

ICU-acquired weakness
[created by Paul Young 02/10/07]

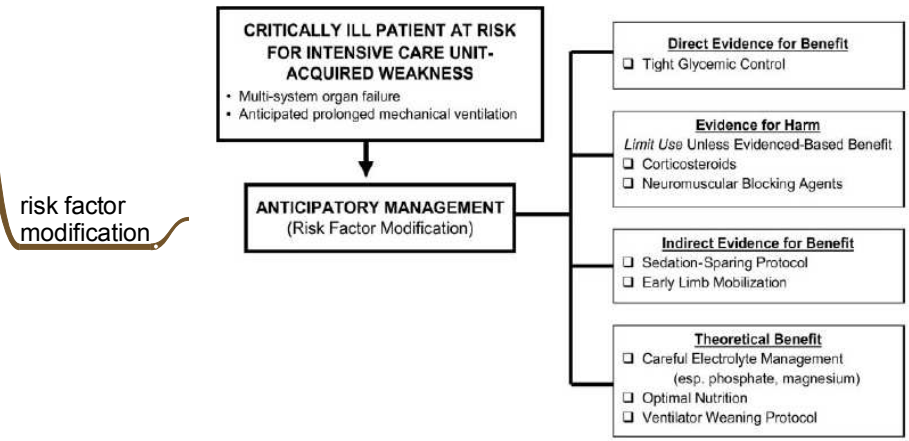
general
ICU-acquired weakness encompasses:
(i) critical illness polyneuropathy (CIP), and
(ii) critical illness myopathy (CIM)

epidemiology
- De Jonghe et al found clinically significant ICU-AW in 25% of patients who received mechanical ventilation for at least 7 days.
- Studies using cohorts restricted to sepsis and multiorgan failure have found even higher incidences of neuromuscular disease, ranging from 50 to 100%.

clinical presentation
common scenarios include:
(i) difficulty weaning
(ii) generalised weakness
- When a reliable motor examination is possible, affected patients will exhibit generally symmetrical motor deficits in all limbs, ranging from paresis to true quadriplegia.
- Reflexes are usually diminished or absent, but normal reflexes do not rule out the diagnosis.
- Sensory examination is often curtailed by patient sensorium, interaction with the examiner, and edema.

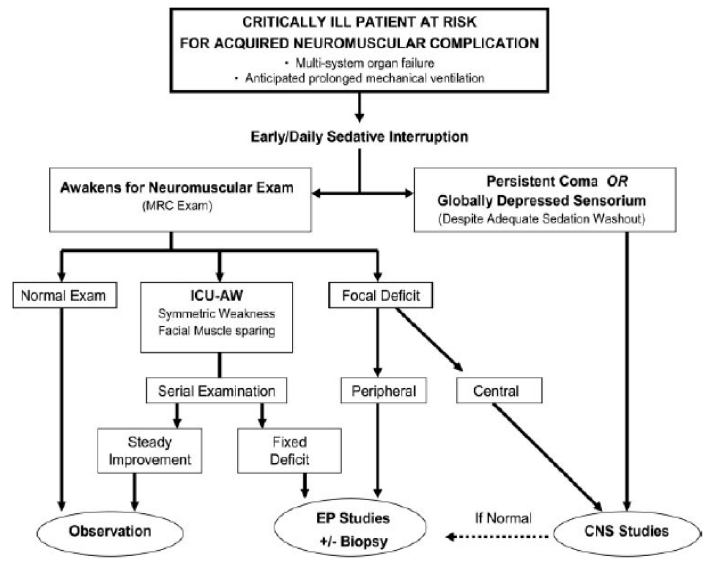
differential diagnosis
- Once a weakness syndrome is entertained, the clinician must clearly establish the absence of a neuromuscular condition that began before admission to the ICU
such conditions include:
- acute spinal cord injury,
- motor neuron disease,
- Guillain-Barre syndrome,
- myasthenia gravis,
- Lambert-Eaton syndrome, and
- muscular dystrophy

risk factors
1. systemic inflammation
2. glycaemic control:
- tight glycaemic control appears to decrease prevalence of ICU-acquired weakness
3. medications
- steroids and neuromuscular blocking agents
4. immobility
5. malnutrition



risk factor modification

approach



investigation

arguments for specific investigation:
(i) CIM and CIP are potentially reversible entities, therefore should be carefully identified to avoid unreasonably pessimistic prognoses
(ii) accurate predictions are paramount in decisions regarding goals of care in the patient with protracted critical illness.
(iii) may identify an alternative diagnosis

arguments against specific investigation:
(i) Technical difficulties in investigation of ICU patients including oedema, artifacts related to the presence of multiple electrical devices, and invasive catheters are common sources
(ii) Neurophysiologic testing does not predict duration of mechanical ventilation nor ICU stay
(iii) The presence of CIP and/or CIM does not ensure reversibility
(iv) establishing a highly specific diagnosis does not translate to a specific therapy.

prognosis

short-term:
- ICU acquired weakness has been demonstrated to lead to longer ventilation, ICU stay and mortality yet no conclusive evidence exists to refute the possibility that poor outcomes and weakness may simply reflect the type and/or severity of the patient's underlying condition.

long-term:
- Metaanalysis of 36 studies provided information on the outcomes of 263 patients. Mean duration of follow-up was 3 to 6 months (range, 2 days to 8 years).
- Complete functional recovery with patients regaining the ability to breathe spontaneously and to walk independently was reported in 68% (180 of 263 patients).
- Severe disability with quadriplegia, paraplegia, or paraplegia was reported in 28% (74 of 263 patients).
- Persisting milder disabilities were common even in patients with complete functional recovery, and included reduced or absent deep tendon reflexes, stocking and glove sensory loss, muscle atrophy, painful hyperesthesia, and foot drop

CIP vs CIM

- In CIP, electrophysiologic testing usually shows sensorimotor axonopathy with decreased compound muscle action potential (CMAP) and sensory nerve action potential yet normal nerve conduction velocities
- CIM is an acute primary myopathy (not secondary to muscle denervation) and is diagnosed by abnormalities of the electromyographic tracing during a voluntary contraction (requiring patient cooperation). The definitive diagnosis of muscle involvement requires examination of muscle tissue by biopsy with selective loss of myosin being practically pathognomonic.
- aka acute quadriplegic myopathy