=preprandial blood glucose, SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure.

* means significantly difference at $p < 0.05$ by and chi-square test.