

NUTRITION STRATEGIES IN ACUTE SPINAL CORD INJURY – A NARRATIVE REVIEW

SQA21

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Introduction

- Spinal cord injury (SCI) is a condition that often necessitates admission to ICU in the acute phase for airway, respiratory, and cardiovascular support.^{1, 2}
- Our intensive care unit had a policy of withholding feeding for 48 hours in the acute phase of SCI due to the risk of ileus in keeping with regional specialist guidance.
- There is a disparity between this approach and that used in other critically ill trauma patients, where feeding is initiated early due to a hypermetabolic state.³
- We reviewed the evidence for delayed feeding in acute SCI.

Methods

- We searched MEDLINE, EMBASE, and Cochrane CENTRAL from their inception until the 24th of January 2021 (Table 1)
- We searched for articles that observed a patient population with acute SCI in an intensive care or acute spinal rehabilitation unit. We required studies to actively investigate clinical outcomes relating to an explicitly detailed feeding regimen (Table 1)
- Outcomes required for inclusion were changes in neurological function, neurological complications, time spent on intensive care units, time to ICU discharge, incidence of secondary complications, other adverse effects, and mortality.
- Quality was assessed using the Downs and Black tool.⁴

Parameter	Inclusion	Exclusion
Patient	Patients with acute SCI who are seen for initial care after injury in an ICU	Chronic SCI patients, patients without SCI
Intervention	Feeding protocol which incorporated an explicit time to feed as part of it's process	
Outcomes	Any clinical outcome	No clinical outcomes
Report Characteristics	Primary Literature, publication in English	

Table 1. Inclusion and exclusion criteria for the narrative review

Included Studies

Four articles met the inclusion criteria. Distribution of injury level amongst patients in studies 1-3 is demonstrated in Figures 1-3.

- 1) Cinotti et al.⁵ - A quasi-experimental pre-post study of 117 patients with traumatic cervical SCI. Introduced an early care bundle that included initiating enteral feeding within 24 hours of admission vs. standard practice according to French guidelines (Figure 4).
- 2) Dvorak et al.⁶ - An RCT of 23 patients with cervical spinal cord injury. Feeding < 72h post-injury vs. Feeding at 120h post-injury.
- 3) Kuric et al.⁷ – A pre-post QI project of 166 patients. Initiation of parenteral feeding if unable to tolerate enteral diet by day 5 vs. feed when “clinically ready”.
- 4) Rowan et al.⁸ – Retrospective evaluation of 13 quadriplegic and 20 paraplegic patients with complete cord transection. Enteral feeding commenced NG/ NJ feeding a median of 2 days from time of admission.

