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A total of 14 patients with crush syndrome were transferred to Osaka University Hospital after the 1995 Hanshin-Awaji earthquake. Clinical aspects of three cases representing the typical and atypical crush syndrome were presented.

[Case 1] A 66-year-old female was buried under a collapsed house and was rescued one hour after entrapment. She was conscious on the scene and was evaluated as yellow (severe, but not critical). However, she developed cardiopulmonary arrest during transport to the hospital. She was successfully resuscitated, and was referred to this Center. She had unstable pelvic fractures as well as crush injury to the buttock. Bleeding from the pelvic fracture was the cause of her sudden collapse. Transcatheter embolization controlled the bleeding and external fixation of the pelvis was provided. She did not develop renal failure or other organ dysfunctions. In this patient, the crush injury was not severe, but the associated pelvic fracture and hemorrhage caused critical situation.

[Case 2] A 25-year-old female was buried under the debris for three hours and was transferred to this hospital three hours following her extrication. On admission, severe hyperkalemia, severe rhabdomyolysis, and increased intracompartmental pressure were detected. Emergency hemodialysis and fasciotomy were performed. Aggressive fluid supplementation reaching 24 liters for the initial 24 hours was needed to counteract massive edema and fluid loss to the injured legs. This fluid support was sustained until the fasciotomy wound was closed. The clinical course was not complicated by acute renal failure, and now she can walk without assistance.

[Case 3] A 25-year-old male was transferred to this hospital 35 hours after injury. He had been compressed under the debris for eight hours, and had renal failure on admission. He was hemodialyzed from the day of arrival. After several days, he had unexpected complications including necrosis of the gall bladder that required surgical intervention. His general condition and renal function recovered rapidly after the operation.

Keywords: acute renal failure; cardiopulmonary arrest; crush syndrome; earthquake; fasciotomy; fracture; hemodialysis; hyperkalemia; rhabdomyolysis

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Long-Term Physical Outcome of Patients Who Suffered Crush Syndrome: Prognostic Indicators

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Objective: To identify independent predictors of physical outcome in patients suffering from crush syndrome

Methods: Sensory and motor functions were examined two years after the 1995 Hanshin-Awaji earthquake in 42

patients with a combined total of 58 compressed lower extremities. The influences of time to rescue, fasciotomy, and radical debridement on lower leg muscle strength were evaluated by stepwise regression analysis.

Results: Severe disabilities related to the lower leg compartment were present, and the anterior compartment was damaged more severely than was the posterior compartment. Stepwise regression analysis showed the performance of fasciotomy and debridement to be an independent predictor of long-term, lower leg muscle survival, and indicated that it was an independent predictor when the debrided compartments were not included in the analysis. In all debrided anterior compartments, muscle contractility was abolished completely. There was a significant negative correlation between time to fasciotomy and lower leg muscle strength.

Conclusions: Secondary compartment syndrome affected physical outcome in crush syndrome patients. There was no evidence that fasciotomy improves functional outcome. Delayed rescue, delayed fasciotomy, and radical debridement may worsen the physical prognosis. Indications for fasciotomy in crush syndrome during the acute phase need further study and evaluation.

Keywords: debridement; earthquake; fasciotomy; Hanshin-Awaji; morbidity; predictors; rescue

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Penetrating Cardiac Injury following Sternal Fracture

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Objective: Myocardial injury used to be considered as one of the major complications associated with sternal fracture, even though recent studies on injuries associated with fracture of sternum are contrary to this belief. Many authors now believe the presence of sternal fracture no longer is indicative of occult injuries to the underlying structure such as the heart.

Methods: A case was presented of a 38-year-old female patient transferred to our hospital after being injured in a motor vehicle accident. On arrival, her blood pressure (BP) was 90/50 mmHg but two hours later, it dropped to 60/30 mmHg. Although her chest roentgenography and electrocardiography (ECG) did not reveal any significant findings, chest computerized tomography (CT) scan later revealed a sternal fracture and cardiac tamponade.

Results: A diagnosis of cardiac rupture resulting from sternal fracture following blunt chest trauma was made. Under midline sternotomy, her right atrial rupture was repaired. The patient was doing well during a three months post-operative follow-up.

Conclusion: Clinicians should maintain a high index of suspicion for the presence cardiac tamponade in cases presented as blunt chest trauma as early diagnosis and surgical intervention is vital to the patient's survival.