

Outcomes associated with a screening and treatment pathway for occult hypoperfusion following cardiac surgery

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Introduction:

Routinely monitored parameters such as blood pressure (BP) and heart rate may not reliably detect perfusion abnormalities. However, central venous oxygen saturation (ScvO₂) and lactate (LA) levels can detect occult hypoperfusion (OH) and identify patients who may be at risk for complications. The purpose of this study was to assess the impact of an OH treatment pathway (OHTP) on morbidity and length of stay (LOS) post on-pump coronary bypass and valve surgery.

Hypothesis:

An OHTP guided by ScvO₂ and LA can reduce morbidity and LOS.

Methods:

Prospective cohort observational study following the implementation of an OHTP, defined by ScvO₂ < 70% and LA ≥ 18mg/dL with systolic BP ≥ 90mmHg upon ICU admission. Initial treatment included volume resuscitation and/or blood transfusion, followed by additional interventions when ScvO₂ remained < 70%. Repeat LA was obtained 18hr postoperatively. Primary outcomes were ICU/hospital (H) LOS and complications.

Results:

Among 390 cases evaluated, 53 OH cases were identified and treated according to the OHTP. The 53 cases were compared with 21 OH cases prior to implementation of the pathway. Furthermore, 33 cases achieving the repeat LA goal (< 18mg/dL) were compared with 18 cases not achieving the LA goal.

Comparing pre-implementation (n=21) vs post-implementation (n=53): ICU LOS was 117hr vs 64hr (p=0.27); HLOS was 16 days vs 11 days (p=0.049); ICU readmission rate was 28.6% vs 7.7% (p=0.03); length of mechanical

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ventilation (LMV) was 64hr vs 44hr ($p=0.67$); complication rate was 47.6% vs 26.4% ($p=0.10$).

Comparing achieving LA goal ($n=33$) vs not achieving LA goal 18hr postoperatively ($n=14$): ICU LOS was 50hr vs 105hr ($p=0.06$); HLOS was 10 days vs 14 days ($p=0.17$); ICU readmission rate was 9.1% vs 7.1% ($p=1.0$); LMV was 18hr vs 117hr ($p=0.17$); Complication rate was 15.2% vs 50.0% ($p=0.02$).

Conclusions:

Implementation of an OHTP was associated with significantly shorter HLOS and lower ICU readmission rates, as well as a trend toward shorter ICU LOS and lower complication rate. Among patients managed by the OHTP, achieving the LA goal 18hr postoperatively was associated with a significantly lower complication rate, and a trend toward shorter ICU LOS/HLOS and LMV.