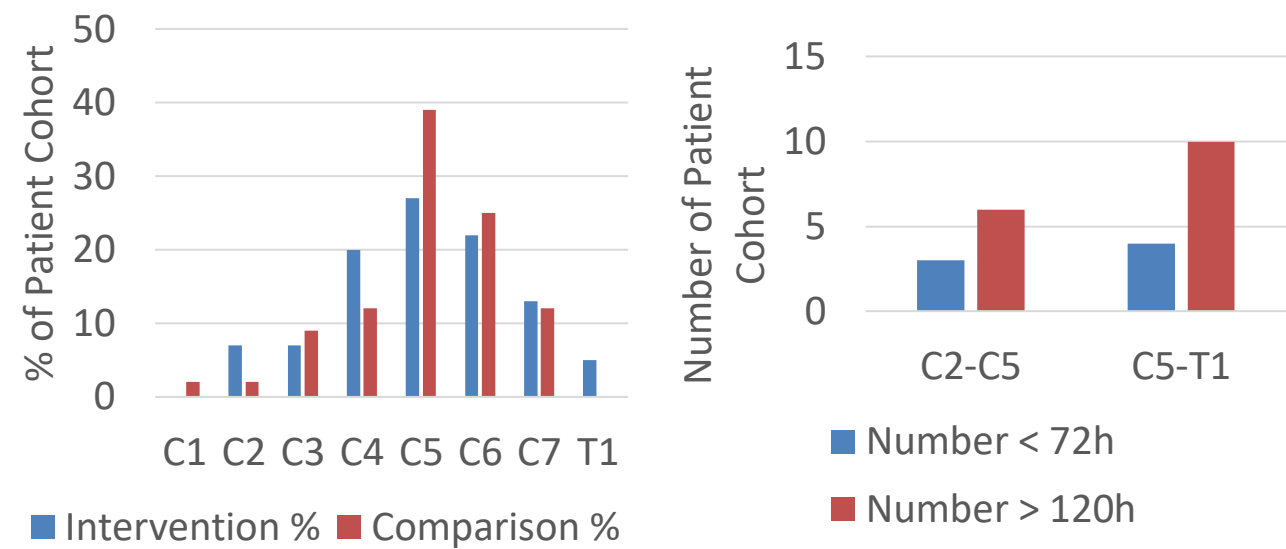


Figure 1. SCI level distribution in Cinotti et al.⁵ study

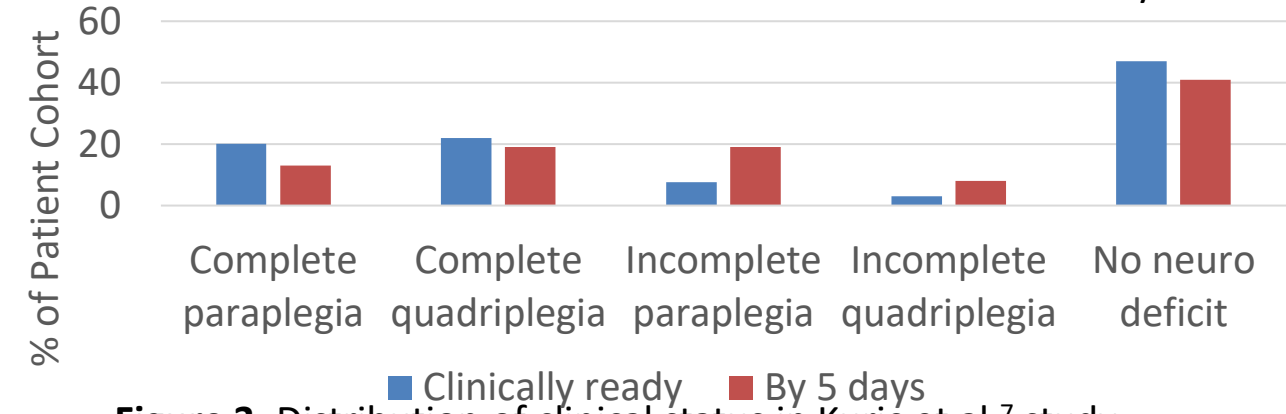


Figure 2. SCI level distribution in Dvorak et al.⁶ study

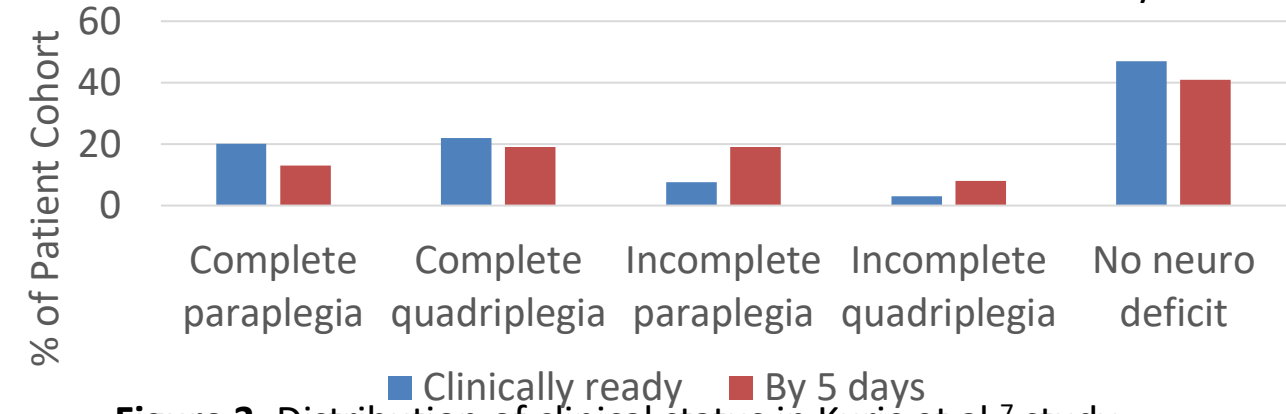


Figure 3. Distribution of clinical status in Kuric et al.⁷ study

Outcomes

- General ICU:
 - Cinotti et al.⁵ found no increased risk of pneumonia in a group fed within 24 hours.
 - Dvorak et al.⁶ found no increased risk of sepsis in patients fed <72h post injury.
 - Rowan et al.⁸ found no complications associated with enteral feeding initiated at a median of 2 days for a median of 7.7 days duration.
 - Kuric et al.⁷ found that initiating feeding by day 5 significantly reduces risk of GI haemorrhage.
- Metabolic and Feeding Outcomes:
 - Dvorak et al.⁶ found a greater number of feeding complications in the group fed at >120 hours, and that they also took on average 53 hours longer to meet calculated energy goals
 - Kuric et al.⁷ found that patients who were protocolized to initiate feeding pre-day 5 reached calculated energy requirements at 2 days vs 16 days when patients were fed when they were clinically ready
 - Rowan et al.⁸ found that one of the 33 patients had an ileus, with a median feed interruption of 2 times for high gastric aspirates (100-200ml)
- Neurological Outcomes:
 - Cinotti et al.⁵ found that a bundle of care in conjunction with early feeding significantly improved ASIA score at discharge and one-year post-discharge

Interventions	Control phase	Intervention
General care Unstable spine Prevention of secondary spine cord injuries	Surgery as soon as possible Body temperature ≤38°C Glycemia: 6–9 mmol/L ⁻¹ PaCO ₂ : 30–35 mm Hg PaO ₂ ≥60 mm Hg MAP ≥70 mm Hg	Surgery as soon as possible Body temperature ≤38°C Glycemia: 6–9 mmol/L ⁻¹ PaCO ₂ : 30–35 mm Hg PaO ₂ ≥60 mm Hg MAP ≥70 mm Hg
Mechanical ventilation Tidal volume PEEP Tracheostomy		Vt 6–8 mL/kg ⁻¹ IBW PEEP ≥5 cm H ₂ O Before day 7 in case of complete motor deficit (AIS grade A–B) ^a above C6
