



## Ultrasonographic diagnostic criterion for severe diaphragmatic dysfunction after cardiac surgery

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Background: Severe diaphragmatic dysfunction can prolong mechanical ventilation after cardiac surgery. An ultrasonographic criterion for diagnosing severe diaphragmatic dysfunction defined by a reference technique such as transdiaphragmatic pressure measurements has never been determined. Methods: Twenty-eight patients requiring mechanical ventilation > 7 days postoperatively were studied. Esophageal and gastric pressures were measured to calculate transdiaphragmatic pressure during maximal inspiratory effort and the Gilbert index, which evaluates the diaphragm contribution to respiratory pressure swings during quiet ventilation. Ultrasonography allowed measuring right and left hemidiaphragmatic excursions during maximal inspiratory effort. Best E is the greatest positive value from either hemidiaphragm. Twenty cardiac surgery patients with uncomplicated postoperative course were also evaluated with ultrasonography preoperatively and postoperatively. Measurements were performed in semirecumbent position. Results: Transdiaphragmatic pressure during maximal inspiratory effort was below normal value in 27 of the 28 patients receiving prolonged mechanical ventilation (median, 39 cm H<sub>2</sub>O; interquartile range [IQR] 28 cm H<sub>2</sub>O). Eight patients had Gilbert indexes  $\leq 0$  indicating severe diaphragmatic dysfunction. Best E was lower in patients with Gilbert index  $\leq 0$  than  $> 0$  (30 mm; IQR, 10 mm; vs 19 mm; IQR, 7 mm, respectively;  $p = 0.001$ ). Best E < 25 mm had a positive likelihood ratio of 6.7 (95% confidence interval [CI], 2.4 to 19) and a negative likelihood ratio of 0 (95% CI, 0 to 1.1) for having a Gilbert index  $\leq 0$ . None of the patients with uncomplicated course had Best E < 25 mm either preoperatively or postoperatively. Conclusions: Ultrasonographic-based determination of hemidiaphragm excursions in patients requiring prolonged mechanical ventilation after cardiac surgery may help identify those with and without severe diaphragmatic dysfunction as defined by the Gilbert index.

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### **Liens**

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