

13.0 Thiamine

There were no new randomized controlled trials since the 2018 update and hence there are no changes to the following summary of evidence.

Question: Compared to standard care, does thiamine supplementation result in improved clinical outcomes in critically adult ICU patients?

Summary of evidence: This is a new topic in 2018. There was 1 level 2 study that compared the effect of thiamine supplementation (200 mg twice daily for 7 days) to no thiamine supplementation in 88 critically ill patients with septic shock.

Mortality: When the two groups in this study were compared, thiamine supplementation had no effect (44% in the thiamine group, 42% in the control group, $P = 1.0$). However, once enrolled in the trial, thiamine levels were measured at baseline. There were 15 patients in the thiamine group and 13 in the placebo group who were found to be thiamine deficient at baseline (≤ 7 nmol/L). Of these deficient patients, 2 patients in the thiamine group died (13%) compared to 6 (46%) in the placebo group ($p=0.047$ for area under the curve). Therefore, in the subgroup of patients with thiamine deficiency at baseline, thiamine supplementation showed a statistically significant reduction on mortality.

ICU and hospital LOS: When the two groups in this study were compared, thiamine supplementation had no effect.

Infections and Ventilator Days: Not Reported.

Conclusions:

- 1) Thiamine supplementation has no effect on mortality, LOS or ventilator days in the general septic critically ill patient.
- 2) Thiamine supplementation is associated with reduced mortality in critically ill septic patients with thiamine deficiency.

Level 1 study: *if all of the following are fulfilled: concealed randomization, blinded outcome adjudication and an intention to treat analysis.*

Level 2 study: *if any one of the above characteristics are unfulfilled.*

Table 1. Randomized Studies of Thiamine Supplementation in Critically ill Patients

| Study | Population | Methods (score) | Intervention | Mortality # (%) | | p-value | Infections # (%) | | p-value |
|-----------------|--|--|---|-----------------|------------|---------|------------------|---------|---------|
| | | | | Thiamine | Control | | Thiamine | Control | |
| 1) Donnino 2016 | Septic patients requiring vasopressors N=92 | C. Random: no ITT: no Blinded: double (6) | 200 mg thiamine given twice daily for 7 days vs placebo (5% dextrose) | 19/43 (44) | 18/45 (42) | 1.0 | NR | NR | NR |

Table 1. Randomized Studies of Thiamine Supplementation in Critically ill Patients (Continued)

| Study | Mechanical Ventilation | | p-value | LOS | | p-value |
|-----------------|------------------------|---------|---------|------------------------|------------|---------|
| | Thiamine | Control | | Thiamine | Control | |
| 1) Donnino 2016 | NR | | NR | ICU 8 [4, 13] | 7 [3, 18] | 0.7 |
| | | | | Hospital 13 [8, 20] | 13 [7, 24] | 0.86 |

C.Random: concealed randomization
 LOS: length of stay

NR: Not Reported
 ICU: intensive care unit

ITT: Intent to treat

Reference:

Included studies

1. Donnino MW, Andersen LW, Chase M, Berg KM, Tidswell M, Giberson T, Wolfe R, Moskowitz A, Smithline H, Ngo L, Cocchi MN; Center for Resuscitation Science Research Group. Randomized, Double-Blind, Placebo-Controlled Trial of Thiamine as a Metabolic Resuscitator in Septic Shock: A Pilot Study. Crit Care Med. 2016 Feb;44(2):360-7.