

Rhabdomyolysis following crush injury in the earthquake

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The great earthquake of Chi-Chi, Taiwan, on September 21 resulted in 2329 deaths and 8722 casualties. For those severely injured, rhabdomyolysis became inevitable and many suffered from acute renal failure. The purpose of this study is to define the clinical picture of rhabdomyolysis secondary to crush injury in a local area close to the epicenter of the earthquake. Questionnaires designed to collect pertinent data were sent to most of the major medical centers in central Taiwan. Patients with a peak serum creatine phosphokinase (CPK) of more 1000 U/L within 2 weeks following the earthquake were included in the study. Patients with elevated serum CPK of etiologies other than crush injury were excluded. Six hospitals responded adequately and a total of 95 cases were recruited for the analysis. There were 60 males and 35 females with a mean age of 37.6 ± 17.3 (SD) years. The median time from the earthquake to the time being rescued (T-rescue) was 6.0 hours (range: 0.1 to 31 hours) and time to emergency room (T-ER) was 11.0 hours (range: 2 to 144 hours). The median CPK value was 20000 (range: 1040 to 351540). Acute renal failure defined by a serum > 1.3 mg/dl was found in 52 (54.7%). Dialysis including hemodialysis and/or continuous arteriovenous hemofiltration were performed in 32 cases (33.7%). Of whom, 29 (90.6%) were oliguric with a mean oliguric phase of 11.0 ± 9.5 days (median: 9, range: 1-36 days). Fasciotomy was performed in 35 cases (36.8%) due to compartment syndrome. Up to 88 cases (92.6%) also suffered from at least one of the following associated injury: fracture (41.5%), head injury (10.8%), motor or sensory neuropathy (29.8%), chest injury (7.45%), abdominal injury (7.4%), thermal burn (1.1%). The initial management at ER included a vigorous fluid supplement (median: 5240.0 ml, range: 500 to 15381 ml in 48 hours) and the use of various drugs (dopamine, 36.8%; sodium bicarbonate, 43.2%; furosemide, 55.8%; mannitol 18.9%) in various combinations. The use of mannitol, dopamine and sodium bicarbonate was associated with a shortening of oliguric phase in oliguric patients but did not reach statistical significance. Oliguric patients were associated with a longer T-rescue (9.85 vs 5.04 hours, $p < 0.01$), higher CPK (79204 vs 30495 U/L, $p < 0.01$), higher LDH (4110 vs 1498 U/L, $p < 0.02$) and lower serum calcium (6.53 vs 7.46 mg/dl, $p < 0.001$) as compared to nonoliguric patients. Serum CPK levels were correlated with urine volume in the first 24 hours ($r = -0.27$, $p < 0.05$), BUN ($r = 0.33$, $p = 0.001$), SGOT (r