
BACKGROUND AND METHODS: Although cachexia often accompanies advanced heart failure, little is known about the causes of the cachectic state. To assess the potential role of tumor necrosis factor in the pathogenesis of cardiac cachexia, we measured serum levels of the factor in 33 patients with chronic heart failure, 33 age-matched healthy controls, and 9 patients with chronic renal failure.

RESULTS: Mean (± SEM) serum levels of tumor necrosis factor were higher in the patients with heart failure (115 ± 25 U per milliliter) than in the healthy controls (9 ± 3 U per milliliter; P less than 0.001). Nineteen of the patients with chronic heart failure had serum levels of tumor necrosis factor greater than or equal to 39 U per milliliter (greater than 2 SD above the mean value for the control group), whereas the remaining 14 patients had serum levels of tumor necrosis factor below this level. The patients with high levels of tumor necrosis factor were more cachectic than those with low levels (82 ± 3 vs. 95 ± 6 percent of ideal body weight, respectively; P less than 0.05) and had more advanced heart failure, as evidenced by their higher values for plasma renin activity (2.92 ± 0.53 vs. 1.06 ± 0.33 ng per liter per second [10.5 ± 1.9 vs. 3.8 ± 1.9 ng per milliliter per hour]; P less than 0.01) and lower serum sodium concentration (135 ± 1 vs. 138 ± 1 mmol per liter; P less than 0.05). The group with high levels of tumor necrosis factor also had lower hemoglobin levels (7.82 ± 0.2 vs. 8.69 ± 0.4 mmol per liter [12.6 ± 0.4 vs. 14.0 ± 0.6 g per deciliter]) and higher values for blood urea nitrogen (19.5 ± 2.2 vs. 12.5 ± 1.8 mmol per liter) than the group with low levels of tumor necrosis factor (P less than 0.05 for both). The high levels of tumor necrosis factor were not due solely to decreased renal clearance, however, since the levels in the patients with heart failure were considerably higher than those in the nine patients with chronic renal failure (115 ± 25 vs. 45 ± 25 U per milliliter; P less than 0.05).

CONCLUSIONS: These findings indicate that circulating levels of tumor necrosis factor are increased in cachectic patients with chronic heart failure and that this elevation is associated with the marked activation of the renin-angiotensin system seen in patients with end-stage cardiac disease.