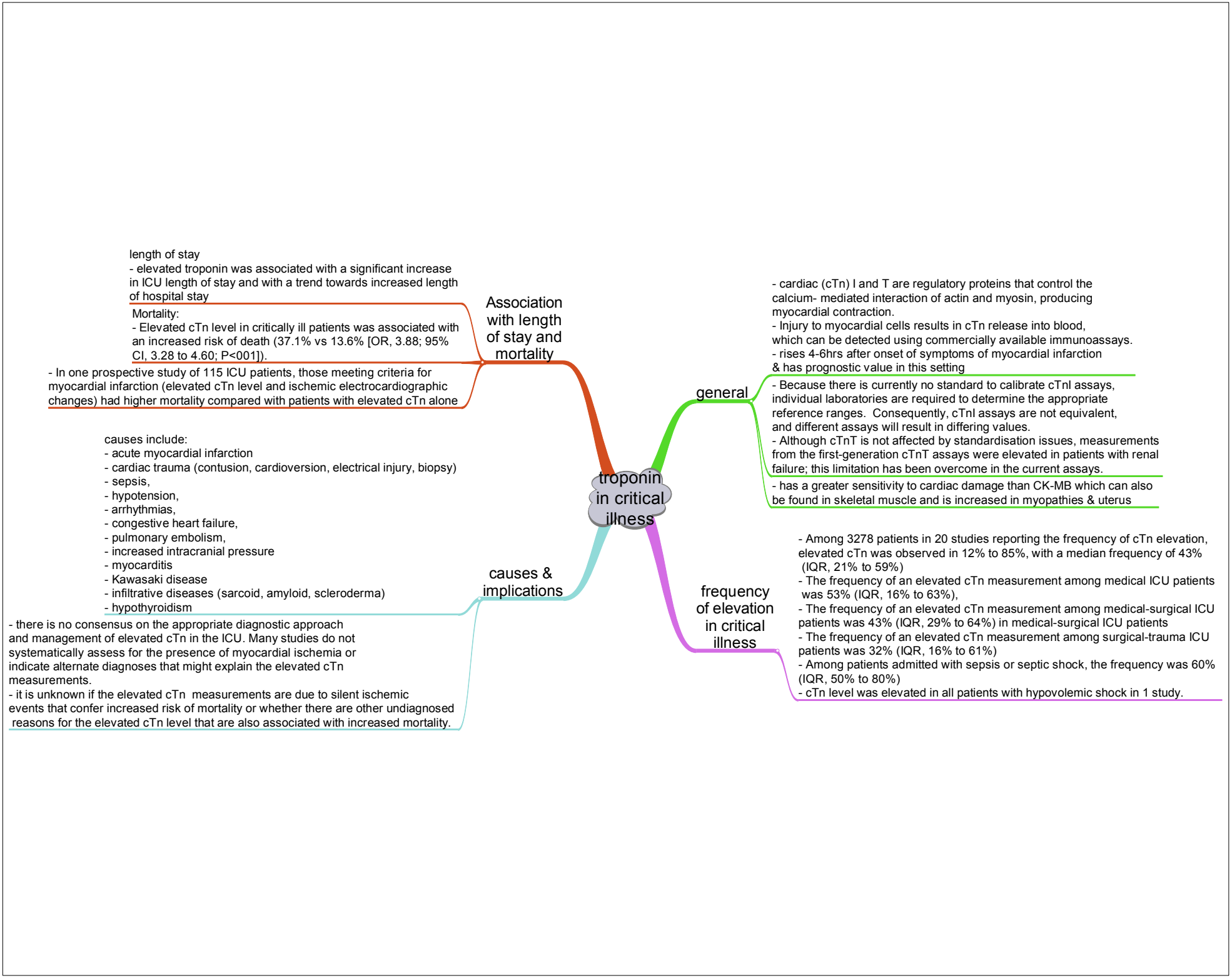
troponin in critical illness
Association with length of stay and mortality
length of stay
- elevated troponin was associated with a significant increase in ICU length of stay and with a trend towards increased length of hospital stay
Mortality:
- Elevated cTn level in critically ill patients was associated with an increased risk of death (37.1% vs 13.6% [OR, 3.88; 95% CI, 3.28 to 4.60; P<001]).
- In one prospective study of 115 ICU patients, those meeting criteria for myocardial infarction (elevated cTn level and ischemic electrocardiographic changes) had higher mortality compared with patients with elevated cTn alone
causes & implications
causes include:
- acute myocardial infarction
- cardiac trauma (contusion, cardioversion, electrical injury, biopsy)
- sepsis,
- hypotension,
- arrhythmias,
- congestive heart failure,
- pulmonary embolism,
- increased intracranial pressure
- myocarditis
- Kawasaki disease
- infiltrative diseases (sarcoid, amyloid, scleroderma)
- hypothyroidism
- there is no consensus on the appropriate diagnostic approach and management of elevated cTn in the ICU. Many studies do not systematically assess for the presence of myocardial ischemia or indicate alternate diagnoses that might explain the elevated cTn measurements.
- it is unknown if the elevated cTn measurements are due to silent ischemic events that confer increased risk of mortality or whether there are other undiagnosed reasons for the elevated cTn level that are also associated with increased mortality.
general
- cardiac (cTn) I and T are regulatory proteins that control the calcium- mediated interaction of actin and myosin, producing myocardial contraction.
- Injury to myocardial cells results in cTn release into blood, which can be detected using commercially available immunoassays.
- rises 4-6hrs after onset of symptoms of myocardial infarction & has prognostic value in this setting
- Because there is currently no standard to calibrate cTnI assays, individual laboratories are required to determine the appropriate reference ranges. Consequently, cTnI assays are not equivalent, and different assays will result in differing values.
- Although cTnT is not affected by standardisation issues, measurements from the first-generation cTnT assays were elevated in patients with renal failure; this limitation has been overcome in the current assays.
- has a greater sensitivity to cardiac damage than CK-MB which can also be found in skeletal muscle and is increased in myopathies & uterus
frequency of elevation in critical illness
- Among 3278 patients in 20 studies reporting the frequency of cTn elevation, elevated cTn was observed in 12% to 85%, with a median frequency of 43% (IQR, 21% to 59%)
- The frequency of an elevated cTn measurement among medical ICU patients was 53% (IQR, 16% to 63%),
- The frequency of an elevated cTn measurement among medical-surgical ICU patients was 43% (IQR, 29% to 64%) in medical-surgical ICU patients
- The frequency of an elevated cTn measurement among surgical-trauma ICU patients was 32% (IQR, 16% to 61%)
- Among patients admitted with sepsis or septic shock, the frequency was 60% (IQR, 50% to 80%)
- cTn level was elevated in all patients with hypovolemic shock in 1 study.