

CMG 30 - CRUSH SYNDROME

(Revised: June 2021)



Crush syndrome occurs when a crush injury is of sufficient pressure and duration to cause muscle death and, thereby, systemic manifestations outside the localised tissue injury. The development of crush syndrome is time and pressure dependent: for example, a large muscle mass need only be compressed for a relatively short time by a large compressive force, or conversely, over longer periods where the pressure is relatively low. Violent crushing can destroy a muscle immediately, but even if the force is not sufficient to mangle the muscle tissue, muscle death may occur within an hour.

Crush syndrome applies to the limbs and buttocks – when applied to the head or torso, the prolonged pressure necessary to cause crush syndrome is thought to be non-survivable.

Crush syndrome can also result from prolonged periods lying motionless.

While the compressive force is in place, there is generally little deterioration of the patient. Upon release of the force, a cascade of events leads to the systemic manifestations which are known as crush syndrome. These include:

- **hypovolaemic shock**
- **acute renal injury**
- **hyperkalaemia**
- **metabolic acidosis**
- **disseminated intravascular coagulopathy**
- **hypothermia**
- **acute respiratory distress syndrome**

EARLY TREATMENT IS VITAL –

patients usually survive extrication if resuscitative treatment and monitoring has commenced while the patient is still trapped. Maintain a high index of suspicion for any patient trapped for a prolonged period **(i.e. DO NOT wait for clinical signs to develop)**.

continues over

CMG 30 - CRUSH SYNDROME cont.

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PRE-EXTRICATION

ICP	Consider the need for a medical team early (request via ComCen)	AP
ICP	IV fluids – warm fluids if available (early, aggressive fluid administration, regardless of vital signs). (In the presence of a crushed limb and haemorrhage, it is more important to prevent crush syndrome with aggressive fluid therapy and direct control of bleeding, than to permit mild hypotension for haemorrhagic hypovolaemia [“permissive hypotension”])	AP
ICP	Active rewarming / prevent heat loss	AP
ICP	High concentration oxygen throughout contact	AP
ICP	Monitor ECG and vital signs throughout contact	AP
ICP	<p>Consider use of an arterial tourniquet, only indicated in crushed lower limbs</p> <ul style="list-style-type: none"> • A tourniquet is not required if aggressive fluid resuscitation has occurred. • Only apply an arterial tourniquet immediately prior to release of the compressive force. • Once applied, the arterial tourniquet should not be removed pre-hospitally. 	AP

POST-EXTRICATION

ICP	Rapid transport to trauma facility, as soon as possible. (Patients have better outcomes when they arrive at definitive care earlier)	AP
ICP	Continue IV fluids	AP
ICP	Monitor ECG for changes	AP
ICP	Manage, as appropriate, for <i>shock and hypoperfusion</i> (CMG 14), <i>limb injuries</i> (CMG 19) and <i>hyperkalaemia</i> (CMG 27)	AP
ICP	Analgesia as required	AP
ICP	Splint and immobilise the injured limb at heart level – do not elevate	AP