Weaning Airway obstruction Enteral nutrition	Not standardized	Abdominal strap Nebulization (salbutamol 5 mg × 4–6/day)
Physiotherapy	Not standardized	Started at day 1 25–30 kcal/kg ⁻¹ before day 5
Perineal care	Not standardized	From day 1 after spine stabilization Alternate lateral decubitus every 6 h from day 1 Expectoration drainage (Cough Assist [®])

Figure 4. The bundle of care used by Cinotti et al.⁵ Intervention was Demonstrated to improve neurological outcome

Discussion

- There is little evidence to support the practice of delaying enteral feeding in spinal cord injury patients.
- The review is limited by the external validity of the studies; there is exclusion of common co-morbid pathology (e.g. chest/ abdo trauma, TBI), as well as confounding in all studies.
- It is unclear whether acute SCI patients are in a hypermetabolic state; recent data suggest that there is substantial heterogeneity in between individuals,⁹ meaning using standard formulas such as the Harris-Benedict equation to calculate energy requirement risks both over and under feeding within patient cohorts.
- Future research should therefore focus on titration of caloric intake according to indirect calorimetry.

Domain	Cinotti	Dvorak	Kuric	Rowan
Reporting (/10)	9	9	8	8
External Validity (/3)	1	1	1	3
Internal validity – Bias (/7)	3	6	4	4
Internal validity – Confounding (/6)	3	4	3	1

Table 2. Scores from Downs and Black Checklist

Conclusions

- There is no strong evidence to support delaying feeding in patients with acute SCI.
- There is no evidence of increased risk of adverse events, concerns regarding risk of ileus are unfounded
- Early feeding may improve long term neurological outcome.
- Further research on individualised titration of feeding regimens in the early phase of acute spinal cord injury is recommended to further evaluate impacts of early feeding on outcomes.

References

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